

Poster and Exhibit Abstracts

(In alphabetical order by author)

Pradip Adhikari; Plant and Environmental Sciences, New Mexico State University

Soil Thermal Properties under Contrasting Soil Textures, Soil Moisture Regimes and Water Quality

Knowledge of soil thermal properties is needed to quantify the vapor flow through the vadose zone and to prepare efficient irrigation management strategies for semi-arid areas such as Southern New Mexico. This study was conducted to compare and quantify the thermal conductivity (λ), thermal diffusivity (α), thermal resistivity (r), and volumetric specific heat capacity (C), of loamy sand, sandy loam and sandy clay loam textured soils using tap water and lagoon treated wastewater. Core and bulk soil samples were collected from each soil types form West Mesa, West of Las Cruces and USDA-ARS, Jornada Experimental Range, NM. Soil water characteristic curves were obtained at 0, -0.3, -1, -3, -5, -10, and -15 bars suctions using pressure plate apparatus after saturation with tapwater and wastewater from the West Mesa holding ponds. Once core equilibrated to an applied suction, soil thermal properties were determined using KD2 probe (Decagon Devices, Inc.). The λ was higher and r was lower for sand than loam and clay soils for cores saturated with both tapwater and wastewater. The λ , C , α , were lower and r was higher for cores saturated with treated wastewater than with tapwater especially at lower soil water potentials (-5, -10, and -15 bars). The results of the study showed that the application of treated wastewater reduces heat conductance to lower depths and could reduce the evaporation of soil moisture. However, there is a need to simultaneously consider the effect of soil salinity due to treated wastewater application on root growth and vegetation sustenance.

Kenza Arraki; Astronomy, New Mexico State University

The FAST BAL Monitoring Campaign: Multi-epoch Constraints on Quasar Outflows

Kinetic energy carried by AGN winds and jets may rival radiation as the dominant feedback mechanism regulating galaxy-SMBH co-evolution. Though outflows likely accompany all luminous accretion disks, broad absorption line quasars (BALQSOs) provide the most dramatic astrophysical examples; their massive outflows display P-Cygni profiles that span velocities up to $\sim 0.3c$ and are visible in the spectra of 15-40% of optically-selected quasars. Spectroscopic variability studies of BALQSOs probe the structure, stability, location, and dynamics of the emitting and absorbing gas near the SMBH and can provide insight into connections between AGN feedback and host galaxy formation and evolution. We report on a multi-year spectroscopic campaign that monitors seventeen BALQSOs (identified originally in the SDSS) using the Fred Lawrence Whipple Observatory's 1.5m telescope's FAST spectrograph. These targets have Chandra X-ray data and have been repeatedly observed with FAST, in regular cadences from one day to two years – a 6 year cadence is planned for spring 2012. We identify variability in the broad absorption line region, assess its significance, magnitude, and frequency and discuss the constraints these investigations can place on QSO outflows.

Leslie Costa-Guerra; SPED/CD, New Mexico State University

Cultural/linguistic Diversity in the Tewa and Dine Populations

Cultural/linguistic differences in the Native American population should be considered even when the primary language is English. This poster summarizes the findings of interviews conducted with Tewa and Dine parents whose children were diagnosed with language disorders. The themes derived from the interviews and the clinical implications for Speech-Language Pathologists and Special Educators will be discussed.

Robert DeBry; Anthropology, New Mexico State University

Archaeofaunal Investigations at Kipp Ruin, Southwest New Mexico

What changes in faunal usage occur over time within southwest New Mexico's Mogollon culture? Did changing environmental and social processes contribute to temporal variation in faunal assemblages? This poster presents faunal analysis from the Kipp ruin, a multi-component Mogollon site (A.D. 200-1450) located on the banks of the lower Mimbres River. In particular how might the uses of large and small mammals have changed from the pit house period component through the Mimbres and post Mimbres Pueblo periods? Were late prehistoric Cliff Phase (A.D. 1300-1450) people more reliant on larger game than earlier Mimbres peoples?

Lisa L. Drake; Biology, New Mexico State University

Function of Aquaporins in the Disease Vectors Aedes aegypti and Culex quinquefasciatus

Female mosquitoes require the uptake blood for egg production and as a result, they transmit disease pathogens to humans. During feeding, an adult female can take up more than its own body weight in blood. It is essential for mosquitoes to possess an efficient excretion system to shed excess water and ions and retain nutrients from the blood. After a blood meal females excrete large amounts of urine through their excretion system, the Malpighian tubules (MT). Aquaporins (AQPs) are a family of membrane transporters that regulate the flow of water, glycerol and other small molecules across cellular membranes in both prokaryotic and eukaryotic cells. Our aim was to identify aquaporins that function as water channels, mediating transcellular water transport in MTs of adult female *Aedes aegypti* and *Culex quinquefasciatus*. We surveyed genome databases and identified six putative AQPs in the genome of *Ae. aegypti* and *Culex*. Four of the AQPs are expressed in the MTs of *Ae. aegypti*. RNAi-mediated knockdown of the MT-expressed AQPs resulted in significantly reduced diuresis. Ligation experiments with female *Culex* mosquitoes resulted in significant reduction in excretion rates.

Andrea Einck; Anthropology, New Mexico State University

Ethnic and Social Studies at a Frontier Fort

In this paper I analyze artifacts recovered from 1972 excavations at Ft Selden, New Mexico (1865-1892) to understand the negotiation of ethnic and social boundaries within the community. Ft Selden was the southernmost fort in a long line of frontier garrisons. Like the Spanish presidios (1750-1821), it was a multiethnic community, with both white and black units. The military also interacted with local Hispanic populations, which affected artifact assemblages, particularly ceramics. Unlike Spanish presidios, frontier forts of the 19th century were dependent on the US for most commodities, but staple foodstuffs, such as beef, were supplied from the local area.

Daniel Armando Estrada, Alma D. Pacheco; Geography, New Mexico State University

Airline Passenger Volume Study of McCarran International Airport

With the slack economic performance of the U.S. economy in the past three years the City of Las Vegas, Nevada has decided to examine the potential for expansion of airline traffic at McCarran International Airport (LAS). In the past 10 years the city undertook a major airport and urban transport expansion. Currently, there are more than 44,000,000 passengers moving through the terminal. The airport has room for a new national airlines or expanded service from an existing carrier. Using GIS, statistics, data mining, and graphics a study was conducted to determine a new service area that is feasible for profit.

Daniel Gambacorta; Psychology, New Mexico State University

Dominance and Deference: The Effect of Social Status on Creative Display in a Competitive Mating Context

Dominance is a form of status derived from the ability to control resources via threat of physical force. One way that humans can defer to more dominant individuals is by inhibiting creative displays in competitive mating contexts. This form of deference could function to prevent physical harm from more dominant competitors. To test this hypothesis, fifty-one male participants were led to believe that they were competing with another male for the chance to go on a lunch date with an attractive female. Participants were shown a shirtless picture of their competitor, depicting either a dominant (strong) male or a nondominant (scrawny) male. Videotapes of participants being interviewed by the female with the male competitor watching were then rated on several dimensions by a team of coders. Results revealed that participants competing against a dominant male produced fewer and lower quality creative displays than participants competing against a nondominant male.

Kasha Geels; Psychology, New Mexico State University

False Alarms and Misses Differentially Affect Trust in Multiple Automation

By combining system-wide trust theory with the reliance-compliance model, we show that false alarms and misses differentially affected trust in a multiple-automated aid paradigm. Participants performed a simulated flight mission while monitoring for system errors. Findings showed a significant difference in the effect of the two types of errors.

Annabelle Gutierrez Sisneros; Social Sciences and School of Nursing, New Mexico State University
Ostracism Concept Analysis

I have a Nursing graduate research course concept analysis poster on “Ostracism” which won second place at the School of Nursing graduate research seminar in May of 2011. I will present that poster.

Michael Hayden; Astronomy, New Mexico State University
Searching for a Metallicity Gradient in the Milky Way

Metallicity gradients of stars have been observed in many nearby galaxies, and have been predicted in the Milky Way. A new survey using the Sloan Digital Sky Survey (SDSS) telescope called APOGEE will map the galaxy and obtain data on over 100,000 stars, including their metallicities. Using simulated data we have found that we are able to reproduce a metallicity gradient with the errors in the temperature and gravities that we will be getting from the APOGEE survey. This means we should be able to detect a metallicity gradient in our own Milky Way. We will begin work on the survey data as soon as it becomes available.

Rebekah Lee Horn, Kenneth S Macdonald, Rossana Sallenave, David E Cowley; Fish, Wildlife and Conservation Ecology; Molecular Biology; New Mexico State University
*Links Between Genetic Population Structure and Morphology of a Tadpole Shrimp (*Triops Newberryi*) in Southern New Mexico*

Ecological genetics on non-model species is challenging due to the lack of genomic resources available. In desert aquatic ecosystems, development of a model species would aid in determining physiological, ecological, and evolutionary components of adaptation to extreme environments. Ephemeral playa lakes are one such ecosystem; they provide critical water sources to many desert organisms as well as a stopping point for migrating bird species. Tadpole shrimp (*Triops* spp.) are inhabitants of playa lakes and could be utilized as a model species to analyze the evolutionary genetics of adaptation in desert ecosystems. This study examines population and evolutionary genetics of one species of tadpole shrimp (*Triops newberryi*), which occurs throughout the Chihuahuan Desert in southern New Mexico. The mitochondrial d-loop was sequenced from 160 *T. newberryi* samples from six playa lakes sampled from 2008 to 2011. Distinct haplotype lineages were found in each sampling location with haplotypes being separated in a parsimony network by an average of 10.8 mutational steps. To begin elucidating if population structure is linked to observed morphometric features, carapace length, carapace spine count, presence/absence of egg sac and number of legless rings were compared between individuals in the same playa, but with different haplotypes. Significant results were observed for carapace length, providing evidence for morphological variations attributable to maternal lineage. Future work will continue to link genetic differences to morphology and physiology to further develop the tadpole shrimp as a model desert species.

Gizelle Hurtado; Biology, New Mexico State University
*Brush Mouse (*Peromyscus boylii*) Dietary Habitat Preferences*

Brush mice (*Peromyscus boylii*) are often thought of as a generalist species, feeding on a variety of food types. Generalist species tend to have a wide dietary range. However, recently the idea of a dietary generalist species has begun to be scrutinized. Recent studies suggest that individuals or subpopulations within a generalist species may have more specialized diets than the overall species diet range. This may have implications for species habitat selection, within species genetic diversity and species management. To determine if Brush mice demonstrate this generalist-specialist spectrum I investigated the dietary habitat preferences of Brush mice from oak woodland and chamise shrubland habitats. Brush mice were simultaneously offered 8 food types. Food types offered were a combination of food types commonly found in both habitats and food types predominately found in oak woodland or chamise shrubland habitats. Overall, Brush mice from both habitats preferred oak acorns.

James Kilcrease; Plant and Environmental Sciences, New Mexico State University
Chile Pigments: Origin & Architecture

Chile peppers (*Capsicum* spp.) are members of a plant clade that contain many unique, interesting, and useful characteristics. Chile peppers have a wide range of applications such as traditional and modern cuisines, medicinal products, and even food coloring agents. The genus *Capsicum* produces many interesting and unique secondary metabolites, which makes it a highly desirable target for modern research. Carotenoids are one of the major secondary

products formed during the metabolic process that function as nutrient precursors and as pigmentation agents. While previous research has been done to identify the ways in which many of these compounds generally function, there has been little work done in the interest of linking unique carotenoid profiles with chromoplast structural differences. We hypothesize that chromoplast architecture may influence carotenoid packaging thus impacting the crops medicinal properties, pigment content, and the pepper industry as a whole. Therefore, the objective of this research is to quantify architectural dimensions of chromoplast structures and correlate with specific carotenoid abundances in various cultivars of chile peppers.

Michael Kirk; Astronomy, New Mexico State University

Mapping the Dynamics of Chromospheric Flares

Brightening in the chromosphere comes in three different flavors: plage, flare ribbon, and point. These types of brightening are all characterized by intensity above the background but have different dynamics causing the increased intensity. We have developed an automated software suite to identify and track both ribbon and point brightening associated with moderate sized flares observed in $H\alpha$. Superposing our detections on complementary datasets, we produce a three-dimensional velocity map of flare ribbons, and a Doppler velocity measurement beneath the point brightening detections. These dynamic measurements allow us to postulate a physical connection between point brightening, the erupting flare, and coronal loops.

Elizabeth S. Klimek; Astronomy, New Mexico State University

ART vs. Nature: Characterizing Cosmological Simulations of Milky-Way Like Galaxies

We present preliminary results from part of a larger project aimed at studying the halo of hot diffuse gas surrounding the Milky Way. The ultimate goal of the overall project is to quantitatively compare cosmological simulations of Milky Way-like galaxies to the vast database of quasar absorption line observations of Milky Way halo gas that exists in the literature. The simulations were run by collaborator D. Ceverino using the Eulerian Gasdynamics plus N-body Adaptive Refinement Tree (ART) code, a high resolution code which incorporates all of the most important physical processes known to be responsible for galaxy formation and evolution. How well these simulations are able to reproduce existing observations reflects the degree to which we understand the complex processes that continue to shape galaxies like our own today. As a first step in analyzing the simulated galaxies, we compare some of their global properties to those observed to be associated with large star-forming galaxies like the Milky Way. In particular, we focus on the distribution of various gas phases and of different stellar populations to see how well the simulated galaxies can reproduce Galactic structure as seen in nature.

John David Kulpa; Psychology, New Mexico State University

Considering Motor Control Under Pressure in Terms of the Regulatory Fit Hypothesis

Previous research investigating the regulatory fit hypothesis in classification learning has demonstrated that whether learners choke or excel is determined by a 3-way interaction between task type, pressure, and reward structure (Worthy et al., 2009b). Related research suggests that this relationship may hold for performers of motor control tasks (Worthy et al., 2009a). The participants in the present study were college students. Pressure and reward structure were manipulated as in the previous research. In contrast to this research, levels of the task type variable corresponded to different levels of training on a difficult motor control task. Performance was measured by time taken to complete test trials after training. A questionnaire was administered at the conclusion of the experiment. The predicted 3-way interaction was not found. High-training participants performed better than low-training participants in the test trials. Test trials were grouped into blocks to facilitate within-participants analyses, and an effect of training was found to moderate a block effect. Possible explanations for the lack of pressure and reward structure effects are explored, and solutions are suggested for use in future experimental research. Archival research is offered as a potential alternative to experimental.

Kristina Leifeste; Mathematics, New Mexico State University

A Forgotten Contrivance: A Study of the Diagonal Scale and its Appearance in Mathematics Texts from 1714 to the Present

The diagonal scale, whose origins are credited to Rabbi Levi Ben Gershon (1288-1344), is a two-dimensional scale, drawn on a flat surface, used to measure short lengths up to a precision of three figures, much as we use a caliper today. The diagonal scale was a prevalent tool in mathematics for many years, up until about the late 1900s, when

advances in mensuration, such as the vernier scale and the caliper, eradicated its use because they were more precise and easier to use. Today, we see the scale mainly in architecture and drafting books, for use in precise drawing, whereas in the past, it appeared in scores of mathematics texts for school, practical, and recreational use. This thesis will cover the origin and history of the diagonal scale, a demonstration of its uses, and its appearance in over 100 mathematics texts (written in English) from 1714 (Wells) to 2002 (Higgins). Using GoogleBooks as a primary source in finding these texts, we can chronicle the appearance of the diagonal scale as a necessary mathematical contrivance and learn how it was used to solve math problems in practical ways.

Greggory Thomas McPherson; Physics, New Mexico State University

Monochromated Study of Light-Induced Triggering Mechanism for Symbiote Ejection in Bobtail Squid

Bobtail squid of the order Sepioida are a ubiquitous model system in the studies of Immunology and Symbiosis due to their symbiotic relationship with a fluorescent strain of the bacteria *Vibrio fischeri*. That these nocturnal hunters eject their cultured symbiotes at sunrise is well known, but the triggering mechanism is not fully understood. In order to initiate a study of this mechanism by which sunlight induces colony ejection, we modified a scanning spectrometer to identify which frequency or frequency band in sunlight initiates the ejection reflex. For each animal tested, we isolated individual wavelengths from a “full spectrum” source via our spectrometer and shined that light onto a 48 hour old colonized squid after 12 hours of exposure to darkness. Each squid was exposed to a particular wavelength of light in the visible regime for 30 minutes. If no ejection was observed, the spectrometer was tuned to a progressively shorter wavelength and the squid was again exposed for 30 minutes until colony ejection was observed. Initial data has suggested that only light in the blue to ultraviolet regime of the electromagnetic spectrum induce colony ejection, and further that the proportion of the colony evacuated from the squid is at least partly dependent upon the energy of the light to which the squid was exposed.

Amelia M. Medina; Special Education and Communication Disorders, New Mexico State University

Effectiveness of Bilingual Intervention for Language Impairment: A Mixed Methods Study

This project explores the effects of a vocabulary intervention for three bilingual preschoolers with expressive language delay who learn English as their second language (L2) in early childhood education programs. An embedded mixed design is used to explore the effects of instructional language on word learning outcomes for three Spanish-dominant bilingual preschoolers with expressive language delay. A series of single-subject experimental design (SSED) with concurrent qualitative interview and video coding are used to explore the absolute and relative effectiveness of Native language-only (NO), English-only (EO), and Bilingual (BI) training conditions on vocabulary learning. The “primary” data source and purpose of this study relies on the SSED quantitative data to test the theory of linguistic interdependence (Cummins, 1979) which predicts a necessarily sufficient level in L1 to precede success in L2 for children entering English-only school settings. A “secondary” data source of qualitative interviews and observations are used to provide support for interpretation of empirical trends in the visual data of SSED. The research addresses why relative and absolute treatment differences exist among young bilinguals receiving vocabulary intervention for early signs of language impairment, i.e. overt delays in acquiring first words. Differential gains are discussed from the perspective of intervention programming.

**Charles Miller, Nancy J. Chanover, James R. Murphy, Angela M. Zalucha;
Astronomy, New Mexico State University**

Dynamical Atmospheric Modeling of Condensation Flows on an N_2 Covered Body

Triton and Pluto both feature an N_2 frost covered surface in vapor-pressure equilibrium with a predominantly N_2 atmosphere. Modeling the dynamics of such an atmosphere is useful for several reasons. First, winds on Triton were inferred from images of surface streaks and active plumes visible at the time of the Voyager 2 flyby in 1989. Atmospheric simulations can reveal the seasonal conditions under which such winds would arise. Second, a dynamical model of a cold, thin N_2 atmosphere can be used to predict wind speed and direction on Pluto during the New Horizons encounter with the Pluto/Charon system in July 2015. We modified the NASA Ames Mars General Circulation Model, version 2.0, to model an N_2 atmosphere in contact with N_2 surface frosts. We altered the Ames GCM to simulate conditions found on Triton. Our simulations did not include atmospheric radiative heat transfer, but did include conduction, convection, and surface-boundary layer heating. We ran simulations of 100 Triton days at 10 points along Triton's orbit between the 1952 equinox and the 2000 southern summer solstice to examine seasonal changes in the condensation flow. We present results from these simulations and discuss the interplay between sub-surface heat conduction, N_2 frost phase changes, and atmospheric dynamics. We also compare these results to those

obtained under two other initial surface conditions – no N₂ frost layer, and a global N₂ frost layer with sublimation and condensation inhibited. This study was funded by a NASA Earth and Space Science Fellowship through grant number NNX09AQ96H.

Tapaswy Muppaneni, Harvind. K. Reddy; ChE, New Mexico State University
Non-Catalytic Transesterification of Camelina Sativa Oil Using Super Critical Ethanol

Transesterification is the process of converting vegetable oils into biodiesel, in which the triglycerides present in the vegetable oils chemically reacts with alcohol in the presence of catalyst to produce corresponding alkyl esters. The purpose of transesterification is to reduce the viscosity of the vegetable oils so that they can be used in diesel engines as a renewable fuel. This study is about the transesterification of camelina sativa oil using ethanol under non-catalytic super critical fluid conditions. Different parameters affecting the yield rate of the fatty acid ethyl esters (biodiesel) in the transesterification reaction have been studied. These include the molar ratio of camelina sativa oil to ethanol, reaction temperature and reaction time. The ethyl esters produced are analyzed with Gas chromatography mass spectroscopy (GC-MS), Fourier transform infrared spectroscopy (FTIR) and Thermo gravimetric analysis (TGA). The fuel properties of the produced biodiesel such as cetane number, viscosity, specific gravity, pour point have been studied and compared to American Society for Testing and Materials (ASTM) standards.

Xuan Vu Nguyen; Counseling and Educational Psychology, New Mexico State University
Acculturation Across Generations of Hispanic College Students in the Borderland Region

Questions remain about the relationship between generation status and acculturation. Cuéllar, Nyberg, and Maldonado (1997) concluded not enough is known about acculturation across generations in the borderland region of the United States and Mexico as this region is strongly influenced by Hispanic culture. Acculturation can take place over several generations (i.e. generation one may not differ from generation two, but may differ from generation three in acculturation levels) as a result of the strong physical and psychological ties to Hispanic culture. In this line of thinking, Buriel (1993) suggested that acculturation may increase across generations but not continuously hence the increase across generations may be specific to the region. In contrast, Valentine (2001) found that acculturation increases continuously across generations in a predominantly Hispanic population in the borderland region. Additionally, there appears to be no significant differences between generations three, four, five, and six. In some studies, acculturation differences are less discerning going from generation one to two, while in others, significant differences exist between generation one and all subsequent generations: these differences seem to vary depending on the study (Buriel, 1993; Cuéllar, Nyberg, & Maldonado, 1997; Valentine, 2001). The researchers endeavor to show that acculturation in the borderland region takes place over several generations as a result of the strong influence of Hispanic culture. Hypothesis 1 – generations one and two will reflect similar acculturation outcomes, thus there will be no significant difference. Hypothesis 2 – generations one and three will differ significantly in acculturation outcome. Both hypotheses were supported.

Nikole Nielsen; Astronomy, New Mexico State University
A Standardized Catalog of 225 MgII Absorption-Selected Galaxies: Correlations, Covering Fractions and Cantankerous Outliers

We conducted an extensive literature search for $z < 1$ spectroscopically confirmed MgII absorption-selected galaxies. We standardized the galaxy impact parameters, k-corrections, absolute AB magnitudes, and rest-frame colors to the current Λ CDM cosmology. The full sample comprises 225 galaxies, where 32 are ambiguous identifications or group galaxies. Selected results based on the remaining 193 galaxies include: (1) a 7.8σ anti-correlation between $W_r(2796)$ and impact parameter, and (2) a confirmation of the gas halo size-luminosity scaling with $R^* = 106$ kpc and $\beta = 0.35$ for $W_r(2796) > 0.1 \text{ \AA}$. Within the gas halo the fraction of absorbers increases as the EW threshold is decreased such that 39% have $W_{cut} > 1.0 \text{ \AA}$, 61% for $W_{cut} > 0.6 \text{ \AA}$, 83% for $W_{cut} > 0.3 \text{ \AA}$, and 94% for $W_{cut} > 0.1 \text{ \AA}$. The full sample and further analysis are presented.

Neda Nourabadi; Biology, New Mexico State University
The Role of Sensor Regulator Loci that Accommodates pH in Symbiotic Competence of the Euprymna-Vibrio Mutualism

The bioluminescent bacterium *Vibrio fischeri* and its sepiolid squid host *Euprymna tasmanica* has been a valuable model to underpin the mechanisms of recognition and specificity during the onset of symbiosis. Each partner recognizes and responds to one another in a molecular “cross-talk” within the host’s nascent light-emitting organ during

the association. *Vibrio* bacteria can modulate their behavior through complex systematic interactions of different transcription factors, which can modulate gene transcription and therefore functions specific to the association. One example is the enzymes of the citric acid cycle during oxygen fluctuations. Coding genes are regulated mainly at the transcriptional level by the *arcA* and *arcB* two-component regulatory system. Therefore, *arcA* and *arcB* are global regulators that control a number of genes involved in various metabolic pathways. We examined the physiological and metabolic consequences of mutation within these key regulatory loci among various strains of *V. fischeri* and measured their response under various biological conditions. We hypothesized that *arcA* and *arcB* are responsible for utilization of carbon sources during biological stress, and mutation of these genes will decouple the control of acidic by-products in the light organ. Thus, the major roles of *arcA* and *arcB* contribute to the physiological control under different biological condition during colonization of *V. fischeri* within the host squid light organ. Determining which molecular signals are responsible for establishing a successful association will help us better understand the subtle cues responsible for specificity in this environmentally transmitted mutualism.

Ashley Estelle O’Hearn; Psychology, New Mexico State University

*Does Salience of Masculine and Feminine Pronouns Affect Readers’
Perception of a Gender-bias in Written Language?*

When text alternates between masculine and feminine pronouns, readers overestimate the frequency of feminine pronouns and think the text is gender-biased (Madson & Hessling, 1999; Madson & Shoda, 2006). We used two manipulations of salience to test whether these effects are a function of the greater salience of feminine pronouns: 1) instructing readers to “pay close attention” to either the masculine or the feminine pronouns in a gender-neutral essay and 2) using bold font to emphasize masculine or feminine pronouns. Both studies included control groups where none or all of the pronouns were given increased salience. In both studies, the overestimation effect replicated. Although the “pay close attention” manipulation did not significantly decrease the overestimation effect, the “bold” manipulation did. Compared to the control condition in which none of the pronouns were emphasized, readers reported more feminine pronouns (and fewer masculine pronouns) when feminine pronouns were emphasized. Analogously, readers reported more masculine pronouns (and fewer feminine pronouns) when masculine pronouns were in bold. In other words, increasing the salience of masculine pronouns eliminated readers’ tendency to overestimate the frequency of feminine pronouns and increasing the salience of feminine pronouns exacerbated the overestimation.

Andrea Anna Lisa Padilla; Health, Dona Ana Community College

Unseen Above the Eyes

I am an aspiring artist with interests in photography and capturing overlooked beauty in nature as well as capturing people in exhibiting their alter personalities. I also enjoy capturing events in Las Cruces amongst the art community and sharing the images to promote the arts in Las Cruces.

David P. Price; Molecular Biology, New Mexico State University

Big Secrets of Small Mosquitoes

When raised under less than ideal conditions, mosquitoes emerge smaller and with less nutrient reserves than those raised under standard laboratory conditions. Under “field” conditions, high-nutrient mosquitoes occur less frequently than low-nutrient mosquitoes. Such mosquitoes require a second blood meal in order to successfully produce eggs. This raises their vectorial capacity. Immune function and longevity are also related to size. We conducted a transcriptome analysis of the *Ae. aegypti* fat body, a key metabolic organ, response to blood feeding, gathered data on the metabolic rate and metabolome of fat bodies from small vs large mosquitoes, pre- and post-bloodmeal. Transcriptome analysis revealed distinct differences in the types of transcripts expressed pre- and post- bloodmeal. Ribosomal protein-encoding transcripts are the prevalent transcript type pre-bloodmeal. Post-bloodmeal, yolk protein transcripts from the cathepsin-b, vitellogenin, vitelline membrane protein and vitellogenic carboxypeptidase families were found to be the vast majority of transcripts present. Metabolomic analysis of small and large mosquito fat bodies, pre- and post-bloodmeal revealed sets of putative metabolomic identifiers for each group, as well as changes affected post-bloodmeal. In conclusion, important transcriptional and metabolomic differences exist between mosquitoes raised under high- and low-nutrient regimens. Many of these differences originate in the fat body and may be important in mosquito reproduction, energy homeostasis and immunity.

Matthew James Rambert, Igor Dolgov; Psychology, New Mexico State University
Naturalistic Presentation Method of Written Text Improves Memory Retrieval

We investigated whether the method of presentation of written text has an impact on word retention and future recognition in two studies. Naturalistic presentation of text, which involved seeing the word written out, presented a significant advantage in word recognition over artificial presentation of text, which involved either seeing the word presented in its entirety (Exp. 1) or scrolled in from left-to-right (Exp. 2). We observed significant main effects of word presentation in both studies that supported our hypotheses and a contrast analysis revealed a significant advantage in word recognition of words studied using the naturalistic presentation methods

Meredith L. Rawls, M. S. Rao; Astronomy, New Mexico State University
Light Curve Solutions of Eclipsing Binaries in the Large Magellanic Cloud

We present model light curves for nine eclipsing binary stars in the Large Magellanic Cloud (LMC). These systems are detached binaries with nearly circular orbits, and were pseudorandomly selected from three of 21 LMC regions in the Optical Gravitational Lensing Experiment II (OGLE-II) survey. We make use of light curves, orbital periods, and binary classification as reported in Wyrzykowski et al. (2003). We present light curve solutions created with the software PHysics Of Eclipsing BinariEs (PHOEBE, Prsa & Zwitter 2005). Each solution has the best-fit mass ratio q , system inclination i , component temperatures T_1 and T_2 , and modified Kopal potentials $\Omega_{\alpha 1}$ and $\Omega_{\alpha 2}$. PHOEBE employs a Nelder & Mead's Simplex fitting method that adjusts all the input parameters to find the best fit to the light curve. Many of the light curves have significant scatter, which can lead to multiple degenerate best-fit solutions, and we discuss what can be done in the future to refine our results, derive global stellar parameters, and place these nine systems in a larger context.

Gregory Philip Reeves; Plant and Environmental Sciences, New Mexico State University
'Moruga Scorpion' Pepper is the World's Hottest Chile Pepper at More than 2 Million Scoville Heat Units

In replicated trials with appropriate controls at Las Cruces, N.M., two 'Trinidad Moruga Scorpion' chile pepper plants reached more than two million Scoville heat units (SHUs). This is the first confirmation of a chile pepper measuring more than two million SHUs. A large range of heat levels was observed among the field plots. When overall field averages of 'Trinidad Moruga Scorpion,' and '7-pot,' and 'Trinidad Douglah' (Chocolate 7-Pot) were compared they did not significantly differ in average heat level. 'Trinidad Moruga Scorpion' was significantly hotter than 'Bhut Jolokia,' but '7-pot,' 'Trinidad Douglah,' and 'Trinidad Scorpion' did not differ significantly from 'Bhut Jolokia.' Molecular analysis with randomly amplified polymorphic DNA markers confirmed that 'Trinidad Scorpion' belongs to the species *Capsicum chinense* Jacq. and is not the same pepper as 'Bhut Jolokia.'

Heidi Reutter; Psychology, New Mexico State University
Influences of Attachment Style, Self-esteem, & Interpersonal Relatedness on Loving

This study used the ECR Inventory (Brennan et al., 1998) to measure attachment, the Rosenberg Self-Esteem scale (Rosenberg, 1989) to measure self-esteem, and Becks SAS to get a more general measure of interpersonal relatedness in order to predict how well participants would like one another following a relationship building activity. Avoidant and anxious attachment and low self-esteem have been linked to less intimacy in relationships. The focus of this study was to see if attachment style, self-esteem, or interpersonal relatedness influences a relationship at its beginning. The literature suggested there would be correlations among the measures. Low self-esteem, avoidant attachment, and autonomy were expected to predict less loving reported by participants. Participants were asked to respond to the measures and then interact with an opposite-sex stranger as a pair. The pair completed one of four activities: self-disclosure, gazing (prolonged eye-contact), and mimicry. The fourth activity was a control group; the subjects took turns writing down directions. The results indicate that self-esteem correlates negatively with avoidance, anxiety and sociotropy but not autonomy. Autonomy is positively correlated to avoidance and sociotropy is correlated with anxiety. Only two measures predict reports of love using Rubins Liking and Loving scale; loving is negatively correlated to self-esteem and positively correlated to sociotropy. An unexpected predictor of love was sex; men reported significantly more love than did women. The results suggest that attachment style may be a good predictor of future relationship quality, but interpersonal relatedness is a better predictor for feelings during acquaintanceship.

Jessica Richardson; Psychology, New Mexico State University
Relationship Trouble? Consistency Versus Strategic Thinking in Relationships

Previous research has focused widely on the benefits of communication in relationships; however, there is less known about mechanisms of communication that foster those benefits. Participants involved in romantic relationships completed a survey in which they agreed/disagreed with common relationship arguments. They completed the survey individually and then as a couple. Potential Performance Theory (PPT) analyses were used to determine if communication increased agreement simply by increasing the consistency of the responses, or by improving strategies for communication. The results indicated that consistency had little effect on agreement; the effects of communication on observed agreement were almost completely due to strategy.

Erin Rivera; Biology, New Mexico State University
*Finding Balance: The Ultrastructural Characterization of the *Xenopus laevis* Vestibular System*

Perhaps the most clandestine, yet vital and widely conserved sensory modality utilized by vertebrates is their balance and sense of orientation in space. The inconspicuous vestibular system is often paired with the auditory system in research due to their anatomical proximity in the inner ear, shared susceptibility to ototoxic substances, similarity in sensory cell structure, and mutual degradation with age. However, vestibular disorders affect 69 million Americans and 34.5% of adults over the age of 40. Costs associated with vestibular disorder treatment exceed 20 billion dollars a year in the US and is on the rise with our aging population. Damage or degradation to the hair cells responsible for vestibular and auditory function is believed to be irreversible in humans. However, amphibians maintain the ability to regenerate hair cells into adulthood and post injury. This study lays the foundation for future regenerative work by characterizing the ultrastructure of the semicircular canals of the amphibian model *X. laevis*. The cellular and synaptic architecture of the *X. laevis* crista ampularis were analyzed using TEM and confocal microscopy. The types, ratios, and distributions of hair cells and supporting cell were characterized. Additionally, ribbon body type, distribution, and relation to efferent and afferent innervations was determined. Supported by: NIH P50GM068762 & R25GM061222 to EES

Stacy Rodriguez; Biology, New Mexico State University
*Use of Microsatellites to Test Reproductive Fitness of *Aedes Aegypti* Males
Raised under Different Nutritional Regimens*

Aedes Aegypti is the primary vector for dengue and yellow fever. Sterile insect technique is a method of vector control that has been proposed for mosquito eradication. Preparing sterile males for release can be challenging and rearing techniques are extremely important for healthy mosquitoes. Nutritional regimens during larval stages can determine adult size, which has many implications as to mosquito health and longevity. We evaluated the reproductive fitness of small and large mosquitoes measured by wing length. Polymorphic microsatellites were used to distinguish paternity in different strains of *Aedes Aegypti*.

Teresa Ross; Astronomy, New Mexico State University
Metallicity Distribution Function for Leo I based on HST WFC3 photometry

We present a preliminary metallicity distribution function (MDF) for Leo I, derived from photometry with the Wide Field Camera 3 (WFC3) aboard the Hubble Space Telescope (HST). We obtained relatively high S/N photometry in V (F555W), I (F814W) and Ca H & K (F390M) for giants. Using the medium band filter that covers the Ca H & K lines - the strongest metal absorption lines in the visible spectrum - in conjunction with the V and I band photometry, we calculate the stellar metallicities of individual stars with an expected accuracy of approximately 0.2 dex. From the photometric metallicities we construct a MDF for Leo I containing almost 4000 stars, 5 times more stellar metallicities than have been obtained from the ground. While the metallicity accuracy in our study is lower than spectroscopic measurements, the larger number of data points provide some advantages in looking for rarer components of the population and possible substructure. While the Leo I MDF presented here is a preliminary result, our long term goals are to use the distribution of metallicities of Leo I to constrain the formation and evolution of the system, through an understanding of its chemical evolution.

Karla A. Salazar, Maria G. Castillo; Biology, New Mexico State University

*Presence of a Novel Mannose Binding Lectin-associated Serine Protease
Found in the Hawaiian Bobtail Squid Euprymna scolopes*

Our laboratory studies the symbiosis of the Hawaiian squid *Euprymna scolopes* with the bacterium *Vibrio fischeri*. We are interested in understanding how this relationship is established without developing into pathogenesis. Furthermore, we are interested in describing the molecules involved in the squid immune system and how *V. fischeri* evade them. One of the most ancient immune defenses is the complement system. This cascade can be activated by three different pathways: the classical, the alternative and the lectin pathway. This last pathway is thought to be the oldest of three activation cascades. The purpose of this project is to identify the presence and functionality of one of the initial components of the lectin pathway, mannose binding lectin-associated serine protease (MASP). An EST from the *Euprymna scolopes* database presenting homology with other known MASP molecules was selected. Confirmation of this EST candidate using specific primers was performed followed by rapid amplification of cDNA ends (RACE). An ORF of 2772 bp, encoding a protein of 924 aa was obtained. BLAST analysis of the sequence indicated a MASP-like molecule containing most of the domains present in other MASP proteins. An potentially novel feature in this molecule is the presence of Immunoglobulin domains, which are absent in all other known MASP proteins. Further studies to determine the function of this MASP-like molecule will help us determine the lectin pathway is used by *Euprymna scolopes*.

Nada Saleh; Sociology, New Mexico State University

The Role of Cultural Sensitivity in Development Programs for Women

Oftentimes development programs aimed at women's empowerment in many developing countries have been dominated by Western ideas of development. As a result plenty of these programs were met with resistance by local people and were seldom successful. Hence, many of them have failed to achieve their objective as they contradicted with traditional norms and values and the way societies are structured. Hence, development programs need to be culturally sensitive when addressing womens needs. Womens needs should be understood in accordance to the culture and the environment in which these women live. Hence, this mini-research will present case studies of development programs aimed towards womens development and empowerment that failed for their lack of cultural sensitivity. Moreover, cases of successful and sustainable culturally sensitive development programs will be presented to analyze how they were implemented in order to ensure they are compatible with the context of society in which they are conducted. Development programs that are culturally sensitive are more likely to be successful and sustainable. Several issues need to be taken into account when designing and implementing development programs for women. These include but not limited to: involving community members, addressing structural inequalities and the status of women, involving influential members and local leadership of community in program design and implementation, taking into account traditional ways of living, beliefs and norms and values, especially those attributed to the status of women.

Joshua Sandry; Psychology, New Mexico State University

Isolation of Random and Non-Random Factors that Contribute to Limited Working Memory Capacity

We used Potential Performance Theory to separate and identify the role that randomness plays in working memory capacity. Over 2 experiments, participants were presented with a 2-alternative forced choice recognition memory task using number/letter strings between four and nine digits/characters long. Findings indicated that as the number of items to be memorized increased, observed performance decreased. PPT analyses showed that this effect was almost entirely due to a decrease in consistency (randomness) whereas participants' potential performance remained nearly perfect. The present findings provide some interesting new information about the role consistency plays in human memory capacity.

Jeremy David Schwark; Psychology, New Mexico State University

The Impact of Automated Aids on Strategy in Target Search Tasks

Automated diagnostic aids can influence the decisions of a human operator in target search tasks, but the impact on an operators decision strategy is unknown. The current study found that a nonhelpful aid (only 50% accurate) was able to influence the decision strategy of operators, whereby operators would spend longer deciding a target was absent when the aid reported that a target was present, even if the operator knew the aid provided no real benefit.

These findings show that the risks of using imperfect aids may not be found in operator decisions, but in decision making strategy changes.

Joshua Sherman; Department of Plant and Environmental Sciences, New Mexico State University
Characterization of the Relationships Between Manganese Fertilization and Photosynthesis, Chlorophyll Fluorescence, Nut Quality and Yield in Pecan

The purpose of this study is to observe the critical physiological role that the trace element manganese (Mn) has on pecan (*Carya illinoensis*), in particular the photosystem complex which is responsible for photosynthesis (Pn). Pecans have proven to be an important economic resource in New Mexico. However, a deficiency of Mn and its relationship to Pn, chlorophyll fluorescence, nut quality, and nut yield, has never been researched in the Southwest. Starting in 2011 four manganese nutrition treatments was established on 'Pawnee' (in the juvenile stage), 'Western' and 'Wichita' (in their adult stage) with a Control, Low, Medium, and High foliar treatment. Photosynthesis, chlorophyll content and mid-day stem water potential were measured and the study will continue into the 2012 growing season.

Frank Solano-Campos; Molecular Biology, New Mexico State University
*Resistance to Imidacloprid in the Aphid *Monellia caryella* (Homoptera: Aphididae) is not Associated with a Target Site Modification (Y151S) within Two Alpha Subunits of the Nicotinic Acetylcholine Receptor.*

Imidacloprid resistant populations of *Monellia caryella* have been reported in pecan orchards from New Mexico, USA. Resistance to imidacloprid may arise from a mutation within the ligand-binding domain in the nicotinic acetylcholine receptors (nAChRs). To examine the possibility that imidacloprid resistance in *M. caryella* is due to a target site mutation, three novel *M. caryella* nAChR subunits (Mca α 1, Mca α 3 and Mca β 1) were sequenced. By comparison of nAChR subunit sequences from imidacloprid-susceptible to resistant *M. caryella* populations and to resistant *Myzus persicae* populations, no mutation was identified in the nAChR subunits at a position close to the predicted imidacloprid binding site (Y151S). This study suggests that resistance might be due to enhanced oxidative detoxification of imidacloprid by overexpressed monooxygenases rather than due to a mutation within the target site of imidacloprid in nAChRs.

Randi Wade; Anthropology, University of Texas - El Paso
Prehistoric Grass-lined Bed Feature Identified in Archaic-age Deposits in Sierra Diablo Cave, Hudspeth County, Texas

This presentation provides what is believed to be the first description and analysis of a prehistoric grass-lined bed in the Southwest and Trans-Pecos regions. Discovered during the excavation of a dry cave site by students in the 2011 UTEP summer field school, the bed was constructed of agave and wild grasses during the mid- to late-Archaic period. The feature appears to have been used several times, and perhaps served as a cache after the latest use as a bed. Construction detail, possible cache purposes and preliminary dating will be discussed.

Baoyu Wang; Psychology, New Mexico State University
Agency and the Mechanism of Constitution of Cultural Psychological Consequences

In its third decade of the field, there have been some new research frontiers in cultural psychology. The first one is emerging cultural priming research introducing social cognition paradigm to the field. The second one is the application of the general conclusions in the field of cultural psychology to the studies of cross-class differences. The latter one opened a new direction and lots of empirical studies has showed that cross-cultural and cross-class differences share similar psychological fundamentals. Both fields mutually benefit from each other. Meanwhile, agency drew much attention from cultural psychologist in recent years as the core variable during the process of cultural influence. Markus and Kitayama have contributed a lot to support the idea that agency mediates the relationship between culture and human minds both theoretically and empirically. However, lacking particular operationalization of agency causes the researches of the mediating process in this direction to stay on the theoretical level. Based on the assumption that agency mediates cultural influence, I proposed a mediating model in which agency mediates the relationship between social-economic status/mobility and cultural consequences in terms of cognitive styles and self-construe. In the end, the significance of current studies, the deficit and direction for further investigation were discussed.

Whitney Leigh Woodington; Psychology, New Mexico State University

Differential Benefits of Negative and Positive Mood on Short-Term Memory Retrieval Speed

Prior research has shown that both positive and negative mood can impact memory performance, yet these effects are often different. Negative mood has been shown to induce item-specific processing, which emphasizes individual details. Positive mood has been found to induce primarily relational processing, which emphasizes categorical relations. We tested the effects of neutral, positive, and negative moods on short-term memory recall by having participants memorize strings of digits. To test the effects of processing styles, participants performed two types of tasks across 300 hundred trials. They were presented with either a patterned (e.g. 123123) or randomly sequenced digit string (e.g. 589724) and then asked to recall a digit in a specific location (e.g. "What was the fifth digit?"). Across all trials, negative and positive moods significantly decreased recall response times from neutral mood response times. On patterned digit trials, both negative and positive moods significantly decreased recall response time. On random digit trials, negative mood significantly decreased response times, whereas the benefits of positive mood were not significant. These findings suggest that moderate levels of positive and negative mood improve short-term memory retrieval speed on digit recall tasks and that these effects occur in different manners. Increasing item-specific processing by inducing negative mood enhances recall response times for individual stimuli presented among a group, regardless the level of relationship. Increasing relational processing by inducing positive mood appears to only enhance response times on tasks involving patterned, or related, stimuli.

Cat Wu; Astronomy, New Mexico State University

Ionized Gas Velocities for Edge-on HALOGAS Galaxies

Several spiral galaxies show a decrease in rotation speed with increasing height above the disk. This is likely due to a combination of outflowing material from supernova in the disk and infall from the IGM or satellite accretion. The degree to which each component contributes affects the rotational velocity gradient of the gas and has implications for halo formation and evolution. We have optical observations for several edge-on HALOGAS targets from a multi-slit spectroscopic setup at the 3.5m telescope at Apache Point Observatory, NM. HALOGAS is a deep HI survey studying cold gas accretion in the local universe. We present results from our observations and modeling of the ionized extra-planar gas in three of our galaxies. The goal of this project is to characterize the kinematics of the gas and see if we can detect a lagging component in any of our targets.

Qiang Yan; Marketing, New Mexico State University

Indigenous Cultural Branding, the Problem of Intertemporal Durability, and the Consumer Identification Crisis in International Marketing

Using quantitative and qualitative methods, this paper explores a less studied but important topic: how indigenous cultural branding (ICB) solves consumer identification crisis and the problem of intertemporal durability (ID) of brands in cross-cultural markets. This study extends conventional theories of cultural branding (CB) and consumer loyalty. The paper is organized as follows. The first major part illustrates theoretical and substantial background. It first reviews the literature of consumer identification crisis and the problem of ID; second, the paper introduces possible approaches to addressing consumer identification crisis and ID; third, the paper evaluates conventional CB that intended to solve consumer identification crisis and ID; finally, this study explains why ICB is a more powerful method to address consumer identification crisis and ID. The study then discusses research design. The paper first discusses the unit of analysis and then details data sources and data collection. This part also deals with the measurement and operationalization of key constructs such as consumer identification crisis and ICB. The third part analyzes propositions. Multiple quantitative methods are suggested to examine propositions. The study also proposes case study approach that is complementary to quantitative approaches. Finally, the paper summarizes academic and managerial implications as well as limits and research orientations.