

# Poster and Exhibit Abstracts

(In alphabetical order by author)

**Marcelo Araya-Salas & Alejandro Rico-Guevara; Biology, NMSU**

*Bills as daggers? A test for sexually dimorphic weapons in a lekking hummingbird*

Secondary sexual traits often play a role in differential reproductive success. Some traits are used as ornaments to attract mates, while others have a key role in direct physical contests for mates. We describe an undocumented secondary sexual trait in a lekking hummingbird species, the Long-billed Hermit (*Phaethornis longirostris*). The trait is a dagger-like structure of the bill tip, that we hypothesize functions as a sexually dimorphic weapon. Examining 5 leks during three consecutive years, and employing morphological analyses, performance experiments, and territory mapping, we show evidence to support this hypothesis. We found that 1) adult male bill tips were longer and pointier than their counterparts in females and juvenile males, 2) juvenile males acquired dagger-like tips during their transition to adulthood, 3) variation in bill tip morphology reflected puncture capability, and 4) males with larger and pointier bill tips were more successful in achieving lek territory tenure. This study provides the first evidence of sexually dimorphic weapons in hummingbirds and suggests a role of sexual selection on the evolution of overall bill morphology in this group.

**Kenza Arraki; Astronomy, NMSU**

*Comparing the properties of satellite and isolated dwarf galaxies*

The LCDM cosmological model has been very successful at reproducing the large-scale structure of the universe. However, for sub-LMC galaxies, the concordance model overpredicts both the number of satellite and field galaxies. We have conducted analysis of state-of-the-art, high-resolution hydrodynamical simulations of galaxy formation. These simulations include relevant physical models for star formation and stellar feedback including stellar winds, supernovae feedback, and radiation pressure. We have examined the differences between satellite and isolated dwarf populations around a MW-like galaxy. By understanding how the evolution of isolated and satellite galaxies differ we can shed light on the role of baryons in the overabundance problem.

**Antonio R. Arrendondo, Enrico Pontelli, & David DuBois; Computer Science, NMSU**

*An Ontology for Ambient Intelligent Wireless Sensor Networks*

Ambient Intelligence is a term that describes an environment that is responsive to the presence of people. It's a paradigm that builds upon pervasive computing, ubiquitous computing, context awareness, and human-centric computer interaction. Wireless Sensor Networks have evolved into the ideal platform for ubiquitous computing. The operation of an Ambient Intelligent application hinges on the its ability to represent and exchange information. Therefore, an ontology for Ambient Intelligent Wireless Sensor Networks is needed. The ontology will provide the appropriate terminology and classification for a general Ambient Intelligent Wireless Sensor Network. This will establish a general classification and common behavior, that can be extended to specific use cases. One use case in particular, a Dust Monitoring Network, is given to illustrate the hierarchy and extensibility of the Ambient Intelligent Wireless Sensor Network. The ontology has been designed to address the following key areas in Ambient Intelligence, wireless hardware devices, personalized needs and environmental responses.

**Derek Wayne Barchenger, Li Jiang, & Paul W. Bosland; Plant & Environmental Science, NMSU**

*Autopathic Effect of Capsaicin (8-methyl-N-vanillyl-6-nonenamide) on Capsicum annuum L. Seed Germination*

Recently, a new class of chile peppers (*Capsicum* spp.), that rate more than 1,000,000 Scoville heat units have become very popular, in the vernacular these are called "super-hots". However, it has been observed that germination of super hot chile pepper seed is slower and reduced, compared to other chile peppers with lower heat levels. Germination is

a principal component of seedling establishment and survival. After imbibition, radicle emergence is the first visible sign of seed germination and is considered a valuable evaluation of seed vigor in crops. The objective of this work was to determine the effect of capsaicin (the compound causing the heat) on chile pepper seed germination. Two no heat cultivars, Keystone Resistant Giant' and Pimiento L.' were chosen. Seeds were treated with 0, 500, or 1500 ppm capsaicin, and placed in 25°C for 20 days, and scored daily. A successful germination was recorded when radicle emergence reached 2 mm. The osmotic potential of the 500 and 1500 ppm capsaicin solutions was not high enough to act as a salt (0.16 and 0.22 Kpa, respectively), and reduce or prevent germination. We found capsaicin had a major inhibiting effect on seed germination. Capsaicin treatment resulted not only in reduced and delayed germination, but also in inconsistent germination. There was a significant effect of cultivar x treatment, with the control (0 ppm) and 500 ppm treated seeds of Keystone Resistant Giant' having higher germination percent than the control and 500 ppm treated seeds of Pimiento L.' seeds, while the 1500 ppm capsaicin treated seeds of Pimiento L' had higher germination percent than the 1500 ppm treated seeds of Keystone Resistant Giant'. The major implication of this work is to increase germination percent and uniformity of seeds from "super-hot" chile peppers, whereas a seed wash would be beneficial.

**Rachelle Bassen; Biology, NMSU**

*Imaging the Xenopus laevis sciatic nerve*

The myelin sheath is essential for regulating chemical and electrical signaling in neurons. Degeneration of the myelin axonal region in the central (CNS) and peripheral nervous systems (PNS) may lead to disabilities of sensorineural pathways and the motor cortex. Multiple sclerosis and Wallerian degeneration are examples of degenerative disorders that affect the brain, spinal cord, and potentially PNS neural fibers leading to loss in movement. The African clawed frog, *Xenopus*, is useful as a neurophysiological model organism for containing both regenerative and non-regenerative neurons. The purpose of this pilot study was to establish methods that will permit analysis of the internodal lengths, thus indicating the location of Schwann cells found throughout neuronal fiber bundles in the sciatic nerve of *Xenopus*. Light microscopy was implemented to evaluate sciatic nerve sections using a modified protocol of Luxol fast blue and hematoxylin probes for myelin and nuclei observation, respectively. These regions were then compared against images captured in confocal microscopy using the fluorescent filamentous-actin probe Alexa Fluor 488 phalloidin and DNA-probe Hoechst 33342. Schwann cells were detected by greater localization of actin-containing microvilli near the nodes of Ranvier. Images were overlapped to examine myelinated regions stained in Luxol fast blue per Schwann cell region detected in confocal microscopy. Future directions of this project include building a 3-dimensional computer simulated orientation of sciatic nerve sections. Internodal regions observed within this study would also provide a basis of analysis of Schwann cell shrinkage and myelin degeneration, using the similar imaging protocols.

**Edward Berndt; Mechanical Engineering, NMSU**

*The general solution of class 6 piezoelectric materials*

In this work the general solution of the coupled elastic and piezoelectric fields of class 6 piezoelectric materials is found. The results is the general solution for the class 6 piezoelectric material equilibrium equations which allows for appropriate modeling and usage in advanced concepts of solid mechanics. The solutions for point force and point charge are shown. The point force and point charge solutions are utilized to create the Greens tensor representation of this given type of material. The final product is the Greens tensor representation in a proper coordinate system for the use in a variety of boundary value problems and homogenization techniques for materials characterization.

**Sara Blahut; Anthropology, NMSU**

*Examination of Clavicle Variation within the NMSU Skeletal Collection*

The clavicle is a highly variable element of the human skeleton and holds significance functionally, clinically, and forensically. It varies according to age, sex, bilateral asymmetry, normal anatomic variation, and pathology. This study examines the clavicles from the New Mexico State University (NMSU) skeletal study collection. A series of metric and non-metric observations were conducted to assess the range of variation found within the study collection and to compare to findings from the published literature. The study consists of 46 clavicles from 23 unknown adult individuals (15 males, 8 females) and one 17-19 year old adolescent male. Observations disclosed two incidences

of age related variation. Means for all measurements were larger for males than for females. Bilateral asymmetry was not significant across group means, although some individuals exhibited marked asymmetry. Additionally, one individual displayed a rare example of a coracoclavicular articulation.

**Ramaninder K. Brar; Physics, NMSU**

*Effect of X-rays of different wavelengths on the mortality of insects*

Sterile Insect Technique (SIT) has been successfully used to eradicate insect populations. Different sterilization methods, ranging from chemo-sterilization to genetically modified male-sterile mosquito strains have been used, though sterilization with ionizing radiation from radioisotopes is the method of choice for effective sterilization for most species. Irradiating can result in high mortality rates and a decrease in competitiveness. New protocols for sterilization are needed to achieve a high percentage of sterility with few detrimental effects reducing breeding fitness. We have investigated the effect of x-rays of varying wavelengths on x-ray sterilized mosquito males. Our results suggest that wavelengths used during irradiation have a significant impact on males' longevity. The longer wavelength exposure delivered by the copper target shows a substantially steeper death rate than that delivered by the molybdenum target (shorter wavelength). We are currently studying the effect of different wavelengths of fluorescence-induced x-rays on insect mortality, and designing a simple, safe, economical x-ray device for SIT in remote areas.

**Lucia Bernardette Chacon Diaz, Dr. Prentice Baptiste, Dr. Cecilia Hernandez, & Dr. Antonio Lara; Curriculum & Instruction, NMSU**

*College freshmen students experience higher self-efficacy beliefs in an inquiry-based laboratory than their peers in a traditional chemistry laboratory*

The reform of science laboratory teaching in science education has led to the implementation of new instructional models in higher education. The traditional and inquiry-based models are two well-known pedagogical approaches applied in today's science laboratory teaching. This study evaluated two general chemistry laboratories, traditional and inquiry-based, at a university located near the U.S.- Mexico border, using a causal comparative experimental design. The data collected through self-efficacy questionnaires provided insightful information about the two laboratory pedagogical approaches in terms of two groups of student populations in a freshmen level General Chemistry Laboratory course, as well as differences in gender and ethnic backgrounds. The major findings reflect that students in the inquiry-based model experienced a greater gender gap than the students in the traditional laboratory in regard to their self-efficacy beliefs. Additionally, females and Hispanics experience no impact in their self-efficacies, regardless of the pedagogical model. And, lastly, data from the analyzed teaching methodologies show that, males (White and Hispanic) and White students gain the greatest impact from the inquiry-based model. Implications of the results will be addressed.

**Hsiu-Lan Cheng, Jamey Leeanne Rislin, Xuan Nguyen, Charlotte Williams, Chu Hui Cha, Brittany Stamper, Rich Zamora, Guo Apple Liu, & Jill Peters; Counseling & Educational Psychology, NMSU**

*Perceived Discrimination, Acculturative Stress, and Depressive Symptoms in Mexican Americans: Familism and Ethnic Identity as Moderators*

Hispanics have become the largest ethnic minority group in the U.S., among which Mexican Americans are the largest Hispanic subgroup (Rumbaut, 2006). Given their historical and recent sociocultural contexts related to immigration, many Hispanics face substantial ethnic-minority stressors, such as educational and occupational barriers, blatant and subtle ethnic discrimination, and burdens of acculturative stress (Brondolo et al., 2005; Gallo, Penedo, de los Monteros, & Arguelles, 2009). Ethnic discrimination and acculturative stress have been linked to negative mental health outcomes, including increased depressive symptoms among Hispanics (Driscoll & Torres, 2013; Torres & Ong, 2010). This study focuses on the impact of acculturative stress and perceived discrimination on depression, a biobehavioral mental health concern, for Latino individuals. Factors such as Familism and Ethnic Identity will be assessed to determine if they help to attenuated or strengthen the connection between acculturative stress, perceived discrimination and depressive symptoms.

**Erin Coward; Anthropology, NMSU**  
*Cranial Deformation in Romania?*

Artificial cranial deformation is a practice that was used worldwide as cultural identification, social status, and cosmetically both for notions of beauty and for intimidation in battle. Two crania exhibiting intentional deformation were discovered in separate sites in Romania, both crania dating from the 4th-6th c AD. The discovery of the crania from two Christian burial plots suggests the presence of people with a cultural background dissimilar to that of Romania at this time. This paper combines anthropological and scientific information on intentional deformation and evaluates anthropological influences from the surrounding cultures on intentional deformation. With this information the study will explore the probability of societal integration of other cultures into Romanian villages.

**Erica Ruth Davis, Brenda R. Benefit, & Monte L. McCrossin; Anthropology, NMSU**

*Incisor variation at middle Miocene Maboko indicates the possible presence of at least two small-bodied ape species*

The hypodigms and taxonomic classifications of Early and Middle Miocene small bodied apes from Uganda and Kenya are under constant revision and rearrangement. This is largely due to the incomplete nature of the material and the relatively small number of teeth associated in maxillae and mandibles. For species where no associated incisors are known, isolated ones are attributed to them based on inference. A small collection of small-bodied ape permanent and deciduous incisors was discovered during the excavation of in situ sediments at ~15 my Maboko Island between 1987 and 1997. The sample of ten I<sup>1</sup>'s are slightly smaller than *M. clarki* from Napak and therefore are currently the smallest known for any small-bodied ape species. Six of these I<sup>1</sup>'s are attributed to the more common species at Maboko which is presently called *Micropithecus leakeyorum*. They are characterized by an asymmetrical crown and a low and asymmetrical V-shaped lingual cingulum that is longer and taller on the mesial than distal side, most similar to *Pliopithecus vindobonensis*. An additional four specimens appear to belong to a different type and/or species with a more symmetrical crown and a U-shaped lingual cingulum most similar to NAP XV 65'09, currently attributed to *Karamojapithecus akisemia* (they are less like other specimens attributed to that species). Two small-bodied ape species may therefore be present at Maboko, one with upper central incisors more similar to *Pliopithecus* and the other with a morphology more consistent with other East African small-bodied apes.

**Ethan Dederick; Astronomy, NMSU**  
*Jovian Interiors from Velocimetry Experiment*

The interior of Jupiter and Saturn is poorly understood. Theoretical modeling has placed constraints on what the interiors of the planets could look like, but the range of those constraints is far from ideal. We are designing a spectrograph based on a Mach-Zehnder interferometer that will be mounted on the 1 meter or possibly 3.5 meter telescope at Apache Point Observatory that will allow us to observe the oscillations of Jupiter and Saturn. Based on the observed modes of oscillation we can gain insights into the interior structure of these planets, particularly their core sizes and masses. Knowing this, along with the radial structure of the planet interiors, will thus allow us to constrain planetary formation theories in the early solar system.

**Jose M. Diaz, Alen Torell, & Andres Cibils; Range Sciences, NMSU**

*The Economics of Raramuri Criollo Versus British Crossbred Cattle Production In The Chihuahuan Desert*

Preliminary research indicates Raramuri Criollo cattle may range further and forage in areas where traditional breeds rarely venture. These small-frame animals are well adapted to harsh environments and maintain productivity with minimal inputs and supplementation. The objective of this research was to compare the economics of range-fed beef production with Raramuri Criollo cattle versus production of Hereford X Angus (H x A) cattle typically found on Chihuahuan Desert ranches. Enterprise budgets were developed for a 150 AU ranch using production and cost data for herds maintained at the USDA Jornada Experimental Range near Las Cruces, NM. Based on limited studies about differences in forage requirements, animal foraging behavior, grazing distribution and forage use, we assumed the Criollo herd could be maintained at 226 AU, a 50% increase. With 2009-2013 average real beef prices, net returns to land allotment from Raramuri Criollo cattle production was found to be 19% higher than H x A production. The assumed 50% increase in stocking rate was a major factor in the net return increase. Total cash costs were estimated

to be 23% less for Criollo production (277/AUY versus 359/AUY). Notable cost differences included supplemental feed costs (54/AUY versus 109/AUY) and veterinary, medicine and vaccine expenses (5/AUY versus 14/AUY). The typical cow/calf ranch sells calves after 8 months, requiring about 1.34 AUY/mature cow. By comparison, Criollo steers graze for 30 months and heifers for 24 months before sale. RC have a reduced forage requirement but the extended grazing period increases the total forage requirement to about 2 AUY/mature cow.

**Carlos Escobar, German Reyes, & Dr. Hansuk Sohn; Industrial Engineering, NMSU**  
*Decision Support System for Emergency Medical Service*

With the rising number of retired baby boomers, high operating costs (e.g. labor, technology and gasoline) and a constantly increasing trend in emergency medical service (EMS) demand, ambulance service providers are facing the most critical challenges of their history. To overcome these challenges, ambulance service providers must find a way to continuously optimize resources. Therefore, the goal of this research is to improve the ambulance deployment strategy through identifying high performance locations for the base stations of the ambulances and the fleet size. This research includes three types of advanced analytics methods. We propose a hybrid DES/Heuristic algorithm, in which a discrete event simulation (DES) model is embedded into a greedy like heuristic algorithm, in order to determine a high performance ambulance deployment strategy. The applicability of the hybrid DES/Heuristic algorithm is demonstrated in the case study of Doña Ana County's EMS system. While conducting the analysis, the analysis periods are broken down to three distinct periods, namely, January through May, June, and July through December, and then these three periods are subdivided into peak hours (10am-10pm) and non-peak hours (10pm-10am). The hybrid DES/Heuristic algorithm was able to find the best system configuration for each of the six different time frames. The results demonstrate that the hybrid DES/Heuristic algorithm is a practical and flexible tool in solving realistic EMS deployment problems. By using the algorithm, the EMS provider can enhance the delivery of emergency services to the residents, which has a promising potential that will benefit the local community.

**Alison Flores, Manoj Shukla, Geno Picchioni, Brian Schutte, April Ulery, & David Daniel; Plant & Environmental Science, NMSU**  
*Saline Reverse Osmosis Wastewater Effects on Halophyte Species*

In arid regions, low rainfall, high evaporation, low quality groundwater, and declining surface water have led to a need for alternate water sources. Increasingly, saline groundwater is used to meet this water supply demand. The Brackish Groundwater National Desalination Research Facility (BGNDRF) in Alamogordo, NM uses reverse osmosis to make water potable but results in a highly concentrated solution that must be disposed in an environmentally sound way. One method of wastewater disposal is land application. Our hypothesis is that concentrate can be used for halophyte irrigation year-round, provided that proper plants are selected and management techniques are implemented. Objectives in this study are: evaluate the evapotranspiration using water balance method of six plant species, *Hordeum vulgare*, *xTriticosecale*, *Atriplex canescens*, *Distichlis stricta*, *Lepidium alyssoides*, and *Panicum virgatum*, and measure the effects of concentrate on their growth. Total water applied was  $86.08 \pm 4.06$ cm and the total ET was  $51.35 \pm 1.49$ cm. Plant growth was monitored for 90 days in a greenhouse experiment that utilized two soils (clay soil and silica sand) and three water treatments: irrigation tap from greenhouses (EC  $\sim 0.9$  dS/m), well (EC  $\sim 4.1$  dS/m), and concentrate (EC  $\sim 8.0$  dS/m). Evapotranspiration losses were calculated for each plant using the water balance. Both non-destructive (physical and photosynthetic) and destructive measurements were taken to guide the selection of potential species for land application sites. Sustainable safe and local management of the highly saline concentrate resulting from reverse osmosis could provide widespread implementation of inland groundwater desalination in New Mexico.

**Chris Frydenlund; Chemistry, NMSU**  
*Cellular, Molecular and Biochemical Characterization of a Novel Fluorescent Estrogen.*

Aberrant steroid hormone responses in tissues are implicated in many pathologies, therefore, the identification of new tools for efforts from basic research to clinical imaging are necessary to understand the molecular mechanisms of disease and efficiently diagnose affected patients. To this end, we have characterized a new class of triazaborolopyridinium (HPY) fluorescent dyes that can be covalently linked to biomolecules such as steroid hormones without

altering the biological function of the parent molecule. To determine the biological consequence of HPY conjugation on the important female sex hormone  $17\beta$ -estradiol (E2), the HPY dye was covalently linked to the alkyne group of  $17\alpha$ -ethynylestradiol using a palladium-catalyzed coupling reaction to form the fluorescent E2-HPY conjugate. Initial analysis showed that in all aspects tested, E2-HPY maintained the biological activity of E2. There was no significant difference in the induction of cell proliferation in the E2-dependent MCF-7 cell line or the phosphorylation of ERK1/2 when E2 was compared to E2-HPY treatment. Furthermore, E2 and E2-HPY similarly induced both endogenous and exogenous gene transcription controlled by E2-dependent promoters. Furthermore, we took advantage of the fluorescence properties of E2-HPY with fluorescence polarization dynamics to demonstrate that E2-HPY binds specifically to ER $\alpha$  in the ligand-binding domain. These data show that covalently linking HPY to E2 does not significantly alter bioactivity and demonstrates the potential utility of such a compound for use in binding assays for ER $\alpha$ .

**James Christopher Fulton & Mark E. Uchanski; Plant & Environmental Sciences, NMSU**

*Chile Pepper Stip: A Physiological Disorder of the Desert Southwest*

Stip, a physiological disorder affecting bell and NM pod type green chile pepper cultivars (both *Capsicum annul*) has received limited academic attention. Symptoms present as black, brown, and yellow ovoid subcutaneous chlorotic lesions approximately 1.3 cm in length and 0.6 cm in width extending from the endocarp to the mesocarp without apparent expression in the cuticle. In this study, stip has been characterized via microscopy and metabolomics assays, in addition to a cultivar susceptibility experiment. Symptom development was induced in a greenhouse and the incidence, severity, and location of symptomatic pods was quantified for one reported resistant bell pepper cultivar, Cal Wonder 300, and one susceptible green chile pepper cultivar, AZ 1904. Under microscopic analysis, both cultivars presented identical fluorescent and confocal imagery; stip affected tissue was especially apparent under green fluorescent protein and violet filters, which presented as a halo only around chlorotic lesions. These microscopy signals occurred only in proximity to chlorotic lesions, and is not apparent in asymptomatic tissue from symptomatic pods, asymptomatic pods from symptomatic plants, nor asymptomatic tissue from asymptomatic plants. To gain additional insight into this disorder, a polar and non-polar metabolite profile of green chile pods, and carotenoid analysis was performed using tissue from the susceptible cultivar, AZ 1904, collected from seven different fields in southern New Mexico in 2014. Sustained research emphasis is needed to understand the causes of this disorder, effects on growers, and possible remedies.

**Sudip Gaire & Alvaro Romero; Entomology, Plant Pathology & Weed Science, NMSU**

*Toxicity of essential oil components in the Turkestan cockroach, Blatta lateralis (Blattodea: Blattidae)*

The Turkestan cockroach has become an important invasive species throughout the Southwestern United States. This peridomestic cockroach has been reported invading human dwellings as well as animal facilities in California, New Mexico, Arizona and Texas. Our study aims to evaluate ecofriendly management strategies that help manage this urban pest. We evaluate the toxicity of various botanical-derived components against late instar nymphs of Turkestan cockroaches. Compounds were diluted in acetone and nymphs were treated topically between the metathoracic legs. Mortality data from each essential oil component were assessed after 24 hours post-application and subjected to Probit analysis to estimate LD50 values. Thymol was found to be the most toxic compound with a LD50 of 0.39 mg/cockroach followed by trans-Cinnamaldehyde, eugenol, geraniol and methyl eugenol with LD50 values of 0.94, 1.60, 2.41 and 3.72 mg/cockroach, respectively. These results indicated that essential oil plants with a high content of thymol are promising candidates for the management of Turkestan cockroaches.

**Kristina Kay Gonzales, Hitoshi Tsujimoto, & Immo A. Hansen; Biology, NMSU**

*A blood free diet to sustain the Dengue vector, Aedes aegypti colonies*

Anautogenous female mosquitoes require a vertebrate blood meal in order to provide essential amino acids for egg development. Currently, maintaining anautogenous mosquito culture in a laboratory setting requires using whole blood from vertebrates. A recent study by R.J. Pitts has shown that laboratory colonies of the anautogenous mosquito *Aedes albopictus* (Asian tiger mosquito) can be successfully maintained on a blood-free meal that supports oogenesis. In this study we tested a similar feeding protocol for *Ae. aegypti*, the major vector of Dengue and yellow fever

viruses. We tested the effects of the positive control, whole blood, against its fractionated components, red blood cells (RBCs) and serum on egg deposition rates. We also tested four different buffer formulations and used bovine serum albumin (BSA) or hemoglobin (Hb) as protein sources. We found that *Ae. aegypti* colonies can be reared on an artificial blood-free diet. Bovine serum and BSA formulations produced comparatively similar results on egg deposition when compared to whole blood. However, the RBC and Hb formulations did not support egg production and cause digestion defects. Our results suggest that further investigation into the nutritional requirements for *Ae. aegypti* egg production are required in order to optimize a blood free meal for mass rearing purposes.

**Mario Gutierrez Casale, Janeth Sanchez, & Erin Beeman; Public Health & Science, NMSU**

*Cultural adaptation of the Inflatable Colon to promote colorectal cancer screening among Hispanics*

Colorectal cancer (CRC) is the second leading cause of cancer-related deaths in the US among men and women. However, CRC can be successfully treated if detected early. Hispanics exhibit disparities in CRC mortality largely due to lower screening rates, with less than half of the Hispanics 50 years of age and older ever being screened for CRC. Low levels of CRC knowledge and awareness, along with socioeconomic and cultural factors contribute to low screening rates among Hispanics. The inflatable colon (IC) is an innovative, visual, and interactive educational resource designed to engage and educate communities at risk for CRC. The IC-CRC educational tool and its evaluation materials were recently adapted to address cultural barriers and risk factors in Hispanic populations. Study participants included promotoras from Southern NM and NMSU staff who were at least 50 years of age and Hispanic, representing the communities located in Southern NM and the US-Mexico border region. The IC Assessment Survey 2 (ICAS2) assessed CRC knowledge, self-efficacy, cancer fatalism, fear of cancer/screening procedure, perceived benefits of screening, machismo, social norms, medical mistrust, acculturation, health literacy, behavioral intentions to be screened and satisfaction. Procedure. Participants completed a brief survey, received the IC-CRC educational tour, completed the ICAS-2, and participated in a focus group then, evaluated the educational tour. Participants identified content and items that were difficult to understand and required simplification.. This study facilitated further adaptation of the Inflatable Colon tour and ICAS 2 given feedback from the border Hispanic community.

**Lydia E. Hammond & Uziel Marte; Government, NMSU**

*Efficacy of newspaper endorsements in local elections: A case study in New Mexico*

Newspaper endorsement and their influence on voters has been a topic studied for decades, although consensus regarding its true effect has not been reached among scholars. Both Erikson (1976) and Hollander (1979) concluded that newspaper endorsement have the potential of influencing voters, although both focused on presidential candidates. Rystrom (1986) found that this influence was pronounced in primary elections and Chiang and Knight (2010) concluded that media does have an influencing power depending on one's level of bias. Certainly, there exists a dichotomy between the decline of print media and the struggle to reach voters in rural media markets. We hope to build on this research by investigating this relationship at the state and local level, by looking at newspaper endorsement choices and investigating whether there is any statistical change affecting the outcome of studied races. Endorsements will be analysed from 6 newspapers in the state of New Mexico from 2004 - 2014. New Mexico has a small media market, and a large percent of the population still reads their local paper. We hypothesize that we will see a significant effect on lower level elections as these are lesser known candidates to the general population.

**Melody Handali & Dr. Erik Yukl; Chemistry & Biochemistry, NMSU**

*Identification and Characterization of a Zn-specific ABC Transporter Substrate Binding Protein from *Paracoccus denitrificans**

Transition metals are essential cofactors to many proteins responsible for carrying out essential biological processes. In bacteria, Zn and Mn acquisition is carried out by the cluster 9 family of ATP-binding cassette (ABC) transporters. These transporter systems rely on a solute binding protein (SBP) that appropriates metal from the environment with high affinity and specificity, even under extremely metal-limited conditions such as those encountered by pathogens within the human host. As such, these ABC transporters have been identified as critical virulence factors in a number of pathogenic bacteria. We have focused on an apparent cluster 9 family ABC transporter system in *Paracoccus denitrificans* as a model system for similar importers in pathogenic bacteria. This system is unusual in that it

shares sequence homology with both Mn-specific and Zn-specific transporter systems; our goal is to characterize the structure and the function of the SBP (Pd97) in order to determine the structural attributes that confer Zn or Mn specificity.

The SBP has been expressed and purified in vitro, and we have also generated it in its apo form. To study metal affinity and determine substrate specificity, metal competition assays with the fluorophore Mag-fura-2 were performed. We have also examined the effect of metal-binding on the thermal stability of the protein through circular dichroism spectroscopy, and are currently looking into its transcriptional regulation by a bacterial Zn-uptake regulatory protein (ZurR) through electrophoretic mobility shift assays (EMSA). Our results indicate a strong Zn over Mn specificity, despite sequence features that suggest Mn specificity.

**Michael Hayden; Astronomy, NMSU**

*Chemical Cartography of the Milky Way with SDSS-III/APOGEE*

The SDSS-III Apache Point Observatory Galactic Evolution Experiment (APOGEE) spectrograph provides an unprecedented view of the Milky Way, due in part to its ability to observe in the infrared, where the effects of dust extinction are significantly reduced compared to optical surveys. We present results of the metallicity distribution function (MDF) and the  $[\alpha/\text{Fe}]$  vs.  $[\text{Fe}/\text{H}]$  plane at different locations in the Milky Way. These observations span the entire Milky Way visible from the northern hemisphere, ranging from the bulge to the edge of the disk and at a range of heights above the plane.

**Triston Hooks, Geno Picchioni, Brian Schutte, David Daniel, & Jamshid Ashigh; Plant & Environmental Sciences, NMSU**

*Salinity Responses of Three Invasive Lepidium Species*

Weedy and invasive plants can displace native plant species, reduce biodiversity, and hinder crop yields. Edaphic factors, such as salinity, may influence the invasive potential of certain weedy plant species. We hypothesize that *Lepidium* spp. may play an important role in salinity-related vegetative community changes in semiarid landscapes. We are testing this hypothesis by evaluating the salinity responses of three invasive *Lepidium* species, *L. alyssoides*, *L. draba*, and *L. latifolium*, under a controlled greenhouse study. Our objectives are to disclose salinity tolerance and to disclose whole plant Na regulation patterns in these species. *Phaseolus vulgaris* and *Gossypium hirsutum* were grown concurrently as known crop standards. Plants were irrigated daily with three saline treatments in 1/2x Hoagland's nutrient solution: Control (no NaCl), NaCl at 23.8mM (-0.1MPa), or NaCl 47.9mM (-0.2MPa). The study was terminated after 13 weeks and the following data were collected: daily evapotranspiration (ET), growth index, leachate EC, plant fresh and dry weights, and tissue mineral concentrations. Preliminary results indicate the following for all three *Lepidium* species: Small step-wise reductions in both ET and total dried biomass across the three treatment solutions; leachate salinities ranging from 2 to 16 dS/m with minimal observed salt damage; salinity tolerance greatly exceeding that of *P. vulgaris*; and equal or greater salinity tolerance to that of *G. hirsutum*. High leaf Cl accumulation has been observed in all three *Lepidium* species with Na analysis in progress. Collectively, these characteristics may be important factors governing the invasive capabilities of these species in semiarid landscapes.

**Gizelle Hurtado & Dr. Karen Mabry; Biology, NMSU**

*Urban development may impact endoparasite prevalence in Merriam's kangaroo rat*

Urban development can fragment and degrade remnant habitat. These alterations in habitat can have profound impacts on wildlife populations. These impacts may influence the prevalence of pathogens along wild land - urban gradients. I investigated the influence of urbanization on populations of Merriam's kangaroo rat (*Dipodomys merriami*) and their pathogens. I hypothesized that urban development would affect the prevalence of endoparasites in kangaroo rats in urban areas versus wild land areas. I live trapped kangaroo rats at 10 sites in and around Las Cruces, NM: 5 urban and 5 wild land, from June to November 2013, and collected fecal samples from 70 kangaroo rats. Endoparasite presence was determined using fecal flotation, and both roundworms and protozoans were detected. Roundworm (*Mastophorus dipodomis*) prevalence was higher in wild land populations, but (*Pterygodermatites dipodomis*) prevalence did not differ between urban and wild land populations. Further, protozoans were

only detected in wild land populations and kangaroo rats with multiple infections of different pathogens were only detected in wild land populations. These results indicate that kangaroo rat endoparasite prevalence may be influenced by the impacts of urban development on physical, biological or behavioral factors. Increased availability of anthropogenic resources or fragmentation acting as a barrier to transmission may be physical factors. Alterations to plant cover or intermediate host abundance may be biological factors and there may be behavioral differences in kangaroo rat populations between urban and wild populations that may influence endoparasite prevalence. The mechanism(s) driving these differences requires further investigation

**Amal Hasan Ibrahim; Special Educational Psychology, NMSU**

*Summer camp and social skills for children with autism*

The prevalence of ASD is raised from 1 in 88 in 2012 to 1 in 68 in 2014. Children and youth with ASD need early intervention to improve their social, communication, and behavior skills. Summer camp for children and youth with ASD is considered one of the interventions that help in improving many skills and make individuals with ASD feel like they are a part of their community. The purpose of this study was to investigate the impact of a one week day camp in improving social skills for children and youth with ASD. This quantitative study obtained data from 40 parents who have children and youth with ASD who participated in a one week day camp. The Autism Social Skills Profile (ASSP) was given three times to determine if children and youth with ASD made improvements in social skills after participating in the one week day camp. Survey 1 was distributed before camp, survey 2 was given at the end of camp, and survey 3 was given one month post camp. This study reported statistically significant differences when the five domains included in social skills (communication, reciprocity, social cognition, initiation, and perspective taking and self-awareness) were analyzed. The time by treatment interaction was statistically significant for the communication, initiation, and reciprocity domains. These results demonstrated that participants who attended Camp New Amigos showed a positive impact on social skills for children and youth with ASD, as rated by their parents.

**Manasi Jogalekar & Elba E. Serrano; Molecular Biology, NMSU**

*TEM And Fluorescence Imaging Of Human Breast Cancer Cell Cultures*

Tissue and organ failure are major health problems in the United States. Tissue engineering is a tool that can assist with identifying treatments for tissue and organ disorders, such as breast cancer, which comprises about a fifth of all cancers in women. Tridimensional cultures of breast cancer cells are more similar to native cancer tissue in terms of morphology, as compared to typical monolayer cultures. This pilot study was carried out to establish methods for growing the human breast cancer cell line HCC70(ATCC) in 3D matrix Geltrex<sup>TM</sup> (Invitrogen, 12760-021) in parallel with conventional monolayer culture protocols and to compare their structural characteristics. The cells were stained using fluorescent probes for the cytoskeleton (Alexa Fluor<sup>(R)</sup> 488; F-actin) and cell nucleus (Hoechst 33342; DNA). Images captured using an epifluorescence microscope (Nikon TE2000) and a confocal microscope (Leica TCS SP5 II) show that the monolayer cells grew in small clusters, adhered to the neighboring cells and spread horizontally. In contrast, 3D cells grew in multiple layers and formed spheroids. Our optimized histological protocols enabled characterization of the cellular ultrastructure of spheroids and monolayer cultures with transmission electron microscopy (Hitachi H-7650). 3D-cells were characterized by the presence of membrane protrusions that may be involved in cell-matrix interactions, intercellular spaces filled with autophagic vacuoles, which were not detected in 2D cells. These findings demonstrate that morphological adaptations of 3D-cells may have implications for in vitro studies of cell-cell interactions. Future studies will continue to explore the breast cancer 3D cultures by examining autophagic vacuoles using fluorescent probes. Research supported by P50GM068762.

**Virginia Bleu Knight, Kevin P. Hemphill, & Elba E. Serrano; Biology, NMSU**

*Differential Expression Analysis of A6 Cells and Tissue of Origin, the Xenopus Kidney*

Cell lines are used as in vitro models for systems such as the kidney, but the extent to which they resemble the native tissue is often not well established. Similarities and differences between cell lines and tissues can be elucidated by evaluating gene expression with high throughput tools such as microarrays. Our laboratory frequently uses the A6 *Xenopus laevis* kidney cell line as a basis for developing imaging techniques, toxicity studies, and heterologous gene

expression methods. We are interested in evaluating similarities and differences between the genetic profile of the A6 cell line and the organ of origin. To this end, we employed the Affymetrix GeneChip *Xenopus laevis* Genome Array to evaluate gene expression based on intensity values assigned to probe set identifiers (PSIDs) on the microarray. The open source Database for Annotation, Visualization and Integrated Discovery (DAVID) was implemented to impart functional significance to annotated PSIDs meeting the criterion for differential expression (2-fold change?  $\geq 1.5$ ). The DAVID cluster terms were then curated into broader categories (for example, hemoglobin was classified under blood) in order to facilitate the classification of differentially expressed PSIDs. As expected, the kidney tissue assumed higher intensity levels for PSIDs associated with organ function and whole-body homeostatic activity while cell cycle-related gene categories were predominant in the A6 cell line. Moreover, the prevalence of PSIDs lacking annotation was highlighted for PSIDs upregulated in the A6 cell line. This characterization provides important insights affecting the utilization of the A6 cell line as an in vitro model for future heterologous gene expression methods, analysis of protein function, and cellular responses to chemical agents such as drugs and toxins. Supported by NIH P50-GM68762

**Kelly Laje, Barry Dungan, Mark Seger, Jeurgen Polle, & F. Omar Holguin; Plant & Environmental Sciences, NMSU**

*Selecting for Phytoene in Carotenoidgenic Microalgal strains Chlorococcum sp. and Coelastrum sp. While Treating with Fluridone and Norflurazon*

Carotenoids are lipophilic pigments found in plants and algae that serve two purposes, 1) as light harvesting molecules – primary carotenoids, and 2) as antioxidants, acting against reactive oxygen species – secondary carotenoids. Because of their strong antioxidant properties, they possess anti-carcinogenic activity and may be useful in the prevention of degenerative eye diseases, as well as the development of anti-aging strategies. Carotenoids most noted for their medicinal properties include lycopene, lutein, canthaxanthin, astaxanthin, phytoene, and phytofluene. In this study we evaluated the chemical and physiological attributes of two recently characterized microalgal strains *Chlorococcum sp.* and *Coelastrum sp.* These were selected for their high carotenoid production under light and nutrient stress while targeting a reduction of Phytoene Desaturase (PDS) activity with the pigment-inhibiting herbicides Fluridone and Norflurazon. Carotenoid biochemical profiles for both strains with the addition of the listed herbicides, and quantification analyses of phytoene, will be reported.

**Subhankar Mandal & Christopher S. Cramer; Plant & Environmental Sciences, NMSU**

*Selection Progress for Fusarium Basal Rot Resistance in Onions*

Fusarium basal rot (FBR), caused by *Fusarium oxysporum* f. sp. *cepae*, (FOC) is the second most important soil-borne disease for onion grown in New Mexico. Developing resistant cultivars, rather than utilizing cultural practices, such as, crop rotation with non-host crops and soil fumigation, is the best alternative due to increasing population pressure and urbanization. The objective of this study was to measure the selection progress for reduced FBR disease severity and incidence when utilizing a mature bulb inoculation method for selection. Three generations (original, first selected, second selected) of seven autumn-sown, overwintering, well-adapted, open-pollinated populations, and resistant (Serrana') and susceptible (NuMex Crimson') checks were evaluated for their FBR severity and incidence when transversely-cut basal plates of mature bulbs from each entry were inoculated with  $12 \times 10^5$  spores.ml<sup>-1</sup> FOC isolate 'CSC-515' during the summer of 2014. Inoculated bulbs were placed under humid conditions for three days to encourage infection and placed under ambient conditions afterwards for 18 days to allow for disease development. After this time, the basal plates of 20 bulbs from each plot were cut transversely again and FBR disease development on the basal plate was rated on a scale of 1 (no disease) to 9 (70% or more diseased basal plate tissue by area). Disease incidence was calculated as the percentage of diseased bulbs. A high degree of disease severity and incidence was observed for all entries including resistant and susceptible checks. This result suggests that spore inoculum concentration may be too high and/or the environmental conditions used for pathogen infection may need to be modified. For several of the populations evaluated, a decrease in disease severity and incidence was observed in the first selected generation when compared to the original population; however, any progress made was lost with a second selection as observed by the poor performance of the second selected generation of several populations. This study will be repeated during the summer of 2015 and a further examination of spore inoculum concentration and environmental conditions during infection on disease development will occur.

**Gavin Mathes; Astronomy, NMSU**

*The search for Supermassive Black Hole Binary Candidates*

Supermassive Black Hole Binaries (SBHBs) are an inevitable result of the process of hierarchical galaxy mergers during the cosmological buildup of structure. Theories of galaxy evolution seek to explain the observed correlations of black holes and their host galaxies as they undergo successive epochs of mergers and accretion. There are some strong candidates for wide separation SBHBs, but no robust evidence for the expected large population of close SBHBs, at separations of  $\sim 1$  pc or less. We have undertaken a search for close SBHBs with a sample of 88 candidates, selected from a large sample of AGNs, having broad  $H\beta$  emission lines with substantial (1,000 km/s) offsets from the systemic redshift. Multiple epochs of spectroscopic observations can measure any shift in the line offset and, assuming the shift is due to orbital motion within the SBHBs, constrain the curvature of the inferred radial velocity shift and hence place a lower limit on the total mass of the SBHB. Here we present preliminary results of a spectroscopic monitoring campaign of the candidates with the Hobby-Eberly Telescope and Sloan Digital Sky Survey through April 2012.

**Laura Mayorga; Astronomy, NMSU**

*Modelling Phase Curves and Occultations in KOI Light Curve*

Clues about the atmospheric and surface conditions of a planet are buried within the Kepler light curve of the host star. We select several Kepler Objects of Interest (KOI) which show phase variations and occultations to estimate the temperature and albedo of the exoplanet. We apply a Fourier decomposition filtering technique to remove variations in the KOI light curves that are likely of stellar origin. However, intermediary steps are required to understand remaining effects, such as stellar ellipsoidal variations, and doppler beaming/shifting. Finally, we use an MCMC algorithm to fit the different amplitudes of phase variations and compute the planet's mass, nightside temperature, and geometric albedo.

**Bianca Abigail Meyer & Adam Amador; Educational Leadership & Administration, NMSU**

*Mapping Educational Opportunity and Reform Policy in the Borderlands: LatCrit Spatial Analysis and Grade Retention*

The purpose of our study is to investigate reform policy like 3rd Grade Reading Retention under a highly diverse or rather segregated setting, where students not performing proficiently in 3rd Grade Reading Standardized Scores will be retained in the 3rd grade. The research methods and approach include two analyses: a regression analysis across a Borderland county in New Mexico to answer what informs differences in 3rd grade reading scores by using Geographic Information System (GIS) based dated around elementary school attendance boundaries, early childcare providers, and access to very highly qualified teachers within the school itself. The second analysis applies a LatCrit informed Spatial Analysis using K-12 school-level data to map educational access and opportunity, and essentially around 3rd Grade Reading Retention Reform Policy.. The setting of the study is in the U.S. Southwest Borderlands, specifically Doa Ana County in southern New Mexico that borders, Texas and Mexico.. Up to a quarter of the population is under the age of 18, two-thirds (66.6%) of the population are Latino, and half of the population speak another language other than English at home. Implications include policy considerations for policy-makers for non-deficit systemic perspectives to improving educational opportunity. Further implications of this study are that the setting demographically mirrors much of the state of New Mexico, as well as the growing Latino demographic in the U.S., which provides further considerations for key systemic changes to improving academic outcomes like Reading scores.

**Alireza Mohjimi & Dr. Hansuk Sohn; Industrial Engineering, NMSU**

*An observational before-after study of the City of Las Cruces STOP program*

Traffic safety has become a critical issue during the last few decades. One of the areas which has recently been the topic of many studies in traffic safety is red-light running and speeding in intersections. Nearly 20% of the total crashes in 2008 were intersection related (National Highway Traffic Safety Administration, 2008). One of the technologies that has been used to control and decrease red-light running related crashes is the camera enforcement

program.

The City of Las Cruces, NM, introduced the Safe Traffic Operations Program (STOP) in 2009. The purpose of the program is to improve traffic safety at signalized intersections. Reduction in the number of violations and crashes after the installation and operation of the cameras are the important justifications for the STOP. The goal of this research is to assess the impact of the STOP on crash and violation rates during the first three years of implementation and in subsequent years of the program.

In this research, Empirical Bayes Method was used to evaluate the effectiveness of the system. The results show that several camera intersections experienced an overall positive impact as a result of the camera enforcement program; while the other intersections didn't experience any significant improvement.

**Erika Yvonne Monroy & Dr. William Maio; Chemistry & Biochemistry, NMSU**  
*Synthetic Approach Towards Calcaripeptide A-C*

Calcaripeptides were isolated in 2013 from a *Calcarisporium* genus of fungus collected in the German Wadden Sea. The synthetic architecture of these compounds are intriguing since they consist of a dipeptide unit and a nonpeptide unit that contains a 1,3-carbonyl moiety embedded within their 14- and 16-membered macrocycle. The key step of this synthesis is the macrocyclization via a nucleophilic trapping of the resultant alpha-ketoketene with a pendant primary amine which would lead to an efficient means to synthesize all members of the calcaripeptide family. Current progress towards our goal will be presented.

**Kate Moore; Anthropology, NMSU**  
*National Register of Historic Places Nomination of the Tortugas Pilgrimage*

Tortugas National Register Nomination Conducting research in the Tortugas community on their major festival documents the rich culture in Southern New Mexico and the Rio Grande region. Community members come together every year to celebrate the Virgin of Guadalupe December 10-12th, reflecting the blending of the Hispanic and Native American religious traditions. The pilgrimage that takes place every December 11th, is eligible for the National Register of Historic Places as a Traditional Cultural Property. Extensive ethnohistorical and historical research has already been conducted, but a nomination has never been completed. Using the National Park Service 10-900, I will gather information through different methods, including participant observation, personal interviews, photographs and videos. With the cooperation of the Mayordomos of the Corporation of Our Lady of Guadalupe, my research documents the cultural and historical significance of the Tortugas pilgrimage both to the community of Tortugas and to regional history. This research forms the basis of the nomination in the spring of 2015. In completing the NPS 10-900, I will be reviewing other nominations to the register that were successful as trails and Traditional Cultural Properties. A successful nomination will provide public recognition to Tortugas for their festivities as the pilgrimage travels over private, public, NMSU and BLM lands and would allow for plaques to be placed showing their route.

**Roma Mukhopadhyay & Dr. Erik T. Yukl; Biochemistry, NMSU**  
*Nitric oxide signaling through bacterial heme proteins and histidine kinases*

Soluble guanylate cyclase (SGc) is a eukaryotic protein with heme binding domain that binds to nitric oxide (NO) and carbon monoxide (CO) but not oxygen. NO binding stimulates guanylate cyclase activity, increasing the concentration of the secondary messenger cyclic GMP (cGMP), influencing vasodilation, neurotransmission and smooth muscle relaxation among other functions. Bacterial homologues to the heme binding domain of sGC are Heme Nitric Oxide/ Oxygen (H-NOX) proteins. These also function in NO signaling by influencing the activity of downstream histidine kinases in an NO-dependent manner, ultimately impacting biofilm formation and dispersal. Given the homology to sGC and the implication of biofilm formation on bacterial pathogenicity and persistence, detailed structural information on the interaction of HNOX with downstream proteins is highly desirable but currently lacking. To this end we have expressed and purified the H-NOX and associated histidine kinases from *Legionella pneumophila* (causative agent of Legionnaires disease), *Vibrio cholera* (causative agent of cholera). Current work is focused on

characterizing interaction between these proteins toward the goal of eventually crystallizing and solving the structures of H-NOX / kinase complexes.

**Younji Nam; Biology, NMSU**

*Nepriylsin1 plays a important role in eye development*

Proteins in the Neprilysin (NEP) family of membrane bound thermolysin-like zinc metalloendopeptidases play important roles in mammalian nervous, cardiovascular, inflammatory and immune systems. However, whether NEPs contribute to development is not well known. *Drosophila melanogaster* is a good model organism to study about NEPs, because they have relatively short life cycle, are easy to manipulate genetically, and share approximately 60% of identified genes with humans. Thus, findings using *Drosophila* as a model are expect to lead towards a better perceptive of the functions and processes of genes and proteins in humans. As with other tissues, *Drosophila* eyes are formed through complex networks, which require sophisticated regulation. So, even a simple mis-regulation in the network can cause serious defects in eye development. *Drosophila* Neprilysin 1 (Nep1) is an ortholog of humans NEPs. Based on microarray data (FlyBase), *Drosophila* Nep1 is expressed at moderate levels in adult *Drosophila* head, eye, and brain tissues. Accordingly, using RNA interference (RNAi), I have shown that knockdown of the Nep1 gene results in smaller eyes compared to wild type eyes, with misarranged ommatidia. Thus, I hypothesize that Nep1 plays a role in eye development. To determine the role of *Drosophila* Nep1 in eye development, I plan to reduce Nep1 function using RNAi, and by generating loss-of-function Nep1 alleles via CRISPR-based strategies. Removing Nep1 function and analyzing the resulting phenotype(s) will reveal whether Nep1 is required during eye development.. In addition, I will use the Gal4-UAS system to misexpress Nep1 during eye development, which will reveal what Nep1 is capable of during eye development.

**Amy Rebecca Nava & Dr. Michele K. Nishiguchi; Biology, NMSU**

*The exopolysacharride tyrosine kinase (etk) is responsible for regulating symbiosis in the sepiolid squid-Vibrio fischeri mutualism*

The exopolysacharride tyrosine kinase (etk) is responsible for regulating symbiosis in the sepiolid squid-*Vibrio fischeri* mutualism. The exopolysacharride tyrosine kinase, etk is part of a two component regulatory system involved in the regulation of exopolysacharride in bacterial biofilms. Bacteria have evolved various tyrosine kinase regulators to accommodate changing environmental pressures. Here, we use the mutualistic association between sepiolid squids and their luminescent bacteria, *Vibrio fischeri* (g-Proteobacteria: Vibrionaceae) to elucidate mechanisms of exopolysaccharide production, and whether etk is responsible for biofilm modulation in the squid light organ. Mutations in the etk locus (?etk) were created in various strains of symbiotic and free-living (non-symbiotic) *V. fischeri* to determine whether this gene affects biofilm formation differentially among ecotypes. We constructed two mutants that comprised a complete deletion along with the promoter region as well as a mutation in the sensor kinase portion of the operon (wzz and GNVR protein motifs). Both mutant strains were less capable of producing bioluminescence, had slower growth rates, and were less motile than their wild-type counterparts. Additionally, mutations at the etk promoter caused deficiencies in swarming and were unable to establish a pellicle or biofilm in static cultures. TEM images of the mutants with the deletion of wzz and GNVR motifs as well as mutants with the promoter plus etk region are devoid of both flagella and pili. Thus, the etk operon seems to not only affect biofilm production, motility, growth, and bioluminescence but also morphological cell surface features that are responsible for these phenotypes. With an inability to establish a biofilm, these etk mutants would not be able to colonize the light organ of the sepiolid squid with any efficiency, if colonization is possible at all.

**Nikole Nielsen; Astronomy, NMSU**

*Characterizing the MgII Circumgalactic Medium Using MAGIICAT Galaxies*

We probe the circumgalactic medium within 200 kpc of ~180 galaxies using MgII absorption lines in the spectra of background quasars. We determined the colors, luminosities, and halo masses for all galaxies and have obtained the detailed CGM gas kinematics from high-resolution quasar spectra for ~40 of the galaxies. We find that the covering fraction of MgII gas depends strongly on galaxy properties such that higher luminosity galaxies have larger covering fractions at every impact parameter and for all MgII absorption thresholds. In contradiction to theoretical

predictions that cold-mode accretion shuts off for halo masses  $\log(M_h/M_{sun}) > 12$ , we find no evidence for a drop-off in the gas covering fraction as a function of halo mass up to  $\log(M_h/M_{sun}) = 13.8$ , indicating that the MgII absorbing CGM in high mass halos is sustained by other means, possibly outflows. Lastly, the gas cloud-cloud velocity correlation function (velocity dispersion probability distribution normalized to galaxy circular velocity) reveals enhanced velocity spreads in bluer, higher redshift, and lower luminosity galaxies. Interestingly, lower mass halos have a highly pronounced larger velocity dispersion than higher mass galaxies, indicating that gas is more kinematically “active” in lower mass galaxies. Our results provide a clear picture of how the evolution of galaxies is strongly connected to CGM properties and place strong constraints on currently accepted theoretical ideas on galaxy evolution.

**Matthew Pinch, Robert Güth, Manoj Samanta, & Graciela A. Unguez; Biology, NMSU**

*Bioinformatics Analysis of a Brown Adipose Gene Expression Network in the Myogenically-Derived Electric Organ of the Electric Fish, Sternopygus macrurus*

Skeletal muscle fibers are unique cells with malleable phenotypic properties. In many species of fish, this flexible phenotype has been exploited to develop entirely new organs of myogenic origin, including thermogenic organs, light-producing organs, and electric organs (EOs). In each case, remnants of the muscle program continue to be manifested. How regulation of the myogenic program may be distinct in these specialized tissues is not known. We have obtained transcriptomes and miRNA expression profiles from the skeletal muscle and EO of the South American electric fish *Sternopygus macrurus*. Interestingly, microRNAs that are upregulated in the EO compared to muscle of this fish miR-30, miR-193b, and miR-365 are reported to drive the phenotype of brown adipose cells in mammals, despite the absence of brown fat in this fish. Target prediction analysis using Targetscan Fish shows convergence of these miRNAs on genes involved in metabolism, and components of the sarcoplasmic reticulum and contractile apparatus. To date, we have also identified a set of transcription factors that are known to be important in brown adipose tissue formation in mammals, and determined their expression levels in skeletal muscle and EO of *S. macrurus*. These data indicate that a gene expression network that plays a role in controlling the brown adipose tissue phenotype in mammals may be driving the partial muscle phenotype of the EO of *S. macrurus*. Identification of additional targets of these miRNAs using Targetscan and RNAhybrid miRNA target prediction algorithms, and the upstream factors that regulate these miRNAs will provide important knowledge on how a partial muscle phenotype is maintained in the EO of *S. macrurus*. These data are also likely to inform processes relevant to the evolution of different cell types, and underlying mechanisms of pathologies of skeletal muscle. Future biological studies will validate the role played by this network in this unique model system. To our knowledge, these data represent the first large-scale miRNA expression study performed in electric fish.

**Kelsey E. Quinn & Ryan Ashley; Animal & Range Science, NMSU**

*Establishing the Connection: Fetal-Maternal Communication in Early Pregnancy*

Our objective for this study was to determine the contribution of chemokine ligand twelve (CXCL12) and its receptor, CXCR4 during early gestation in sheep with the long-term goal of reducing early pregnancy loss in livestock. We hypothesized CXCL12 and CXCR4 would increase during the time-frame of fetal attachment and placental development. Maternal (caruncle) placenta and fetal extraembryonic membrane (FM) tissues were collected on days 18, 20, 22, 25, 26 and 30 of pregnancy, with day 10 of the estrous cycle as a control (non-pregnant, NP). Real time PCR was used to assess relative mRNA levels and protein expression was determined via Western blot and immunohistochemistry analysis. CXCL12 mRNA and protein expression increased in caruncle tissue in pregnant compared to NP ewes. CXCL12 and CXCR4 protein also increased in FM tissue on day 25 compared to day 20 of gestation. To further elucidate functionality of the CXCL12/CXCR4 signaling axis, we also localized CXCL12 in sheep uterine tissue. CXCL12 was localized in the uterine luminal epithelium, intercaruncular glandular epithelium and FM on each day of gestation. Greater protein immunoreactivity was present in FM tissue on day 24 of gestation. Because CXCL12 promotes proper invasiveness in an autocrine manner and stimulates cell proliferation in human FM, we suggest CXCL12/CXCR4 signaling is playing a role in maternal-fetal communication and possibly contributing to fetal attachment and subsequent placentation in sheep. This contribution could therefore help promote fetal survival and reduce early embryonic loss in the livestock industry.

**Roshani Rajbanshi; Curriculum & Instruction, NMSU**  
*SEMAAA An Afterschool Program and Its Effects*

Majority of students (K-12) in New Mexico are Hispanic and second language learner and are underrepresented in STEM field. Test scores indicate a lack of STEM proficiency in these Hispanic students. SEMAA (Science, Engineering, Math and Aerospace Academy)—an afterschool program—is helping students to develop 21st Century skills such as critical thinking, collaboration, communication, creativity, adaptability, imagination and entrepreneurship (Trilling & Fadel, 2009) through hands-on learning and practice. SEMAA also uses the theory that learning supported by activities which uses more than one sensory organ draws students' attention and interest (Eristi and Kurt, 2012). Therefore, the goal of SEMAA is to develop interest and involve them in STEM. Informal science experience was used as a theoretical framework which is based on an understanding of the nature of science, mathematics, engineering, and technology teaching and learning, especially, making curriculum, opportunities, and experiences relevant for the underrepresented students in the STEM fields (Banks, 2006; Weissglass, 2002; Stigler & Hiebert, 1999). The study found out that, students understood SEMAA is about science and they were gaining experience in science. The study also found out that learning can be done along with having fun which was illustrated by observation of the classroom and from interviews. In addition to that, it was also clear that SEMAA provided these underrepresented students with learning opportunity which motivated them to continue SEMAA every year. Besides these, it was also evident from interviews that SEMAA also motivated students to go to college for further education.

**Nishath Rajiv Ranasinghe, Andrea Gallegos, James Ni, & Thomas Hearn; Physics, NMSU**  
*Frequency dependent Lg attenuation in Northeast China and Korean Peninsula*

Lg spectra are collected from 452 crustal events spanning from 1995 to 2014 in Northeast (NE) China and surrounding areas using 202 seismic stations from Northeast China extended seismic Array (NECESSArray), GSN stations in NE Asia, China national seismic network, IRIS PASSCAL experiments in NE China, Korean and Japanese permanent seismic networks to study Lg attenuation in NE Asia. Using reverse two-station and two-station methods we obtained frequency dependent Lg attenuation models for a frequency range between 0.5 Hz to 5 Hz with a resolution of about 2°. We solved for the geometric spreading term by fitting the amplitude to the two-station distance ratios and the absolute distances. The best fit yields a spreading coefficient of 0.36 instead of the traditional cylindrical spreading term of 0.50. Lg Q values in NE China and the Korean Peninsula vary from 50 to 1600. Q values increase rapidly in the Songliao Basin (SNB) for higher frequencies ( $\geq 2$ Hz), while they stay relatively constant in the Great Xing'an Range (GXR). Low attenuation regions are found in the Great Xing'an, Lesser Xing'an (LXR) and Songen-Zhangguangcai Ranges (SZR). Overall, attenuation is high in the Songliao, Sanjiang (SNB), Bohai (BHB), Erlian (EB) and Hailar (HB) basins. The highest attenuation is found in the vicinity of Wudalicanchi (WVF), Changbaishan (CBV), and Quaternary volcanic regions, the southern Songliao Basin, west of Erlian Basin, Bohai Basin and the Sanjiang Basin. In general regions with low attenuation ( $Q > 800$ ) have a low heat flow value ( $< 70$  mW/m<sup>2</sup>) and very thin ( $< 1$  km) or no sediments.

**Meredith Rawls; Astronomy, NMSU**  
*The Double Red Giant Binary With Odd Oscillations*

Red giants in eclipsing binaries are excellent tools for studying the interplay among stellar evolution, binarity, and solar-like oscillations. We present a detailed look at one unique system composed of two red giants, KIC 9246715. One of the stars exhibits solar-like oscillations that are weaker than expected, and the other shows none at all. To address this oddity, we combine four years of Kepler light curves, radial velocity curves for both stars, and stellar atmosphere models for each star's extracted spectrum. Our final, well-constrained photodynamic model yields new physical insights for both stars in the binary, puts asteroseismology to the test, and paves the way for detailed studies of other red giant eclipsing binaries with main-sequence companions. This work summarizes the main results of a new paper by Rawls et al.

**Teresa Ross; Astronomy, NMSU**

*Metallicity Distribution Functions for Four Local Group Dwarf Galaxies*

In an effort to extend the study of dwarf galaxies in the Local Group we have developed a method of measuring metallicity distribution functions (MDFs) from photometric metallicities. This technique has the advantage of measuring every star in the field, including stars fainter than those available using spectroscopy, expanding the number of measured stellar metallicities in these galaxies an order of magnitude in some cases. Using the WFC3 instrument aboard HST we obtained relatively high S/N photometry in V (F555W), I (F814W) and Ca H & K (F390M) filters for four Local Group dwarf galaxies: Leo I, Leo II, IC 1613 and Phoenix. We use synthetic color-color diagrams to model observations and thereby recover the metallicity distributions in each galaxy in a technique similar to that used to derive star formation histories. The MDFs provide information on the formation, evolution and enrichment history of each dwarf galaxy.

**Yogesh Raut & David Trafimow; Psychology, NMSU**

*Experiential vs Deliberative Judgments: When Does Mere Difference Lead to Derogation?*

Tastes can't be wrong, so why do we hate it when other people's judgments differ from ours? A pilot study and a survey investigated whether deviant experiential judgments lead to greater interpersonal derogation than deviant deliberative judgments, due to implicating the self and activating a sense of self-threat.

**Sunnie Sartin, Winona Patterson, Kristen Coral, & Todd Scarbrough; Anthropology, NMSU**

*Twin Pines Village: Looking Beyond the Mimbres Valley*

The Twin Pines site, located in the Gila National Forest, New Mexico, is a large Mimbres site that shows signs of multiple occupational periods spanning the Late Pithouse Phase (AD 550-1000) through the Mimbres Classic phase (AD 1000-1130). On the basis of recent mapping and reconnaissance, the Twin Pines site can provide crucial information about the Mimbres culture. First, it is a large Mimbres site which lies farther north of the extensively studied Mimbres Valley and most other sites of the same period. Investigating the site allows us to understand the interaction and affiliation between the people from Chaco Canyon and the Mimbres areas. Second, the site is a source of several interesting artifacts, including copper bells, a copper effigy, an abundance of turquoise, and obsidian flakes. Tracing these artifacts to their source allows us to understand and reconstruct trade between people in the Upper Gila and other areas in the American Southwest. Finally, the site is of interest because it features rock art panels, which include several mortar holes. Understanding these features allows us to better understand the social landscapes and how people interacted in the Mimbres region.

**Collin Scarince & Michael C. Hout; Psychology, NMSU**

*I Won (as far as I remember). Broad Implications of the Incongruity Effect*

Two studies explored memory patterns of Card Game Task based on expectancy, personally characteristics, and outcome. One hundred and six participants in Study 1 and 196 in Study 2 played a simulated Card Game Task similar to Black Jack. Depending on experimental condition, participants were told the game is easier or more difficult to win compared to other casino games. Participants then completed a short questionnaire regarding their attitudes of the game, the Brief Sensation Seeking Scale, and demographics. In Study 1, participants then completed a surprise memory task that included estimating how often they won, lost, or tied during the trials. Participants overestimated how often they won, and underestimated how often they tied. Study 2 sought to explain this difference by using a recognition memory task in place of the recall task. Again, participants showed poorer recognition of trials that resulted in ties compared to wins or losses.

**Sudhir Singla; Plant & Environmental Sciences, NMSU**

*Diverse Guar Genotypes Performance under different Planting Dates in New Mexico*

With increasing climatic variability, water scarcity is becoming a major concern in arid and semi-arid regions of the world including New Mexico, which has threatened sustainability of agriculture and rural economy in the region. Guar or clusterbean (*Cyamopsis tetragonoloba* L.) is a high value legume crop that has a high potential to adapt to the local farming system and boost the local economies. Guar can tolerate high temperatures and dry conditions prevailing in arid and semi-arid climates such as in New Mexico. Guar can be grown for fresh pods for vegetables, or for protein-rich high quality forage for animals or for seed to produce guar gum. Guar gum is obtained from guar seed endosperm which is mainly galactomannan polysaccharide giving the high viscosity properties and has been widely used in various food industry and cosmetics. More recently, use of guar gum for ‘fracking’, where combination of horizontal well drilling and hydraulic fracturing have enabled extraction of previously un-retrievable hydrocarbons from shale formations, has revolutionized natural gas industry. This newly found use of guar gum in oil drilling has resulted in unprecedented increase in demand for guar gum by the US oil industry making the US the biggest user of the guar gum in the world. The objective of this preliminary study was to evaluate several genotypes collected from various parts of the world through USDA germplasm for their adaptability in southern NM. Results will be presented on growth and seed yield and yield attributing characteristics of the tested genotypes. Results indicate that guar could grow and adapt well in the local cropping systems.

**Grace Smith Vidaurre; Biology, NMSU**

*Identifying genomic evidence of selection in a pesky beast: the invasive monk parakeet *Myiopsitta monachus**

Biological invasions have accompanied environmental change and increased global connectivity caused by human activities. Naturalized monk parakeet *Myiopsitta monachus* populations in the Northern hemisphere were introduced as a consequence of the exotic pet trade. These populations, largely restricted to cities and consuming generous supplies of birdseed through winter months, are found across the U.S., Europe and parts of Africa. Previous research shows losses of neutral genetic diversity among naturalized populations compared to native South American populations. Are naturalized populations adapting to different selection pressures? I am currently using two approaches to address genotypic changes among naturalized and native populations. The first is a genome-wide approach, RAD-sequencing, to identify potential candidate genes under selection among naturalized and native populations. The second is a targeted candidate gene approach, in which I am sequencing major histocompatibility complex (MHC) and toll-like receptor (TLR) genes involved in disease resistance. Disease is among the foremost selection pressures populations experience during colonization of novel environments. MHC and TLR genes, players in the adaptive and innate immune systems, respectively, are therefore likely to be under selection among naturalized and expanding populations. Parakeet invaders present a unique opportunity for investigating the complex relationship between natural selection, genotypic and phenotypic changes following invasion.

**Karoline Nicole Sondgeroth, Santiago Morales, M.Ed, Rebecca Palacios, PhD, Joe Tomaka, PhD, & Gigi Shamaley, PhD; Department of Public Health Sciences, NMSU**

*College Students' Body Perceptions and Their Relation to Lifestyle Behaviors*

Obesity is a risk factor for heart disease, stroke, type II diabetes, and cancer. Approximately 2/3 of US adults are overweight or obese (CDC, 2014). In 2013, 34.4% of college students were overweight or obese, 53.8% did not meet the recommended guidelines for physical activity, and 94.6% did not eat the recommended amount of daily fruits and vegetables (American College Health Association, 2014). Research suggests that obese adults misperceive their own weight and in result are less likely to engage in physical activity or healthy lifestyle behaviors (Duncan, et al., 2011). The purpose of this study is to examine how college students' perceptions of their body image relate to their lifestyle behaviors, such as eating habits and physical activity, perceived health, and shape concerns. METHODS. Participants included 681 students attending New Mexico State University. MEASUREMENT. The Body Image Assessment (Thompson & Gray, 1995) assessed self-perceptions and satisfaction of the body. The International Physical Activity Questionnaire (Craig et al., 2003) assessed self-reported physical activity in past 7 days. The Eating Behaviors Questionnaire assessed eating behaviors on a typical day (Greenwood, et al., 2008; 5 items) and the Eating Disorders Examination (Fairburn & Beglin, 2008) assessed shape and weight concern. Additionally, this

study also assessed demographics, Body Mass Index, and perceived health (BRFSS, CDC, 2012). ANALYSES. We conducted bivariate correlations between Body Image Assessment and all other assessments. RESULTS. Findings suggest that this college sample had an accurate perception of their body image with heavier individuals rating heavier contour drawings. Body contour ratings correlated positively with weight/shape concerns, dieting practices, and sedentary lifestyle and correlated negatively with healthy eating practices (e.g., eating breakfast, number of snacks), engagement in vigorous physical activity, and physical health self-rankings. In general, women demonstrated stronger relationships between body contour self-ratings and behavioral practices and body perceptions. Although college students are properly assessing their weight status, this study finds the heavier an individual is the less likely he/she is to engage in healthy lifestyle practices.

**Kathryn Stroud; Sociology, NMSU**  
*Sexuality Norms for Non-Normative Genders*

The current research will explore how people of non-normative gender roles negotiate between sexuality identities. As past research has shown, individuals who identify as transsexual, transgender or genderless often have difficulties fitting into the constraints of gender-specific sexuality labels, such as heterosexual, homosexual or bisexual. The research will be compiled by conducting multiple interviews with people of non-normative gender roles. While the research is still in-process, we hypothesize that the framework to be used will be labelling theory. Individuals of non-normative gender roles are already stigmatized by not identifying within the gender binary, and therefore might feel more compelled to identify within the sexuality labels, while feeling the need to qualify certain aspects of these gendered sexualities.

**Brendan P. Sullivan; Industrial Engineering, NMSU**  
*An Iterative Approach to New Product Development*

This paper describes an approach for optimization of manufacturing systems and facility planning by incorporating the use of analytical comparative techniques. The scope of this project emphasizes the optimization of facility design through the utilization of practical and theoretical processes in the an iterative engineering approach from prototype to advanced full-scale product manufacturing. The project objective is to minimize the cost of manufacturing processes through an optimized facility design, while successfully satisfying established constraints. Through the utilization of the analytic hierarchy process (AHP), the design and adoption of established constraints enables adjustment for qualitative and quantitative considerations in both the manufacturing process and facility design. Through the AHP process, the identified constraints ensure that the final design works through a concurrent process in order to achieve optimal physical design and integrity specifications. This approach demonstrates the ability of a numerical hierarchical technique to increase efficiency and performance of the manufacturing system through multiple levels of development.

**Ali Vaziri-Gohar & Kevin D. Houston; Molecular Biology, NMSU**  
*Tamoxifen-induced IGFBP-1 expression requires GPER and is dysregulated in chemoresistant breast cancer cells*

The membrane-bound G protein-coupled estrogen receptor (GPER) mediates rapid signaling events induced by  $17\beta$ -estradiol (E2) to modulate tissues. In addition to E2, the active metabolite of the selective estrogen receptor modulator tamoxifen activates GPER. Tamoxifen is the most frequently prescribed hormonal treatment for women presenting with estrogen receptor-? (ER?)-positive breast cancer. ER?-positive breast cancers often express GPER; however, the function of GPER during tamoxifen treatment and the development of tamoxifen resistance, a common occurrence in treated patients is not clearly defined. Recent studies have suggested a role for GPER in the development of tamoxifen resistance in breast cancer cells; however the molecular mechanisms of GPER-dependent tamoxifen action remain poorly understood. The insulin-like growth factor-1 (IGF-1) signaling axis increases proliferation of breast cancer cells and is often altered during the development of tamoxifen resistance. To identify putative GPER-dependent mechanisms of tamoxifen action, transcription of IGF-binding protein-1 (IGFBP-1), a known inhibitor of IGF-1, was measured in breast cancer cells after treatment with tamoxifen or the GPER-specific agonist G-1. IGFBP-1 transcription was elevated after tamoxifen treatment and resulted in decreased IGF-1-dependent cell

signaling in MCF-7 breast cancer cells. This decrease was inhibited upon co-treatment with an IGFBP-1 neutralizing antibody. GPER knockdown experiments demonstrated the requirement for GPER during tamoxifen-induced IGFBP-1 induction and inhibition of downstream IGF-1-dependent cell signaling. Furthermore, tamoxifen-dependent IGFBP-1 expression was not observed in tamoxifen-resistant MCF-7 cells. These data provide evidence for a novel, GPER-dependent mechanism of tamoxifen action that is dysregulated during the development of chemoresistance.

**Baoyu Wang; Psychology, NMSU**

*The Effect of Imagined Social Contact on Chinese Students' Perceptions of Japanese People*

This study is designed to understand the mechanism by which stereotypes can change, for the purpose of better understanding whether public policies encouraging social contact could improve the relationship between China and Japan. To this end, one hundred and eighty participants were randomly assigned to three groups (experimental, contrast and control) to test the effect of imagined social contact on stereotypes. Compared with the contrast group, participants in the experimental group were told to imagine a more positive and specific conversation with a Japanese in a bus. Thirty adjectives and four general attitude terms were selected as the measurement of participants' attitudes toward Japanese. We found that the treatment (experimental and contrast group combined) had a significant effect on general attitude terms and four specific attitude terms. In addition, there was a significant correlation between the frequency of the adjectives used to describe Japanese and the effect of imagined contact.

**Justin Winans, Andre Guerrero, & Dr. Alla Kammerdiner; Industrial Engineering, NMSU**

*An Experiment to Study the Risk of Falling with a Wearable Device*

Falls are a serious health problem, especially in the aging population. The increased overall risk in falls among older adults is associated with age-related physiological changes affecting gait and balance. While the overall risk of falls is well-understood, the dynamic changes in the risk of falling has received much less attention. The purpose of this applied research is to understand and quantify temporal changes in the risk of falls by sensing and monitoring gait and balance with a wearable personal device. This project is aimed at the collection and analysis of movement data with a system of wearable sensors. We have collected sample data with a series of motion sensors from individuals while walking. We then analyzed the data, and our results have shown that the wearable device successfully detects the differences in the risk for falling with different types of movement perturbations (e.g., tripping versus slipping).

**Litao Yan; Chemical Engineering, NMSU**

*TiO<sub>2</sub> conformal coating on carbon nanotubes as lithium-ion battery anode*

The controllable synthesis of strongly coupled inorganic materials/carbon nanotubes hybrids represents a long-standing challenge for developing advanced catalysts and energy-storage materials. Here we report a simple hydrolysis method for facile synthesis of TiO<sub>2</sub>/carbon nanotubes hybrid. The porous anatase TiO<sub>2</sub> nanoparticles are uniformly coated on the carbon nanotube conducting network, which leads to remarkably improved electrochemical performances such as exceptional cycling stability, good high rate durability, and reduced resistance. The prepared composite material exhibits a reversible capacity as high as 200 mA·h g<sup>-1</sup> at a current density of 0.1 A g<sup>-1</sup> in lithium-ion cells and a specific supercapacitance of 140 F g<sup>-1</sup> in 0.5 M H<sub>2</sub>SO<sub>4</sub> electrolyte for supercapacitors. The specific supercapacitance were higher than that of the previously reported TiO<sub>2</sub> and graphene composite. Moreover, this hybrid material also exhibits excellent durability after 1000 cycles for both LIBs and SCs. Such superior performance and cycling durability demonstrate the reinforced synergistic effects between the porous TiO<sub>2</sub> and interweaved carbon nanotubes network, indicating a great application potential for such hybrid materials in high power lithium-ion batteries and SCs.

**Yuzhe Yan & German Reyes; Industrial Engineering, NMSU**  
*Optimal Water Releasing Policy for Sustainable Reservoir Operation*

This research highlights progress developing sustainable management strategies for multipurpose reservoir operation systems. The reservoir systems provide multiple benefits of irrigation, municipal and industrial water supply, flood control, and hydropower generation. However, the systems also bring side effects on environment, i.e., a negative influence on the health of the downstream ecosystem such as endangering some fish species and damaging plants downstream. This operation has gained much attention over the last decade. However, most research efforts have been focused on typically optimizing energy and producer-economic benefits, and there have been minimal attempts to develop research on the reservoir operating system under environmentally sustainable conditions. This paper presents an optimization model to derive an optimal operation policy for a multipurpose reservoir system. Unlike the conventional reservoir management, the proposed model maximizes both ecological benefits and those associated with municipal and irrigation usage. The applicability of the optimization model is demonstrated in the case study of Heron Reservoir in the State of New Mexico, United States. The results demonstrate the effectiveness of the proposed model for deriving optimal policies for multipurpose reservoir operation. The results can also be expanded to offer many alternative policies for the reservoir operator, giving flexibility to choose the best out of them.

**Yuliana Zaikman & Michael J. Marks; Psychology, NMSU**  
*Hot, Nice and Slutty: Can Physical Appearance and Personality Influence the Sexual Double Standard?*

The sexual double standard is the phenomenon whereby men are evaluated positively and women are evaluated negatively for engaging in identical sexual behavior. Although people can hold conflicting information (e.g. stereotypical vs. counterstereotypical individuating information) about other individuals, they attempt to form a consistent impression of individuals by inhibiting inconsistent information. The goal of the present study was to investigate whether individuating information about physical appearance and personality could mitigate the exhibition of the evaluations stereotypically associated with the sexual double standard. A sample of 596 participants evaluated a target person who reported having 1 or 12 sexual partners. Overall, participants evaluated highly sexually active (12 partners) female targets more positively than their male counterparts, when the targets were either attractive and had a pleasant personality, or were unattractive and had an unpleasant personality.