Poster and Exhibit Abstracts

(In alphabetical order by author)

1. Aaron Bueno-Cabrera, Department of Biology, NMSU

Assessing SINAP's role in protecting critical habitat of endangered charismatic species at Mexico: An ecological niche modeling approach

Natural Protected Areas (NPA) is an important tool preserving critical habitat for many species, especially those under any protection category. I analyzed the effectiveness of the SINAP (Sistema Nacional de Areas Naturales Protegidas; Mexican NPA National System) for a suite of charismatic and endangered species listed under the NOM-059 species act occurring at Mexico. I developed Habitat Suitability Models (HSM) for each species using presence-only modeling techniques (Maximum entropy algorithm) and climatic and topographic variables from several sources at a 0.01 arc-sin degree pixel resolution. I tested each model using the AUC (area under the curve) parameter, the Kappa index, simple Chi-square tests and the historical range. All procedures were conducted in ArcMap 9.3, ArcView 3.2, DIVA-GIS 7.1 and Excel. HSM models performed well, averaging an AUC of 0.9, a Kappa index >0.5 and all tests significant (Chi2<0.05). According to our results, the Mexican NPA are protecting between 22% and 60% of the species historical distribution. In terms of habitat suitability, the SINAP protects only 19% of moderate quality habitat, however, for the high quality habitat category, this is reduced to only 11% for all the analyzed species; the Quetzal (Pharomachrus mocinno) habitat situation is particularly critical in the Mexican Southern region. Management implications, as well wildlife and its habitat conservation are discussed under the perspective and utility of the ecological niche modeling as a biodiversity conservation and management tool.

Keywords: NPA, NOM-059-SEMARNAT-2001, habitat, Ecological niche modeling, SIG, Maxent, charismatic species

2. Aldo R. Pinon-Villarreal, Department of Civil Engineering, NMSU

Retention and Transport Of Nitrate And Ammonia In Two Media: Clinoptilolite Zeolite And Sandy Loam

The use of large amounts of fertilizers in agriculture poses a risk of groundwater contamination. Clinoptilolite zeolite (CZ), a sedimentary volcanogenic mineral, could be applied to soil to enhance water and nutrient retention, reduce the risk of groundwater contamination and increase crop yields. The objective was to conduct batch and leaching experiments with CZ and native sandy loam (SL) of Mesilla Valley, New Mexico to determine effects of CZ on retention and dispersion of nitrate (NO_3) and ammonia (NH_4) ions. Batch adsorption experiments were undertaken by mixing six different concentrations of nitrate (NO_3) and of ammonia (NH4) fertilizer solutions with CZ and SL. Leaching experiments were performed by repacking two 10 cm diameter, 10 cm long Plexiglas columns with CZ and SL. The columns were saturated with deionized water, and a 200 mL pulse of 35 mg/L NO_3-/NH_4 solution was passed through the columns using a peristaltic pump (Control, CO., Friendswood, Texas). The effluent was collected in 20 mL bottles until the pulse was leached completely. Nitrate and NH4 concentrations were determined with spectrophotometer. The CXTFIT program was used to fit observed data into equilibrium and non-equilibrium transport models. Results from batch experiments indicated an increase in the NO_3/NH_4 adsorption in CZ as compared to SL. Nevertheless, the leaching experiment indicated no retention of NO3 by CZ but rather anion repulsion, and only NH_4 retention. More studies are needed to ascertain the effect of CZ at different pore water velocities on the transport and retention of NO_3.

3. Areen Khattabi, Chemistry and Biochemistry Department, NMSU

Wetting of fatty acid monolayers by organic solvents

Covalent monolayer assemblies of stearic, elaidic and oleic acids are characterized by infrared (IR) absorption and the contact angle with water and organic solvents. The contact angle variations with water and small organic molecules correlate with the monolayer density, which is the lowest for unsaturated hydrocarbon tails and is due to a kink at the double bond, the latter especially pronounced in the case of oleic acid (the cis isomer). Contact angle with hexadecane is distinctly peculiar in demonstrating enhanced wetting of low density monolayers. Such a behavior is in line with the density effects in phospholipid bilayers and can be used in mid and upper chemistry laboratory classes as a physical illustration of the effects of saturated and unsaturated fatty acids on the fluidity of cell membranes.

4. Betty A. Strietelmeier, A. Craine and G.B. Smith, Department of Biology, NMSU

Survey for Avian Influenza A Virus in the Rio Grande River

Avian Influenza A virus (AIV) is found as Low-Pathogenicity (LPAI) and High-Pathogenicity (HPAI) Avian Influenza species. Two viral proteins determine the pathogenicity: hemagglutinin (H) and neuraminidase (N). These two proteins are used to classify AIV, with the H5N1 subtype being primarily responsible for extreme virulence in HPAI-infected species. This subtype has caused illness and death in domestic birds (e.g. chickens, turkeys) and wild birds (e.g. mallards, pintails, snow geese) in Southeast Asia and elsewhere since 1996. Subsequently, the virus has spread over Asia, Northern Europe and Africa, through several mechanisms, including live-bird markets and wild-bird migration. It appears several duck species are adapting to this virulence, allowing birds to survive and spread AIV (as “Trojan ducks”) worldwide. The rate of spread is causing concern in many

countries, especially those close to migratory pathways, such as the Rio Grande fly-way. This study utilizes concentrated water from ponds/lakes frequented by migratory birds to detect AIV. The scientific literature reports use of the matrix (M) gene, which codes for matrix protein (surrounds and protects viral RNA genome), for detection of AIV by RT-PCR. Water was obtained from Bosque del Apache preserve and used to further develop methods for ultrafiltration/concentration of samples to obtain protozoa, bacterial and viral fractions for analysis. We describe here sampling, ultrafiltration and RT-PCR results, as well as the design of new M-gene PCR primers, using current NCBI database sequences. The data used included a large, representative sample of M-gene sequences obtained from >60 species of infected birds (>6400 sequences).

5. Cat Wu, Department of Astronomy, NMSU

Halo Gas Velocities Using Multi-Slit Spectroscopy

Extra-planar gas in spiral galaxies could originate from disk-halo cycling driven by star formation in the disk or from infalling gas clouds. Studying halo gas kinematics can provide evidence for which scenario is more plausible, and edge-on galaxies provide an opportunity to study extra-planar gas. We measure gas velocities from H-alpha emission as a function of height above the galactic disk for a sample of nearby, edge-on galaxies. Using a multi-slit setup on the ARC 3.5m telescope in Sunspot, NM, we are able to measure H-alpha velocities along 11 slits simultaneously. By positioning the slits parallel to the minor axis, we can cover 11 radial distance bins in one exposure. We compare our results to studies of HI velocities in these galaxies.

6. Cat Wu, Department of Astronomy, NMSU

Shifting Focus: Southern India and the Himalayas through the eyes of an astronomer

During the summer of 2008, I studied at the Indian Institute of Astrophysics in Bangalore, India. I had the opportunity to travel around the southern states of Karnataka, Tamil Nadu, and Kerala. I also visited the Taj Mahal and spent some time in the Himalayas. These are some pictures from my travels.

7. Charles Miller, Department of Astronomy, NMSU

Analysis of Images from the Apache Point Observatory LCROSS Impact Observation Campaign

The 2009 LCROSS impact in Cabeus crater at the lunar south pole provided an opportunity to observe the ejecta plume from an impactor of known mass, velocity, and entry angle. We observed the LCROSS target with the 3.5 meter and 1.0 meter telescopes at Apache Point Observatory and the 0.6 meter telescope at Tortugas Mountain in Las Cruces. We discuss the challenges of observing a diffuse plume against the illuminated lunar limb. We also present images of Cabeus before and after impact and analyze these images for evidence of a faint plume. This work is supported by USRA grant number GR0002970.

8. Cynthia Renteria, Department of History, NMSU

Preserving Memory/Promoting Justice: A Collection on U.S.-Mexico Border Activism

Social justice, service and activist groups in Las Cruces, El Paso and Ciudad Juárez work daily to address human rights, economic, labor, environmental, housing, land tenure, violence and other critical issues. Recognizing the importance of this work, members of the New Mexico State University (NMSU) faculty and library staff got together and applied to the

Southwest Border Cultures Institute for a grant. After the grant was awarded I was one of two graduate students hired for the acquisition portion of the project. The goal of this project is to preserve activism along the U.S.-Mexico border. A group in each city was selected; in Las Cruces the Colonias Development Council, in El Paso, Paso del Sur and in Ciudad Juárez the residents of Lomas del Poleo. The project resulted in a permanent collection on social justice housed at the NMSU library. This collection will benefit students, researchers and community groups wishing to learn more about the history and social justice work done in the region. The organizations will benefit by having a safe place to deposit their materials and ensure that their work is preserved for future generations. This presentation focuses on the work done to connect the community and the university by working with the organizations, collecting materials and conducting oral histories. In addition, the presentation will highlight the ongoing working relationships established between the archive and these organizations.

9. Elizabeth Klimek, Department of Astronomy, NMSU

Effects of Shielding on Metallicity Estimates in QSO Absorption Line Systems

One of the powers of QSO absorption line systems is estimating the metallicities and abundances over cosmological time and in a variety of environments (i.e., DLAs, galaxy halos, and the IGM). Most all metallicity estimates in the literature have not investigated UV photon shielding by optically thick material in the proximity of the absorber being studied. Shielding removes ionizing photons, thereby softening the ionizing spectrum incident on the absorber. This process results in ionization fractions that differ from an unshielded photoionized cloud and can lead to a substantial underestimate in the inferred metallicity. This may have consequences for metallicity estimates, especially in Lyman Limit Systems, which are thought to arise in close proximity to galaxies.In this work we use the photoionization code Cloudy to investigate the effects of shielding on the observed column densities of MgII, CIV, and OVI for both the optically thin and optically thick cloud scenarios. We test this for shielding clouds with different HI column density as a function of total hydrogen number density, n_H. Shielding results in an underestimate of the metallicity relative to unshielded absorbers. Generally, the greater the shield cloud N(HI), the greater the metallicity underestimate for all three ions. For MgII, the greater the shield cloud n_H, the greater the metallicity underestimate, while the opposite is true for the higher ionization ions CIV and OVI. The effect is more sensitive to the shield cloud N(HI) than to its n_H. The amount of underestimation is more severe for higher N(HI) absorbers.

10. Garrett L. Strosser, Robert Lawson, Department of Psychology, NMSU

Explicit and Implicit Attitudes toward Atheists and Other Unreligious Concepts

While national polls suggest that atheists are one of the most despised social groups by Americans, little research has dealt with the issue of attitudes toward this group. This study sought to address this topic by evaluating explicit and implicit attitudes held by American theists and atheists towards both religious believers and nonbelievers and related religious/unreligious concepts. Theoretically, the study addresses the issue as to whether or not implicit and explicit measures tap into the same underlying attitudinal domain. To assess implicit attitudes, participants completed a paper-and-pencil version of the Implicit Association Test (IAT), (Lemm, Lane, Sattler, Khan, & Nosek, 2008) in which pre-tested religious and unreligious words were paired with pleasant and unpleasant words. To assess explicit attitudes, participants completed two feeling thermometers in which they rated how “warm” versus “cold” they felt toward both religious believers and nonbelievers. Findings from the paper IAT indicate that while theists showed an implicit attitudinal bias favoring

religious concepts over unreligious concepts, atheists showed no implicit preference for unreligious or religious concepts. However, atheists reported less warm feelings towards religious believers than theists reported. Overall, the correlation between the explicit attitude measure and the IAT is weak and nonsignificant. This finding is interpreted as showing a partial dissociation between the two measures; while theists displayed a preference for religious concepts at both the explicit and implicit levels, atheists only favored unreligious concepts at the explicit level.

11. F. Omar Holguin, Plant and Environmental Sciences, NMSU

Integration of experimental studies with mass spectrometric metabolomic techniques to study and model the metabolism changes in GS1 transgenic alfalfa

By integrating experimental studies with quantitative approaches that better deduce, characterize, and optimize the regulation and integration of complex and interacting metabolic pathways, we can model and engineer the gene regulatory networks (GRNs) and metabolic networks (MNs) involved in and related to C and N metabolism for effectively improving nitrogen use efficiency and biomass. GS plays a key role in N assimilation and may play a key role in N use efficiency. By applying mass spectrometric techniques we are looking for other steps in underlying biochemical pathways that may become the bottleneck in the N assimilatory pathway. Towards this objective we have produced transgenic alfalfa plants with increased cytosolic GS (GS1) activity that exhibit improved biomass compared to control plants. We have subjected the extracts from leaf tissues of these transformants and control plants to metabolite analysis using GC/MS, LC/MS, and FT-ICR/MS. Our data shows th at increased GS1 activity is accompanied changes in many metabolic pathways, including those involved in nitrogen metabolism, carbohydrate metabolism, and the TCA cycle.

12. Janeth Sanchez, Department of Health and Social Services, NMSU

Gender and Ethnic Differences in Eating-Specific Motivational Tendencies

Gray's (1994) two factor learning theory includes a Behavioral Approach System (BAS) that responds to stimuli signaling reward by facilitating appetitive behavior, and a Behavioral Inhibition System (BIS) that responds to stimuli signaling punishment by inhibiting motor behavior. Individual differences in these systems have been related to risk behaviors in past research. Of interest in this study is the relationship of motivational tendencies to eating behavior. Methodology: A pilot study examined eating-specific BIS and BAS motivational tendencies among 160 college students. Specifically, a survey consisting of four BAS (Escape, Sensation Seeking, Positive Emotion, and Reward) and two BIS subscales (Punishment and Negative Emotion) was employed in this study. A 2x2 research design with gender (male/female) and ethnicity (Hispanic/non-Hispanic) as independent variables and all 6 motivational subscales as dependent variables was used. Results: Multivariate analysis of variance identified significant gender effects for Negative Emotion ($p<.001$), Positive Emotion ($p<.05$), and Sensation Seeking ($p<.001$). In anticipation of eating, male participants demonstrated greater Positive Emotion and Sensation Seeking than female participants, while females demonstrated greater Negative Emotion than males. This analysis also found a significant Ethnicity effect for Punishment ($p<.05$). Specifically, Hispanics demonstrated greater Punishment in anticipation of eating than non-Hispanics. Discussion: This study identified gender and ethnic differences in eating-specific motivational tendencies. It is important to further examine the relationship between motivational tendencies and actual eating behavior. Understanding individual differences in

eating-specific motivational tendencies may help develop more effective behavioral interventions for groups at risk for overeating and obesity, such as Hispanics.

13. Jamie Hughes, Department of Psychology, NMSU

Implicit Beliefs about Stability and Change: A Construct Validity Study

Implicit theories are beliefs about the relative stability or malleability of human characteristics. Individuals can hold these beliefs about intelligence, morality, or personality. Further, the particular belief one holds (entity beliefs versus incremental beliefs) are shown to predict a particular pattern of behavior. However, it is not known whether beliefs about broad domains such as intelligence, are consistent with beliefs about specific domains such as mathematical ability. An association between specific and broad domains would provide evidence of the construct validity of implicit belief theory. One hundred and twenty seven participants completed a series of four-item implicit belief measures about specific domains related to person attributes, intelligence, and morality. Results indicated that most participants endorsed incremental beliefs. The classification of participants into entity theorists, incremental theorists, or neither revealed that approximately 70 percent of participants were unclassified or incremental theorists. A confirmatory factor analysis provided evidence for the construct validity of implicit beliefs, and high correlations between specific domains and latent constructs were obtained.

14. Joshua Sandry, Psychology, NMSU

Students Misperceive Their Instructor's Expectations Regarding Appropriate Classroom Behaviors

Classroom incivility degrades the quality of education and accurate description of classroom rules serve to reduce incivility. We assessed the accuracy of student's perception of their professor's expectations for appropriate decorum. Students in eight classes rated how irritating they believed 16 classroom behaviors were to their instructor and we compared students ratings to the ratings given by their instructor. Students frequently had misassumptions about what their instructor believed were important errors of classroom decorum. We suggested several ways that faculty can better communicate their expectations.

15. Jillian Bornak, Department of Astronomy, NMSU

Dust in the Wind: Grain Formation & Evolution in Classical Novae

We see dust everywhere we look, from our own Milky Way galaxy to the distant universe, but dust formation is poorly understood. Classical novae are a convenient way to study dust formation on human timescales, however dust masses derived from observations are erroneously large. We propose the flaw resides in assuming that the dust is distributed in homogeneous shells. We will present the results of using the advanced dust modeling code, DIRTY, to over 200 days of data of Nova Cen 1991 (V868 Cen), a classical novae with dust formation and strong evidence of inhomogeneous ejecta.

16. Jillian Bornak, Department of Astronomy, NMSU

Eye of the Beholder

I present photos from the past 4 years, taken in the Southwest and the East Coast.

17. Khaled S Hatamleh, Mechanical and Aerospace Engineering, NMSU

Unmanned Aerial Vehicles Dynamics Modeling & Parameter Estimation

Dynamics modeling of Unmanned Aerial Vehicles (UAVs) is an essential step for design and evaluation of an UAV system. Many advanced control strategies for nonlinear dynamical or robotic systems which are applicable to UAVs depend upon known dynamics models. The accuracy of a model depends not only on the mathematical formula or computational algorithm of the model but also on the values of model parameters. Many model parameters are very difficult to measure for a given UAV. The poster presents the results of a simulation based study of an in-flight model parameter identification method. The method can identify the unknown inertia parameters of the UAV under certain conditions. Using the recursive least-square technique, the method is capable of updating the model parameters of the UAV while the vehicle is in flight. sensor noise effect on the identified parameters is also considered by the study.

18. Leah Lankford, Animal and Range Sciences Department, NMSU

Effects of human gonadotropin on serum progesterone concentrations, embryonic survival, and lambing rates in ewes

This study was conducted to determine if human chorionic gonadotropin (hCG) will increase circulating concentrations of progesterone (P4) in sheep and prolong elevated levels through the period of implantation. Fifty-nine Suffolk ewes (avg BW =79.7 ± 2.5 kg) received an intravaginal P4-containing insert (CIDR, 0.3 g P4) for 12 d and were mated with fertile rams on the second estrus (d 0) after CIDR removal. Ewes were randomly assigned to one of two treatments. Treated ewes received 200 IU (0.4mL) of hCG im and controls received 0.4 mL saline im on d 4, 7, and 10. Blood samples were taken via jugular venipuncture beginning on d 0 and on alternate days until d 35. Serum P4 concentrations were similar ($P > 0.10$) between groups through d 5. However, on d 7, ewes treated with hCG had greater ($P < 0.01$) serum P4 concentration than controls, and P4 remained higher ($P < 0.05$) throughout the sampling period (d 35). Of ewes receiving hCG, 68% had 4 or more total CL present compared to 33% for controls ($P < 0.05$). On d 60 85% of hCG-treated ewes had multiple fetuses compared to 62% of controls ($P < 0.10$). In addition, 82% of hCG-treated ewes gave birth to two or more lambs compared to 63% of control ewes ($P = 0.17$). In conclusion, hCG administration on d 4, 7, and 10 after mating resulted in elevated serum P4 from d 7 through d 35, and more ewes carrying multiple fetuses.

19. Lisa Drake, Department of Biology, NMSU

The role of SLC7-type amino acid transporters in mosquito immunity, reproduction and lifespan

Mosquitoes are successful as disease vectors because they require vertebrate blood as a nutrient source for egg development. After a blood meal, yolk protein precursor (YPP)-synthesis is up-regulated in the fat body. Amino acid (AA)-transporters, located in the fat body plasma membrane, facilitate blood meal-derived AA import and generate a signal that

is transduced to the yolk protein gene via the TOR/S6K signal transduction pathway. YPP gene expression in *Aedes aegypti* is dependent upon the cationic AAs histidine, arginine, and leucine. Arginine is also the precursor to nitric oxide which is an important molecule for the innate immune system of mosquitoes. We identified 68 putative AA transporters in the genome of A. aegypti, eleven members of the subgroup of SLC7-type AA transporters, and five of the subfamily of cationic AA transporters (CATs). We determined fat body expression levels of the eleven SLC7-transporters and found several of them strongly up-regulated after a blood meal. Using RNAi-mediated knockdown and subsequent analyses of reproductive fitness, aging, and immunity we demonstrate the role of SLC7-type AA transporters in adult female *A. aegypti.*

20. Lisa Busche, Department of Psychology, NMSU

Effects of Recent Sexual Relationships on Mate Desirability

Previous research offers a consensus that individuals with promiscuous sexual histories are less desirable mates. This finding is often attributed to an increased risk of cuckoldry for men and of diversion of resources for women who are involved with promiscuous partners. Despite these risks, most individuals do have more than one sexual partner over the course of their lifetime. One variable that may help individuals decide when it is acceptable to enter a relationship with a partner who has previous sexual experience is the recentness of the partner's previous relationships. In particular, we expected to find men avoiding partners who had terminated their most recent sexual relationship within the past four months, because in such a scenario a woman could be pregnant from her last relationship but not showing any physical signs of the pregnancy. Participants were asked about their willingness to engage in a causal, long-term, or purely sexual relationship with a new partner. The amount of time since the most recent sexual relationship of this potential partner was varied between subjects. Results confirmed our predictions showing that recentness of a past relationship influences the degree to which an individual is desired as a mate.

21. Marco Schiavon, Matteo Serena, Plant and Environmental Sciences, NMSU

Growing Degree Days to Predict Warm Season Turfgrass Establishment from Seed under Saline and Subsurface Drip Irrigation

A growing scarcity of potable water in the southwestern United States sets limits on its availability for nonessential uses such as turfgrass irrigation. Low quality ground water and recycled water have been identified as alternatives to potable water for irrigation. Both types of water can exhibit higher salinity levels than potable water and the resulting salt build-up in the turfgrass rootzone requires a change in species selection in transition zones from traditional cool season grasses to salt tolerant warm season grasses. However using warm season grasses in high altitude desert locations has been challenging, because the growing season for the warm season grasses can be relatively short and salinity stress can further slow down growth and establishment. A study was conducted at New Mexico State University in Las Cruces, NM in 2008 and 2009 to determine the Accumulated Average Daily Soil Temperature (AADST) necessary to establish bermudagrass [Cynodon dactyon (L.)] cultivar Princess 77 and seashore paspalum [Paspalum vaginatum (Swartz)] cv. Sea Spray. The grasses were irrigated at 100% potential ET with both with saline (1500 ppm TDS) and potable (500 ppm) water under 2 irrigation systems (sprinkler vs. subsurface-drip). In 2008 grasses were planted early March [dormant] and early June [standard]) and in 2009

grasses were seeded every 15th day of each month from March to June. Response of percent ground cover to AADST was fitted to linear regression equations. In 2008 early seeded plots established faster than late seeded plots regardless of irrigation type and water quality. With the exception of saline drip irrigated plots, all late seeded treatments required fewer heat units (AADST) to reach 50% ground cover than early seeded plots. AADST strongly predicted percent ground cover for all treatments.

22. Matteo Serena, Plant and Environmental Sciences, NMSU

Dormant Seeding and Sodding for Faster Turfgrass Establishment under Saline and Subsurface Drip Irrigation

Establishing warm season grasses from seed or sod in the transition zones of the United States poses a challenge because of the short growing period in which turf can be transplanted. To assess the establishment of turf during dormancy, a study was conducted at New Mexico State University in 2008 to compare the effects of 2 planting dates (early March [dormant] vs. mid-June [late]) and 2 irrigation systems (sprinkler vs. subsurface-drip) on the establishment of bermudagrass [Cynodon dactylon (L.)] cultivar Princess 77 under 2 qualities of irrigation water (saline at 1800ppm Total Dissolved Salts vs. potable at 500 ppm). Plots were irrigated daily at 100% pET and fertilized every two weeks at 2.5 g N/m2. In 2008, quality of irrigation water had no effect on establishment. When data were pooled for water quality, dormant sodded sprinkler irrigated plots established faster than all other treatments and dormant sodded drip irrigated plots and late seeded sprinkler irrigated plots reached 75% ground cover 147 and 152 days after early seeding or sodding (DAES). Early seeded drip irrigated, late sodded drip irrigated, and late seeded sprinkler irrigated reached 75% ground cover 177, 182, and 186 DAES respectively. Plots that were drip irrigated and seeded late did not reach 75% ground cover by the end of the study period. Our results suggest that bermudagrass established better from sod during the dormant season than from seed.

23. Mohammed Habeeb Ur Rahman, Klipsch School of Electrical Engineering, NMSU

Mathematical Formulations for Electromagnetic Pulse Propagation in Rocard-Powles-Debye Dispersive Model of Distilled Water

It has been long known that propagation of electromagnetic pulse through dispersive media give rise to Brillouin and Sommerfeld type precursors. The mathematical model to represent these precursors, in most dispersive media, results in mathematically intractable complex differential and integral equations. However, modern asymptotic theory of pulse propagation through dispersive media gave rise to closed-form formulations for Brillouin type precursors. There are, however, very few experimental studies reported in the literature to experimentally observe the existence of the precursors and characterize the evolution of these precursors in a given dispersive media. A simple mathematical formulation has been introduced to observe electromagnetic pulse propagation in Rocard-Powles-Debye model of dispersive dielectric for distilled water using a waveguide. Moreover, these formulations are validated using existing reported results.

24. Michael Abravanel, Department of ECE, NMSU

Rotman lens waveguide implementation in Ku band

Modern satellite, wireless communication, and radar systems often demand the wide-band performance for multi-channel operation. Phased array beam steering provides the benefit of multi-directional radiation without changing the physical position of the array. Phased array antennas have been widely used in orbital communications as well as radar applications. Specifically, recent applications such as the collision avoidance feature in automobiles provide the need for the compact dimensions that result from the use of high frequency design. Stationary beam steering, utilizing beam switching techniques, offer a less expensive and compact, and low profile alternative to traditional phased arrays. Rotman lenses have been used in the past as attractive candidates in beam forming networks. Typical implementation involves microstrip design equations based on wave, ray tracing assumptions and path length from one contour (circular) to another (typically parabola or hyperbola). Such devices tend to have losses that increase with frequency as well as the number of ports used. Implementation of the Rotman lens in a waveguide, or stripline form could help improve the power efficiency of the system.

25. Maria T. Patterson, Department of Astronomy, NMSU

HII Regions in the Outer Disk and Tidal Arms of M81

The outer disk spiral arms of M81, caused by the interaction with M82 and NGC3077, are fertile grounds for exploring star formation in low density environments. The area is characterized by extended HI arms and filaments within which are found HII regions and dwarf galaxies, including HoIX. Much attention has focused in past years on the evidence for star formation and on the properties of the stellar populations detected in these HI features, especially from recent GALEX and HST observations. Here we report on a study of the HII region population over a 1.5 degree field, derived from a Burrell Schmidt H-alpha composite supplemented with ARC 3.5-m telescope emission line images of both inner and outer disk HII regions. We discuss the luminosities and morphologies of the HII regions and compare the current massive star formation with the recent and past rates inferred from the stellar populations detected in the outer disk features.

26. Martha Martinez Grimes, Department of Molecular Biology, NMSU

The role of nitrogen status on the genes in sugar metabolism in the leaves and root nodules of alfalfa

The legume-Rhizobium symbiosis involves very complex interactions, which lead to the formation of a new organ, the root nodule. The bacteria residing in the nodule fixes atmospheric N2 into a form usable by the plant and in turn obtains photosynthate derived carbon substrates from the plant. The photosynthate is delivered to the nodule in the form of sucrose and the carbon derived from the metabolism of sucrose in the nodules is used for several physiological processes; including plant and bacterial respiration, N2-fixation and assimilation, and the biosynthesis of starch and cellulose. C assimilation, C partitioning and N assimilation are highly coordinated and there are many points of reciprocal control. Our objective is to analyze the expression pattern of genes encoding key enzymes in Carbon metabolism in the nodules and leaves under conditions where the symbiont can fix or not fix N2, thus providing conditions of nitrogen sufficiency on deficiency. Our results will determine how nitrogen status regulates the expression of key genes in C metabolism in both the leaves and the nodules. By integrating experimental studies with quantitative

approaches that better deduce, characterize, and optimize the regulation and integration of complex and interacting metabolic pathways, we can model and engineer the gene regulatory networks (GRNs) and metabolic networks (MNs) involved in and related to C and N metabolism for effectively improving nitrogen use efficiency and biomass. GS plays a key role in N assimilation and may play a key role in N use efficiency. By applying mass spectrometric techniques we are looking for other steps in underlying biochemical pathways that may become the bottleneck in the N assimilatory pathway. Towards this objective we have produced transgenic alfalfa plants with increased cytosolic GS (GS1) activity that exhibit improved biomass compared to control plants. We have subjected the extracts from leaf tissues of these transformants and control plants to metabolite analysis using GC/MS, LC/MS, and FT-ICR/MS. Our data shows that increased GS1 activity is accompanied changes in many metabolic pathways, including those involved in nitrogen metabolism, carbohydrate metabolism, and the TCA cycle.

27. Mark Seger, Department of Molecular Biology, NMSU

Repercussions of increased leaf sucrose biosynthesis in Medicago Sativa (Alfalfa) when grown under symbiotic nitrogen conditions

Legumes form a unique organ called the root nodule that is the site of nitroge(N2) fixation to ammonia by the bacterial symbiont, *Rhizobia*. In exchange for ammonia, the plant provides the root nodule a source of carbon in the form of sucrose and its metabolism supports bacteroid growth, fuels N2 fixation, and provides the carbon skeletons needed for ammonia assimilation. Synthesis of sucrose begins in the source leaves and a key regulatory enzyme, sucrose phosphate synthase (SPS), catalyzes the penultimate step in the pathway. Our objective is to increase sucrose synthesis in the leaves of alfalfa to determine how increased sucrose transport to the nodules will affect both carbon and nitrogen metabolism. To date, a maize SPS gene driven by the CaMV35S promoter has been introduced into alfalfa to constitutively increase SPS activity. Expression of the maize SPS transgene has been demonstrated in the source leaves with a concomitant increase in SPS activity and sucrose levels. The transformants demonstrated changes in the levels of several key carbon and nitrogen metabolites when grown under symbiotic conditions. Moreover, transformants demonstrated a change in appearance and an increase in the number of nodules.

28. Michael Sussman, Department of Astronomy, NMSU

Simulation of the Uranian Circulation with the EPIC GCM

Uranus' emitted infrared irradiance is only 6% more than its absorbed insolation, thus unlike other giant planets, Uranus appears to emit little internal heat. This results in an important role for solar radiation in the planetary energy budget, in spite of its large heliocentric distance. Furthermore, its extreme axial tilt of 97 degrees generates a strongly varying insolation pattern which may act as a forcing mechanism to drive seasonal circulation effects. Some evidence such as increased discrete cloud features and altered zonal winds suggest seasonal change has already been observed (Hammel et al., 2005, Icarus 175, 534-545).

To model potential seasonal changes on Uranus' circulation, we employ the use of the Explicit Planetary Isentropic Coordinate (EPIC) GCM (Dowling et al., 2006, Icarus 182, 259-273), previously used successfully for simulations of atmospheric circulation for the other giant planets. To properly model the effects of seasonal insolation patterns, we replace

EPIC's default Newtonian cooling, and introduce a new, more realistic two-color (visible and mid-IR) fully radiative scheme which properly models radiative diffusion. Our radiative scheme generally reproduces the planet's temperature-pressure profile with only three free parameters: extinction coefficients for visible radiation and mid-IR radiation, and an assumed abyssal temperature. We present the results of our modeling efforts, showing spin-up of zonal and meridional winds with forcing from various seasonal insolation patterns.

29. Mary Jean McCann, Fisheries, Wildlife, and Conservation Ecology, NMSU

Bolson Tortoise (Gopherus flavomarginatus) Headstart in New Mexico

Endangered bolson tortoises presently occur in the wild in a small region of the Chihuahuan Desert in Mexico. Restoration of them is dependent on captive breeding and headstarting of young. Three known populations of bolsons now exist in the United States, all in New Mexico. Two of them on Ted Turner's Armendaris and Ladder ranches. In 2009, 25 hatchlings were produced in New Mexico. Various techniques have been used to increase the production of neonates to assess their survival. X-rays have proven to be particularly useful because they not only tell us the number of eggs each gravid female has, but also estimate time of laying. On the Armendaris ranch during the summer of 2009, 10 females were x-rayed 4 times during the nesting season (May-July). Ninety percent were determined gravid for the first clutch, 70% for a second clutch, and none produced a third clutch. Identifying natural nests had limited success. Nests found were either protected with a predator-proof enclosure or eggs were removed for indoor incubation. Three tortoises hatched as laid in one of these enclosures. X-rays determined 84 eggs total from gravid females. Among these eggs, 27 (32%) were located in the fenced enclosures. Of the 27 eggs, 19 (70%) were removed for artificial incubation and 8 (30%) were incubated naturally. Time of indoor incubation from eggs hatching ranged between 72-80 days and natural incubating ranged between 100-110 days. We will continue to refine techniques to obtain large numbers of hatchlings for future releases in the wild.

30. Nafish Quraishi, Electrical Engineering, NMSU

Velocity estimation by UWB noise radar using superresolution technique

UWB radar systems are being widely used for remote sensing applications, such as, detection of underground mines, utility lines and pipes, etc. These systems offer a very fine range resolution capabilities and hence enhancing the underline image. However this system suffers to estimate the velocity of a moving target precisely. In UWB radar systems, the Doppler spread by which we determine the velocity is bandwidth dependent and susceptible to noise. MUSIC (multiple signal classification) algorithm is used to determine the Doppler frequency which provides much better resolution when the system is operating under noisy conditions. The most important property of MUSIC method is that, at least in principle, they produce unbiased frequency estimation with infinite resolution, regardless of the signal to noise ratios. MUSIC is an improvement of Pisarenko harmonic decomposition. The idea is to decompose the autocorrelation of input signal into two subspaces, signal and noise subspace, then a frequency estimation function is build to extract the frequencies of the desired signals. Simulations are carried out to show how smoothly MUSIC can detect the Doppler spectrum and hence the velocity under noisy conditions.

31. Nabil Al-Aqtash, Department of Physics, NMSU

Covalent functionalization of Boron/ Nitrogen doped Graphene : an ab Initio Study

We have studied the mechanism of chemical functionalization of graphene by COOH groups. Our study was performed in the framework of ab initio pseudopotential density functional computational methods. The structural and electronic properties of carboxylated graphene sheets were examined in cases of graphene containing no defects, containing a SW defect, containing a vacancy, and containing defects combined with N/B- doping . We observed significant structural changes in graphene after the attachment of the COOH group to its surface. We found that the binding energy between the COOH group and graphene increases significantly in the presence of SW defects and vacancies combined with doped B. The B-doping appears to enhance the interactions between the defective graphenes and the COOH molecule. However, the N-doping appear to depress these interactions. Our calculations show that surface defects combined with B-doping play an important role in the carboxylation of graphene.

32. Pradip Adhikari, Department of Plant and Environmental Science, NMSU

Identification of Soil Properties Based Indicators Using Principal Component Analysis for Desert Soils Irrigated with Treated Wastewater

Knowledge of soil heterogeneity is useful for designing site specific soil management practices especially for those affected by anthropogenic activities. The objectives of this study were to determine the variability of soil physical and chemical properties and to identify the minimum number of principle components (PCs) necessary to explain the total variability of lagoon treated wastewater irrigated soils of West Mesa. Variability in soil properties was identified by coefficient of variation (CV) as the indicator and a property was ranked as least (CV < 0.15), moderate (0.15< CV<0.35) or most (CV > 0.35) variable using the criteria proposed by Wilding (1985). Nitrate (NO3-), chloride (Cl-), sodium adsorption ratio (SAR), hydraulic conductivity (Ks), sodium (Na+), exchangeable sodium percentage (ESP) and electrical conductivity (EC) were observed most variable in the irrigated plots at 0-20 cm depth. Using Principle Component Analysis (PCA), 16 soil physical and chemical properties were grouped into four components (eigenvalue> 1) as: soil sodicity, water transport, soil texture and organic matter (OM) at 0-20 cm depth and soil sodicity, soil texture, water retention and OM at 20-40 cm depth. The soil sodicity factor was the most dominant with ESP the most dominant measured soil attributes at both 0-20 and 20-40 cm depths. Therefore, ESP should be monitored over time in the west mesa land application site. The mean SAR for study site was 19.17 in the irrigated plots, it is necessary to initiate management strategies on controlling soil sodicity in the West Mesa land application site.

33. Phanidhar Kukutla, Department of Biology, NMSU

The role of melanization in defense againt plasmodium yoelii in Anopheles gambiae mosquitoes

Malaria is a mosquito-born disease that kills over one million people annually. An understanding of the mosquito-parasite interactions is critical for developing control strategies to intervene malaria transmission by Anopheles mosquitoes. One way in which Anopheles gambiae responds to some species of malaria is through melanization of oocysts. A black coating of melanin is formed on the parasites in response to recognition of the parasite. Here we report that serine protease CLIPA8 is required for oocyst melanization of Plasmodium yoelii in An. gambiae. However, while RNA interference (RNAi) mediated inhibition of CLIPA8 decreases the number of melanized oocysts, the live parasite load on

the midgut is not changed, suggesting that the melanization may not be necessary for the early oocyst killing.

34. Qi Lu, Mechanical & Aerospace Engineering, NMSU
Virtually Offloading Body Mass for Rehabilitation: A Simulation Study

This paper describes a computer simulation based investigation of an active body-weight support (BWS) technology which has a high potential of significantly improving treadmill-based locomotion rehabilitation. Using acceleration feedback and force control strategies, the active BWS system can offload not only partial body weight but also partial body mass (thus the dynamic load) of the patient who is supported by the system. As a result of the reduced mass, the patient can perform training with ease and comfort. Due to the safety requirements, the proposed technology has to be thoroughly investigated through simulation and experiment before a human subject experiment can be safely conducted. The work reported in this paper is such a simulation work. In the simulation the physical human is modeled as a multi-body system with 54 degrees of freedom. The model also predicts physical interaction of the feet with the treadmill using contact dynamics simulation. The simulation results verify that the proposed new active BWS system can dynamically and seamlessly reduce dynamic load of the patient in training.

35. Ryan T. Hamilton, Department of Astronomy, NMSU
Are Short Period CVs Normal?

We present the continuing results of VLT ISAAC K-band spectroscopy of short period cataclysmic variable (CV) systems below the "period gap" between 2 to 3 hours. It is extremely difficult to see the secondary stars in short period systems, since the low luminosity secondaries are swamped by the accretion disks in these objects. We show the infrared spectra for 9 systems below the gap: V2051 Oph, V436 Cen, EX Hya, VW Hyi, Z Cha, WX Hyi, V893 Sco, RZ Leo, and TY PsA. We are able to clearly detect the secondary stars in all but WX Hyi, V893 Sco, and TY PsA. We present the first direct detections of the secondary stars of V2051 Oph and V436 Cen, and present new detections for EX Hya, VW Hyi, Z Cha, and RZ Leo. Previous infrared spectroscopic surveys of CVs above the period gap reveal that these secondaries suffer a universal deficit of C12, enhanced levels of C13, and unusual abundance patterns for other species (e.g., Mg,Si, Al, Ca). Infrared spectroscopy of short period magnetic CVs (polars) have shown that their secondary stars appear completely normal, and the secondaries in a sample of "pre-CVs" have normal carbon abundances. Implications for CV evolution and formation scenarios will be discussed.

36. Sayed Gebril, Mark Seger, Jose Ortega, Champa Sengupta-Gopalan,
Department of Plant and Environmental Sciences, NMSU
Characterization of SPS gene in Pea (Pisum sativum)

Sucrose phosphate synthase (SPS) is an enzyme that catalyzes the first step in sucrose synthesis. Sucrose is the only source of carbon compounds that can be transferred between source and sink tissue. Sucrose is utilized as source of energy in sink tissues such as root nodules and seeds where it is broken down by sucrose synthase (SucSy). The goal of this study is (1) to characterize SPS gene families in pea Pisum sativum, (2) to understand the expression of this gene in source and sink tissues. Southern blotting and probing with alfalfa SPS showed that SPS is encoded by multi gene families.

37. Sieun An, Department of Psychology, NMSU

Applying signal detection strategies to investigate the differences in making moral attribution across cultures

An and Trafimow (2007) found that there are differences in making moral attributions in Americans and Koreans. While Americans had more moral attributional weight after perfect duty violations (e.g. dishonesty and disloyalty) than imperfect duty violations (e.g. unfriendliness and uncharitability), Koreans did not differentiate between perfect and imperfect duties. This indicates that people from the two counties handle moral attribution differently. Based on the previous findings, it seems that people from different cultures may have different ideas about what are perfect duty violations (such as dishonest behaviors) and what are imperfect duty violations (such as unfriendly behaviors). Specifically, some specific behaviors in the same categories would be considered differently depending on the culture in which a given transgression occurred. Therefore, to conclude the question on moral attribution differences across the cultures, we decided to figure out cultural moral behavior domain/frame by applying signal detection strategies. To define people's cultural moral domain/frames, specific behaviors in the moral domain were needed and were borrowed from work by Chadwick, Bromgard, Bromgard, and Trafimow (2006). 25 items from their dishonest category for perfect moral duty behaviors and 25 items from the unfriendly category for imperfect moral duty behaviors were used in the current study. Items were randomly mixed and presented in four conditions. All the participants were asked to rate each item on whether should be deemed immoral behavior or not. The result of the study suggested that Korean and American moral domains were not the same, which means that, because Koreans and Americans consider certain behaviors differently with respect to their morality, they would make moral attribution differently on particular violations.

38. Teresa Ross, Department of Astronomy, NMSU

Examining the Mg II Absorber-Galaxy Connection at Intermediate Redshifts

A fundamental astrophysical question is the role of gas in galaxy evolution. Mg II absorption as observed in quasar spectra is found to arise in a broad range of gaseous galactic environments. But the overall relationship between the distribution of Mg II absorbers, their host galaxies, and the larger scale galactic structure is not well known. Lyman-alpha studies have been successful in showing how galaxies and galaxy over densities correlate to neutral hydrogen absorption; therein providing insights into the absorbing gas-galaxy correlation function. However such studies have not been preformed using a tracer of low ionization metal enriched material that has been processed through galaxies. We present our study, in progress, to examine the relationship between Mg II absorbing gas and galaxies in 25 sight lines.

Our goals are to analyze how impact parameter, galaxy morphology and Mg II absorption kinematics are related, to constrain the gas distribution within an impact parameter of 500 kpc, and to study whether absorbing and non-absorbing galaxies differ in morphology. We also aim to quantitatively compare the Mg II-galaxy correlation, Lyman-alpha -galaxy correlation and galaxy-galaxy correlation functions.

39. Prafulla D Patil, Department of Chemical Engineering, NMSU

Microwave-Assisted Catalytic Transesterification of Camelina Sativa Oil

Catalytic conversion of Camelina Sativa oil to biodiesel through both conventional heating and microwave radiation was investigated. Three different types of catalysts: homogeneous catalysts (NaOH and KOH), heterogeneous metal oxide catalysts (BaO and SrO), and sol-gel derived catalysts (BaCl2/AA and SrCl2/AA) were evaluated for their efficacy on biodiesel production. The following conditions were obtained for the catalysts based on the maximum biodiesel yield: Potassium hydroxide: methanol to oil ratio of 1:9, catalyst concentration of 1% (w/w), and reaction time of 60 s; Sodium hydroxide: methanol to oil ratio of 1:9, catalyst concentration of 0.5 wt.%, and reaction time of 60 s; Barium oxide: methanol to oil ratio of 1:9, catalyst concentration of 1.5 % (w/w), and reaction time of 4 min; Strontium oxide, methanol to oil ratio of 1:9, catalyst concentration of 2 wt.%, and reaction time of 4 min. For the sol-gel derived catalysts, different catalyst loading rates in the range of 1-10 mmol/g were used. Low biodiesel yield of 10-25% on the sol-gel derived catalysts were observed. Based on energy consumptions in the transesterification processes with both conventional heating and microwave-heating methods evaluated in this study, it was estimated that the microwave-heating method consumes less than 10% of the energy to achieve the same yield as the conventional heating method. The fuel properties of camelina biodiesel produced were compared with those of the regular diesel and found to be conforming to the American Society for Testing and Materials (ASTM) standards.

40. Piedad Esther Mayagoitia González, Fish, Wildlife and Conservation Ecology, NMSU,

Status and Habitat Use of Neotropical Otters in Southern Tamaulipas

The neotropical otter (Lontra longicaudis) is listed as in danger of extinction by IUCN and as a threatened species by the Mexican government. Otters in southern Tamaulipas have been deleteriously impacted by poaching, the clearing of riparian vegetation and by water pollution due to industrial, agricultural and municipal wastes. Our study was conducted in La Vega Escondida Protected Area (LVPA), located near the terminus of the Tamesi River (TR), during the summer of 2008 and February-August 2009. The objectives of this study were: 1) to determine otter distribution and habitat use; 2) determine fish biomass and 3) determine local attitudes towards otters. Distribution was determined using surveys to detect otter sign (tracks, scats, sightings). We classified the study area into river, canal and lagoon habitats and conducted transects to evaluate landscape features related with otter presence such as roots, logs, debris, sandbar, gravel and rocks. Fish biomass was also assessed in the three habitats. We conducted interviews of commercial fishermen in LVPA. The majority of otter scats were found in canals during both seasons. In all three habitats, roots, logs and debris occurred at a frequency greater than 40%. Lagoon had the greatest average fish biomass value (> 800 g), followed by canal (< 700 g), and river (< 400 g). Eighty-eight percent of the interviewees had a favourable attitude towards otters. Our data suggests canals are the most used habitat by otters. However, there is an urgent need to limit the impact of anthropogenic disturbances.

41. William Graves, Department of Psychology, NMSU

Video Game Experience and Visual Attentional Abilities

Much recent research has examined the question of whether playing video games is beneficial. Bavalier and colleagues (2003, 2006, 2009) have shown that avid video game players have an improved attention capacity and are able to track more moving objects than the average person. The current study extends this work by comparing the performance of videogame players and non-videogame players on four standard cognitive measures of attention: black-and-white and color versions of the flanker compatibility task, an enumeration task, and an attentional blink task.

42. Yahya Al-Khatatbeh, Department of Physics, NMSU

Mechanical strength and stability of high-pressure ZrO2 phases

It has long been speculated that materials synthesized at high pressures provide a promising route to systematically develop materials that can replace expensive diamond as an industrially used abrasive. We investigate the feasibility of this proposal in the case of zirconia (ZrO2), a material that is thought to possess extremely hard high-pressure phases, by combining experiment and theory. We provide revised equations of state (EOS) for the low-pressure ZrO2 phases (monoclinic MI and orthorhombic OI). The small volume decrease of 3.4% across the MI → OI transition at ~10 GPa is associated with a 38% increase in the bulk modulus consistent with our ab initio calculations that predict a ~36-39% increase. In contrast to the EOS of MI and OI, we find that our experimental EOS for the high-pressure OII phase is in good agreement with previous measurements. The large volume decrease across the OI → OII phase transition as obtained from both our experiments and calculations is ~10%. Using scaling relations we find that all three observed ZrO2 phases show very similar hardness of ~10 GPa. This finding is against the common belief that hardness increases as the specific volume of high-pressure phases decreases. Our findings imply that the relationship between hardness and phase is more complicated than previously thought and synthesis procedures and strategies for superhard abrasives should be re-evaluated.

43. Yihua Leng, Department of Biology, NMSU

Detection of post-transcriptional components in muscle-like cells of the electric fish S. macrurus

Cells in multicellular organisms show multiple phenotypes because of different gene expression profiles. In the weakly electric fish S. macrurus, cells of the electric organ (EO) are called electrocytes and are derived from skeletal muscle. Electrocytes are not contractile, yet continue to make some muscle proteins. How can it that an electrocyte be partial muscle-like and not be a contractile cell is unknown. Previous data from out lab suggest that regulation is not solely at the transcriptional level. Hence, we hypothesize that the partial muscle phenotype of electrocyte is under post-transcriptional regulation. One post-transcriptional regulation mechanism in eukaryotes involves P-bodies, protein complexes that store mRNAs until these are translated. To determine whether P-body dependent events are involved in electrocyte phenotypic regulation, we first set out to study their presence in electrocyte and skeletal muscle cells by using antibodies to detect P-body components: RCK, HuR and Dicer. Western blotting and immunohistochemistry studies detected RCK, HuR and Dicer in muscle and electrocytes. Their distribution differed in that RCK and Dicer were not only localized along the membrane in skeletal muscles like those in

electrocytes, but were also diffused in cytosol. Moreover, this distribution is altered in the absence of electrical input into electrocytes. These data warrant further verification of the role that post-transcriptional events play in the conversion of the skeletal muscle phenotype to give rise to electrocytes, and how they mediate changes in electrical activity from the nervous system.

44. Zachary Libbin, A. Salim Bawazir, Bernd Maier, Department of Civil Engineering, NMSU

A Study to Improve Irrigation Management for a Vineyard in Deming, New Mexico

Growing grape vines for wine production is increasing in New Mexico. Despite this increase, limited knowledge exists on management of soil moisture and salinity, consumptive water use (evapotranspiration), and microclimate effects on the vines. In an effort to improve irrigation management practices of vineyards and crop yield, soil moisture and salinity, evapotranspiration (ET) and microclimate within a vineyard in Deming, New Mexico were measured during a growing season of 2009. These measurements are part of a 3 year study that ends in 2011. A 20-ft flux tower was installed in 2008 in a large area of vineyard at Deming, New Mexico to measure ET. A three-dimensional sonic eddy covariance (3DSEC) and one-propeller eddy covariance (OPEC) systems were installed on the tower to measure ET. Temperature and relative humidity above and within the vines were measured. A weather station was also installed nearby to measure weather parameters such as wind speed and direction, solar radiation, ambient temperature and relative humidity, precipitation, and soil temperature. In addition, soil salinity, soil moisture and temperature were measured. Soil moisture characteristic curves were then developed. Soil texture and salinity were mapped to determine their spatial and temporal distribution. Preliminary results from the study are presented.