

Talk and Performance Abstracts

(In alphabetical order by author)

Khaled Ali Abuhasel; Industrial Engineering
Institute for Energy and the Environment, New Mexico State University
Medium Optimization by Using Response Surface Methodology for Maximizing the Percentage of Biomass Out of Chlorella Microalgae

Energy is essential for economic and social development and also poses an environmental challenge. Scientists and investors are concentrating on ways to find a relatively cheap, high volume biomass feedstock which does not impact human food such as corn, soybean and other food crops. The use of algae as a biomass feedstock could replace, or at least strongly supplement, the use of fossil fuels. Algae can be cultured in brackish water as well as waste water. Algae do not compete with other crops for good land or fresh water. They produce more oil than any other oil crops. Because of the differences in the volume of oil produced, the responses to pH, light, materials, and other conditions, are of great importance. Which species of algae used in cultivation is important. A response surface methodology was conducted using brackish water with electrical conductivity of 20000 ds m⁻¹, growing one strain of microalgae *Chlorella sorokiniana* UTEX 1230 in three different media BBM, brackish water, and half of brackish water & half of BBM. The results from growing this strain indicated there were significant differences during experimentation. Response surface methodology showed that the combination of *Chlorella sorokiniana* with BBM medium maximized the percentage of biomass. It also showed that the combination of half of brackish water & half of BBM with *Chlorella* Microalgae maximized the percentage of biomass.

Jorge A. Achata Bottger; Molecular Biology, New Mexico State University
Phylogenetic Analysis of the Alfalfa Weevil in North America

The Eastern, Western, and Egyptian strains of alfalfa weevil are severe pests introduced to North America on three separate occasions. They are found in most of the continental U.S and share overlapping geographic ranges. Behavior, susceptibility to parasites, and subtle morphological differences separate the strains. The difficulty in differentiating among these strains morphologically has led to the application of molecular phylogeny approaches including RFLP characterization and sequencing of mitochondrial genes. While valuable for strain identification, this approach cannot identify inter-strain hybrids since mitochondrial markers are maternally inherited. The work reported here extends previous findings by comparing over 7 Kb of sequence from two mitochondrial and four nuclear loci to increase the resolution of molecular phylogeny for these weevils. The related clover leaf weevil, also an occasional pest of alfalfa, was included in the analysis since the molecular phylogeny of this weevil has not been examined to date. Sequence data confirms that all strains can be cleanly separated with mitochondrial sequence data. However, all three alfalfa weevil strains are closely related, and no informative differences were detected at any nuclear locus while the clover weevil is clearly separable from alfalfa weevils based on sequence data from nuclear loci. These data refine the relationships among these strains and may find application in design of better control strategies.

Waleed Alkohani; Electrical Engineering, New Mexico State University
Application Performance Characterization Using Dynamic Binary Instrumentation and Hardware Performance Counters

The ability to correctly and accurately characterize the performance of applications has always been the focus of a large body of research. This type of characterization can pave the way to understanding and improving both application and CPU(hardware) performance. This research presents a characterization method based on both freely-available dynamic binary instrumentation tools and hardware performance counters available on most CPUs. This research targets x86-based applications and CPUs.

Sufian Alnemrat; Physics, New Mexico State University
Ab-initio Molecular dynamic calculations on phase stability of (Fe,Ni) alloy at Earth Core Conditions

Meteoritic, astronomical, and geophysical evidence strongly suggest that the composition of the earth's inner core is dominated by an iron rich (Fe,Ni) alloy. All three known phases of elemental iron, hcp, fcc, and bcc have been

proposed recently to be stable in the inner core. In this study we addressed thermal fluctuations which can affect the phase stability of Fe and FeNi. Ab-initio molecular dynamics simulations are used to study the thermal fluctuations in Fe and (Fe_{0.875},Ni_{0.125}) alloys up to pressures (370 GPa = 3.7×10^6 atm.) and temperatures (5000 - 7000 K) that encompass most likely the thermodynamic conditions expected in the earth's inner core. The dynamics include the cell parameters, magnetic moment, and thermal evolution. The preliminary results show a phase transformation in hcp FeNi alloy into cubic structure after 2.5 ps. large thermal fluctuations are observed in the FeNi alloy which could be the driving force for artificial phase transformations. This result may account for some of the contradicting results in previous computations. However, the preliminary results also show that neither Fe nor (Fe_{0.875},Ni_{0.125}) possesses a permanent magnetic moment. Thus, the inner core is unlikely to stabilize the magnetic field which is generated in the outer core against magnetic field reversals.

Joshua William Amburgey; Physics, New Mexico State University

The Role of Non-Conventional Hydrogen Bonding in the Liquid Structure of Phenol

The hydrogen bond plays an indispensable role in the structural stabilization of biological macromolecules such as proteins, nucleic acids, lipid membranes, and carbohydrates, as well as the aqueous environment in which these systems function. Traditional hydrogen bonded systems involve the interaction of strongly electronegative atoms like fluorine, nitrogen, and oxygen with hydrogen. It is these interactions that give rise to such structures as alpha helices and beta sheets in proteins and drive the thermodynamics of the aqueous environment in which they exist. However, the less commonly known non-conventional hydrogen bonded systems like O-H...C and O-H...O* play a crucial role in the stabilization of these biological macromolecular systems. The present work looks at the non-conventional hydrogen bonding of phenol and how it gives rise to its liquid structure. Phenol possesses both O-H...C and O-H...O interactions and their role in the structure of liquid phenol is investigated using both x-ray and neutron diffraction techniques. A temperature series from just below the melting point to about 20 degrees above melting was taken in order to follow the evolution of liquid structure from the solid state. Data interpretation was aided through implementation of computer modeling in which the systems structure function is refined so as to produce a molecular structure consistent with experimental data.

Tamara Anatska, Mia Sosa-Provencio; Curriculum and Instruction, New Mexico State University

Living and Breathing Tattoo Artistry: Breaking Apart to Reconfigure

This ethnographic study seeks to describe lives of five tattoo artists as they experience art that enables them and the clients they serve to claim and reclaim physical, social, and cultural identities that have been historically distorted and tainted (Fanon, 1963; Olguin, 1997; Taliaferro-Baszile, 2010). The tattoos inscribed upon their bodies and the bodies of their clients represent a complex, profound, intertextual (Albin, 2006) blending of public and private worlds (Grumet, 1989; Pinar, 2008) that they utilize as vehicle towards emancipation and reinterpretations of their horizons of possibilities (Slattery, 2006). According to Counts (2009), our "age is pregnant with possibilities. There lies within our grasp the most humane, the most beautiful, the most majestic civilization ever fashioned by any people" (p. 49). Congruent with Greene (2009), these men challenge us toward "continual reconstructions" in order to attain a "new totality" in which the possibilities Counts (2009) speaks of may take root and germinate. The dearth of literature involving tattooing focuses on individual expression, the history of tattoos as a mark of criminalization and deviance, as well as the psychological motivations that drive individuals to self-mutilation and body modification (Fisher, 2002; Jeffreys, 2000). We instead focus here on the dynamic lived realities of five tattoo artists who daily navigate and negotiate the all-too-often fixed identities ascribed to them as a function of their gender, ethnicity, and socioeconomic status, reconfiguring themselves through tattoo artistry, reclaiming ownership over their lives, bodies, spirits, and their right to continue along the path of becoming.

Irisa Danielle Arney, Dr. Monte McCrossin and Dr. Brenda Benefit;

Anthropology, New Mexico State University

*Ape-like Mobility in the Semi-terrestrially Adapted Foot of *Kenyapithecus africanus*.*

Two sexually dimorphic partial feet of the middle Miocene hominoid *Kenyapithecus africanus* from Maboko Island, Kenya are described. Both have MT IV and MT V, but the larger individual (body mass 54 kg) has a cuboid, and the smaller (21 kg) a navicular. The *K. africanus* foot exhibits many derived ape-like features relative to Proconsul and hylobatids. The cuboid is similar to Homo and Pongo in being wedged with a proximodistally shorter lateral than medial side. Such wedging is even more exaggerated in Pan and Gorilla. It also has a long calcaneal process similar to Pan and Pongo. As in African apes, the navicular is slightly abbreviated proximodistally, with a tuberosity that

extends further distally than the articular surfaces for the cuneiform facets. Its lateral facet for the ectocuneiform lies in a plane that is oblique to the mesocuneiform and entocuneiform facets, as in great apes. Non-hominoid features seen in the *K. africanus* foot include a large peroneal facet on the lateral side of the cuboid, an MT IV with a medioproximally oriented dorsal third metatarsal facet, and a laterally curved MT V shaft. In addition, the dorsoplantar diameter of the proximal articular surface of MT IV is larger than the mediolateral diameter, in contrast to the equidimensional morphology of African apes. Functionally, slight midtarsal abbreviation and a large attachment for tibialis posterior indicate mechanical efficiency for midtarsal flexibility and inversion of the *K. africanus* foot, but the cuboid's large peroneal facet and metatarsal morphology are clear signatures of terrestriality.

Joshua Baldwin; Geography, New Mexico State University
*Land Use/Land Cover Change in an Exurbanizing Mountain Valley in the
Greater Gila Ecosystem of Southwest New Mexico*

The U.S. Southwest is experiencing rapid land changes in the form of urban, exurban, and rural residential development. Because of these changes, many stakeholders are increasingly concerned with the conservation value of private lands surrounding protected areas. This is particularly true in southwestern New Mexico, where residential development is encroaching upon the Greater Gila Ecosystem (GGE), an ecologically and economically vulnerable area composed of a complex patchwork of federal and privately owned land. Thoughtful land management in the GGE is critical in order to maintain biodiversity, protect watersheds, and conserve working landscapes. However, the spatially explicit information needed to make informed land management decisions is currently lacking. The Mimbres Valley, a development hotspot within the GGE, is the site for this land use/land cover change project. In order to assess the ecological implications of exurban and rural residential development at the local scale, multi-temporal (1980, 1990, 2000, 2010) high spatial resolution aerial photography was interpreted and digitized in a GIS to produce detailed land change data. Several landscape metrics (e.g., patch size and shape, core area, isolation/proximity, contrast, contagion/interspersion, and connectivity) were calculated to assess patterns of landscape fragmentation. With development in this mountain valley encroaching on the habitat of endangered species like the Chiricahua leopard frog and endemic species like the Chihuahuan chub this critical information can be used by wildlife biologists, conservation groups, and land developers interested in building sustainable subdivisions.

Briana Michele Bianco; Anthropology, New Mexico State University
Going from the Known to the Unknown: Beekeeping Practices in Modern and Ancient Yucatán

According to historic documents and some very scarce archaeological data, apiculture with the stingless bee, *Melipona beecheii*, was significant in the diet, economy, tribute, medicine, and ritual practices of pre-Columbian Mesoamerica. Ethnographic studies by several anthropologists have been carried out over the years in order to document modern beekeeping practices in the Yucatán Peninsula. Current practices with stingless bees can give us a frame of reference for interpreting archaeological data. By creating a life history model, or by looking at every step of today's beekeeping practices and honey production, my research has made inferences about what we can expect to find archaeologically. We can also examine how beekeeping practices have changed over the years due to internal and external forces, like the introduction of other species of bees, the Spanish conquest, and globalization. My future research will focus on ethnoarchaeological studies, experimental archaeology, and accelerated mass spectrometry and gas chromatography technology to identify honey and wax on vessels and other materials. The importance of this research is emphasized by the disappearance of traditional beekeeping practices and current traditional ecological knowledge, the disappearance of the variety of plants necessary to produce honey, and the disappearance of the bees themselves.

Arthur Edward Binder; Communication Studies, New Mexico State University
Healthy Persuasion: A Content Analysis of Persuasive Messages in Health Brochures

Failure to adopt a persuasive message in health brochures by targeted audience members could have serious consequences, or even result in death. The messages have to include some form of persuasion so the target audience will enact or reinforce the proposed healthy behavior. To persuade, changing attitudes or reinforcement of existing attitudes must be accomplished. This study examines whether logic, humor, fear, or other emotional appeals are used in health brochures gathered from the New Mexico Department of Health (DOH), the state agency charged with providing information on deadly diseases and health threats. This study will find if elements from successful health communication theories are evident in persuasive messages from DOH. Several successful theories such as the extended parallel process model, the theory of planned behavior, social marketing, and harm reduction have proved

successful in helping people adopt healthier messages. These theories and models use persuasion to convince the listener to adopt the suggested behavior. A beneficial outcome of this content analysis will inform which types of persuasion and which elements of health communication theory are now being used in brochures.

April M Bond, Steinkopf Rice; Sociology, New Mexico State University

The Great Recession and Free Market Capitalist Hegemony: A Critical Discourse Analysis of U.S. Newspaper Coverage of the Economy, 2008-2010.

This study examines the role of discourse in re-establishing the hegemony of free market capitalism during and immediately after the global financial crisis in the U.S., colloquially referred to as the Great Recession. Theoretically we employ post-Marxism and particularly the work of Ernesto Laclau, but also draw insights from poststructural feminism and critical theory. Methodologically we use a corpus linguistics approach to critical discourse analysis. This methodology allows us to examine, both quantitatively and qualitatively, the discursive strategies used during 2008-2010 in a random sample of daily newspapers throughout the U.S. Our findings include identifying the discursive chains of equivalence used to obscure counter-hegemonic discourses of alternative forms of economic relations that are locally based. Contributions of this study include furthering our understanding of the role discourse plays in current economic relations, and demonstrating how a corpus linguistics approach to critical discourse analysis can be used to empirically examine post-Marxist theoretical assertions both quantitatively and qualitatively.

Jillian Bornak; Astronomy, New Mexico State University

Classical Novae Blow Smoke Rings: A DIRTY Approach to Modeling Dust Formation

This work demonstrates the importance of taking into account geometry when modeling dust formed in classical novae. Studies of some classical novae imply most of the ejected gas turns into dust, which is unphysical. We suggest these analyses overestimated dust mass by erroneously assuming the dust forms in a homogeneous spherical shell. Observations show the gas that forms the dust is distributed in an inhomogeneous spherical shell or in an ellipsoid with an equatorial ring. We have extensive observations in different wavelengths of a dusty nova and use the powerful program DIRTY to model different shell geometries. We find our data is best represented with an equatorial ring seen almost edge-on.

Ramaninder Kaur Brar; Physics, New Mexico State University

Anomalous Small Angle Scattering for a Structural Study of Bone 2012

Bone is a complex biological composite material comprised of collagen fibrils reinforced with calcium phosphate nanoparticles. The various structural domains can span several orders of magnitude. The fiber composites are arranged in a lamellar structure and the mechanical properties of the whole are very intimately dependent upon the structural integrity of the various levels. Understanding the effects that one layer of structure has on another is still an open problem whose solution carries with it the hope of understanding maladies like osteoporosis. Few structural techniques have the ability to span many orders of magnitude and elucidate the structural interrelationships like small angle scattering. Elemental specificity can be introduced by using energy as a contrast mechanism in the diffraction measurement. The proposed work introduces high elemental specificity and is accomplished by taking a first order difference of two small angle measurements near the absorption edge the element of interest. This allows for a determination of the local environment of the element of interest on the nanometer length scale. The X-ray and Neutron Science Laboratory of the Department of Physics at NMSU has designed and constructed an anomalous small angle diffractometer to take such measurements and the instrument is currently in its commissioning phase. Measurements of Silver Behenate and other standards will be discussed.

Jose Lorenzo Castellano; Physics, New Mexico State University

Surfactant Free Emulsions in Degassed Water

There is a pharmacological interest in providing a delivery mechanism for highly hydrophobic drugs through the bloodstream. A typical methodology would be to introduce a surfactant which would serve to bind the hydrophobic molecule to the aqueous environment. Because of the need for the surfactant to be non-toxic this avenue proves problematic and many highly hydrophobic drugs which could prove effective are not useable. We have demonstrated the formation of a stable emulsion of Silicone Oil in degassed water alone. The emulsion droplets were on the order of 50 nm in diameter and stable over a period of 8 hours. Previous studies have shown that the surfactant free emulsions do not lose their stability when the previously removed gasses are reintroduced. The formation of a stable

emulsion in the complete absence of a surfactant could provide an alternative approach to a physiologically safe drug carrier. The present work involves the formation of stabilized surfactant free emulsions in a homologous series from pentane through decane. The emulsions structure and thermodynamic stability were then characterized using small angle x-ray scattering.

Malati Chaudhary; Electrical Engineering, New Mexico State University

Short Circuit Analysis of Type II Induction Generator and Wind Farm

With recent proliferation of wind farms around the world, it has become important to study the short circuit characteristics of wind turbine generators. This paper describes the short circuit characteristics of a Type-II WTG, and a wind farm comprised of this type of generators. A commercial time-domain software is used to model the WTG and the wind farm. The machine model is validated against field data, thus increasing the credibility of the results. The difference between the short circuit responses of Type-I and Type-II WTGs is described. Response of an actual wind farm with Type II WTGs to faults outside and inside the farm is documented and analyzed.

Adam Crittenden; English, New Mexico State University

Collaborative Writing: Losing the Ego

Authors often work together to create scholarly articles, novels, short stories, screenplays, poetry and beyond. Collaboration allows all parties to parlay their strength to the page, be it research, sentence structure, concept, or more. It also provides a rich learning experience improving not just writing skills, but also interpersonal skills. I will discuss specific ways of incorporating the collaborative model of authorship in the composition and creative classrooms, but without students becoming impeded by ego and authorial ownership. I will also discuss methods and theories of how to resist ownership in collaborative writing, and the ramifications of resisting the ego.

**Jesus A. Cuaron, Santosh Dulal, Peter H. Cooke, and John E. Gustafson;
Biology, New Mexico State University**

Novel Tea Tree Oil-Selected Staphylococcus aureus Small Colony Variants Exhibit Altered Antiseptic Susceptibility

Background: Tea tree oil (TTO) is a popular antiseptic that exhibits broad-spectrum antibacterial activity. In an effort to gain insight into mechanisms of biocide resistance, we report the characterization of TTO-reduced susceptibility (TTO^{RS}) mutants of *Staphylococcus aureus*. Methods: *S. aureus* strain SH1000 and MRSA COL -TTO^{RS} mutants were isolated by swabbing cultures over the surface of a 0 – 1.0 % v/v TTO gradient and following overnight growth, colonies were picked from the top of the TTO gradient. Representative strains were then characterized by comparative genomic sequencing (CGS), antimicrobial susceptibility tests, colony size, growth curves, confocal and scanning electron microscopy, fatty acid methyl ester profiling, whole cell autolysis, and qRT-PCR. Results: TTO^{RS} mutants exhibited a small colony variant (SCV) phenotype, demonstrated through smaller colony size, reduced growth, and increased cell wall-active antimicrobial resistance, yet no alteration in whole cell autolysis. Furthermore, TTO^{RS} mutants displayed reduced susceptibility to TTO, individual bioactive TTO terpenes, alcohols, and higher triclosan susceptibility. CGS of one SH1000-TTO^{RS} mutant revealed mutations in genes involved in fatty acid metabolism (*acpP*) and cell division (*ezrA*), corroborating the observation of decreased saturated fatty acid content and cell size. Additionally, cell division genes that produce EzrA interacting products were down-regulated in all TTO^{RS} mutants. Conclusions: *S. aureus* TTO^{RS} mutants also demonstrated reduced susceptibility to broadly utilized alcohols and cell wall-active antimicrobials. The novel TTO^{RS} mutant SCV phenotype resulted from an alteration in cell division without distorted whole cell autolysis leading to a reduced growth rate and the formation of diminutive cells.

Om Prasad Dahal; Electrical and Computer Engineering, New Mexico State University

*Investigation of Various Options to Avoid False Tripping of a
Primary Distribution Feeder: Part II - Solution Techniques*

Pacific Gas and Electric is facing a problem on several of its 34 kV underground feeders in the San Francisco area. These feeders trip due to ground relay operation while being energized. Our previous paper on this issue described the modeling of a problematic feeder with PSCAD/EMTDC[®], and validation of the model by comparing our simulation results with field-test results. This paper summarizes the modeling and validation for continuity, and discusses various options to resolve this problem. Each option is simulated, and results are analyzed. Advantages and disadvantages of each option are listed, and recommendations are made.

Jeanine Deibel; English, New Mexico State University

Contemporary Poetics and the Skewed Self

Through reading a collection of my own poems, as well as works by other notable poets, I will explore how contemporary poetics is changing the idea of what constitutes self and identity. What is the "I" in poetry really representing? Is the relationship between the speaker and the "you" always a direct address or a reference to the reader? In the past, a first person account in verse was assumed to be a steadfast, unwavering view of the world. However, more contemporary movements in poetry have veered away from the all-knowing and monological "I" towards not only dialogical depictions of self, but also skewed and fractured renditions of identity. The skewed self in poetry may, on one hand, seem less personal, yet it possesses the ability to create multiple vantage points as well as close the distance between the reader and the creative work. This presentation will show how embracing the other side of human experience, displacement and fracture, through the use of a skewed self, not as an immobile speaker but as a poetic device, allows for the heightened execution of ambivalence and verisimilitude.

Adriano De Santis; Anthropology, New Mexico State University

Technological Differentiation in C-shaped Structures in the Yucatán Peninsula

During the Terminal Classic period (A.D. 900-1100), C-shaped architectural structures begin to appear across the Yucatán peninsula. Their presence persists through the Early and late Postclassic periods. Though they are thought to be horizon markers for the Classic to Postclassic transition, their variation is still not understood. In this paper I apply Michael Schiffer's concept of technological differentiation to C-shaped structures to reveal spatio-temporal patterning in architectural variation.

Santosh Dulal, Jesus A. Cuaron, and John E. Gustafson; Biology, New Mexico State University

Relationship Between apt Mutation and Altered Cell Wall-Active Antimicrobial

Susceptibility in Clonal Clinical Staphylococcus aureus Strains

Background: A previously identified purine salvage gene (*apt*) mutation occurred during vancomycin selection of vancomycin-intermediate *Staphylococcus aureus* (VISA) mutants. In an effort to understand an association of the *apt* mutation within the VISA mechanism, we report on the characterization of *S. aureus* 2-fluoroadenine (2-FA) reduced susceptibility (2-FA^{RS}) mutants harboring *apt* mutations. Methods: 2-FA^{RS} mutants were selected with *S. aureus* clonal clinical MRSA strains MM61 and heteroVISA MM66. Parent mutant pairs were subsequently analyzed by sequencing of *apt*, qRT-PCR, growth in the presence and absence of adenine, whole cell autolysis, and antimicrobial susceptibility tests (MICs, MBCs, gradient plates, population analyses). Results: Compared to MM61 and MM66, 2-FA^{RS} *apt* mutants demonstrated increased resistance to adenine and purine analogs, but did not exhibit altered growth rates. MM66-2-FA^{RS} mutants displayed decreased oxacillin, teicoplanin, and vancomycin susceptibility levels and whole cell autolysis, whereas MM61-2-FA^{RS} mutants expressed increased susceptibility profiles and whole cell autolysis. Unlike MM61-2-FA^{RS} mutants, vancomycin resistance population analyses revealed that MM66-2-FA^{RS} mutants tolerated higher vancomycin concentrations compared to parent. Genes involved in purine biosynthesis (*pur*) and cell wall processes (*pbp*, *vra*) were found to be down-regulated in all 2-FA^{RS} mutants. Conclusions: 2-FA^{RS} *apt* mutants displayed purine analog cross protection, altered cell wall-active antibiotic susceptibility levels, whole cell autolysis, and transcription of genes involved in metabolism and signal transduction. Furthermore, the addition of exogenous adenine elicited an altered *S. aureus* response during simultaneous exposure with vancomycin. Overall 2-FA^{RS} mutants expressed strain specific modifications that may contribute to the acquisition of the VISA phenotype.

Ling Fei; Chemical Engineering, New Mexico State University

Preparation of Mesoporous Silica-Supported Palladium Catalyst for Biofuel Upgrade

we report the preparation of two hydrocracking catalysts using mesoporous silica as support, Pd/CoMoO₄/silica and Pd/CNTs/CoMoO₄/silica (CNT's, carbon nanotubes). The structure and morphologies of catalysts were studied by X-ray diffraction (XRD), scanning electron microscopy (SEM), raman spectra, and transmission electron microscopy (TEM). Energy-dispersive X-ray (EDX) and thermogravimetric analysis (TGA) are carried out to determine the catalyst composition and thermal stability. The catalyst activity was performed in a Parr reactor with camellia fatty acid methyl esters (FAMES) as feed materials. The analysis shows that the palladium nanoparticles have been incorporated onto silica in Pd/CoMoO₄/silica or on the CNTs surface in Pd/CNTs/CoMoO₄/silica catalysts. The different combination of metals and support has been proved to have selective control cracking on heavy hydrocarbons.

Nalin Fernando; Physics, New Mexico State University

Pt-Pd Alloy Catalysts for Efficient Ultra-Low Temperature Car Exhaust Catalysts

It is expected that one of the major challenges for the current century is the production of green energy in order to reduce greenhouse gas emissions and human effects on climate change. While the developments of greener energy technologies are active areas of research it is unlikely that any new technology will be accepted at once, if available. Therefore global R&D efforts of many car manufacturers aim at improving low temperatures car exhaust catalysts. However, current catalysts depend on expensive Pt catalysts. As a solution to the increasing demand of the Pt for car exhaust catalyst, Pt-Pd alloyed catalysts can be used. While achieving high reactivity for hydrocarbon and carbon monoxide oxidation at ultra-low temperatures, the total cost of the catalysts can also be reduced, for example the cost of raw materials could be reduced worldwide from 5.5 billion dollars to 3.7 billion dollars, an ~30% reduction. Published Pt-Pd phase diagrams show a miscibility gap, implying that Pd and Pt are likely not to form an alloy for a wide range of compositions. In contrast our density-functional-theory (DFT) study shows that Pt-Pd alloys particles are always favorable in large particles. We will discuss the results of this research and its application for the design of ultra-low temperature car exhaust catalysts that are expected to green current car engine technologies.

Randee Fladeboe; Anthropology, New Mexico State University

Potent Agency: The Ritual Deposition of Snakes in the Northern San Juan Region

Although ritual animal burials occur in the Southwest, the deposition of snakes has only recently been encountered. This study focuses on two decapitated snake skeletons from ceremonially closed kivas at sites in southwest Colorado. Although one was isolated and one accompanied by other faunal remains, both were treated in a manner common to animals whose lives were ended and parts used for ritual purposes. Similar to human beings, ceremonial objects are often characterized by distinct life histories, including deposition or burial that reflects their once animate or potent status. I am operationalizing Michael Schiffer's communication theory into an interpretive framework for the investigation of ritual deposits such as these, which casts ritual action in behavioral terms and provides the necessary tools for measuring the performance characteristics of contextual interactors. The questions I address include: (1) What is the nature or level of agency possessed by these deposits, and how can this agency be interpreted in the archaeological record according to behavioral theory? (2), What are the possible life histories of these snakes? and (3), With these factors in mind, which category of animal deposit – dedicatory offering, kratophanous deposit, or ceremonial trash – would best facilitate interpretation?

**Veronica Gallegos, Romina Pacheco and Nancy Wasser;
Curriculum and Instruction, New Mexico State University**

We are the Stories We Tell: Grupo Teatral Hermandad sin Fronteras

Life stories are powerful tools that can be used in and outside the classroom to enhance learning. Thus, this presentation provides an insight into the life stories of three female educators from different backgrounds, to analyze the dominant discourses about gender, race, and culture in our society. Through the performance of their stories and by drawing on Critical Discourse Analysis (CDA), the authors attempt to demonstrate arguments that support the idea that the way people choose to tell their stories help them not only to display who they are to others, but also to construct the range of identities that come together at different facets of "this is who I am." Guided by the CDA concepts of Discourse, social languages, situated meanings, and figured worlds the authors establish the relevance of sharing, discussing, and analyzing who they are within their narratives. Through their performance and facilitated discussion, the authors hope to invite others (e.g. the audience) to engage in a process of inquire as they position themselves in their own stories. Ultimately, the goal is to have life stories become pedagogical instruments to open critical discussions on issues relevant to diversity in and outside the classroom. A concurrent goal is to explore Participatory Action Research by involving the audience in the "study," of narrative and its use as a tool of transformation.

William Graves; Psychology, New Mexico State University

Personalized Avatar Affects on Collaborative Behavior

Are video games more than a leisure time activity? Video games have been shown to provide learning scenarios that can modify the behavior of a player. Content appears to be the primary driving force behind the type of behavior learned. Increasing a players immersion in video games has been seen to enhance the effect of the content of a video

game. Personalized avatars increase immersion for the player and allow the player to visualize them performing the actions of the virtual avatar. We believe that having someone play a cooperative pro-social video game, relative to a competitive video game, with a personalized avatar, relative to a generic avatar, will increase their pro-social tendencies.

Amado Reyes Guzmán; History, New Mexico State University

Paso del Norte, the Robledo Paraje, and the Presidial System: Dependency and Defense

The Spanish presidio system has been presented by historians as fulfilling a defensive purpose in New Spain's far Northern frontier. Presidios did have a military purpose, but it may be surprising to learn that they also worked as an institution of dependency for semi-sedentary Native Americans on the margins of Spanish power. This paper looks at the development of the presidial system and its effects on New Mexico, with special attention to the San Elizario/Paso del Norte complex and its relationship with outlying areas like the Mesilla Valley and the Sierra Florida (south of Deming).

Christopher Habrock; Geography, New Mexico State University

Pragmatics Supporting Banal Nationalism in Russia: An Analysis of Postage Stamps

Michael Billig's work, *Banal Nationalism*, explains how the everyday, behind-the-scenes items and features of a national landscape seek to build or develop a sense of nationalism within a nation. Banal means the ordinary, obvious, boring, and mundane. Nationalism can be simply defined as a politically organized group with a sense of national consciousness and aspirations. This brand of theory requires an understanding that nationalism is not an overtly present feeling one can witness or observe but one that remains hidden. In Billig's case, it refers to the obvious or less-attractive items found in the construction of nationalism. It does not refer to large, grandiose displays of nationalism or any political grandstanding that showcases the importance, significance, and direction of a nation; rather, it is the little things that are largely unnoticed but very powerful and potent to include items such as imagery of flags, national leaders - both past and present, images on currency, certain words used in political thought and speech, national songs, and even idioms within the national language. Many of those themes are found on postage stamps and are vehicles of promoting nationalism. The analysis of postage stamps during the 1980s (last decade of the Soviet Union), dissolution of the USSR, and the transition years of the new Russian state through 1993 shows changing themes dependent upon the political tone for any given time. The evolution from power projection to soft semiotics is indicative and an admission to the power of Billig's theory.

Kelsie Hahn; English, New Mexico State University

Judging the Us: Problems and Solutions in Assessing Collaborative Student Work

Collaboration and team-work have been popular in both the work place and the classroom for decades, yet collaborative writing offers unique challenges for pedagogical use and assessment in the college classroom. In academic institutions obsessed with authorship, individual achievement, and "giving credit where credit is due," how do instructors navigate these expectations in a collaborative environment? Like any pedagogical practice, both the students' learning and the effectiveness of the practice must be assessed, but this process changes when evaluating a collaborative assignment or project. This presentation will consider the challenges of assessing collaborative writing and offer possible solutions, both through informed research of current educational practices and through my own experiences teaching undergraduate composition classes. In using a collaborative assignment designed and implemented in my own classroom as a model, I will offer an "on-the-ground" perspective on both the dangers and opportunities in assessing these types of assignments.

Ryan T. Hamilton; Astronomy, New Mexico State University

Understanding Abundance Patterns of Cataclysmic Variables in the Near Infrared

We present the progress of an ongoing program to obtain and understand moderate resolution ($R > 2000$) near infrared (NIR) spectroscopy for all cataclysmic variable (CV) subtypes. Looking in the NIR allows us to directly examine the atmosphere of the donor star in the CV system. In general, pre-CV, magnetic, and short period systems appear to have normal abundances and do not harbor any surprises. A significant fraction of long period systems, however, show weak or absent K-band CO lines. To fully assess these data, we compute synthetic spectra using either PHOENIX or MOOG. We use a genetic algorithm (GA) to search a multidimensional parameter space efficiently, spanning a large range in effective temperature, surface gravity, metallicity, C^{12}/C^{13} isotope ratio, and a variety

of individual elemental abundances. Of particular interest is the C abundance, which allows us to explore the C deficiencies as shown by weak or absent CO lines in our sample. The GA results have been calibrated against a number of “standard” K and M dwarfs with known abundances and stellar parameters to provide error and confidence estimates. We present our early results of this observation and modeling program.

Patrick Hanley; History, New Mexico State University

The Caudillo and the Fuehrer

This work examines the relationship between Franco’s Spain and Nazi Germany from 1936 to 1945. It examines why Franco never entered World War II in support of the Axis powers, despite his desire to do so.

Natalie R. Harmening; Government, New Mexico State University

The Role of the Swarm Phenomenon In Political Protests

Information is power. Power is about who knows, who wants to know, who can keep what they know secret and who can shout it out to the world. The use of the internet to foment political protest is amping up the power of networks. Global networks are ‘swarming’ to an exponential power to achieve their protest goals. A comparative case study is used to explore this phenomena, and implications for the future within political science.

Allison Harvey; Anthropology, New Mexico State University

Prehistoric Land-use Patterns throughout the Dunes of White Sands National Monument

Prehistoric land-use patterns within the Tularosa Basin of New Mexico are poorly understood. Cultural sites known as “hearth mounds”, scattered throughout the gypsum dunes of White Sands National Monument, have the potential to provide additional insight into human habitation and subsistence strategies within the basin. Survey and preliminary lithic analysis suggest a long utilization of the monument’s property dating from the Paleo-Indian through the Historic periods. Findings support a strong association between Prehistoric land-use patterns and dune movement.

Terri Horn; Sociology, New Mexico State University

Experiencing Diversity Through Service Learning: Results from a Survey of Sociology Undergraduates

Helping students to understand the complexities and the significance of identity and cross-cultural relationships in the 21st century continues to be important to many sociology courses and to the institutions of higher education. This study examines the effectiveness of using service learning as a pedagogical strategy to assist in these efforts. We conduct a case study analysis of a sociology capstone course that is structured as a service learning course. As a capstone course, all sociology undergraduates are required to take this course in order to fulfill the requirements for a major in sociology. This course is taught both online and on campus. We first review the organization of the course and discuss how Paulo Freire’s notion of praxis was used to structure the course’s approach to service learning. We also discuss how the course incorporated sociological theoretical paradigms so that students could deepen their understanding of social theory within a concrete, personalized context. To assess the effectiveness of using service learning as a way to increase students’ exposure to and understanding of the complexities of diverse populations we analyze survey data collected from approximately 200 students. Findings indicate that service learning provides an effective pedagogical strategy to promote awareness and understanding of diverse population. We also discuss other benefits students acquire through service learning, including employment opportunities and a deeper sense of connection to their communities.

Robert Frank Houghton; English, New Mexico State University

Finding Joy in Revision in a Composition Classroom

How does a writer move from the hot fire of inspired writing to the cold bath of revising his or her ideas? These two states of being are familiar to seasoned writers. In the first, words flow out with ease as ideas seem to magically spring to our mind. In the next, we must sit and ponder the reasons why our inspiration has lead us to write certain things the way we did. We must have some measure of self-awareness to be able to say “you know what, I can say this better” or “that rough idea has lead me to a more solid notion, and now I need to go back and change the beginning”. For creative writers it might seem easy to find an element of joy in both states of being, but for many beginning writers finding joy in revision is a learned process. In a freshman composition classroom getting students

to enjoy writing is a task, but to go even further and get them to enjoy revising is something more difficult still. In this way, using a creative writing assignment, say a personal narrative or a poem, and then having the student revise the assignment might be a way of helping them to see the importance that revision plays in any writing process.

Cheryl Denise Ingram; Education, New Mexico State University

Soulful Words: The Art of Storytelling

Soulful Words is a fictional counter story done through a critical race theory framework. The story addresses actual research that is investigating the dropout rate of Black students in post secondary educational institutions. The story is told from multiple perspectives that will address multiple characters who have different educational experiences that vary over time and show a relation of those experiences that still affect students today.

**William L. Johnson, David P. Price, Dr. Immo A. Hansen, Dr. Kathryn A. Hanley;
Biology, New Mexico State University**

*A Field Derived Aedes aegypti Mosquito Population from Southern New Mexico is
Susceptible to Infection With All Four Serotypes of Dengue Virus*

The four serotypes of mosquito-borne dengue virus (DENV-1-4) circulate in Mexico, and there is concern that DENV will cross the U.S.-Mexico border to seed an outbreak in the U.S. The major vector of DENV is *Aedes aegypti*, but susceptibility to each DENV serotype varies among *Ae. aegypti* populations. While the susceptibility of many U.S. populations of *Ae. aegypti* to DENV have been characterized, populations from the Chihuahuan desert have not been investigated. We compared the susceptibility to DENV infection of field-derived *Ae. aegypti* from Las Cruces, NM with that of the susceptible Rockefeller strain. Mosquitoes were fed a bloodmeal containing one of the 4 DENV serotypes and incubated for 14 d. Bodies were separated from heads, homogenized and serially titrated in wells of confluent mosquito C6/36 cells; plaques were immunostained using dengue-specific antibodies. DENV-1-4 infected 13% (N = 36), 28% (43), 28% (46), and 41% (41) of Las Cruces *Ae. aegypti*, respectively and 20% (30), 28% (21), 23% (30), and 27% (36) of Rockefeller *Ae. aegypti*. Susceptibility did not differ between the two mosquito strains to any of the four DENV serotypes (Fisher's exact test, $P > 0.24$ for all comparisons). These results are rendered more significant by the 2010 discovery by de la Mora-Covarrubias et al. of DENV- positive *Ae. aegypti* in Ciudad Juarez. If continuing violence in Ciudad Juarez leads to deterioration of public health monitoring or increases in vector abundance, the region may represent a likely penetration point for DENV into the U.S.

Sergio Fernando Juarez; Communication Studies, New Mexico State University

Illegal Immigrant Discourse in the United States and its Impact on Residents' Sense of Place and Self

The issue of immigration is a current social issue and while it has been studied from a semiotic perspective, studies focus on a national media narrative as well as universal theories of identity. Specifically, scholars are requesting an analysis of the relationship between social interaction and culture. I propose how illegal immigration is communicated has an effect of people's identity, how people relate to others, and their sense of place. As a current social issue that is worsening a discourse analysis provides an opportunity to understand how different residents individually make sense of "illegal immigration" and will allow examination of unique perspectives of, not only, undocumented immigrants, but, their family members, supporters, as well as those who stand against illegal immigration. Attempting to understand the meaning of "illegal" immigration discourse in the different speech communities has not occurred. Having an understanding of the different meaning is vital because of the differences of opinion are spilling over beyond the issue of immigration. Discovery of information could possibly help influence government policy on illegal immigration. Ideally, policy that benefits both opponents of the issue and neither subjugates nor ignores either sides concern. This study would also supplement the ongoing academic research on illegal immigration.

Menuka Karki; Biology, New Mexico State University

Exploring the Role of Putative Hippo-signaling Pathway Component - Fat in Cell Division

The control of organ size is a mystery in developmental biology. Among several cellular pathways, Hippo-signaling has been reported to be the major signaling pathway in controlling growth and cell number. Fat a component of Hippo signaling pathway is shown to be required for normal cellular death and proliferation in *Drosophila*. In humans, Fat 4, which is the closest ortholog of *Drosophila* Fat among four isoforms, has multiple destruction box (D-box) which is the critical motif of proteins regulating cell division. Proteins containing this motif undergo regulated proteolysis through proteasome-mediated degradation to drive cell division. As for instance, when bipolar attachment of the

chromosomes is ensured, a specialized protein called securin undergoes proteasome-mediated degradation that finally lead to the separation of the sister chromatids (anaphase) to give rise to two daughter cells. Given that Fat4 has multiple D-boxes, it may be controlling cellular proliferation in humans through the regulation of cell cycle. To explore the role of Fat, established cell lines will be treated with specific agents, and the proteins of interest will be further characterized by biochemical, molecular and through microscopy techniques. This experimentation will give insights into the function of Fat during metaphase to anaphase transition thereby allowing us to establish the interrelationship between hippo signaling cascade and cell division.

Shyam Kattel; Physics, New Mexico State University

Group VA Chemical Modifications in Graphene and its Possible Applications in New Materials for Spinbased Computing

Graphene is a two-dimensional allotrope of carbon in which carbon atoms are arranged in regular honeycomb lattice. Perfect graphene is semi-metallic with linear characteristics of band structure at Dirac point, non-magnetic and inert. Therefore, modification of its electronic and magnetic properties is very important since it offers interesting new functionalities for application in areas that range from energy production to electronic circuitry elements, spintronic device, sensors, magnetic storage device and as a hydrogen storage material. Previously, defects and dopants are known to alter the electronic structure of graphene. We extend previous studies by systematically investigating changes of the graphene's electronic and magnetic structure due to group VA (N, P, As, Sn, and Bi) atoms adsorption in single vacancy (SV) and double vacancy (DV). Our parameter free density-functional-theory (DFT) computations show that group VA atoms chemisorb on SV and DV of graphene and has large and diverse effect on its geometry, electronic and magnetic properties. N@SV has a small band gap below Fermi level (EF) and P@SV has semiconducting and magnetic properties consistent with previous studies. Our preliminary electronic structure calculations show that As@SV induces $\sim 100\%$ spin polarization near EF while Sb@SV and Bi@SV are metallic. On the other hand, N@DV configuration has large spin polarization close to EF while P, As, Sb and Bi in DV are metallic. These results suggest that especially As@SV and N@DV may have interesting applications in spintronics and post-CMOS applications.

Phanidhar Kukutla, Dr. Jiannong Xu; Biology, New Mexico State University

Protocol to Efficiently Deplete Ribosomal RNA for Metatranscriptomic Analysis of Mosquito Gut Microbiome

In order to study the structure and function of microbial community of mosquito gut microbiome, we developed protocols to prepare mosquito gut metagenomic and metatranscriptomic samples for high throughput sequencing. Using sample specific rRNA probes, the protocols efficiently enrich mRNA by removing ribosomal RNA from mosquito gut microbial samples.

Heather Lang; English, New Mexico State University

Boundaries of the Body: Dismantling the Rhetoric of Citizenship and the American Obesity Epidemic

Since World War II, the rhetoric of the "American obesity epidemic" and related fat-phobia has served to create an alarmist marginalization of fat or deviant bodies. As a result of this marginalization of the fat body, size and weight have entered into discourses of appropriate citizenship and moral integrity, in turn establishing criteria and social "rules" for the exclusion of or discrimination against fat, and thus queered, bodies. From the rhetoric of obesity, we learn that the fat American is lazy, immoral, and socially irresponsible. Thus, the ideal American is disciplined, regimental, and physically superior, while the fat body is an unruly body. As this understanding of fatness prevails in American society, this rhetoric becomes both of bodies and embodied. The transgressive nature of fat bodies calls for a queering of the fat body politic. As Kathleen LeBesco argues, an anti-essentialist framework is crucial to the study of corpulence, as such a position "does not seek causal factors but focuses instead on the ability of human actors to participate in the creation of meaning." This paper attempts to dismantle this rhetoric and draw attention to size-related boundaries by analyzing "One Woman's Struggle to Shed Weight, and Shame," a story from NPR's special series "Living Large: Obesity in America," which aired over summer 2011. I will demonstrate how the fat body is made docile through institutional control, queer by nonconformity to gender binary, and Othered by its lack of utility in Nationalist movements.

Yuanying Luo; Communication Studies, New Mexico State University

*Relationship Building in Intercultural Communication:
Chinese Guanxi Network and Social Networking in United States*

As rapid development of Chinese economy, there are more and more interactions between China and other countries. Within these interactions, the interaction between China and United States often attract most attention. This study tries to compare the relationship building process in two countries. This article will first explain the cultural background of Chinese guanxi network and how guanxi affects Chinese communication with others. Then through cross-cultural comparison between China and U.S. in establishment of relationship, the author expects to find out how guanxi networks and social networking affect people in relationship building for both Chinese and American.

Sharon March; Sociology, New Mexico State University

Employing Gender Performance in the Sex Toy Party Arena: The Mary Kay Effect

This paper uses a multiple method approach to investigate both women's labor and consumption practices within the sex industry, a space traditionally orchestrated by heterosexual men and targeted to male customers, by focusing on the at-home adult novelty party. Sex toy parties are unique in that they are predominately by women, for women, therefore this paper explores how this niche in the marketing and consumption impacts the women who participate by drawing on data from ethnographic observation at 30 novelty parties, interviews with 10 party consultants, and 150 surveys with party attendees. This research employs gender, queer and symbolic interaction theoretical frameworks to situate this tenuous relationship between gender, labor, the economy and sexuality. Williams and Bemiller (2011) refer to at-home parties as "marketplaces of interaction," wherein women "rely upon an organizational arrangement of relations, including both professional and personal associations that guide economic transactions (9)." We expect that while consultant labor remains central to the party plan structure, party attendees also engage as laborers through recommending certain products and validating fellow attendees' product choices. Women's purchase decisions are therefore affected by both a consultant's exposure to certain items as well as fellow attendee's interactions and consumption patterns, which we refer to as the "Mary Kay Effect." However, since adult novelty parties are in a sexualized setting, we question this effect when women engage in purchasing sex toys and intimate products. Observational finding indicate that certain deviations from traditional party plan structures (e.g. private ordering rooms, emphasis on confidential purchasing) do facilitate but also sometimes hinder what and how much women buy. Interview data show sex toy parties promote women's independence through a home-based business plan, yet financial rewards may be minimal. Further, sex toy parties could be characterized as participation in a patriarchal capitalism; women selling and promoting products that ultimately serve men through gendered, sexualized performance and scripts. We argue that while some women gain autonomy and strengthen their own intimate relationships through being a sex toy party consultant, they must negotiate familial and social stigma associated with selling sexualized products.

Greggory Thomas McPherson; Physics, New Mexico State University

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

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

Amelia M. Medina; Special Education and Communication Disorders, New Mexico State University
Effectiveness of Bilingual Intervention for Language Impairment: A Mixed Methods Study

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

Annie Muirhead; History, New Mexico State University
The Falkland Islands: Synecdoche for Empire

Most histories of the British Empire neglect to mention the Falkland Islands or at best relegate them to a footnote. However, this distant group of islands remains significant as a last vestige of this once great Empire. Even after the return of colonial possessions following World War II, life in Falkland Islands bore a much greater resemblance to a 19th century crown colony than a member of the modern British Commonwealth. When Great Britain defended the Islands in 1982, she continued a long imperial tradition of equating sovereignty over the Falklands with national prestige. George III staked his throne on the Islands in the 18th century; William IV seized the opportunity to reaffirm his claim to the Islands in 1833, marking one of the first instances of the New Imperialism as nations across the world picked apart the remains of the failed Spanish empire and scrambled to obtain previously unoccupied territories; Margaret Thatcher connected the fate of the Falkland Islands to the fate of all Englishmen. Even with imperialism out of favor by the mid-20th century, Great Britain continues to govern the Falkland Islands as a symbol of the lost empire on which the sun never set. The islanders themselves appear uniquely determined to remain part of Great Britain long after other colonies have declared independence.

Mazen Nairat; Physics, New Mexico State University
Prototype Remote Sensing of Natural Gases in the Atmosphere

A prototype remote sensing system is developed. The system is based on a tunable diode laser used for a differential absorption LIDAR. A nonlinear optical crystal system is used to achieve multiple chemical detections. An Acousto-Optical Tunable Filter (AOTF) is used to select the desired “on-line” and “off-line” pairs. A Mercury Cadmium Telluride (HgCdTe) Photoconductive Detector is employed due to its wide wavelength bandwidth and Thermoelectrically Cooled functionality. The system is characterized and tested to be prepared for a field prototype.

Mauren Gabriela Navarro; Curriculum & Instruction, New Mexico State University
Understanding the voice behind The Latino Gangsters

There is a story circulating on the Internet and the media about a fictional article from Arnaldo Jabor in which Capo Marcola gives an account of the reasons why he became a drug dealer. This fictional interview is significant because Marcola’s statements were taken as true and as it was disseminated by the media it gained strength because it represented the realities of many oppressed groups. The apocryphal story of capo Marcola exemplifies a disenfranchised individual facing extreme hardship who is being forced to make life-changing decisions. Marcola’s speech highlights some elements: stratified classes, economic crisis, poor educational system, and government corruption. Many people in Latin America living in similar situations feel identified with Marcola’s story (Hoftman, 2009; Filgueira, C., & Peri, A., 2004; Petit, J.M., 2003). Some of these inequalities contribute to the development of “different” values and beliefs in marginalized sectors. Issues that will be discussed in this presentation include an analysis of Marcola’s beliefs, his construction of learning, knowledge acquisition, and his street smarts. I will address the multiple forms of stratification of the marginalized in order to understand how Marcola’s discourse reinforces class inequality; how

marginalized people respond to these inequalities; and the role of the educational system in determining the destiny of such groups. Because education is the gateway to political and economic opportunities, it is important to help the marginalized to extricate themselves from this cycle and provide a system that addresses their real needs.

Suleiman Otieno Okoth; Communication Studies, New Mexico State University

Challenges to Developing Effective Measurements of Public Diplomacy

This research looks at the various challenges of measuring public diplomacy. The purpose of the study is to examine the relationship between public diplomacy strategies, theories, outcomes and metrics used in public diplomacy. Because of multiple factors involved in achieving foreign policy aims and influencing foreign policy outcomes, setting targets and measuring performance of public diplomacy efforts, this study addresses some of the many challenges that practitioners and scholars of public diplomacy face in developing effective measurements of public diplomacy programs. Further, an examination of the challenges posed due to the multi-disciplinary nature of public diplomacy and how it is defined by scholars and practitioners of public diplomacy is addressed. Different tools (for example public opinion polls and surveys); and models of public diplomacy that have been applied by both public diplomacy professionals and scholars are also examined as a way of exploring their effectiveness in measuring public diplomacy effects.

**Romina Pacheco, Veronica Gallegos and Nancy Wasser;
Curriculum and Instruction, New Mexico State University**

We are the Stories We Tell: Grupo Teatral Hermandad sin Fronteras

Life stories are powerful tools that can be used in and outside the classroom to enhance learning. Thus, this presentation provides an insight into the life stories of three female educators from different backgrounds, to analyze the dominant discourses about gender, race, and culture in our society. Through the performance of their stories and by drawing on Critical Discourse Analysis (CDA), the authors attempt to demonstrate arguments that support the idea that the way people choose to tell their stories help them not only to display who they are to others, but also to construct the range of identities that come together at different facets of “this is who I am.” Guided by the CDA concepts of Discourse, social languages, situated meanings, and figured worlds the authors establish the relevance of sharing, discussing, and analyzing who they are within their narratives. Through their performance and facilitated discussion, the authors hope to invite others (e.g. the audience) to engage in a process of inquire as they position themselves in their own stories. Ultimately, the goal is to have life stories become pedagogical instruments to open critical discussions on issues relevant to diversity in and outside the classroom. A concurrent goal is to explore Participatory Action Research by involving the audience in the “study,” of narrative and its use as a tool of transformation.

EmmaLee Pallai; English, New Mexico State University

Creative Writing: A Look at Neural Activity and Cross Curriculum Benefits

What is the use of creative writing outside of the creative writing classroom, and what actually happens when we create? Recent medical studies have looked into brain activity while in the act of creating and are starting to be able to decipher just what parts of the brain are stimulated. Some findings show that an imagined event is treated the same way in the brain as a real event. MIT, in recognizing the importance of creativity in the classroom, has hired Junot Diaz as the Rudge and Nancy Allen Professor of Writing to work with their engineering students. So what does all of this mean? In this paper I seek to take a scientific approach to explain the act of creative writing, drawing on research from various psychological and neurological studies. I will then discuss how a program of learning that integrates creative writing can benefit fields generally thought of as ‘non-creative.’

Maria T. Patterson; Astronomy, New Mexico State University

The Gaseous Halo of the Sunflower Galaxy: Results from the HALOGAS Survey

Continued star formation in spiral galaxies is a puzzle, since star formation rates indicate that galaxies should already have converted all gas into stars. This research investigates a galaxy that shows an extended gaseous halo and possible evidence for accretion of new gas, which may help solve this problem. I present deep radio data for the galaxy NGC 5055, the Sunflower Galaxy, from the Hydrogen Accretion in LOcal GALaxieS (HALOGAS) Survey. I also present my current model for the gaseous disk of this galaxy and compare these radio data (which trace the gas) to deep optical data (which trace the stars).

Joe Peterson; Physics, New Mexico State University

Local Structural Study of Prussian Blue Analog

Prussian blue analogs have demonstrated remarkable and unpredictable thermal expansion behaviors. Specifically, some exhibit a complex form of negative thermal expansion (NTE). This is interesting for physical reasons – as most materials expand on heating – and industrial reasons – as a potential mechanism to achieve zero thermal expansion over a given temperature range. Presented here is a local structural study of one Prussian blue analog that has been shown to exhibit an interstitial-water-dependent thermal expansion.

Erin Punke; Biology, New Mexico State University

*How Temperature Can Influence Spatial and Temporal Patterns
Among Symbiotic *Vibrio fischeri*: Environment Matters!*

The mutualistic association between *Vibrio fischeri* (γ -proteobacteria: Vibrionaceae) and the sepiolid squid, *Euprymna tasmanica* (Mollusca: Cephalopoda), is an ideal model for understanding how abiotic factors can drive this environmentally transmitted symbiosis. *V. fischeri* are cosmopolitan marine bacteria and are known to environmentally infect the light organ of their squid host during the onset of symbiosis. Bacterial diversity is high both geographically and temporally, where persistent dominant strains exist throughout both space and time. Free-living vibrios are strongly influenced by environmental conditions, suggesting that constant abiotic fluctuations in areas of thriving *Euprymna*/*Vibrio* associations may be a driving factor in both the formation and continuation of this mutualism. Utilizing geographically and temporally distinct *V. fischeri* strains, we experimentally evolved these bacteria to a wide range of temperatures, and examined growth and competitive dominance compared to native wild-type strains. Results show a gain in fitness in the evolved strains, giving further support to temperature adaptation being a dominant factor behind bacterial phenotypic plasticity. Furthermore, we examined whether temperature was an underlying factor controlling patterns of diversity among *V. fischeri* on a temporal scale. Further understanding of survival limits and temperature thresholds of symbiotic bacteria will provide insight into adaptation of an environmentally transmitted mutualism subjected to daily and seasonal environmental fluctuations.

Dakota Raynes; Sociology & Women's Studies, New Mexico State University

*A View of Occupy Denver From the Ground Up: A First-hand Account of Building Solidarity and
Maintaining Mobilization Within the Occupy Wall Street Movement*

This presentation utilizes three months of my ethnographic field research, including observation, participation, qualitative interviews, and photography. I observed and participated in the daily activities of Occupy Denver from September 20, 2011 through December 25, 2011, which included attending and participating in general assemblies, working groups, marches, occupying the park and/or streets through the night, and other direct actions. The research project was informed by a grounded theory approach, feminist methodologies, and a social constructionist framework. One focus was to create a typology to describe the different kinds of social movement actors engaged with Occupy Denver. As the typology emerged from the data, a second goal arose – to illuminate Occupy Denver's location as a social movement organization within the Front Range social movement sector and within the emergence of the broader Occupy Wall Street movement nationally. Denver has a long history of both social movement protest and issues with police brutality. This profile article discusses the emergence of Occupy Denver within this sociopolitical context and highlights the complexities of creating and maintaining solidarity and mobilization both at the individual and group levels. More specifically, this project focuses on the differences and similarities between individuals and groups focused on reformatory goals and those focused on revolutionary goals.

Harvind K. Reddy, Tapaswy Muppaneni; Chemical Engineering, New Mexico State University

Direct Conversion of Algal Biomass to Biodiesel Under Supercritical Ethanol Conditions

This work offers a single step, environmentally friendly and an optimized method for the direct conversion (one-step) of algal biomass to biodiesel using supercritical ethanol condition. Ethanol was used for simultaneous extraction and transesterification of lipids at supercritical conditions to produce fatty acid ethyl esters. The process parameters studied in this work are algae to ethanol (wt./vol.) ratio (1:3 1:15), reaction temperature (245 °C-270 °C), and reaction time (2 min. 25 min.). About 67% (of total lipids) FAEE conversion was achieved at 265 °C and 10 minutes of reaction time. The fatty acid ethyl esters (FAEE) were analyzed using GC-MS and FTIR after purification. TGA analysis of algal biomass was presented along with the TEM images of the biomass sample before and after the supercritical ethanol transesterification. The single-step process has the potential to provide an energy efficient and economical route for algal biodiesel production.

Sasha Richardson; Sociology, New Mexico State University

Teeth: Biting Through the Sexual Stereotype Landscape

Horror is a genre that defies barriers; it both maintains and shatters mainstream perspectives of gender. In this essay, Barbara Creed's *Horror and the Monstrous Feminine* (1993), Michael Thomas Ford's (2002) short story "Night of the Werepuss," the 1976 film *Carrie*, and Julie Kristeva's *Powers of Horror: An Essay on Abjection* (1982) are referenced in order to problematize and challenge prevailing and perpetuating gender stereotypes in the 2007 film *Teeth*. Horror relies on the dichotomous juxtaposition of some kind of "bad" versus some kind of "good." Women are frequently portrayed in horror as "monstrous," and while they may not often be the antagonist, or "bad" character, they often strongly parallel said "bad" character's attributes (flawed outsider). *Teeth* sets up a number of common stereotypes regarding puberty, sexual maturity and exploration, religion, and gender roles, but ultimately challenges some stereotypes regarding monstrous femininity. The main, female character starts as strongly representative of the conservative, abstinent Christian perspective, and ends with a new understanding of herself as a sexual woman, as well as a great sense of power, agency, and responsibility over her own sexuality.

Ashley Ryan; Curriculum and Instruction, New Mexico State University

Post-Epistemological Strands within Multicultural Education Courses

This study focuses on multicultural education courses, both at the undergraduate and graduate levels, and the possible programs, outlets, and support that can be offered after a multicultural education course. While much of the research done on multicultural education looks at what occurs during a course, little research is available on what happens after a course. Multicultural education courses can be a space for transformation, realization, discovery, and complexity, however leaving a space of exploration can be difficult, and empowerment can be lost. Currently many pre-service teachers experience contradictions when entering into practicum courses, and student teaching. While many teacher education programs place importance on multicultural education, and the implementation of multicultural concepts, support from fellow teachers and school districts is not widely apparent therefore pre-service teachers experience moments of dissonance, questioning their education, and wondering what they can do. The concern is the manifestations of these experiences, from a multicultural course and the support offered from both teacher education programs and schools. This investigation sought to ascertain how such a broadening of the focus of multicultural education within teacher education contexts had impacted the actual conceptualization and implementation of multicultural education among teachers. By offering spaces of support, agency, and working towards hope in the classroom this study expands upon long standing ideas, theories, and frameworks. Working to be advocates for the next generation of teachers this study dives into a critical question within multicultural education, and restores hope within education.

Erin Schmidt; Anthropology, New Mexico State University

An Examination of Hacienda Architecture in Yucatán, Mexico

This paper presents the results of archaeological and historical research on haciendas in three regions of the Yucatán peninsula. Haciendas are agricultural estates that are maintained by a wealthy land-owner and a lower-class labor force to supply small-scale markets with goods and enhance the prestige and status of the owner. I compare the variation in the architecture of the haciendas before and after the Caste War (1847), in the areas around Campeche, Yaxcabá, and Ebtun. Architectural variation reveals new details about labor organization and production during the volatile 19th century.

Marc Adrian Scott; English, New Mexico State University

Reconfiguring Writing Assessment Through Feminist, Qualitative Research Methodologies

My research project explores how college writing instructors might employ feminist qualitative research methodologies to better assess student writing. In my presentation I'll discuss how my project overlaps and departs from existing scholarship in the field of writing assessment. I'll briefly explain the methodology of my project and describe major features of a writing assessment theory informed by feminist qualitative research methodologies. In particular, I'll explain how my proposed theory of writing assessment alters the relationship between student, teacher, and administrator. By using sample prompts and rubrics, I'll detail how the proposed theory might be applied to college-level writing classrooms and writing programs.

Andrea Marie Severson; History, New Mexico State University

Clothing Reform, Gender Roles, and the Consumer

The turn of the century presented a time of great social change where many issues became political including the issue of clothing. During the late 19th and early 20th century, doctors and suffragists alike called for clothing reform as more women stepped into the public sphere on issues such as temperance and women's suffrage. Often, the debate about women's clothing, particularly the corset, became a displaced argument over what role women should take in the twentieth century. However, despite such outward support of clothing reform from the medical community as well as the women's movement, the kind of change they called for did not take place until after the First World War because clothing reform did not fit the demands of the consumers, which were the women themselves. The debate over clothing reform was not about whether or not women should change the way they dress, most people believed they should. The question was the reason for advocating reform. This argument broke down into those who believed women should reform their clothing for purely medical reasons and those who believed they should reform clothing for the advancement of women in society. This paper examines that argument by first exploring the medical and scientific reasons behind clothing reform. It then looks at the feminist arguments for change associated with the women's movement. Finally, it explores the reasons why female consumers who actually wore the clothing were hesitant to adopt the reformist style.

Manjita Shrestha; Physics, New Mexico State University

Magnetic Properties of Selected Prussian Blue Analogs

Prussian Blue Analogs consists of MC6 and AN6 octahedra connected by cyanide ligands (M, A= metals). They typically crystallize in cubic structures. We have studied temperature and field dependence of the magnetization and the susceptibility of selected Prussian Blue Analogs such as hexacyanocobaltates, -ferrates and -chromates. All compounds exhibit modified Curie-Weiss behavior in the paramagnetic region. The observed effective moments of those compounds were compared with the ones of the respective free-ion values. Furthermore, we find evidence that a few of the compounds exhibit a transition to long-range magnetic order at low temperatures.

Katherine Rose Smith; Biology, New Mexico State University

Refuge Use and Movement in the Endangered Salt Marsh Harvest Mouse

Understanding how animals interact with their environment is a major challenge in the field of animal behavior. Investigating how habitats affect animal behavior and vice versa is a difficult but essential part of effective wildlife management and conservation. The salt marsh harvest mouse (*Reithrodontomys raviventris*) is a unique and highly specialized species that occupies and interacts with a complex intertidal habitat type utilized by very few species of rodents. The primary threat to this endangered species is habitat loss and degradation. Because the amount of habitat available to this species has been so dramatically reduced it is imperative that managers understand how this mouse is interacting with the habitat that remains. In this study I used radio-telemetry to monitor the habitat use and movement of the salt marsh harvest mouse. I monitored mice during high tides in naturally tidal wetlands and diked wetlands simultaneously, during both the full and new moon lunar cycles. I used triangulation to estimate mouse locations, and used locations to estimate movement rates. With this data I identified the primary form of refuge from tidal inundation used by the mice, as well as examined differences in movement rates in different wetland types and during different lunar cycles.

**Nancy Wasser, Romina Pacheco and Veronica Gallegos;
Curriculum and Instruction, New Mexico State University**

We are the Stories We Tell: Grupo Teatral Hermandad sin Fronteras

Life stories are powerful tools that can be used in and outside the classroom to enhance learning. Thus, this presentation provides an insight into the life stories of three female educators from different backgrounds, to analyze the dominant discourses about gender, race, and culture in our society. Through the performance of their stories and by drawing on Critical Discourse Analysis (CDA), the authors attempt to demonstrate arguments that support the idea that the way people choose to tell their stories help them not only to display who they are to others, but also to construct the range of identities that come together at different facets of "this is who I am." Guided by the CDA concepts of Discourse, social languages, situated meanings, and figured worlds the authors establish the relevance of sharing, discussing, and analyzing who they are within their narratives. Through their performance and facilitated discussion, the authors hope to invite others (e.g. the audience) to engage in a process of inquire as they

position themselves in their own stories. Ultimately, the goal is to have life stories become pedagogical instruments to open critical discussions on issues relevant to diversity in and outside the classroom. A concurrent goal is to explore Participatory Action Research by involving the audience in the “study,” of narrative and its use as a tool of transformation.

Sessily Watt; English, New Mexico State University

Another Woman

While fiction has extensive mimetic possibilities, it can also explore experiences that may not have a direct match in the physical realities of the everyday. Through the surreal or the metaphor made literal, fiction can highlight or accentuate what might otherwise pass unnoticed. As an MFA Fiction student at NMSU, I am interested in writing into those unexplored experiences. I will read from my short story, “Another Woman,” which features a heartbroken woman who does not see the world around her as clearly as she thinks.

Nichole Kay Weber; Sociology, New Mexico State University

*The Foucauldian Homo Economicus Subjectivity and Collectively-Oriented Economic Change:
Results from a Survey of Farmers Market Consumers*

Consumerism is a necessary component to advancing anti-capitalist economic relations. However, little research to date has examined the subjectivity processes of consumers who participate in alternative trade relations. This study contributes to our understanding of the contradictions and contingencies involved in advancing anti-capitalist economic relations by problematizing the subjectivities of consumers. We focus upon farmers market consumers as farmers markets embody many attributes of a collectively-oriented place of economic exchange. Theoretically we draw upon the Foucauldian notion of the homo economicus subjectivity to examine results from a survey administered to farmers market consumers. Using OLS regression to analyze our results, we find that the collectively-oriented motivations of these consumers are significantly and positively related to concerns with availability, cost, and health benefits of the products sold at the market. Our findings also indicate collectively-oriented motivations are significantly associated with efforts to manage environmental risks stemming from late modernity. These various concerns, we argue, are all consistent with a homo economicus subjectivity. We discuss the theoretical implications arising from the recognition that collectively-oriented economic exchanges are being advanced by individuals motivated in part by a homo economicus subjectivity. Contributions of this study include demonstrating the value of poststructural theoretical conceptualizations of social change and the subject, as they relate to alternative economic exchanges. We also provide suggestions for future research examining these issues from a post-Marxist perspective.

Nina Elvira Williams; Anthropology, New Mexico State University

La Noria: A Hydrologic Technology of Yucatán

This paper explores the variation among norias (or water wheels) and offers insight into how technology transfer reengineered Yucatán’s landscape. Norias were introduced to Yucatán after the Spanish Invasion (1511-1546). Cenotes (depressions that reach the water table) were a reliable fresh water source and were accessed using the new hydrologic technology. Mechanical and morphological variations of the noria occur throughout the Northern Yucatán peninsula. I provide a timeline for how and when the noria changed.

Megan M. Wong; English, New Mexico State University

In Defense of Living Messy

Megan M. Wong’s first collection of poetry, *In Defense of Living Messy*, is a thoughtful and philosophical examination of motherhood, relationships, and the struggles in between and beyond. The book takes its reader on a journey of prose and verse, and Wong employs each mode to balance the dense lyric with philosophical inquiry. Wong’s narrator utilizes the occasion of prose to ground and locate the lyric moment - a moment that often works in tandem with Socratic philosophy - and her poetry offers insight to the human condition insofar that we, as readers, are shown how one might manage being-ness as a thinking entity. These poems culminate into a collected apology. But the apology Wong gives us is not an apology in the conventional sense—it is a defense; a defense of motherhood, of womanhood, of sexuality, of thinking. The defense is for everyone, a defense of living messy or any other way.

Cat Wu; Astronomy, New Mexico State University

The Mystery of Spiral Galaxies

Spiral galaxies are known for their spiral arms filled with stars. But these galaxies also have a fainter component made of gas and dust that creates a huge sphere around the spiral arms. It's called a 'halo', and no one knows where all the material comes from – Supernovae? Other galaxies? Outer space? Studying how fast halo material orbits within a galaxy and comparing it to how fast stars in the spiral arms orbit around the galaxy's center can shed light on where the halo came from and has implications for how galaxies evolve.