

Graduate
Research
& Arts
Symposium

New Mexico State University

March 10-12, 2014

Corbett Center, NMSU Campus



Graduate
Student
Council
of New Mexico State University

**Funding provided by: Associated Students of
New Mexico State University**

Graduate Research & Arts Symposium

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NOTE: All abstracts for oral presentations, posters, and exhibits are posted on our website. Please visit <http://web.nmsu.edu/~wwwgsc/gras/> for more information.

2014 Graduate Research and Arts Symposium

Dear NMSU Students, Faculty, Staff, and Guests,

We welcome you to the 2014 NMSU Graduate Research and Arts Symposium. GRAS is a celebration of the dedication, diligence, and creativity of our NMSU graduate community. It is an annual opportunity for graduate students from diverse areas – business, science, mathematics, government studies, education, health, the humanities, and the arts – to come together to share their work and the contributions they have made to their chosen fields. This year, we have more than 160 submissions from 14 departments and 5 colleges represented here at GRAS. During three days, March 10th, 11th and 12th, the entire NMSU community has the opportunity to explore the breadth of leading-edge work done by our graduate students.

GRAS is a time to recognize our graduate students for their work in research and the performing arts and for their efforts to help both other students and the local community. Graduate students spend a significant amount of their time teaching and mentoring their fellow NMSU students. Many graduate students support the surrounding communities by volunteering for a variety of education outreach and community service events throughout the region. NMSU graduate students represent our university at professional seminars and conferences throughout the world. The work of NMSU graduate students directly reflects the reputation of New Mexico State University as a leading institution of higher learning.

GRAS provides an opportunity for graduate students to meet one another, learn about academic work outside their own expertise, and develop the presentation skills crucial to success in research and the arts. It is an opportunity for NMSU undergraduates to find out what graduate students do and to ponder graduate studies for themselves. For NMSU administration, staff, and faculty, GRAS is an opportunity to recognize the continuing success of our graduate students.

As President and Vice-President of Activities of the Graduate Student Council, we invite you to explore the world of NMSU graduate studies through GRAS. We thank the many people who have helped make this year's symposium possible. This includes our GRAS participants and volunteers, as well as ASNMSU for providing critical funding. We sincerely appreciate everyone's hard work and we wish everyone a rich and stimulating experience at GRAS 2014.

Sincerely,

Romina A. Pacheco
President
Graduate Student Council
New Mexico State University

Cecilia Palacio-Ribón
Vice-President of Activities
Graduate Student Council
New Mexico State University

NMSU Graduate Student Council, 2013-2014

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Steven Gregory

Collin King

Tapaswy Muppaneni

Alireza Saraeian

Acknowledgements

The GSC would like to thank the Graduate School Dean Interim, Dr. Loui Reyes and the ASNMSU President David Maestas for their support.

Special thanks to all the faculty, staff, and graduate students who have tirelessly worked in making GRAS a success, we could have not done it without you.

Schedule of Events

Note: Registration will be open all day on the third floor of Corbett Center Student Union. Presenters should arrive 15 minutes prior to their scheduled start time to check in for presenting.

Monday, March 10, 2014

- 8:00am-12:00pm Oral Presentations—Senate Chambers/Senate Gallery
9:00am-11:00am Morning Poster and Art Exhibit—East Ballroom
12:00pm-1:00pm Lunch Break
1:00pm-5:00pm Oral Presentations—Senate Chambers
2:00pm-4:00pm Afternoon Poster and Art Exhibit—East Ballroom
6:00pm-7:00pm Keynote Speaker: Amauri Gutierrez Coto—Corbett Auditorium

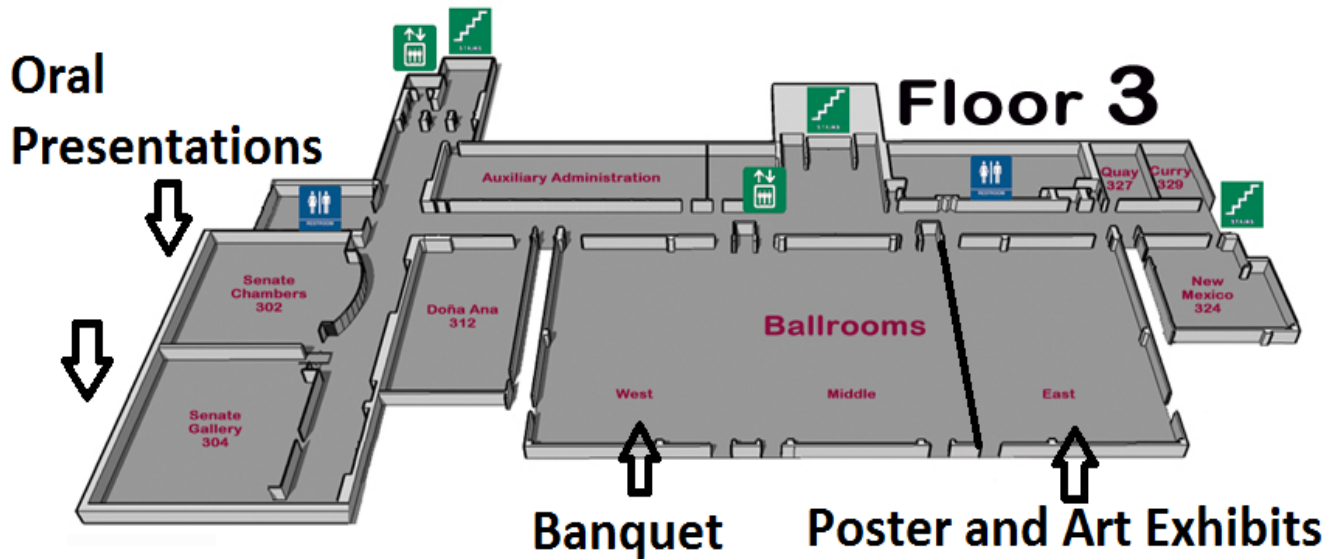
Tuesday, March 11, 2014

- 8:00am-12:00pm Oral Presentations—Senate Chambers
9:00am-11:00am Morning Poster and Art Exhibit—East Ballroom
12:00pm-1:00pm Lunch Break
1:00pm-5:00pm Oral Presentations—Senate Chambers/Senate Gallery
2:00pm-4:00pm Afternoon Poster and Art Exhibit—East Ballroom

Wednesday, March 12, 2014

- 8:00am-12:00pm Oral Presentations—Senate Chambers
5:00pm-8:00pm Banquet and Closing Ceremony—West/Middle Ballrooms

Corbett Center Floor Plan



Banquet and Closing Ceremony

Wednesday March 13th 5pm-8pm

Corbett Center Ballroom

Join us for dinner, raffle prizes, and entertainment!

There will be dance and other artistic performances by our student community and local talent

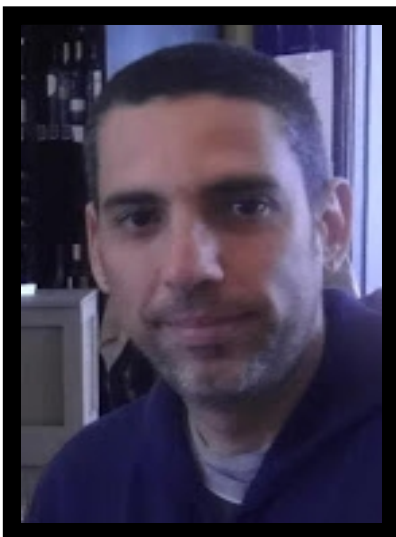
Monday **MARCH 10** 6:00 PM
Corbett Center Auditorium

Graduate
ReseArch
& **Arts**
Symposium

GRAS 2014 presents
Keynote Speaker
Amauri Francisco Gutierrez Coto

Amauri Francisco Gutierrez Coto, poet, essayist, author of *Diario de un intruso* (Pinar de Rio, 2002) and *Aprendiz de mudo* (Madrid, 2013), and co-author with Ana Cairo in *El Padre Las Casas y los cubanos*, (Bayamón, PR, 2007, 2008, 2009 and Havana, 2011), will return “home” to share his experiences as a researcher and talk about his life in the American Southwest. After graduating with honors, and being awarded with the Outstanding Alumni Graduate Award at New Mexico State University, Amauri was accepted to the Hispanic Literature program with a Graduate College Access Fellowship, and a teaching position at the University of Arizona. He is majoring in Nineteenth through Twenty-first Century Spanish American Literature along with a minor in Literary Theory from Thirteenth-Century through Eighteenth-Century Spanish literature.

Amauri will be sharing his achievements as a graduate student, his experience in the doctoral program, along with his familiarity with teaching and learning in the US-Mexico borderland.



Amauri Gutiérrez Coto completed his B.A. at the University of Havana, MA from New Mexico State University in Spanish, and he is currently working on his PhD at the University of Arizona.

He is the recipient of the 2008 fellowship from La Junta de Andalucía, and the 2010 fellowship from the Minister of Education and Culture in Spain.

Amauri published essays such as *Acerca de lo negro y la africanía en la lengua literaria de Motivos de Son* (Pinar del Rio, 2002), *Orígenes y el paraíso de la eticidad* (Santiago de Cuba, 2010) and *El grupo de Lezama Lima o el infierno de la trascendencia* (Madrid, 2012) among other exceptional literature works.



Presentations and Performances

Monday, March 10, 2014

Morning Session

Corbett Center 3rd floor, Senate Chambers

| Time | Name | Title | School | Department |
|--------|---|---|--------|-----------------------------------|
| 8:00a | Karla A. Salazar | Transcriptome of the Southern dumpling squid <i>Euprymna tasmanica</i> white body and its possible role in hematopoiesis | NMSU | Biology |
| 8:20a | Rachael Ryan | Cryptic species of Checkerspot Butterfly reveals evolutionary diversification as a result of climate change in the American Southwest: <i>Euphydryas anicia cloudercrofti</i> | NMSU | Biology |
| 8:40a | Rebekah L. Horn | Identifying drivers of local adaptation in an ephemeral pond crustacean (Notostraca: <i>Triops</i>) | NMSU | Molecular Biology |
| 9:00a | Mohammed Sawalhah & Andres F. Cibils | Animal-driven rotational grazing patterns in a seasonally grazed New Mexico rangeland pasture | NMSU | Animal & Range Science |
| 9:20a | Laura Goodman | Effects of Applying Picloram and Aminopyralid with 2,4-D on White Locoweed in Northern New Mexico | NMSU | Animal & Range Science |
| 9:40a | Racheal Jones | Estimating available saline water resources in aquifers of New Mexico using GIS | NMSU | Water Science & Management |
| 10:00a | Lekha N. Adhikari & Dr. Matthias Burkardt | Quark Angular Momentum Distribution in the Transverse Plane | NMSU | Physics |
| 10:20a | Nishath Rajiv Ranasinghe | Lg attenuation in Northeast China Using NECESS Array Data | NMSU | Physics |
| 10:40a | Greggory T. McPherson | The construction and implementation of a small angle light scattering instrument as a structural probe of micron-scale pore systems in solids | NMSU | Physics |
| 11:00a | Candace Gray | Venus' oxygen green line emission: an auroral process? | NMSU | Astronomy |
| 11:20a | Sam Schonfeld | The Sources of F10.7 Emission | NMSU | Astronomy |
| 11:40a | Amani Al-Ghraibah | Feature Selection in a Cross-Validated Classification Framework as Applied to Spatial Features of Solar Magnetogram Images | NMSU | Electrical & Computer Engineering |

Presentations and Performances

Monday, March 10, 2014

Morning Session

Corbett Center 3rd floor, Senate Gallery

| Time | Name | Title | School | Department |
|--------|--|---|--------|--|
| 8:00a | Roshani Rajbanshi | Why Afterschool? | NMSU | Curriculum & Instruction |
| 8:20a | Andres S. Rosan, Dr. Patricia MacGregor Mendoza, Dr. Gabriela Moreno, & Audra Westphal | Table Discussion: Principles for the development of a new Spanish leveling exam for NMSU students: Diagnosis based on the first data collection | NMSU | Language & Linguistics |
| 8:40a | Rebecca Dutton | An Exploratory Mixed-Methods Study of the Impact of Formal Education on Moral Development in Post-Conflict Liberia | NMSU | Social Work |
| 9:00a | Giselle Del Carmen Martinez Negrette | Balanced Dual Language Education in Linguistically Unbalanced Dual Language Classrooms | NMSU | Curriculum & Instruction |
| 9:20a | Robert M. Hastings | The Crisis in STEM: Menace, Myth - or Both? | NMSU | Education |
| 9:40a | Stella M. Lucero | Leadership Change and Reform | NMSU | Education Management & Development |
| 10:00a | Melissa Cast | Domains as Sources of Acculturative Stress in International Students: An Ethnographic Perspective | NMSU | Management |
| 10:20a | Ryan E. Cruz | Advertising differences in male aesthetic among non-Caucasian actors across three magazine genres | NMSU | Marketing |
| 10:40a | Hector L. Hernandez | A Household Model of Food Security in Tanzania | NMSU | Agricultural Economics & Agricultural Business |
| 11:00a | Karen R. Trujillo | Emotional Expressions of a Tri-State Border Community through an Oldies Radio Show | NMSU | English |
| 11:20a | Hayley Cotter | From Fragmentation to Wholeness: The Dwarfs of Spensers Faerie Queene | NMSU | English |
| 11:40a | Iliana Guadalupe Villegas | An Ethnographic Perspective of Human Trafficking and Human Rights in Guatemala | NMSU | Anthropology |

Presentations and Performances

Monday, March 10, 2013

Afternoon Session

Corbett Center 3rd floor, Senate Chambers

| Time | Name | Title | School | Department |
|-------|---|--|--------|-------------------------------------|
| 1:00p | Adriana Goenaga Ruiz de Zuazu | Critical Literacy in the Classroom through Literacy Circles | NMSU | Curriculum & Instruction |
| 1:20p | Marilupe Rodriguez | Understanding the Meaning of Students' Mathematical Motivation | NMSU | Curriculum & Instruction |
| 1:40p | Yvonne Moreno | Transition: Barriers, best practices, and teacher assumptions on disability | NMSU | Special Education |
| 2:00p | Anurag Veerabathini & Dr. Paul M. Furth | A High-Efficiency, Ultra-Low-Ripple Fully-Integrated Switched Capacitor Buck Converter Employing Time-Interleaving and Pulse-Frequency Modulation Techniques | NMSU | Electrical & Computer Engineering |
| 2:20p | Tiep Le | Logic Programming for DCOP | NMSU | Computer Science |
| 2:40p | Gholamali Rahnavard | Applying Big Data Approaches for Experimental Biological Data Mining: A Case Study | NMSU | Computer Science |
| 3:00p | Bishnu H. Dhakal, Rajesh K. Patti, & James W. Herndon | Generation and Reactivity of Isobenzofurans from Carbene Complex Acetylene Coupling | NMSU | Chemistry & Biochemistry |
| 3:20p | Thushara W. Madanayake | CYP2S1 depletion alters mTOR signaling in Beas2B cells; orchestrating cell size | NMSU | Chemistry & Biochemistry |
| 3:40p | Collin Scarince | Further Recall of Wins over Losses in Gambling | NMSU | Psychology |
| 4:00p | Mauren G. Navarro | Globalized capitalism, neoliberalism and its effects on the living condition of the worlds population | NMSU | Curriculum & Instruction |
| 4:20p | Dawn M. Bates | Prejudice and Discrimination in Graduate School: A Discussion | NMSU | Counseling & Educational Psychology |
| 4:40p | Carmen C. Boje & Dr. Edward Pines | A Survey-Interview to analyze the Electronic Health Records Systems in United States of America | NMSU | Industrial Engineering |

Presentations and Performances

Tuesday, March 11, 2014

Morning Session

Corbett Center 3rd floor, Senate Chambers

| Time | Name | Title | School | Department |
|--------|---|--|--------|-------------------------------------|
| 8:00a | Desa K. Daniel & Dr. Ivelisse Torres-Fernandez | A Phenomenological Study of the Invisibility Syndrome among African Americans | NMSU | Counseling Psychology and Education |
| 8:20a | Lihua Zhang | Lecturing or Coaching? –Towards an Alternative Approach for EFL teaching in China | NMSU | Curriculum & Instruction |
| 8:40a | Mariam Abdelmalak | Building Online Learning Communities Using Web 2.0 Technologies | NMSU | Curriculum & Instruction |
| 9:00a | Daniel Ramirez Gordillo | Do hearing loss and Alzheimers disease share common genetic mechanisms? | NMSU | Biology |
| 9:20a | Tara Devi Newar, Rodolfo Tello-Aburto & William A. Maio | The First Total Synthesis of (-)-Palmyrolide A | NMSU | Chemistry & Biochemistry |
| 9:40a | Ronny Forney | The Effects of Diurnal Patterns on the Spatial Distribution of Female Desert Bighorn Sheep (<i>Ovis canadensis mexicana</i>) | NMSU | Geography |
| 10:00a | Bahar Sayoldin | Applying Data Mining and Bioinformatics Techniques to Analysis Capsicum Species Transcriptome | NMSU | Computer Science |
| 10:20a | Federico Campeotto | Explore the use of GPUs in constraint solving | NMSU | Computer Science |
| 10:40a | Brittany N. Porter | My Land is the Southwest: A Nomination to the National Register of the Peter and Henriette Wyeth Hurd home and studios | NMSU | Anthropology |
| 11:00a | Baoyu Wang | Agency and the Mechanism of Cultural Influence | NMSU | Psychology |
| 11:20a | Maria Dolores Molina | Venir sin temores, a exponer la cultura: Preliminary Study of the Factors Impacting Culture Shock Among some Ecuadorian Sojourners in the U.S. | NMSU | Communication Studies |
| 11:40a | Ramona Isabel Ojeda | Aurora | NMSU | Languages & Linguistics |

Presentations and Performances

Tuesday, March 11, 2013

Afternoon Session

Corbett Center 3rd floor, Senate Chambers

| Time | Name | Title | School | Department |
|-------|---|--|--------|--|
| 1:00p | Nancy Wasser | Using Counternarratives of Social Justice to Promote Literacy and Prevent Bullying in Schools | NMSU | Curriculum & Instruction |
| 1:20p | Mark Franzak | Exploring the intersections of mathematics and race – What are teachers' beliefs, how did they originate, and what are the implications? | NMSU | Curriculum & Instruction |
| 1:40p | Romina A. Pacheco | Participatory Action Research as Pedagogy of Expansion | NMSU | Curriculum & Instruction |
| 2:00p | Alejandro E. Bernal | Evolution of retail food markets and Supplemental Nutrition Assistance Program | NMSU | Agricultural Economics & Agricultural Business |
| 2:20p | V. Bleu Knight & Elba E. Serrano | Profiling the Normal Human Astrocyte Transcriptome with Next Generation Sequencing | NMSU | Biology |
| 2:40p | Phanidhar Kukutla, Jinjin Jiang, Dong Pei, Wanqin Yu, & Dr. Jiannong Xu | The Impact of Gut Bacteria on the mosquito <i>Anopheles gambiae</i> Fecundity and Immunity against malaria <i>Plasmodium berghei</i> | NMSU | Biology |
| 3:00p | Wenjie Wang | Becoming a Better You: A Further Development of Ten Commandments for Motivating Second Language Learners | NMSU | Curriculum & Instruction |
| 3:20p | Armando Altamirano | Common Practices of Law: From Slavery to Immigration Policies | NMSU | Curriculum & Instruction |
| 3:40p | Cecilia Palacio-Ribón | Spanish for Spanish Speakers: differences between Spanish Native Speakers and Spanish Heritage Speakers | NMSU | Curriculum & Instruction |
| 4:00p | Sebastian Trujillo | Formation of galaxies in a dark universe | NMSU | Astronomy |
| 4:20p | Kenza Arraki | The tidal disruption of satellite galaxies | NMSU | Astronomy |
| 4:40p | Elizabeth S. Klimek | The Causal Connection Between Inflows, Outflows, and Disk Star Formation in ART Simulations | NMSU | Astronomy |

Presentations and Performances

Tuesday, March 11, 2013

Afternoon Session

Corbett Center 3rd floor, Senate Gallery

| Time | Name | Title | School | Department |
|-------|------------------------------------|--|--------|-----------------------------------|
| 1:00p | Ramaninder Brar | Effect of dissolved gases on the formation of surfactant free emulsions | NMSU | Physics |
| 1:20p | Joshua W. Amburgey | Raman Spectroscopy in Oscillating Large Electric Field Gradients | NMSU | Physics |
| 1:40p | Dan Short & Dr. Michael De Antonio | Narrow line width tunable DIAL LIDAR detector | NMSU | Physics |
| 2:00p | Nigel Mathes | A Detailed Spatial Study of HI and OVI Absorbing Gas Around Galaxies | NMSU | Astronomy |
| 2:20p | Meredith Rawls | A Tale of Two Red Giants: Testing Asteroseismic Scaling Relations with KIC 9246715 | NMSU | Astronomy |
| 2:40p | Sten Hasselquist | Kinematical and Chemical Gradients Within the Sagittarius dSph Galaxy | NMSU | Astronomy |
| 3:00p | Wenyan Li | Fluorescence decay measurements using flow cytometry | NMSU | Chemical Engineering |
| 3:20p | Balakesavaraju Nadikatla | Fully Integrated Switched Capacitor Buck Converter using Capacitive Banks for High Efficiency over a wide range of Load currents | NMSU | Electrical & Computer Engineering |
| 3:40p | Ping Hou | Revisiting Risk-Sensitive MDPs: New Algorithms and Results | NMSU | Computer Science |

Presentations and Performances

Wednesday, March 12, 2013

Morning Session

Corbett Center 3rd floor, Senate Chambers

| Time | Name | Title | School | Department |
|--------|--|---|--------|--|
| 8:00a | Kyle Uckert | A Comparative Study of in Situ Biosignature Detection Spectroscopy Techniques on Planetary Surfaces | NMSU | Astronomy |
| 8:20a | Karina Yazmin Gutierrez-Jurado | Farm water budgets for semiarid irrigated floodplains of northern New Mexico: characterizing the surface water-groundwater interactions | NMSU | Water Science & Management |
| 8:40a | Kefaya Diab | Contested Representations of Reality in Waltz with Bashir & Children of Shatila: The Agenda Setting Theory as Analytical Framework for Looking at Documentaries | NMSU | English |
| 9:00a | Manuel Rodriguez Ramos | Historia, cultura y pensamiento universal según la visión iconoclasta de Gastón Baquero | NMSU | Languages & Linguistics |
| 9:20a | Mariá de los Ángeles Pereira Jiménez | Gastón Baquero: visión de América Latina en sus ensayos | NMSU | Languages & Linguistics |
| 9:40a | Jessica P. Lail | He said, she said: Engendering blame through personalization biases in news reports of sexual assault | NMSU | Psychology |
| 10:00a | Jean McKeever | Asteroseismology of Red Giants | NMSU | Astronomy |
| 10:20a | Nicholas Ule | Investigation Into Differential Rotation on Kepler Targets | NMSU | Astronomy |
| 10:40a | Erandi Apsara Wijerathna & Dr. Boris Kiefer | Effect of Point Defects and Microstructure on Mechanical Hardness Estimates of η -Ta ₂ N ₃ | NMSU | Physics |
| 11:00a | Laura Davidson-Salguero & Dr. Igor Sevostianov | Microstructure and Elastic Properties of Cortical Bone | NMSU | Department of Mechanical & Aerospace Engineering |
| 11:20a | Mohammad A. Qayum | Transactional Memory as synchronization solution for Scalable Parallel | NMSU | Electrical & Computer Engineering |
| 11:40a | Nafiul A. Siddique | Local Memory Store - A multi purpose memory replacing on-chip cache | NMSU | Electrical & Computer Engineering |

Posters and Exhibits

Monday, March 10, 2014 & Tuesday, March 11, 2014

Corbett Center 3rd floor, East Ballroom, 9am - 11am, 2pm-4pm

| Poster Number | Name | Title | School | Department |
|---------------|---|---|--------|---|
| 28 | Rachelle M. Bassen | Staining for Myelination with Luxol Fast Blue and Neutral Red | NMSU | Biology |
| 19 | Erin Brown-Meeks & Erica Davis | Another example of a chimp-like black-handed spider monkey (<i>Ateles geoffroyi</i>) "raid" observed at La Milpa, Belize | NMSU | Anthropology |
| 18 | Kristin Lea Corl & Angel Pena | Ritual or War: Burning in the Jornada Mogollon | NMSU | Anthropology |
| 47 | Kyle DeGrave, Jason Jackiewicz, & Matthias Rempel | Validating Time-Distance Helioseismology With Realistic Quiet Sun Simulations | NMSU | Astronomy |
| 34 | Adam Dettmer | Determination of optimal coordination complex for facilitated transport enabled - in-situ chemical oxidation of 1,4-dioxane in groundwater | NMSU | Water Science and Management |
| 41 | Carollan Ehn | The Hasse-Weil Theorem and Applications to Elliptic Curve Cryptography | NMSU | Mathematical Sciences |
| 46 | Diane Feulliet | Ages of Nearby Giants with APOGEE | NMSU | Astronomy |
| 30 | Erek H. Fuchs & James Witcher | Central Palomas Basin Aquifer Investigation | NMSU | Civil Engineering, Water Science and Management |
| 40 | Andrea Gallegos | Lg Attenuation in the Central and Eastern United States as Revealed by the EarthScope Transportable Array | NMSU | Physics |
| 29 | Robert Gueth | Temperature effects on the electric discharge and gene expression in the electric organ of <i>Eigenmannia virescens</i> | NMSU | Biology |
| 38 | Mohammad A. Haque | Item Implementation of low quiescent current low-dropout (LDO) regulator using Split Length Compensation technique with Enhanced Transient Recovery | NMSU | Electrical & Computer Engineering |
| 50 | Michael Hayden | Chemical Cartography with APOGEE: Large-scale Mean Metallicity Maps of the Milky Way Disk | NMSU | Astronomy |
| 32 | Gizelle Hurtado & Dr. Karen Mabry | Impact of urbanization on kangaroo rat abundance in Las Cruces, NM | NMSU | Biology |
| 9 | Laura Ana James | Exploring the psychological impact of the Mexican Drug War in the border Mexican community | NMSU | Counseling & Education Psychology |

2014 Graduate Research and Arts Symposium

| Poster Number | Name | Title | School | Department |
|---------------|--|---|--------|------------------------------|
| 26 | Yufeng Jiang, Liu Fang, Hongmei Luo, & Yunfeng Lu | Titanium oxide nanocrystal on carbon 3D-Scaffold for electrochemical energy storage | NMSU | Chemical Engineering |
| 24 | Manasi Jogalekar | A three-dimensional culture system for breast cancer cell line HCC70 | NMSU | Molecular Biology |
| 31 | Dusan Jolovic, Aleksandar Stevanovic, & Cameron Kergaye | A Review of Traffic Management Center Practices for Contemporary Technological and Service Improvements | NMSU | Civil Engineering |
| 3 | Christianne Jane Jones, Dr. Linda Spencer, Genevieve Munoz & Stephanie Morales | Spelling as a Window of Phonological Development in Children with Diverse Learning Backgrounds | NMSU | Communication Disorders |
| 5 | Seda Karayazi Ozsayin | Teachers Attitudes towards Inclusion in Different Countries: a review of the literature | NMSU | Special Education |
| 6 | Randa Keeley | Co-Teaching Model Preferences for Students and Teachers | NMSU | SPED/CD |
| 35 | Naima Ansar Khan | combined natural attenuation processes in vadose zone for produced water in oil & gas operations | NMSU | Water Science and Management |
| 11 | Mayra Lovas, Mario Gutierrez Casale, & Janeth Sanchez | Using Cancer 101 to increase cancer knowledge among public library staff in Southern New Mexico | NMSU | Public Health Sciences |
| 12 | Candyce Luna & Alma Gross | Pediatric Pesticide Exposure: Proximity of Selected Elementary Schools to Agricultural Crops in Doña Ana County, New Mexico | NMSU | Public Health Sciences |
| 4 | Eribel Lupercio, Azucena Mayorga, & Teresa Román | Somos Bilingües: The Need for Specialized Training Through the Eyes of Bilingual Graduate Clinicians | NMSU | Communication Disorders |
| 51 | Laura Mayorga | Disentangling the Planetary and Stellar Components of Transit Light Curves | NMSU | Astronomy |
| 17 | Sarah Ann McCormick, Kayla Hurd & Elizabeth Arnold | An ethnoarchaeological examination of the utility of tool preparation methods for the production and use of bone and antler needles | NMSU | Anthropology |
| 13 | Amanda R. Miller | Strengths of the Homeless Population in a Rural Southwest Community | NMSU | Social Work |

2014 Graduate Research and Arts Symposium

| Poster Number | Name | Title | School | Department |
|---------------|--|--|--------|-------------------------------------|
| 27 | Alireza Moghimi | An observational before-after study of the of City of Las Cruces camera enforcement program | NMSU | Industrial Engineering |
| 33 | Cesar Eber Montelongo | Bioinformatics analysis and gene expression studies of Complement-like factors in <i>Biomphalaria glabrata</i> | NMSU | Biology |
| 7 | Stephanie Morales, Genevieve Munoz, & Christianne Jones | Spelling development in four populations: Hard of hearing, ELL, struggling readers and typically developing third grade students | NMSU | Communication Disorders |
| 8 | Genevieve Munoz, Dr. Linda Spencer, Dr. Deborah Rhein, Christianne Jones, & Stephanie Morales | Spelling as a Window of Phonological Development in Children With Diverse Learning Backgrounds | NMSU | Communication Disorders |
| 48 | Nikole Nielsen | Characterizing the MgII Circumgalactic Medium Using MAGIICAT Galaxies | NMSU | Astronomy |
| 20 | Winona J Patterson | Captivating, Sacred Place at Tank Mesa Village in Montezuma Canyon, Utah | NMSU | Anthropology |
| 39 | Javier Perez-Ramirez | Anchor-cum-Relay Nodes for Localizing a Mobile Source and Relaying Source Signals | NMSU | Electrical & Computer Engineering |
| 25 | Kelsey E. Quinn | CXCL12 Expression Increases in Sheep Uterine and Fetal Tissues during Early Gestation | NMSU | Animal and Range Science |
| 36 | Gholamali Rahnavard | Applying Big Data Approaches for Experimental Biological Data Mining: A Case Study | NMSU | Computer Science |
| 10 | Jamey L. Rislin, Dr. Ivelisse Torres-Fernandez; Dr. Ralph James Crabbe; Desa Daniel; & Jessica Jackson | The Invisibility Syndrome: Understanding Black Men's Experiences with Contextual-Cultural Discontinuity | NMSU | Counseling & Educational Psychology |
| 42 | Aaron Rosenthal, Andrew Garcia, Marcus Wolschlager & Alejandro Castro Jr. | NMSU Power Generating Capacity: Vision and Roadmap for 2050 | NMSU | Electrical & Computer Engineering |
| 45 | Teresa Ross | Metallicity Distribution Functions of 4 Local Group Dwarf Galaxies | NMSU | Astronomy |

2014 Graduate Research and Arts Symposium

| Poster Number | Name | Title | School | Department |
|---------------|---|--|--------|--------------------------------------|
| 15 | Liliana Salazar | Colonia Residents' Perceptions of Water Quality in Dona Ana, NM and El Paso, TX | NMSU | Department of Public Health Sciences |
| 1 | Claudia Saldaña | Art as a Tool of Communication of Meanings in Children with Disabilities | UTEP | Education |
| 37 | Bahar Sayoldin | Applying Data Mining and Bioinformatics Techniques to Analysis Capsicum Species Transcriptome | NMSU | Computer Science |
| 22 | Harmandeep Sharma | Partial root zone drying helps conserve water while maintaining chile growth and yield | NMSU | Plant & Environmental Sciences |
| 23 | Sukhbir Singh, Sangu Angadi, Sultan Begna & Kulbhushan Grover | Water use depths across root zone of spring safflower in the Southern High Plains | NMSU | Plant & Environmental Sciences |
| 16 | Swati Somuri | Weight Management Practices in College Students and Their Underlying Eating Motives | NMSU | Public Health Sciences |
| 43 | Ian Sturdevant & Dr. Kwong Ng | Preconditioning and Ionic Current Modeling for Element Free Simulation of Cardiac Propagation | NMSU | Electrical & Computer Engineering |
| 2 | Richard Raymond Torres | 'Conquering' the World: Differing Discourses in Global English | UTEP | Education |
| 44 | Jacob Vander Vliet | Structure and Evolution of a Dwarf Galaxy's Circumgalactic Medium | NMSU | Astronomy |
| 21 | Addison Warner | Exploring Chultun Functionalities: An Experimental Assessment of Food Storage in Chultuns at Uaxactun, Guatemala | NMSU | Anthropology |
| Artwork | Lea Wise-Surguy | Untitled (Agar Box) | NMSU | Art |
| 49 | Cat Wu | How to Analyze a Spiral Galaxy | NMSU | Astronomy |
| 14 | Yuliana Zaikman | Ambivalent Sexism and the Sexual Double Standard | NMSU | Psychology |

Talk and Performance Abstracts

(In alphabetical order by author)

Mariam Abdelmalak; Curriculum & Instruction, NMSU

Building Online Learning Communities Using Web 2.0 Technologies

In this paper I describe how I use Web 2.0 technologies to facilitate the development of a community of learners among graduate distant students and how students responded to the use of Web 2.0 tools and to what extent these tools assisted in developing a community of learners. Twitter, Skype, Google Documents, Blog, and Wiki were intentionally used in order to build online learning communities among students. An anonymous survey was used. The students indicated that using Google Documents, Twitter, Wiki, and blog gave them a sense of a learning community while using Skype did not give them a sense of a learning community. Google Documents and Wiki had the most impact on students' sense of a learning community in the course.

Lekha N. Adhikari & Dr. Matthias Burkardt; Physics, NMSU

Quark Angular Momentum Distribution in the Transverse Plane

Several possibilities to relate the t -dependence of generalized parton distributions (GPDs) to the distribution of angular momentum in the transverse plane are discussed. None of them turns out to correctly describe the orbital angular momentum distribution that one would identify for a longitudinally polarized target.

Amani Al-Ghraibah; Electrical & Computer Engineering, NMSU

Feature Selection in a Cross-Validated Classification Framework as Applied to Spatial Features of Solar Magnetogram Images

Solar flares release stored magnetic energy in the form of radiation and can have significant detrimental effects on earth including damage to technological infrastructure. Recent work has considered methods to predict future flare activity on the basis of quantitative measures of the solar magnetic field. Feature selection methods can provide insight into the measures which have the largest discriminatory potential and can provide a means to streamline real-time processing of solar data. Since solar flares are relatively rare events, however, datasets for such predictive analysis are inherently unbalanced which causes a bias in the classification. Cross validation with randomly subsampled balanced datasets can mitigate classifier biases for unbalanced datasets, but it is unclear how to implement and interpret feature selection in such a framework. This paper proposes a method to determine an appropriate feature subset with cross validation classification based on a histogram analysis of selected features. We show that the feature subsets resulting from this analysis yield better classification accuracies across a large unbalanced dataset unseen in the feature selection and classifier training.

Armando Altamirano; Curriculum & Instruction, NMSU

Common Practices of Law: From Slavery to Immigration Policies

The purpose of this paper is to explore the historical judicial treatment granted to undocumented immigrants [UI] and its effect on legislature and the treatment of UI. Using the theoretical lens of Critical Race Theory [CRT] I seek to uncover how racist practices have served as the foundations of many policies that relate to the judicial treatment of UI. I will present information, narratives, and general data to compare and contrast the actual immigration laws with some of the policies and decrees constructed during the Colonization of the Americas that dealt with slavery and noncitizens. This analysis employs a CRT perspective that carefully analyzes the intersectionalities between UI and racism, power, and race as a beginning framework that describes how today, immigration policies fail to protect UI and allow the use of inhumane punishment against them, people whose only crime is the lack citizenship.

Joshua W. Amburgey; Physics, NMSU

Raman Spectroscopy in Oscillating Large Electric Field Gradients

Raman spectroscopy has become a staple technique used to probe a wide variety systems. Since very few molecules contribute to Raman scattering, the scattering intensity is weak. Discussed here is a proposed method for enhancing the Raman signal using oscillating large electric field gradients.

Kenza Arraki; Astronomy, NMSU

The tidal disruption of satellite galaxies

Information about the survival of Milky Way satellites is important for interpreting indirect dark matter detection results and for testing of the cosmological model at the smallest scales. However, even after extreme tidal stripping the complete disruption of a satellite galaxy is difficult to achieve. We investigate the survival of dwarf galaxies orbiting a Milky Way sized host using numerical simulations. The tidal evolution of our simulated satellites is extreme, with evidence of large amounts of mass loss, reductions in circular velocity, and evolution of density profiles. The steep inner slope of the NFW profile results in a compact region that is difficult to destroy even in the most extreme orbits. Using the ratio of the satellites tidal to scale radius and number of completed orbits, we create a predictive model of their evolution. This model is a powerful tool to estimate mass loss, maximum circular velocity reduction, and density profile at all times for any orbiting satellite.

Dawn M. Bates; Counseling & Educational Psychology, NMSU

Prejudice and Discrimination in Graduate School: A Discussion

My dissertation topic is rooted in my own experiences as a feminist, bisexual White woman in a graduate program. As I reviewed the literature, I began with women, trying to find research that suggested that women still were experiencing sexism while in their graduate programs. This proved somewhat difficult and I was surprised to find that there was not as much recent evidence as I had anticipated. I began to explore other “differences”, including race, ethnicity, international students, age, class, and motherhood. While I found some evidence of prejudice and discrimination within some studies (for example, Beoku-Betts, 2004; González, 2007), it was generally buried in the research, hidden in the measures the researchers gave, and not discussed at length in the articles. I found this interesting because my experiences and so many stories from other graduate students did not support these minor mentions and brief discussions of discrimination in academia. When I turned to look for lesbian, gay, bisexual, and transgendered students experiences in graduate school, I found two older dissertations that discussed gay and lesbians students experiences.

I found this distressing. I wanted to know women graduate students’ stories and I believe there is a need within the literature to directly address and share narratives about graduate students’ experiences with prejudice and discrimination. I would like to gather graduate students for a discussion about the prejudice and discrimination that they experienced in graduate school. Having this discussion allows us to support each other and network.

Alejandro E. Bernal; Agricultural Economics & Agricultural Business, NMSU

Evolution of retail food markets and Supplemental Nutrition Assistance Program

The primary objective of this study is to examine the impact of changing Supplemental Nutrition Assistance Program (SNAP) participation rate and benefit levels on local access to retail food outlets overtime. An econometric model that accounts for spatial correlation is used to analyze the data. The preliminary results show that the relationship between the SNAP participation rate and retail food business is negative particularly in rural areas.

Carmen C. Boje & Dr. Edward Pines; Industrial Engineering, NMSU

A Survey-Interview to analyze the Electronic Health Records Systems in United States of America

Electronic Health Record (EHR) practices affect patient care cost and organizational efficiency. This research applies industrial engineering methods and statistics to create an EHR system assessment tool to collect data, evaluate the EHR system quality level, analyze EHR system problems, and compare different EHR systems.

EHR system quality is determined by the following factors: EHR acceptance and learning time, current EHR system stage, efficiency, and cost. EHR acceptance factors like adequate training, perceived usage qualities, perceived usefulness, tech support qualities are investigated and compounded in a total acceptance level. These items are rated on a five-point scale. Results are categorized by type of practice (private or public), specialties, geographic areas, and EHR stage levels.

Understanding the needs and attitudes of the medical staff would help organizations to facilitate the EHR smooth implementation. The findings can be useful to EHR developers in designing products to accommodate multiple clinical specialties and user skill levels.

Reiterative applications of the analytical tools developed by this research could serve to optimize the quality of Information Technology used for the health care services in the US.

Ramaninder Brar; Physics, NMSU

Effect of dissolved gases on the formation of surfactant free emulsions

The stabilization of hydrophobic colloids, such as oil droplets, in water has attracted scientist for a long time for a variety of scientific, pharmaceutical and industrial applications. In medicine today, many anti-cancer agents, as well as other drugs, are hydrophobic and cannot dissolve in water. There is a pharmacological interest in providing a delivery mechanism for these 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 but surfactants can be toxic and can cause side-effects that would decrease the quality of life for the patient. 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. The work of Pashley and coworkers has demonstrated that hydrophobic materials can form emulsions with water if all of the dissolved gasses have been removed. However, very little is known about the structure and stability of these emulsions or even to what extent they form. 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 hour. We have also studied the change in turbidity of oil droplets in water with time. Our present work involves the effect of degassing on the density of water and formation of stabilized surfactant free emulsions in a homologous series from pentane through decane. The emulsions structure and thermodynamic stability can then be characterized using small angle x-ray scattering.

Federico Campeotto; Computer Science, NMSU

Explore the use of GPUs in constraint solving

This paper presents an experimental study aimed at assessing the feasibility of parallelizing constraint propagation—with particular focus on arc-consistency using Graphical Processing Units (GPUs). GPUs support a form of data parallelism that appears to be suitable to the type of processing required to cycle through constraints and domain values during consistency checking and propagation. The paper illustrates an implementation of a constraint solver capable of hybrid propagations (i.e., alternating CPU and GPU), and demonstrates the potential for competitiveness against sequential implementations.

Melissa Cast; Management, NMSU

Domains as Sources of Acculturative Stress in International Students: An Ethnographic Perspective

International students are an important asset in higher education institutions as they bring financial growth and cultural diversity. However, international students face unique challenges produced by acculturative stress during their acculturation process. This stress leads to negative symptoms which in turn affect students physiological, mental health, and social environments. Current studies have identified such symptoms mostly in a quantitative manner, but usually fail to address the emic aspect of such symptoms, their origins, and related frequency or occurrence. Therefore, this paper presents an ethnographic study conducted at a large land grant institution in the Southwestern United States. The paper contributes to the literature by addressing existing gaps in three main ways. First, it provides an insight as to different domains and emerging themes to examine who and how symptoms of acculturative stressed are produced. Second, it gives an insight as to the frequency and occurrence of such symptoms. Finally, this paper provides the proper resulting implications for higher education institutions and administrators.

Hayley Cotter; English, NMSU

From Fragmentation to Wholeness: The Dwarfs of Spensers Faerie Queene

Unas Dwarf, introduced in Book I of Spensers Faerie Queene (FQ), has long defied a satisfactory allegorical interpretation. The other main characters of the book – Redcrosse, Una, Archimago, Duessa – invite more straightforward, obvious readings, but the Dwarf has either been overlooked entirely, explained in overly simplistic terms, or dismissed as a mere agent that propels Spensers plot. Clearly, the approach to the Dwarfs interpretation has been fraught with problems. The first is that critics have chosen to look at Unas Dwarf independent of the other dwarfs that inhabit subsequent books: Florimells Dwarf (Books III and V), Paeanas Dwarf (Book IV) and Brianas Dwarf (Book VI). The second is that critics have been too quick to provide the dwarfs with a prosaic explanation that fails to capture both the subtleties of the characters and the intricacies of the plot. Looking at existing criticism surrounding Unas Dwarf, and then analyzing the roles of the poems remaining dwarfs will support my thesis, namely that Spensers dwarfs should not be viewed as separate entities; instead, they exist only as alter egos of the Ladies they serve, and that they are no longer mentioned after they fulfill their duty serves as evidence of their reintegration with their respective Lady. This explanation of the dwarfs both accounts for their abrupt disappearance from the text and grants them the psychological attention they and their ladies deserve.

Ryan E. Cruz; Marketing, NMSU

Advertising differences in male aesthetic among non-Caucasian actors across three magazine genres

Advertisements guide and influence consumer preferences, behaviors, and gender role affiliations. The actors, products, messages, and embedded social roles within advert parameters introduce, normalize, reinforce, and replicate behavior through the availability of print and digital media. Although it may be argued that consumers are free agents in information consumption, advertisements are large determinants in the decision-making processes leading to the consumption and presentation of aesthetic.

This research investigates advertisement actor aesthetic to decipher not only what exists in advertisements, but also why it exists and how it modifies across target audience mediums. To prepare for this work, a review of advertising, marketing, and gender theories is presented followed by empirical literature and methodologies on content analysis inspiring the creation of an assessment tool used to survey and investigate male actor aesthetic within a sample of 710 advertisements selected from three issues of nine magazines printed in 2010.

Desa K. Daniel & Dr. Ivelisse Torres-Fernandez; Counseling Psychology and Education, NMSU

A Phenomenological Study of the Invisibility Syndrome among African Americans

According to Franklin (1999) the invisibility syndrome is comprised of social confusion due to mixed messages regarding African American males legitimacy as accepted members of mainstream society. This qualitative research aims to uncover possible themes associated with African American College students experiences at their perspective universities.

Laura Davidson-Salguero & Dr. Igor Sevostianov; Department of Mechanical & Aerospace Engineering, NMSU

Microstructure and Elastic Properties of Cortical Bone

This presentation focuses on the connection between microstructure and the elastic properties of cortical bone. We obtain an analytical, closed form model to represent this relationship. This topic has attracted the attention of researchers in biomechanics for more than half a century. At present, the microstructure of cortical bone is largely established. It consists of hydroxyapatite interlaced with collagen fibrils in a dense matrix, interrupted by a series of cavities and channels; Haversian canals, Volkmans canals, osteocyte lacunae, and canaliculi. It is extremely important to understand the real contribution of many different elements of the microstructure to the overall properties of cortical bone because it is an evolving material. The microstructure depends on many factors and changes significantly with age. Due to mathematical complexity, the microstructure-property relationships are usually oversimplified in existing literature. In most cases the authors either neglect the actual anisotropy of the mineralized tissue or they fail to consider the full set of cavities and channels established as existing in normal cortical bone. In our study, we account for both of these factors. The proposed approach, in particular, allows the estimation of the effects of aging (decrease in osteocyte lacunae concentration, change in shape and size of Haversian canals, etc.) on the mechanical performance of cortical bone- foremost of which is a decrease in stiffness that may lead to increased risk of fracture. The obtained results are in good agreement with published experimental data.

Bishnu H. Dhakal, Rajesh K. Patti, & James W. Herndon; Chemistry & Biochemistry, NMSU

Generation and Reactivity of Isobenzofurans from Carbene Complex Acetylene Coupling

Fischer carbene complexes are useful precursor for the various synthetic transformations. Many examples of polycyclic aromatic ring systems involve the coupling of carbene complexes with enyne carbonyl systems to form an isobenzofuran followed by a third component. The reaction between chromium carbene complexes with enynecarbonyl derivatives has been carried out to afford different derivatives of alkylideneaphthalans. Coupling of these substrates are unique in that decomposition of the isobenzofuran to an alkylideneaphthalan is too fast for coupling with a third component. This unique facile net [1-7]hydride shift will be the focus of the talk.

Kefaya Diab; English, NMSU

Contested Representations of Reality in Waltz with Bashir & Children of Shatila: The Agenda Setting Theory as Analytical Framework for Looking at Documentaries

When I first watched Waltz with Bashir and Children of Shatila documentaries I were caught in a deep thought; both documentaries evolved around the massacre of Sabra and Shatila in Lebanon in 1982. Yet, the two films provided contested representations of reality regarding what happened there, driven by two different political agendas. To me as an Arab, I already believed in one version of the story. However, thinking about the Western audiences that would see these films, it occurred to me: which version are they more likely to believe? How do they judge which tale is more accurate? And are they aware of the agendas behind these representations put forth by these films? According to Stuart Hall (1997), reality doesn't exist until somebody represents it to audiences. The implication is that deception is accessible to those who have the power to tell their stories about the historical world. In this paper, I apply the Agenda Setting Theory (McCombs & Shaw, 1972) to both these documentaries to show how these films used rhetorical strategies to persuade their audiences to believe their representation of reality. In doing so I analyze: (1) the filmmakers choice of story topic, archive and characters during the pre- production stage, (2) the audio- visual techniques of representing the characters during the production stage, and (3) the professional and the mass audience evaluation during the post- production stage.

Rebecca Dutton; Social Work, NMSU

An Exploratory Mixed-Methods Study of the Impact of Formal Education on Moral Development in Post-Conflict Liberia

The purpose of this study is to explore the effect of formal education on moral development in young adults in post-conflict Liberia. Since education has been identified as having a key role in moral development in numerous

cross-cultural studies, it is important to understand the role of education in moral development in Liberia as education had been disrupted for many students during the civil conflict. 102 participants were interviewed using a modified version of the Determining Issues Test. Each participant decided the best course of action in three scenarios and explained why they thought this was the best choice and what issues were important in their determination. The study determined that numerous factors including gender, location, past experiences during the civil conflict and community connections influenced the level of moral development an individual had attained.

Ronny Forney; Geography, NMSU

*The Effects of Diurnal Patterns on the Spatial Distribution of Female Desert Bighorn Sheep (*Ovis canadensis mexicana*)*

This project explores variation in the distribution patterns of desert bighorn between day and night, specifically whether there are variations in elevation, slope, and aspect of desert bighorn locations. The data used in this study are of 6 adult female desert bighorn captured from the Cabeza Prieta mountains, Arizona in 2002. Female locations are mapped in ArcGIS raster layers, allowing for inferences of spatial patterns and prediction of female desert bighorn locations. I generate a Minimum Convex Polygon around all female point locations to estimate home range size and determine movement. Data points within this polygon are considered areas of use and are compared with an equal number of random points to indicate areas of availability and to determine habitat. To model the surface of the mountain range, I obtain 10 m, 1/3 arc second elevation data, which is overlaid with point locations. In addition, the elevation data is used to create a slope map using percent slope as the output, as well as an aspect map using preferred azimuth categorizations as the output. Whether surfaces are convex (curving outward) or concave (curving inward) are also considered. To determine if there is a significant statistical difference in the means in the six samples of each of the three dependent variables, given two independent variables, MANOVA is applied using SPSS. It is predicted that variation exists in female desert bighorns use of slope, aspect, and elevation between night and day, and between samples (females) in the population.

Mark Franzak; Curriculum & Instruction, NMSU

Exploring the intersections of mathematics and race – What are teachers’ beliefs, how did they originate, and what are the implications?

The body of research in teacher-held beliefs in mathematics education is wide and varied, however, the aspect of teacher-held beliefs about race is almost non-existent, and existing research often perpetuates deficit models (Martin, 2009). The base of research on teachers’ beliefs of mathematics explores teachers’ views of mathematics in comparison to their views of teaching and of learning mathematics, often rooted in Ernests (1989) model, in which mathematics is categorized as dynamic, static, or utilitarian. These explorations have focused on the relationship between teachers’ beliefs and their development of constructivist classrooms (Beswick, 2007), student improvement on assessments (Watson & De Geest, 2005), instructional practice (Thompson, 1984), inquiry-based instruction (Wilkins, 2008), etc. However, this body of scholarly work has not addressed mathematics teachers’ beliefs about race.

Through qualitative research, I will explore teachers’ beliefs about race, mathematics, and teaching and learning mathematics. Participants will be white teachers in the Las Cruces Public Schools teaching classes with Latina/o students. Utilizing Nespor’s (1987) concept of episodic development of beliefs, I will identify specific events and experiences that are the seeds of the beliefs teachers act upon in their practice. I will also explore teachers’ construction of their own race (McIntyre, 1997) as well as the race of their students (Martin, 2010; Sleeter, 2004) as essential components in creating a complete tapestry of the nature of the interactions of teachers’ beliefs about mathematics and teaching and learning mathematics. I expect this research will inform the extant gap of research in race in mathematics education.

Adriana Goenaga Ruiz de Zuazu; Curriculum & Instruction, NMSU

Critical Literacy in the Classroom through Literacy Circles

In the form of culturally and linguistically diverse books, I present a study about teaching through critical literacy in an elementary classroom of a school in the Southwest of the United States. This study is based in the consideration

of texts as social constructs, never neutral; thus, both teacher and students, when exposed to a text, are to bring their perspective and opinion to deconstruct what they read to give sense and meaning to the world (Vasquez, 2012). In the process of teaching through critical literacy in the classroom, I present the use of literacy circles, which will be presented as a continuation of read-alouds and as an alternative to work texts in discussion groups. The main characteristics of the literacy circles will be addressed in the presentation. They are put into practice as a way to address current social issues through critical literacy. In a further reflection, it is necessary that teachers select books that represent the diversity of the cultures and backgrounds of their students, and that they create opportunities to have open discussions following the critical literacy perspective.

Laura Goodman; Animal & Range Science, NMSU

Effects of Applying Picloram and Aminopyralid with 2,4-D on White Locoweed in Northern New Mexico

Locoweed toxicity in livestock is generally prevented by precluding access of animals to infested ranges during early spring and fall and/or by controlling locoweed populations through herbicide application. Picloram is effective in controlling locoweed; however, aminopyralid may be a superior product because of its efficacy at lower application rates, lower off-target movement, and its 'Reduced Risk' classification. White locoweed (*Oxytropis sericea*), non-target grass, and non-target forb response to picloram+2,4-D (P+D; applied at 64 fl oz product/a) and aminopyralid+2,4-D (A+D; applied at 24 fl oz product/a) were investigated at three locations in northern NM. Three randomly selected 200m² plots at each site were either not treated (control) or sprayed with P+D or A+D in June 2009. Both herbicides were similarly effective in reducing locoweed density, plant size, and biomass 15 MAT (months after treatment) compared to untreated rangeland. Locoweed canopy cover was not different in P+D and untreated plots 15 MAT (P=0.06) but was reduced in A+D plots (P<0.01). A+D treatments had lower non-target forb canopy cover than their P+D counterparts 15 MAT (P=0.03). Grass biomass remained similar within treatments over time for control (P=0.86), A+D (P=0.67) and P+D (P=0.57) plots, and was similar across treatments 15 MAT (control: 85.8g/m², A+D: 94.6g/m², and P+D: 93.0g/m²). Grass canopy cover increased in both herbicide plots (A+D: P<0.05 and P+D: P<0.05) relative to control plots 15 MAT.. Overall, both herbicides appeared to affect locoweed and non-target grasses similarly although A+D was less selective, killing a higher proportion of non-target forbs.

Candace Gray; Astronomy, NMSU

Venus' oxygen green line emission: an auroral process?

Venus' oxygen green line at 5577 is a highly variable feature on the Venusian night side, with intensities ranging from stronger than terrestrial green line to non-detectable. We find that green line emission is correlated with large solar events such as solar flares, coronal mass ejections (CMEs), and solar wind streams (SWS). We propose that electron precipitation from CMEs and SWS is the main process responsible for green line emission and we suggest that electrons are penetrating deeper in the atmosphere and with higher density than previously believed or modeled. To test this hypothesis, we compare electron density profiles on the Venusian night side, obtained by the Venus Radio Science Experiment on Venus Express, before and after solar flares and CMEs.

The process for emission is still unknown, but they suggest two possibilities. First, increased levels of EUV photons from flares may increase photodissociation of dayside molecules, which are then transported to the nightside, to a large enough level where green line emission becomes detectable. Second, electron precipitation from solar flares and CMEs may have a high enough energy and density to penetrate deep in atmosphere (<150km) in order to produce green line emission without producing oxygen red lines 6300, 6364, and 7600 Å. Gray detected the green line immediately after a CME impact on April 22, 2012 but was not able to detect the feature after two separate solar flare events not associated with a CME.

We propose that electron precipitation is the main process responsible for green line emission and suggest that electrons are penetrating deeper in the atmosphere and with higher density than previously believed or modeled. To test this hypothesis, we compare electron density profiles on the Venusian nightside, obtained by the Venus Radio Science Experiment on Venus Express, before and after solar flares and CMEs. Here we present the result of these comparisons. This research is funded by NASA's Earth and Space Science Fellowship, NNX12AM70H.

Karina Yazmin Gutierrez-Jurado; Water Science & Management, NMSU

Farm water budgets for semiarid irrigated floodplains of northern New Mexico: characterizing the surface water-groundwater interactions.

With the recent projections for water scarcity, water balances have become an indispensable water management tool. In irrigated floodplains, deep percolation from irrigation can represent one of the main aquifer recharge sources. A better understanding of surface water and groundwater interactions in irrigated valleys is needed for properly assessing the water balances in these systems and estimating potential aquifer recharge. We conducted a study to quantify the parameters and calculate the water budgets in three flood irrigated hay fields with relatively low, intermediate and, high water availability in northern New Mexico. We monitored different hydrologic parameters including total amount of water applied, change in soil moisture, drainage below the effective root zone, and shallow water level fluctuations in response to irrigation. Evapotranspiration was calculated from weather station data collected in-situ using the Samani-Hargreaves. Previous studies in the region have estimated deep percolation as a residual parameter of the water balance equation. In this study, we used both, the water balance method and actual measurements of deep percolation using passive lysimeters. Preliminary analyses for the three fields show a relatively rapid movement of water through the upper 50 cm of the vadose zone and a quick response of the shallow aquifer under flood irrigation. Further results from this study will provide a better understanding of surface water-groundwater interactions in flood irrigated valleys in northern New Mexico.

Sten Hasselquist; Astronomy, NMSU

Kinematical and Chemical Gradients Within the Sagittarius dSph Galaxy

The Sagittarius (Sgr) dwarf spheroidal (dSph) galaxy is presently merging with the Milky Way and is thus a prototype for substructures that participate in the hierarchical build-up of our galaxy. Using highly precise radial velocities from 328 stars observed by the Apache Point Galactic Evolution Experiment (APOGEE) of Sloan Digital Sky Survey III, we have verified with strong significance the existence of a dynamical cold point in the center of the satellite (Majewski et al. 2013, ApJL, in press). Stellar parameters and abundances derived from the APOGEE pipeline have shown evidence for a metallicity gradient that suggests that this cold point may be related to differences in the distributions and dynamics of multiple stellar populations within the Sgr dSph. In this study we further explore the stellar populations and kinematics of the Sgr dSph by expanding our sample to include ~ 40 recently acquired APOGEE targets, as well as 408 additional members from R 15,000 spectroscopic observations obtained with the Hydra spectrograph on the Blanco 4m at Cerro Tololo Inter-American Observatory (see Frinchaboy et al. 2012, ApJ, 756, 74). This expanded data set provides us with 4 times greater radial coverage (out to ~ 6 kpc from the center) for a more comprehensive investigation of the dynamics and stellar populations of this relatively large satellite of the Milky Way Galaxy.

Robert M. Hastings; Education, NMSU

The Crisis in STEM: Menace, Myth - or Both?

This paper, submitted in a graduate education class, explores a widely perceived crisis in Science, Technology, Engineering and Mathematics in the USA. Is there truly a shortage of competent scientists, mathematicians and engineers? If so, then what is causing it? If not, then why does this perception exist? As a separate issue, is there a crisis in the education of primary and secondary students in STEM subjects? If so, then how may this be ameliorated? A solution to such problems in STEM education is proposed by the author.

Hector L. Hernandez; Agricultural Economics & Agricultural Business, NMSU

A Household Model of Food Security in Tanzania

Tanzania is a sub-Saharan African country considered a Least Developed Country by the United Nations. The World Bank estimates that about 33% of the population lives below the poverty line (in 2007), Gross National Income per capita is estimated at \$570 US dollars (in 2012), and life expectancy is about 60 years at birth (in 2011). It is no wonder that a portion of Tanzania's population suffers from food insecurity. According to the World Food Program (2013), about 29% of households were highly food energy deficient. The main thrust of the present research is to

expand on the research of food security in Tanzania. Using Living Standards Measurement Survey (LSMS) data reported in Tanzania's National Panel Surveys (NPS) from 2008 and 2010, this study analyzes measures of food security using an economic model of a farm household. The results are expected to contribute not only to a better understanding of food security, but also to broaden the scope of the literature for Tanzania and Sub-Saharan Africa.

Rebekah L. Horn; Molecular Biology, NMSU

Identifying drivers of local adaptation in an ephemeral pond crustacean (Notostraca: Triops)

Conditions that drive local adaptation in a species include reduced gene flow, a heterogeneous landscape and selection towards genes specifically adapted to the habitat. To further study and understand the factors that can lead to local adaptation, controlled lab experiments were performed using the tadpole shrimp (*Triops newberryi*) as a model organism. Previous research has indicated that *T. newberryi* is highly genetically structured across small spatial scales and can occur in playa lakes with varying water chemical values. It is unknown, however, if specific genes in *Triops* are adapted to a native habitat. To test this, lab experiments were developed to hatch *T. newberryi* cysts in water where they natively occur and in non-native water. Hatched individuals were then preserved for differential gene expression analysis. Results indicate *T. newberryi* has a higher hatch rate in its own pond water and reduced hatch rate in a novel environment. From the hatched *T. newberryi*, greater than 24Mbp of the transcriptome was sequenced resulting in over 10,000 predicted peptides. Differential expression analysis of *T. newberryi* hatched under native and non-native water conditions identified only four transcripts with a significant difference in expression. These results indicate that naupliar *T. newberryi* does not exhibit stress responses to non-native water; suggesting early life history stages do not determine an individual's success in a non-native environment. Despite satisfying some conditions of local adaptation, gene expression analysis of *T. newberryi* suggests either a generalist life history and/or that maternal effects are important.

Ping Hou; Computer Science, NMSU

Revisiting Risk-Sensitive MDPs: New Algorithms and Results

A core problem in artificial intelligence is how an autonomous agent can make decisions autonomously, and our research focuses on exploring novel mechanisms and methods of decision making under uncertainty. The decision making problem is formalized as a mathematical model called Markov Decision Process (MDP). MDPs have many application areas, such as Mars rovers planning their daily schedule of activities (Mausam et al., 2005), planning of military operations (Aberdeen et al., 2004), robocup soccer (Stone et al., 2005), an agent playing blackjack (Popyack, 2009), a set of elevators operating in synchronization (Crites and Barto, 1995), and intervention of cellular processes (Bryce and Kim, 2007). While MDPs have been shown to be effective models for planning under uncertainty, the objective to minimize the expected cumulative cost is inappropriate for high-stake planning problems. As such, Yu, Lin, and Yan (1998) introduced the Risk-Sensitive MDP model, where the objective is to find a policy that maximizes the probability that the cumulative cost is within some user-defined cost threshold. In this paper, we revisit this problem and introduce new algorithms that are based on classical techniques, such as depth-first search and dynamic programming, and a recently introduced technique called Topological Value Iteration. We demonstrate the applicability of our approach on randomly generated MDPs as well as domains from the ICAPS 2011 International Probabilistic Planning Competition (IPPC).

Racheal Jones; Water Science & Management, NMSU

Estimating available saline water resources in aquifers of New Mexico using GIS

It is currently believed that there are roughly 15-billion acre-feet of saline groundwater available in New Mexico aquifers, an estimate first published in 1962 by the New Mexico Office of the State Engineer. This estimate is based on 50-year old, reconnaissance-level investigations although it is still a widely-published statistic. This research seeks to answer the question of whether or not 15-billion acre-feet of available saline water resources is a reasonable estimation for New Mexico. This research collected, synthesized, and analyzed existing well data housed by municipal, state, and federal agencies. Well data were also collected from non-governmental agencies, regional and site specific reports. Methods used to answer the "15-billion acre-feet" question include mapping and analyzing synthesized well

data in ArcGIS 10.2. Surface and subsurface geology data were used in conjunction with well data to determine where saline groundwater exists and to estimate the thicknesses of the saline water-bearing zones. The goal of this research is to provide updated information regarding the total quantity of saline groundwater available in New Mexico and to provide a starting point for water managers at all levels to assess the viability of their saline groundwater supplies.

Elizabeth S. Klimek; Astronomy, NMSU

The Causal Connection Between Inflows, Outflows, and Disk Star Formation in ART Simulations

The CGM is a component of galaxies that hosts a wide variety of physical processes, including accretion, outflows, tidal stripping, and condensation. Understanding the detailed relationship between the processes in this region and the processes in the central disk is integral to developing a complete picture of how galaxies form and evolve. We use high resolution cosmological simulations to study the cause and effect relationship between disk star formation and the flow of gas through the circum-galactic medium (CGM) of the high redshift progenitors of Milky Way mass galaxies. Using a time series of snapshots between $2.0 < z < 4.0$, we show how star formation events in the disk launch high velocity (hundreds of km/s), hot ($T > 10^6$ K) material radially outward. This outflowing material does not significantly impede the ability of cool, accreting material to advance toward the central disk. Smooth radial accretion is dominated by warm-hot ($10^5 < T < 10^6$ K) gas at all radii (up to 2 virial radii) throughout our redshift range. Infalling small galaxies can be identified and tracked using the radial mass flux of stars and dark matter. This allows an estimate of the amount of stars and mass accreted due to merging events.

V. Bleu Knight & Elba E. Serrano; Biology, NMSU

Profiling the Normal Human Astrocyte Transcriptome with Next Generation Sequencing

The tailoring of therapeutic treatments to individuals is facilitated through affordable, complete genome sequencing technologies such as Next Generation Sequencing (NGS). In this study, we exploited NGS in order to acquire a comprehensive view of gene expression among Normal Human Astrocyte cultures. Experiments were undertaken with the goal of characterizing genes essential for glial function. Cells from two anonymous donors were cultured simultaneously in replicate environments. RNA was extracted from the second passage of cells and analyzed for quality control on an Agilent Bioanalyzer. RNA with $RIN \geq 8.9$ was shipped to the MIT BioMicro Center, where Illumina Tru-Seq protocols were used to purify poly-A and reverse transcribe RNA to cDNA. The cDNA was prepared for sequencing on the SPRI-works system using BioMicro Center adapters and PCR primers. The multiplexed samples were then sequenced twice with an Illumina HiSeq 2000. The resulting sequences were mapped to the human genome (UCSC build hg 19; Genome Reference Consortium GRCh37) with the TopHat pipeline software on the Broad Institute public server. CuffDiff software was used to evaluate differential expression and to quantify the fragments per kilobase of transcript per million mapped reads (FPKM). Analysis after \log_2 transformation revealed that approximately 3000 genes were differentially expressed between the two donors with a fold change greater than 2. The differential expression profile was analyzed in detail using the Database for Annotation, Visualization and Integrated Discovery (DAVID) v6.7. As part of functional characterization of the NHA transcriptome, we conducted an in-depth analysis of genes for ion channels as well as genes that are typically used to classify astrocytes. The results establish putative therapeutic targets in NHA and provide a basis for evaluating NHA cells after exposure to different environmental conditions. The outcomes of our transcriptomic analysis provide a rich resource for further investigations of ion channel function, signaling pathways, and gene networks in human glia. Supported by NIH (P50GM068762).

Phanidhar Kukutla, Jinjin Jiang, Dong Pei, Wanqin Yu, & Dr. Jiannong Xu; Biology, NMSU

The Impact of Gut Bacteria on the mosquito Anopheles gambiae Fecundity and Immunity against malaria Plasmodium berghei

The symbiotic bacteria in the mosquito gut affects mosquito fecundity and immunity. In a complex microbial assemblage different members may contribute to different host life traits. We hypothesized that certain bacteria enhances mosquito immunity while other bacteria benefits host fecundity. Mosquitoes were fed on sugar meal containing different gut bacterial isolates to construct a desired gut community with dominance of introduced bacteria. Bacteria fed mosquitoes were then infected with rodent malaria *P. berghei*. The mosquito gut was dissected and examined

for infection. The number of oocysts on the gut was taken as a measure of the anti-malaria immunity. Mosquitoes with fewer parasites had stronger immunity than those with more parasites. Fecundity was measured by counting the number of eggs in the ovaries.

Oral ingestion can establish a gut bacterial community that is dominated by the introduced bacteria. These mosquitoes were used to evaluate bacterial contributions to the immunity and fecundity when infected with malaria *P. berghei*. Introduction of *Enterobacter*, *Elizabethkingia* or *Leucobacter* significantly reduced oocyst load, suggesting these bacteria enhance mosquito anti-malaria immunity. Intriguingly, *Leucobacter* had the strongest effect, the infection rate dropped from 85% in control to 36% in treated group, and the average parasite number decreased from 153/gut in control to 21/gut in treated group. Furthermore, mosquitoes with *Leucobacter* had greatly reduced fecundity in comparison with other bacteria fed mosquitoes. In contrast, *E. anopheles* provided mosquito with a better reproductive outcome than other bacteria. In general, mosquitoes displayed significant tradeoffs between infection/immunity and egg production/fecundity.

These results demonstrate that *Leucobacter*, *Enterobacter* and *Elizabethkingia* effectively enhance mosquito immunity. *Leucobacter* appears to be an ideal symbiont that boosts anti-malaria immunity while reducing fecundity. In sum, different host traits could benefit from different symbionts in associated gut microbial community.

Jessica P. Lail; Psychology NMSU

He said, she said: Engendering blame through personalization biases in news reports of sexual assault

Terministic screens are rhetorical devices deployed by authors to direct the audience toward a specific connotation. Newswriters frequently use terministic screens to position the subjects of a news report either closer to the audience in terms of humanization, or farther away in terms of dehumanization. When reporting sexual assaults, these rhetorical devices may affect the audience's perception of the article's actors depending on the level of humanization allocated to either the victim or the perpetrator. This study intends to analyze the relationship between the deployment of subject positionality and terministic screens as they relate to the attribution of blame in news articles reporting a rape.

Tiep Le; Computer Science, NMSU

Logic Programming for DCOP

Distributed Constraint Optimization Problems (DCOPs) has been used to model various multi-agent coordination and resource allocation problems. This field has matured considerably over the past decade. However, existing DCOP algorithms have focused almost exclusively on imperative programming techniques, in which it teaches computers how to solve the problem step by step. In general, imperative programming techniques consider various inputs the same to each other; they don't allow reasoning for each specific input problem. Without reasoning, those techniques must propagate all of possible solutions, and then pick an optimal correct one as answer. However, there are a lot ones among possible solutions propagated which can be reasoned not to be correct. Observing that, my research explores a new direction, which is to develop algorithms that use declarative programming, specifically logic programming, techniques. Applying logic programming could improve DCOP solvers in terms of scalability and performance due to its ability of reasoning about the problem.

Wenyan Li; Chemical Engineering, NMSU

Fluorescence decay measurements using flow cytometry

Standard laser-based flow cytometers are instruments that enable the characterization of cells by measuring light excitable molecules. Fluorescence and light scatter are typical cytometric measurements widely used, for example, to track subcellular events, and discriminate among native proteins, cell receptors, enzymes, nucleic acids, or gene engineered fluorescence proteins. Spectral differences in the light intensity that is emitted from each cell will help discriminate among different cellular phenomena; however fluorescent colors overlap significantly enough to limit certain flow cytometry assays. In this contribution, we present a new time-resolved cytometry approach to efficiently, sensitively and accurately measure the fluorescent lifetime. The lifetime is a parameter, independent of intensity

that will add to the information content of a cytometer without being disturbed by spectral overlap issues. To accomplish this, we continuously “dither” a laser across a flowing streams of cells so as to interact with each cell multiple times. This methodology results in fluorescence measurements that contain the fluorescence lifetime decay profiles. We present measurements to prove this approach where a fluorescence protein and several fluorophores with different lifetime values ranging from approximately 3 to 25 ns were examined. Fluorescence decay analysis of these measurements positively correlate with fluorescence lifetimes. This was possible by observing long fluorescence lifetimes (e.g. ≥ 10 ns), deciphered by having a long tail and short fluorescence lifetimes by observing the short tail. This cellular analysis technique enables the statistical measure of single fluorescence decays, but also multi exponential fluorescence decays in a high-throughput manner. Our ongoing research is evaluating the capabilities of this new type of flow cytometer using Frster Resonance Energy Transfer (FRET) applications and fluorophore localization scenarios in cells to gain more quantitative information about intracellular events.

Stella M. Lucero; Education Management & Development , NMSU

Leadership Change and Reform

This presentation is about the roles of leadership change agents and how political forces play a key role in dictating reforms. Educational reform involves changes in policy, as well as structure to ensure the practices to restructure public schooling or is accomplishing it in a systematic method. Lastly, I will discuss the history of the pendulum of change.

Thushara W. Madanayake; Chemistry & Biochemistry, NMSU

CYP2S1 depletion alters mTOR signaling in Beas2B cells; orchestrating cell size

Cytochrome P450 2S1 (CYP2S1) expression is elevated in several epithelial derived cancers including squamous cell carcinoma. Although the expression pattern of CYP2S1 suggests an important physiological function, it is still considered as an orphan enzyme with unknown endogenous substrate. To deorphanize the CYP2S1, expression was depleted in human BEAS-2B cells, using RNA-interference targeting the 3UTR (759) and exon 3 (984) of the CYP2S1 gene, and compared with a non-targeting shRNA control (SCRAM). Transcriptomic analysis was performed on CYP2S1 depleted (759) and scrambled control (SCRAM) BEAS-2B cells using RNA-sequencing (RNA-seq). Pathway analysis of differentially expressed genes, using the Database for Annotation, Visualization, and Integrated Discovery (DAVID) analysis, revealed pathways consistent with previously published endogenous substrates and phenotypes. Additionally, analysis also revealed significant changes within mTOR signaling in response to CYP2S1 depletion. mTOR signaling is involved in regulating cell growth. Consistent with changes in cell growth, both CYP2S1 depleted cell lines, 759 & 984, exhibited an approximate 10% increase in cell diameter and 50% increase in cell volume. Western analysis of the mTOR signaling pathway reveal posttranslational changes consistent with increased cell size in CYP2S1 depleted cells (759 & 984) compared with control (SCRAM). CYP2S1 depleted cells specifically exhibit increased phosphorylation of mTOR, and its downstream target S6 kinase. These data suggest that alterations in CYP2S1 expression, and presumably CYP2S1-mediated endogenous metabolism, influence cell size through regulation of mTOR signaling. We are currently pursuing the mechanistic link between CYP2S1-mediated metabolism of endogenous substrates and mTOR signaling.

Giselle Del Carmen Martinez Negrette; Curriculum & Instruction, NMSU

Balanced Dual Language Education in Linguistically Unbalanced Dual Language Classrooms

Dual Language Instruction represents a learning system where minority and majority language speakers learn two languages simultaneously and appreciate their differences. This pedagogical approach supports cultural, social, and academic understandings that connect students through mutual support and respect. Successful dual language settings require very specific conditions that foster linguistic and socio-cultural development; but what can be done when bilingual educators are faced with a classroom population which does not fit the mold of the “perfect” dual language classroom? How can bilingual teachers provide a balanced dual language education in linguistically unbalanced dual language classrooms? This is the focus of this Teacher Action Research mini-project. Using Teacher Action research, I conducted a retrospective reflection of my own practice as a bilingual teacher in a linguistically unbalanced 3rd grade bilingual class in a public school, in Las Cruces, NM. Through the use of Action Research,

I was able to consider the motives guiding my actions, the circumstances surrounding these actions, the impact that my actions had on the students, and how they effected me and my teaching practices. During my reflection, I critically considered my assumptions as a bilingual educator and worked on identifying expectations or ideas that might had been affecting my classroom interactions. I focused on this type of reflection aiming to discover new ways to refine my practices and help my bilingual students impartially.

Nigel Mathes; Astronomy, NMSU

A Detailed Spatial Study of HI and OVI Absorbing Gas Around Galaxies

We present a sample of 14 galaxies imaged by HST with high resolution spectra covering HI and OVI absorption. Galaxies lie within 300 kpc of the quasar line of sight over the redshift range $0.1 < z < 0.7$. We find that HI absorption exists in excess of $\log N(\text{HI}) = 14$ out to impact parameters 300 kpc, with OVI detected out to 260 kpc. In our small sample, we find that higher than average column densities of hydrogen ($\log N(\text{HI}) \geq 15$) are located within the galaxy virial radius. HI absorbers with enhanced column densities are aligned within 10 degrees of the projected galaxy major and minor axes. The OVI column density distribution is consistent with being flat at all distances and orientations. The kinematics inside and outside the virial radius are distinct, with only 10% of clouds located within the virial radius having velocities exceeding the halo escape speed compared to 45% outside the virial radius. We also find 70% of clouds have velocities greater than the escape velocity around lower mass halos compared to 10% around higher mass halos. From these data, we infer that lower mass galaxies appear to preferentially pollute the IGM by expelling their gas. Conversely, higher mass halos seem to retain the majority of their outflowing gas which, through recycling, should replenish their ISM with chemically enriched gas. Thus, the different kinematics of CGM clouds for lower and higher mass galaxies may be responsible for the observed mass-metallicity relationship in galaxies.

Jean McKeever; Astronomy, NMSU

Studying the internal structure of stars through asteroseismology

Asteroseismology is an important tool in stellar astrophysics. It provides a unique insight into the interior of stars that would otherwise be unobservable. My research is focused on the structure and evolution of red giant stars. Through careful extraction and analysis of the oscillations on the star's surface I can derive mass and radius estimates. Additionally, the information contained in the oscillation frequencies allows me to further describe the star's physical structure and evolutionary state. I present here my initial work on extracting the oscillation frequencies.

Greggory T. McPherson; Physics, NMSU

The construction and implementation of a small angle light scattering instrument as a structural probe of micron-scale pore systems in solids

Small angle light scattering (SALS) has been well developed as a tool for studying the microstructure of polymers, as well as probing features of biomolecules and other macromolecules in solution, but applications to inhomogeneous solids and solid-liquid phase systems is less well established. A SALS instrument was designed and built at Oak Ridge National Laboratory to study pore and grain structures in rock samples from many geological formations over length scales on the order of one to several hundred microns. Here will be discussed the design of the instrument, some challenges inherent in using visible light scattering in highly attenuating and often optically inhomogeneous media, and some initial results.

Maria Dolores Molina; Communication Studies, NMSU

Venir sin temores, a exponer la cultura: Preliminary Study of the Factors Impacting Culture Shock Among some Ecuadorian Sojourners in the U.S.

This study reports the findings of research conducted on factors impacting the acculturation process among a group of Ecuadorian students participating in a teacher training program. Thirteen participants were interviewed and a thematic analysis was done using Kim and Ruben's (1988) Stress Adaptation Growth Model as a guide. Participants

identified some key factors that impacted their adaptation as use of humor, expectations and nonverbal behavior among others. This study is an initial report of findings, although the project continues. Future analysis will include an interpretive analysis of the acculturation process.

Yvonne Moreno; Special Education, NMSU

Transition: Barriers, best practices, and teacher assumptions on disability

All individuals regardless of their exceptionalities must have a right to the self-actualization of their goals and aspirations. However, according to the literature, many individuals with disabilities experience poor post-school outcomes. Successful transition is the key to helping individuals set and achieve their post-secondary goals and live independent, productive lives. In order to achieve this, we must identify the barriers that hinder the transition process of individuals and address them through the implementation of best practices. In addition it is important to identify the role that teacher assumptions on disability have on the implementation of transition best practices in schools and on shaping the post-school outcomes for individuals with disabilities.

Balakesavaraju Nadikatla; Electrical & Computer Engineering, NMSU

Fully Integrated Switched Capacitor Buck Converter using Capacitive Banks for High Efficiency over a wide range of Load currents

A circuit and method for providing high efficiency over wide range of load currents is implemented in this paper. The design is fully integrated switched capacitor buck converter implemented with digitally modulating the bucket capacitor by selecting appropriate number of capacitive banks to the output terminal during a clock cycle. A pair of non-overlapping fixed frequency clocks is provided to the Switched capacitor when the respective bank is selected. This converter is designed in 0.5 um technology converting from 3.3V to 1.5V with load range of 5mA to 100uA (6 bit). This design can achieve maximum efficiency of 70% and could maintain around 50% at lower load currents. Implemented better layout techniques to accommodate both bucket and tank capacitor on chip.

Mauren G. Navarro; Curriculum & Instruction, NMSU

Globalized capitalism, neoliberalism and its effects on the living condition of the worlds population

There are many elements involved in globalization, and every element is fundamental as part of the perfect puzzle that comprises this process in which the imperialistic ambitions of nations corporations, organizations, and the like and their desire, indeed need, to impose themselves on various geographic areas to obtain their goals (Dasgupta, S. & Kiely, R., 2006, pg. 239). Today we wonder how human beings have allowed extreme inequality between them and how we have permitted so much injustice. Dasgupta, S. & Kiely, R. (2006) point out that "the idea of globalization is a future world with a single economy based on the capitalist market principles. The system of hierarchy is based on inequalities between the rich and poor nations" (pg. 241). To understand the process in which some obtain more benefits than others it is important to understand globalization, neoliberalism and capitalism from the beginning of their creation. What is globalization?; The effects of globalization (positive and negative); How globalization affects human beings creating different inequalities, based on the construction of new strategies (capitalism and neoliberalism); About identity; Economy; migration/women / negative effects; The role of mass media; The curriculum construction fulfill which needs?

Tara Devi Newar, Rodolfo Tello-Aburto & William A. Maio; Chemistry & Biochemistry, NMSU

The First Total Synthesis of (-)-Palmyrolide A

Nature produces a large variety of natural products, among which some possess potent biological activity. Palmyrolide A was recently isolated from an assemblage of cyanobacteria and was found to display relatively potent sodium channel blocking activity without any cytotoxicity. A full account of our synthetic work towards the first total synthesis of the neuroactive marine macrolide (-)-palmyrolide A will be presented. Our first generation approach aimed to unlock the absolute stereochemistry of the macrocycle via the synthesis of four diastereomers of palmyrolide A aldehyde, a known degradation product, and all four possible stereocombinations of the macrocycle. These studies confirmed the

absolute stereochemistry of palmyrolide A and subsequent work led to the first protecting group free total synthesis of natural (-)-palmyrolide A.

Ramona Isabel Ojeda; Languages and Linguistics, NMSU

Aurora

Aurora is a short novel story, presented in the form of many short stories. It is a fictional novel for a thesis that takes place in two different cities; a small city located in the South of México and a small town called Aserradero. Aurora takes place during the end of XX century and the beginning of the XXI century. Aurora narrates the life of Aurora Imperial and of many of the people that surrounded her during her living days. Many of the short stories represent many moments of her life, many of them full of joy but others full of hope, fantasy, wonder, love, and heartache. Aurora is the story of a little girl who was born in a humble house, whos mother had to give her out in adoption because she was just a little girl herself. Auroras childhood and teenage years are full of violence and marks her in deep ways, she has to learn to survive these traumatic events in her life and explore the many ways in life to make something better of herself as a person and in life.

Romina A. Pacheco; Curriculum & Instruction, NMSU

Participatory Action Research as Pedagogy of Expansion

Framed by a Participatory Action Research (PAR) paradigm, this presentation will explore the possibilities of engaging college students in what Cannella (2008) calls a pedagogy of expansion. That is, engaging in a process that gives everyone involved (including those designated as teachers) the opportunity to experience an “expanded notion of learning, expanded engagement of identities, expanded idea of educational goals” (p. 190). This pedagogy of expansion intentionally positions everyone participating as a learner and a teacher. In other words, an “effort is made to dislodge the hierarchy of which knowledge is worth more than the others (p. 190); as such, teachers learn from students as much (or even more) as students learn from teachers. Thus, PAR, as pedagogy of expansion, deliberately disrupts power dynamics of conventional models of learning and teaching” (p. 190) that bring light to the educational process and facilitates the re/visioning of democratic classrooms. For the purpose of this presentation, a pedagogy of expansion refers to not only an expansion from institutional constrains, but also for everyone involved to experience an alternative model of teaching and learning that reflects horizontal relationships and encourages social action and transformation. Overall, this presentation will discuss how PAR offers an alternative for teachers and students not only to see themselves reflected in the curriculum, but also as contributors to local, national, and global movements towards equity and social change.

Cecilia Palacio-Ribón; Curriculum & Instruction, NMSU

Spanish for Spanish Speakers: differences between Spanish Native Speakers and Spanish Heritage Speakers

Since the 1980s, programs for Spanish speakers have received wide recognition. This is basically because of the increasing size of Hispanic community in the US who is interested in developing their already acquired Spanish skills. As a result, there are many programs offering Spanish classes for Spanish speakers across the nation in high schools, community colleges and universities. However, within the materials that are considered useful for Spanish Native Speakers and Spanish Heritage Speakers, there are important differences that affect their process of learning or improvement of their Spanish proficiency. This research is focused on obtaining a clearer identification of those differences in order to form a foundation to create new didactic materials specifically for each group’s needs.

Mariá de los Ángeles Pereira Jiménez; Languages and Linguistics, NMSU

Gastón Baquero: visión de América Latina en sus ensayos

La obra ensayística del poeta cubano Gastón Baquero (La Habana, 1914Madrid, 1997) ha sido muy poco estudiada por la crítica, a pesar de su extensión y variedad temática. Aunque algunos de sus ensayos han sido incluidos en diversas antologías, son pocos los autores que han incursionado de manera sistemática en este aspecto de su obra. No obstante, en sus ensayos literarios, fiel a la mejor tradición ensayística, Baquero nos ofrece una visión abarcadora,

erudita y muy personal de América Latina. Sus reflexiones sobre la literatura en general y la obra de algunos escritores latinoamericanos en particular reflejan un saber humanista que ayuda a conformar una imagen integral del continente.

Brittany N. Porter; Anthropology, NMSU

My Land is the Southwest: A Nomination to the National Register of the Peter and Henriette Wyeth Hurd home and studios

The National Historic Preservation Act (NHPA) is important in preserving New Mexico's past. This paper demonstrates how the NHPA is used to list properties on the National Register of Historic Places through the example of the nomination of the Peter and Henriette Wyeth Hurd home and studios in southern New Mexico. The paper focuses on the historical significance of Peter Hurd and his wife Henriette Wyeth Hurd, southern New Mexico-based artists who contributed to the development of realist art in the region and nationally. Therefore, their home and studios should be recognized as an important part of New Mexico history.

Mohammad A. Qayum; Electrical & Computer Engineering, NMSU

Transactional Memory as synchronization solution for Scalable Parallel

Synchronization of parallel applications like large graphs is very complex. Two major synchronization policies are used in most of the architectures are- coarse grain which sequentializes program execution and fine grain which is notoriously complex. Transactional memory (TM) attempts to mitigate complexity in programming and also, provides concurrency. Parallel graph algorithms are mostly based on irregular data structures. In a large graph it is very unlikely that multiple threads will try to access the same vertex at the same time. TM benefits when there is low number of conflicts among the transactions. And, if enough number of transactions exists, they can run concurrently too. Some research results with graph benchmarks like SSCA-2 using Software based TM shows some improvements. Currently at the Advanced Computer Architecture and Performance Simulation (ACAPS) lab at NMSU, we are working with graph benchmarks to use hardware TM (HTM) support implemented in Intel Haswell architecture, analyzing performance of different TM policies and believe that HTM will perform better than STM used in previous researches. And also, we are looking for optimal hardware solutions- instructions, micro-architectures for existing HTM or, Software TM (STM) implementation problems.

Gholamali Rahnavard; Computer Science, NMSU

Applying Big Data Approaches for Experimental Biological Data Mining: A Case Study

Biologists produce many expensive experimental data these days to test their hypotheses. Each experiment may contain some data that is not needed for the current hypothesis, but could be used to extract some interesting knowledge in the research area of the hypothesis. Depending on the labs, the order of the data and the storage mechanism could vary. If we collect and store this massive data, we could be able to apply Big Data analysis techniques and discover valuable knowledge beyond the data. In this talk I present a case study that illustrates how bioinformatics techniques could help to analyze experimental biological data. I used the BLT mice model experiments as a case study here which shows how we can apply multivariate analysis methods to the experiment data as a Big Data technique.

Roshani Rajbanshi; Curriculum & Instruction, NMSU

Why Afterschool?

Afterschool programs have been given a great consideration as it has become a part of children's life in American culture. In the past 15 years, there has been growth in afterschool programs. Every afterschool program has a specific focus such as hands-on, project-based and inquiry-based learning, promoting arts and crafts, physical fitness, or nutrition and life skills. The two afterschool programs namely SEMAA and AmeriCorp that were studied here had two potentially important differences. The purpose of this study was to examine if afterschool program is helping children have structured activity with adult supervision. In addition to that, the purpose of the study was to

examine motives of two afterschool programs in a school setting. For this study, a school in Las Cruces was selected which had diverse students. Noam (2003) states, afterschool acts as a bridge trying to connect the academic but without serving as a school and providing family space but without being family. Thus, afterschool programs that we observed performed both activities. Finding also showed that the distribution of socioeconomic status within the programs was very different and influenced the enrollment of students in these afterschool programs. In conclusion, we can say that it filled the gap between school and family. For SEMAA the purpose of filling the gap was to increase students knowledge and interest in STEM activities and AmeriCorp had the purpose of providing a safe environment for children.

Daniel Ramirez Gordillo; Biology, NMSU

Do hearing loss and Alzheimers disease share common genetic mechanisms?

Hearing loss and Alzheimers disease affect more than 43 million Americans and the number of affected individuals is expected to increase drastically due to the aging population. Here we present outcomes of efforts to identify candidate genes that may be implicated in the onset of hearing loss and Alzheimer's disease, disorders that recent literature suggest may be correlated (Lin et al, Arch Neurol. 68:214-20, 2011). To this end we implemented an informatics strategy and mined open access databases to identify genes linking hearing loss and Alzheimers. The Online Mendelian Inheritance in Man (OMIM) database was queried resulting in a list of 267 hearing loss genes and a list of 266 Alzheimers genes. Comparative analysis of the gene lists resulted in the identification of 7 genes that are common to hearing loss and Alzheimers. We further analyzed the gene lists using STRING protein prediction program. Results showed that 67% of the Alzheimers genes have at least one protein in common to a hearing loss pathway protein identified using the STRING program. In contrast, 44% of the hearing loss genes have at least one protein in common with an Alzheimers pathway protein identified by the STRING program. We have successfully identified candidate genes that may link both diseases. Outcomes are being used to validate a Xenopus model for investigations of human hereditary inner ear disorders and Alzheimer's disease. Research supported by NIH (P50GM068762; R25GM061222)

Nishath Rajiv Ranasinghe; Physics, NMSU

Lg attenuation in Northeast China Using NECESS Array Data

The 127 station Northeast China Extended Seismic Array (NECESSArray) stations provides unprecedented seismic data in Northeast China, allowing us to resolve lateral variations of Lg Q greater than or equal to 2.0°. We gathered more than six thousand Lg path-amplitudes from more than hundred crustal earthquakes for the period of 1995 to 2013. Using the reverse two-station/event method, we obtained a two-dimensional tomographic image of Lg Q with its values ranging from about 50 to 1500. A high degree of detail in the lateral variation of Lg attenuation is revealed in our tomographic image than previous studies in the area. We also observe strong frequency dependent in attenuation. Low attenuation regions are found in the Great Xingan, Lesser Xingan and Songen-Zhangguangcai Ranges. Islands of low attenuation appear to be associated with granitic batholiths in the Great Xing'an Range. Attenuation is high in the Songliao, Sanjiang, Erlian Basins and Bohai Basins. The highest attenuation is found in the vicinity of the Changbaishan, Wudalianchi volcanic field, and Quaternary volcanic regions, the southern Songliao Basin, west of Erlian Basin, Bohai Basin and the Sanjiang Basin. Highly attenuating regions correlate well with regions of high heat flow and volcanism, suggesting intrinsic attenuation as the main cause of low crustal Q. Low Q regions also occur within basins with thick, unconsolidated sediments.

Meredith Rawls; Astronomy, NMSU

A Tale of Two Red Giants: Testing Asteroseismic Scaling Relations with KIC 9246715

We present a thorough characterization of the double red-giant eclipsing binary KIC 9246715. Because one of the two stars shows clear pulsations, this system is an ideal empirical test of asteroseismic scaling relations. We combine Kepler light curves and ground-based radial velocity curves for both stars to derive a best-fit orbital solution for the system, which includes masses and radii. We then compare results from this well-established technique to those from asteroseismology. The red giant asteroseismic scaling laws are a promising way to characterize these stars quickly, and are not limited to binary systems with extensive radial velocity data. Interestingly, the two red giants in this

binary system are very similar physically, yet only one shows detectable pulsations. We comment on the possible implications of this, and discuss how our results can help inform ensemble asteroseismology.

Marilupe Rodriguez; Curriculum & Instruction, NMSU
Understanding the Meaning of Students' Mathematical Motivation

This phenomenological study explores, through in-depth interviews, the experiences, motivations and reflections of calculus students emphasizing how their mathematical experiences influence their motivation to continue studying mathematics.

Manuel Rodriguez Ramos; Languages and Linguistics, NMSU
Historia, cultura y pensamiento universal según la visión iconoclasta de Gastón Baquero

Un acercamiento al diálogo que el poeta cubano Gastón Baquero (La Habana, 1914-Madrid, 1997) establece con Europa, Hispanoamérica y África en una parte significativa de su obra, en donde la cultura más refinada dialoga con el sueño, la fantasía, la magia verbal y la plenitud sensorial. Una relación construida desde la inteligencia, sin perder por ello el sentido del humor que siempre caracterizó a su autor. Un diálogo, en fin, donde Baquero asume con audaz desenfado su condición cubana y caribeña: una visión muy personal del mundo y sus connotaciones, cercana también al realismo mágico.

Andres S. Rosan, Dr. Patricia MacGregor Mendoza, Dr. Gabriela Moreno, & Audra Westphal;
Language and Linguistics, NMSU

Table Discussion: Principles for the development of a new Spanish leveling exam for NMSU students: Diagnosis based on the first data collection

Currently the NMSU placement exam is not effective for students to indicate their corresponding classes according to their knowledge of Spanish. Nor is useful to differentiate heritage students from second language ones. This is because of the constructs that are most frequently measured are: Listening, Reading Comprehension, Speaking, Writing, Grammar and Vocabulary, the only ones that are included in the examination of NMSU are the last two and are decontextualized. Thus, very little can be known about the productive and receptive skills of examinees. During the first half of 2013, we conducted a testing of reading comprehension items for second language learners and heritage were in order to establish its reliability and validity. These items are composed of questions that students must answer for after reading a text, thus to assess their reading comprehension directly and indirectly to assess other constructs such as vocabulary and grammar. So has been no attempts to find alternative ways to assess the level of students, therefore, this is the first formal attempt Languages Department toward the formation of a new placement test. From 730 potential participants who were taking Spanish classes during the spring semester at NMSU, both online and in NMSU, 252 participated, 80% in the university and 19% online. In an academic leveling range of courses, between 111 and 313 classes, 18% correspond to 111 students, 30% of level 112, 7% of 113 courses for heritage students, 12% students from 211 classes, 9% from 212 classes, 10% 213 students and from 7% from 214 classes, both for heritage students, and 2% of level 313. Currently this study is in a second stage test based on changes implemented from the results obtained in the first stage.

Rachael Ryan; Biology, NMSU

*Cryptic species of Checkerspot Butterfly reveals evolutionary diversification as a result of climate change in the American Southwest: *Euphydryas anicia cloudcrofti*.*

The Sacramento Mountain Checkerspot Butterfly (*Euphydryas anicia cloudcrofti* Ferris and Holland) is a rare, endemic butterfly from the Sacramento Mountains, New Mexico. This butterfly was once thought to be among the southernmost populations of *Euphydryas anicia* (*Lepidoptera: Nymphalidae*: Tribe *Melitaeini*). However, this cryptic checkerspot butterfly species reveals considerable genetic distinction from its parent species, a result of geographic isolation and historic climate changes in the American Southwest since the end of the Holocene era. In this study, a phylogenetic analysis was undertaken in order to resolve the status of the Sacramento Mountains Checkerspot

Butterfly using the genes 16S and COI. The results of both a Maximum Likelihood and Maximum Parsimony analysis indicate that *Euphydryas anicia cloudecrofti* should be recognized as a new species and the *Euphydryas* phylogeny should be revised.

Karla A. Salazar; Biology, NMSU

Transcriptome of the Southern dumpling squid Euprymna tasmanica white body and its possible role in hematopoiesis

The squid *Euprymna tasmanica* forms a symbiosis with the bacteria *Vibrio fischeri* in a specialized tissue called light organ. Once *V. fischeri* colonizes the light organ, a series of morphological and physiological changes occur. One of the major host responses to symbiosis is the recruitment and circulation of immune cells, hemocytes, to the light organ. The white body is thought to be the blood-forming tissue in cephalopods. The purpose of this study is to investigate the role of the white body in the symbiotic relationship with *V. fischeri*. Therefore, we seek to identify genes that are expressed in the white body using a transcriptomic approach. White body tissues from adults *E. tasmanica* colonized with *V. fischeri* and from antibiotic-treated squids were used for comparative transcriptome analysis. 454 sequencing and analysis produced a total of 13,446 assembled contigs, out of which 2,740 had a BLAST hit. Preliminary gene ontology analysis revealed that the majority of these genes are implicated in metabolism and cellular processes involved in protein binding and enzymatic activity. Furthermore, some of the immune genes identified in the transcriptome were pattern recognition proteins, lectins, and thioester containing proteins, which have been previously reported in squid hemocytes. The identification of genes involved in hematopoiesis and immunity, as well as knowing their gene expression, can lead to a better understanding of the function of white body and its role in this symbiosis.

Mohammed Sawalhah & Andres F. Cibils; Animal and Range Science, NMSU

Animal-driven rotational grazing patterns in a seasonally grazed New Mexico rangeland pasture

GPS data collected over four years on 52 young cross-bred cows grazing a 146 ha pasture were used to determine whether cattle establish patch scale rotational patterns within pastures. Cow positions at 5-min intervals were recorded with GPS collars during 25 d in late winter/early spring. Estimated per capita forage allowance (PCFA) was 347, 438, 1104 and 1884 kg of herbage per cow in 2004, 2005, 2006, and 2007 respectively. Cumulative winter/early spring precipitation (CPPT) was low in 2004 and 2006 (35 and 30 mm, respectively) and high in 2005 and 2007 (119 and 112 mm, respectively). Structured Query Language (SQL) codes developed specifically for this study were used to a) select GPS points associated with movement velocities ranging between 1 and 20 m/min (assumed grazing locations); b) overlay location data on a pasture map subdivided into 30x30m pixels; and c) calculate percent grazed pixels (% GP), pixel residence time (RT), revisit rate (RR), and return interval (RI) for each animal. On average, cows grazed 315.9% of all available pixels (% GP) for 21 ± 3.7 min (RT), revisited grazed pixels 1.6 ± 0.18 times (RR), and returned to previously grazed pixels after 52 days (RI). As PCFA increased, % GP decreased ($r = -0.42$, $P < 0.01$) and pixel re-visits occurred at longer time intervals ($r = 0.73$; $P < 0.01$). Pixel RT and RR were not associated with PCFA; however RT decreased ($r = -0.46$; $P < 0.01$) and RR increased ($r = 0.6$, $P < 0.01$) significantly with increasing CPPT.

Collin Scarince; Psychology, NMSU

Further Recall of Wins over Losses in Gambling

The purpose of this study is to investigate why people recall wins more easily than losses after gambling. The investigation will be based on a social psychology theory that essentially states unexpected events are recalled more easily and frequently than expected events.

This effect has primarily been used with how people evaluate each other. For example, a person is described as generally nice but occasionally lies to a coworker, the lying (inconsistent) behavior will be more easily recalled than behaviors constant with the trait of being nice.

In the proposed study, this concept will be applied to a gambling situation. Participants will play a card game online. They will either be told the card game is difficult to win or easy to win. Based on the above theory, when participants are told the game is easy, they will most likely remember times they lost the game, because it is not expected in an easy game. Conversely, and more importantly, when participants are told the game is difficult to win, they will be more likely to remember times they won.

If people go into a game of chance supposing they will lose, based on this theory, they will be more likely to recall wins over losses and feel like the overall experience was pleasant, even if they lose more times than they win. Identifying this fallacy may lead to ways to intervene with problem gambling by correcting the fallacy.

Bahar Sayoldin; Dept, NMSU

Applying Data Mining and Bioinformatics Techniques to Analysis Capsicum Species Transcriptome

Chile peppers such as *Capsicum* spp. are an important agricultural and economic crop that have a wide variety of uses especially in food and medical purposes. Identifying genetic variations that differentiate pepper species is very important. The genetic variation of chile peppers affects the pungency and pigmentation, and are products of unique bioactive classes of compounds such as capsaicinoids (heat), and carotenoids (color and pro-vitamins) are easily recognized. The goal of this work is to identify transcript in two major species of cultivated *Capsicum*, *C. chinense* and *C. annuum* transcriptome data sets to identify unique expressions by comparing transcript expression patterns and using bioinformatics and data mining tools for annotating the transcript profile of these two species.

Sam Schonfeld; Astronomy, NMSU

The Sources of F10.7 Emission

The solar radio flux at a wavelength of 10.7 cm, F10.7, serves as a proxy for the Sun's ionizing flux striking the Earth and is a heavily used index for space weather studies. In principal both the coronal sources of ionizing flux and strong coronal magnetic fields contribute to F10.7 via different emission mechanisms. Recently the Expanded Very Large Array (EVLA) has added the capability to make high-spatial-resolution images of the Sun at 10.7 cm. In this work we compare a trial F10.7 image from the EVLA with the radio emission predicted to be present from EUV images of the Sun acquired by the AIA telescope on the Solar Dynamics Observatory at 6 wavelengths covering the coronal temperature range. Photospheric magnetograms are used to identify likely regions of strong coronal magnetic field, and the the circular polarization measured by the EVLA is used as a tracer of gyroresonance contributions to F10.7. We discuss the conversion of the EUV data to bremsstrahlung radio fluxes via the construction of differential emission measure images, and analyze the relative contributions of the different sources of F10.7 flux.

Dan Short & Dr. Michael De Antonio; Physics, NMSU

Narrow line width tunable DIAL LIDAR detector

We will describe a field testable prototype DIAL LIDAR detector employing the use of a narrow line width Acousto-Optic Tunable Filter (AOTF) on the receiver of a DIAL-LIDAR system. Methane gas absorbs electromagnetic radiation in the near and mid-IR at several points around 1.6 and 3.5 microns and can be used in making high sensitivity measurements of atmospheric methane. Because methane is the main constituent of natural gas, this allows for the detection of escaping natural gas from leaks in buried natural gas pipelines if sufficient reflected power from the radiation source reaches the detector. On a typical DIAL LIDAR, there is a significant amount of background noise from ambient sources at the online and offline wavelengths. The addition of an AOTF to the receiver will result in a decreased line width to approximately 45 nm at the mid-IR range. The AOTF is also tunable allowing for the inclusion of several other chemical species that would otherwise be outside of the region of detection. AOTFs are also solid state resulting in better durability and decreases the potential to malfunction during periods of high vibrations. Due to the increase of SNR, a detector cooled by a multi stage TEC was used. The system was comprised of a tunable laser source. The laboratory receiver system is comprised of an AOTF, HgCdTe detector, a pair of mid-IR polarizers, and an adjustable iris.

Nafiul A. Siddique; Electrical & Computer Engineering, NMSU
Local Memory Store - A multi purpose memory replacing on-chip cache

Most applications exhibit temporal and spatial locality in data access patterns in memory. However, there are classes of applications, such as those that are graph-based, that are characterized by irregular access patterns resulting in little locality. For these applications, memory latency can be significantly reduced by storing an applications working set in a smaller but much faster on-chip memory than cache. Cache performs very well in decreasing average memory access latency for applications that exhibit locality, but even still a high penalty is paid through the energy requirements to move data on -off chip and to support the complex coherency mechanisms required for multi-core systems.

To support applications that exhibit poor locality, a number of processor architectures provide explicit access to on-chip memory in the form of software controlled scratch-pad memory (SPM). SPM is a fast on-chip memory mapped into a predefined address space of the processor memory. Because scratchpad does not update memory, coherence is not a problem and it is easy to share data in multi-core systems. But predicting an appropriate address range for scratchpad and implementing an efficient allocation technique are still significant research questions.

We propose a memory that replaces the data cache with a hardware controlled memory (Local Memory Store (LMStr)) that stores different sizes of blocks according to the application needs and can simultaneously be partitioned into and used as scratchpad and/or cache memory. The architecture of our memory comprises a directory, a mapping table, and a memory component. During creation, each process allocates a fixed entry table to store the exact position of the data blocks, which can be of varying size, to be stored in scratchpad memory. The LMStr is shared by all processes in the same CPU to ensure data sharing between multiple processes in multiple cores. We have introduced a weighted based static searching strategy that predicts the block references that should be stored in scratchpad space.

Mia Angelica Sosa-Provencio; Curriculum & Instruction, NMSU

Imagining Ourselves in Childrens Literature: Power Dynamics and Epistemologies amid the Pages and in the Classroom

This critical literary analysis aims to investigate depictions of schooling within childrens literature including underlying messages present within the literary text, artistic images, character depiction, themes, and the positioning of these within the greater narrative and within the physical pages of each book. Texts are critically analyzed regarding the ways in which knowledge is defined as well as how teacher/student power dynamics are depicted. The analysis of the works in this study is perhaps helpful to the larger conversation of critical literacy pedagogy because of the high circulation of these titles as award winners, bestsellers, and enduring traditional favorites. In choosing titles with high visibility in the childrens book market, I aim to increase our critical awareness and enrich the conversation regarding the formation of a collective social construction of ourselves, the world we live in, the purposes of schooling, and the particular roles assigned therein. I analyze these titles through a lens of critical pedagogy which aims to illuminate the often hidden and seemingly depoliticized representations of reality and versions of truth that may shape and perpetuate current inequitable power dynamics and the societal stratifications that are manifest within the walls of schooling and beyond.

Karen R. Trujillo; English, NMSU

Emotional Expressions of a Tri-State Border Community through an Oldies Radio Show

At the heart of my presentation titled, "Emotional Expressions of a Tri-State Border Community through an Oldies Radio Show," is an analysis of a Sunday call-in radio show featuring music described as El Paso style oldies. In my analysis, I am interested in the ways in which callers use requests and dedications of songs as a means of emotional expression. This presentation examines The Sunday Jukebox as a site for gathering of a discourse community at which a diverse group of listeners in the tri-state border communities of Texas, Chihuahua and New Mexico express private emotions in a public space. I first contend that the callers and listeners of The Sunday Jukebox strengthen their sense of belonging by sharing sentiments that are not typically shared during day-to-day functions. I examine

the extent to which the discourse community expresses emotion in this public space and posit that the callers are expressing private emotions in this public space because the shows platform calls for such behaviors. In this presentation, the gift of music serves other intimate functions, such as reinforcing the discourse community between the callers and listeners, as an enactment of nostalgia, in commemoration of events. I am interested in the ways in which local discourse communities create spaces for the liberation of emotional expression and in the ways in which the local discourse community commemorates birth, life, and death through narrative created between disc jockey and caller.

Sebastian Trujillo; Astronomy, NMSU

Formation of galaxies in a dark universe

Advances in observational cosmology have resulted in a measurement with unprecedented precision of the initial conditions for the formation of galaxies. Several lines of evidence suggest that most of the matter in the universe is in the form a dark component which does not interact with light but governs the formation of structures in the universe through gravity. However, the problem of galaxy formation is extremely complex, involving an enormous range of scales and many physical processes including gravity, radiation, gas dynamics and atomic physics. I will describe a few recent models we have used to better understand where and how galaxies form and the role of ordinary matter in the process, all in the context of our current cosmological paradigm.

Kyle Uckert; Astronomy, NMSU

A Comparative Study of in Situ Biosignature Detection Spectroscopy Techniques on Planetary Surfaces

We demonstrate the biosignature detection capabilities of several classes of instruments, including a compact laser desorption/ionization time-of-flight mass spectrometer, an acousto-optic tunable filter IR point spectrometer, a laser-induced breakdown spectrometer, and a scanning electron microscope. We collected biotic and abiotic calcite, gypsum, and manganese oxide samples from Fort Stanton Cave to identify the presence of biomarkers with each instrument class. We find evidence of biologic activity in these samples including the presence of organic molecules, macroscopic and microscopic morphological features consistent with fossilized microbes, and the presence of trace elements consistent with the biotic precipitation of minerals. The identification of extant or extinct microbial life is best supported by a suite of biosignatures, rather than a single observation. We demonstrate the unique biosignature detection results of each instrument class and discuss the importance of developing an instrument suite for future landed astrobiology missions on other planetary surfaces.

Nicholas Ule; Astronomy, NMSU

Investigation Into Differential Rotation on Kepler Targets

It has been long understood that the Sun is a differentially rotation star. This was first observed by tracking sunspots as they transited across the Sun's surface, with equatorial spots traveling faster than spots at higher latitudes. With the near micro-mag precision of Kepler it is possible to measure this same phenomenon on other stars. Understanding how differential rotation changes with respect to spectral class will offer new insight into the magnetic field generation for main sequence stars.

We have developed a spot model which can determine the differential rotation of spotted stars. From our Guest Observer program we have 150 stars which show signs of spot activity. These targets typically have over 10 quarters of data so it will be possible to determine the relative amount of differential rotation over a range of latitudes. This presentation will serve to demonstrate the early findings of this project.

Anurag Veerabathini & Dr. Paul M. Furth; Electrical & Computer Engineering, NMSU
A High-Efficiency, Ultra-Low-Ripple Fully-Integrated Switched Capacitor Buck Converter Employing Time-Interleaving and Pulse-Frequency Modulation Techniques

This paper presents a fully-integrated switched capacitor buck converter implemented in the ON-Semi 0.5-um technology, that converts a 3.3 V DC voltage to 1.5 V. while driving up to a 5-mA current load. A symmetric charge-discharge topology for capacitors is devised for low ripple. Ultra-low output ripple is achieved through time-interleaving. It is observed that a ripple of 87 mV on a baseline design can be reduced to 6 mV by implementing 8-phase time-interleaving with a symmetric topology. To achieve high efficiencies at lower loads, a burst-mode phase-frequency modulation (PFM) technique is implemented. A multi-layer layout technique is used for bucket capacitor to reduce the effect of parasitic capacitances, thereby increasing the efficiency of the circuit. To integrate more capacitance in less area on-chip, the tank capacitor is implemented as a MOSCAP.

Iliana Guadalupe Villegas; Anthropology, NMSU
An Ethnographic Perspective of Human Trafficking and Human Rights in Guatemala

This paper is based on preliminary analysis of ethnographic data concerning the legal and reintegration process undergone female victims of human trafficking who reside at a Non-government Organization (NGO) shelter in urban Guatemala go through. Guatemala, an emigrant and migrant transitory country in which demography, ecology, economics, and politics along with a long civil war, have contributed to high poverty. Both migration and poverty influence populations' vulnerability to modern day slavery. These issues frame the ethnographic data, which consists of interviews and participant observation with the NGO staff members of the shelter and the human trafficking task force from the local human rights procurement. The analysis focuses on the different relationships victims undergo in order to reintegrate back to society.

Baoyu Wang; Psychology, NMSU
Agency and the Mechanism of Cultural Influence

Researches in cultural psychology in the past decades implies the idea that agency mediates the relationship between culture and human minds both theoretically and empirically. However, lacking particular operationalization of agency causes the researches of the mediating process in this direction to stay on the theoretical level. Based on the assumption that agency mediates cultural influence, I propose a mediating model in which agency mediates the relationship between social-economic status/mobility and cultural consequences in terms of cognitive styles and self-construe. Agentic Behavioral Tendency Scale and Control Belief Scale were constructed, in Study 1, to be used as the measurement of agency and test the model proposed in Study 2. Two newly designed measurement satisfied basic requirements of psychometric standard according to the results in study 1. The results in Study 2 supported the theoretically assumed model I proposed. Specifically, the statistical analysis showed that a. self-capacity belief partially mediates the relationship between Subjective School Status and internal control tendency/self-construe. b. independent agency partially mediates the relationship between mobility and internal control. c. the relationship between birthplace and attribution styles was mediated by family capacity belief marginally and partially. The unexpected results during the study were analyzed.

Wenjie Wang; Curriculum & Instruction, Education, NMSU
Becoming a Better You: A Further Development of Ten Commandments for Motivating Second Language Learners

The question of what motivation is, where it comes from and how it works in language learning have been studied widely. Ten commandments for motivating language learners were proposed originally by Dr. Dörnyei and Dr. Csizér in 1998, which includes, set a personal example with your own behavior; create a pleasant, relaxed atmosphere in the classroom; present the tasks properly; develop a good relationship with the learners; increase the learner's linguistic self-confidence; make the language classes interesting; promote learner autonomy; personalize the learning process; increase the learners' goal-orientedness and familiarize learners with the target language culture. However, when language learning entered in an information age after sixteen years, with the rapid development of digital technology, new media and the wealth of big data, the Ten Commandments for second language learning needs to

be updated. With this background, a case study of teacher action research is conducted. In this research paper, the researcher presents a literature review of theories of motivation in language learning; and then shows the process of data collecting and analyzing; further, the researcher discusses specific strategies to utilize Ten Commandments in modern second language learning classroom.

Nancy Wasser; Curriculum & Instruction, Education, NMSU

Using Counternarratives of Social Justice to Promote Literacy and Prevent Bullying in Schools

This presentation treats using personal counternarratives as texts with preservice elementary (K-8) teachers as a means to employ narratives for literacy instruction while addressing social justice concerns in the school community and classroom. Preservice teachers write their own narratives recounting experiences of social injustices they witnessed or were made targets of, particularly in school settings. They then apply these authentic texts as examples and models for children to write their own bullying stories, later rewriting them as narratives of transformation, including spoken, written, and performed texts. These transformative texts provide a vehicle for change by helping children move from a position of victimization to one of converting bystanders into allies, and victims into empowered actors. By standing in solidarity with the bullying target, it becomes possible to change bullying behavior through conscious transformative narrative action.

Erandi Apsara Wijerathna & Dr. Boris Kiefer; Physics, NMSU

Effect of Point Defects and Microstructure on Mechanical Hardness Estimates of η -Ta₂N₃

One of the largest challenges in materials science is the design of functional materials through experimentation and/or theory. An example is the synthesis of stable hard and superhard materials. In this presentation we will discuss η -Ta₂N₃ as a test case. This material has recently been synthesized at high pressures and temperatures. Commensurate experiments on the recovered sample suggest that this material could be harder than TiN the industrial material of choice for hard thin-film coatings. However, the synthesized η -Ta₂N₃ sample showed a high porosity and contained point defects rendering the back extrapolation of material properties to a dense sample with zero porosity challenging. In this presentation we will discuss results of our recent parameter-free first-principles computations. In agreement with previous computations we find that η -Ta₂N₃ is only mechanically stable in the presence of point defects. We extend previous research to include cation as well as anion defects and their effect of elastic properties and crystal structure. The combination of our results with recent hardness models suggests an up to 40% lower hardness for dense η -Ta₂N₃ making it significantly softer than TiN. An even lower estimate is obtained by using experimental elastic parameters. We will review several possibilities including microstructural models that may resolve this discrepancy and advance our ability to use the synergy of experiment and theory to design functional materials more reliably.

Lihua Zhang; Curriculum & Instruction, NMSU

Lecturing or Coaching? -Towards an Alternative Approach for EFL teaching in China

Since China adopted the open door policy in 1978, English as a global language for international trade and communication has undergone a period of unprecedented popularity and prosperity in China. However, with English being included as one of the three major compulsory courses in public school curriculum, plus the status of English as a foreign language that one has to labor to learn, it soon becomes the school subject that concerned most by teachers, students, and parents. Very soon, the unique status of English in school curriculum triggered the market sensitivity of people with a business mind. They saw English teaching as something similar to an industrial factory which is free of chimneys. When English learning is closely connected with market and profit, it soon lost its focus in teaching and learning. Gradually, English teaching becomes something as time consuming, energy sapping; too many tests, too little learning, whereas English learning brings the learners more frustration, less enjoyment. Even though up-to-date measures has been proposed to put English teaching back to its right track, the focus of the discussion as presented on China's public forums is still on the peripheral topics such as how many points should be ascribed to English in national entrance examination or should English be eliminated from school curriculum or not, etc. This paper starts from problem posing of current English teaching and learning in China to the analysis of possible causes for such problems. Four possible factors have been identified as the propelling forces to the malpractice of English teaching and learning. After that, the author appealed for changes to be made in this field because "in a time such as the

present when change is so rapid, when so many things are changing from day today, it is imperative that we be able to judge which trends move us in the direction of the goals we want, and which others interfere with the achievement of these goals” (John Dewey, 1919, p. 185).

The author then proposed coaching as an alternative way to traditional, lecturing style English teaching. Such an alternative approach moves the focus of English teaching from knowledge transmission to skills development, which is supposed to be the goal of English teaching and learning in China. The rationale for coaching is justified and a picture of coaching in real classroom practice is envisioned. Finally, the author provided the ”how-to”s for implementing the coaching approach of English teaching in Chinas public schools.

Poster and Exhibit Abstracts

(In alphabetical order by author)

Rachelle M. Bassen; Biology, NMSU

Staining for Myelination with Luxol Fast Blue and Neutral Red

Hearing loss, vestibular disorders and damaged eyesight can be the result of axonal degeneration (*Int Jour Ped Otrlaryn*, 61:1-15; *Inst Ophthalm*, 7:109-125). Improper functioning of the myelin sheath may be responsible for this degeneration, due to its role in conducting chemical and electrical neural signaling. Investigation of myelin degeneration requires understanding of normal myelinogenesis during development. Anatomical characterizations are typically the first step in formulating mechanistic understanding with new model systems. Luxol Fast Blue has often been paired with various counterstains as a way to stain myelin sheaths, including the Kluver-Barrera method with Cresyl Violet (*J Neuropath Exp Neurol*, 12: 400-403). The acidic Luxol stain binds to the phospholipids of the myelin sheath, whereas Cresyl Violet stains Nissl bodies. However, some recent protocols have utilized Neutral Red as a replacement to Cresyl Violet as a Nissl body counterstain due to its greater contrast to the blue stain (*Stain Technl*, 37: 13-16). Using *Xenopus laevis* larvae as a model, we prepared a new method for Luxol Fast Blue myelin stain with Neutral Red counterstain. Results revealed substantial differentiation of tissue, with red Nissl bodies and dark blue myelin. This method will be used for histological staining to detect the earliest stage of myelination of the VIIIth acoustic-vestibular nerve in *Xenopus*, which has not yet been determined. Supported by NIH (R25NS080685, P20RR016480).

Erin Brown-Meeks & Erica Davis; Anthropology, NMSU

Another example of a chimp-like black-handed spider monkey (Ateles geoffroyi) "raid" observed at La Milpa, Belize

Stealthy chimpanzee-like raids by male black handed spider monkeys (*Ateles geoffroyi*) into neighboring territory were first documented in 2006 in the Yucatan Peninsula of Mexico. Raiding groups of males traveled on the ground apparently searching for individuals to attack. They traveled in single file with tails held erect. More recently, hostile events leading to a takeover by neighboring male spider monkeys were documented in NW Costa Rica. Hostile raids in Mexico were linked to male-male philopatry with males remaining in their natal groups, but genetic identification of relatedness of takeover males in Costa Rica revealed they were not as closely related as previously believed.

We report here another example of spider monkey male gang aggression toward individuals of a neighboring group. On March 27th, 2013, during our third brief field trip to La Milpa in North West Belize we witnessed and video recorded spider monkey males traveling arboreally in single file with tails erect. They attacked an adult female and her young offspring. Approximately one minute into the attack another individual arrived at the scene from the opposite direction in which the attackers entered, leading to an escalation of hostilities. Five attacking individuals were photographed leaving the scene in single file and displaying. Since this incident, guides at La Milpa observed two other hostile attacks and one monkey with a bite wound on his shoulder. Attacking monkeys never traveled on the ground. Our observations indicate that hostile attacks by neighboring males may be a normal part of this species' behavior.

Kristin Lea Corl & Angel Pena; Anthropology, NMSU

Ritual or War: Burning in the Jornada Mogollon

What is the significance of room burning within El Paso Phase (A.D. 1300-1450) Mogollon pueblos of Southwest New Mexico? Are these events the results of violence, ritual abandonment of rooms, accidental fires or other processes? This poster explores these questions through a case study of Cottonwood Spring Pueblo (LA 175) one of the largest villages in the region. We have identified at least two temporally distinct burning events at the site. This pueblo also straddles a cultural boundary between the Jornada and Mimbres branches of the Mogollon and possesses relatively high frequencies of Salado polychrome ceramics. To contextualize Cottonwood's burning we will compare it to other

pueblos in the region considering their sizes, locations, ceramic assemblages, dates of occupation and numbers of burning episodes.

Kyle DeGrave, Jason Jackiewicz, & Matthias Rempel; Astronomy, NMSU

Validating Time-Distance Helioseismology With Realistic Quiet Sun Simulations

Linear inversions of two $\sim 100 \times 100 \times 20$ Megameter (Mm) realistic magnetohydrodynamic quiet-Sun simulations are carried out using time-distance helioseismology to recover vector flows in the upper layers of each domain. These inversions were performed using several filtering schemes including ridge, phase-speed, and a combination of ridge+phase-speed filtering with the ultimate goal of assessing the capabilities of our current helioseismic methods. We find that horizontal flow maps recovered from our inversions correlate strongly with those of the simulations down to a depth of ~ 3 Mm, with correlation values dropping rapidly thereafter. In several cases, the magnitudes of the inverted flows severely underestimate those of the simulations, possibly suggesting nonlinearity of the forward problem. We find that inversions for vertical flows depend strongly on filtering method, with phase-speed filtering giving the best results. In general, however, these inversions are unable to accurately recover the vertical flow structure present in the simulations due to the low-amplitudes of these flows coupled with high levels of noise.

Adam Dettmer; Water Science and Management, NMSU

Determination of optimal coordination complex for facilitated transport enabled - in-situ chemical oxidation of 1,4-dioxane in groundwater

1,4-Dioxane is an ether that is commonly used as a stabilizer for many chlorinated solvents (i.e. trichloroethylene and 1,1,1-trichloroethane), and therefore is likely to be present at sites impacted by chlorinated solvent spills. Its properties such as infinite water solubility, low volatilization, and negligible adsorption allow it to form expansive contaminant plumes as large as, or larger than, those associated with chlorinated solvents. These plumes represent a substantial liability due to their potential for adverse health effects (anthropogenic and ecologic) and high remediation costs. Extensive research is underway to develop advanced *in situ* chemical oxidation (ISCO) as applicable technology for 1,4-dioxane-contaminated groundwater, by enhancing the solubility, transportability, and longevity of oxidants. Theoretically, co-injecting oxidants and a chemical “delivery agent”, or complexing agent that will supplement the transportability and stability of the oxidant can accomplish this. The objective of this particular investigation is to determine the most effective oxidant(s)-delivery agent complex, based on the stability of the complex and the ability of the delivery agent to enhance the oxidant solubility.

This research will serve as a fundamental part of a project that will develop a novel, cost-effective, *in-situ* treatment alternative for 1,4-dioxane-contaminated source zones and groundwater plumes and it will contribute to our understanding of the processes controlling the complexation of oxidants. This technology has the potential to completely replace the existing, and more costly, *ex-situ* method for treating 1,4-dioxane-contaminated groundwater and thus, support the management of Department of Defense sites experiencing problems with groundwater contamination.

Carollan Ehn; Mathematical Sciences, NMSU

The Hasse-Weil Theorem and Applications to Elliptic Curve Cryptography

Cryptography is the theory and practice of sending messages so that only the sender and intended recipient can read them. Today cryptography is used in sending information over the internet and computer networks, with the aim of avoiding interception or interference in these transactions. There are cryptosystems which embed messages in collections of points known as elliptic curves. The security of these cryptosystems is often based on the difficulty of solving the “discrete logarithm problem.” There are attacks on the discrete logarithm problem which require knowing information about the number of points on an elliptic curve. In this thesis, we study the Hasse-Weil Theorem, which gives a bound on the number of points on an elliptic curve. This theorem can be used to determine if a cryptosystem is resistant to an attack on the discrete logarithm problem.

Diane Feuliet; Astronomy, NMSU
Ages of Nearby Giants with APOGEE

The SDSS-III Apache Point Observatory Galactic Evolution Experiment (APOGEE) is a high resolution ($R \sim 23,000$) near-IR (H-band) spectroscopic survey of 100,000 Milky Way stars designed to chemically trace the formation and evolution of Galactic stellar populations. In addition to the primary survey, the APOGEE spectrograph has been fitted with 10 fibers from the robotically controlled NMSU 1 m telescope to maximize the use of this instrument when not on sky with the Sloan 2.5 m telescope. This allows for single object observations with this high resolution NIR spectrograph. Using this new capability provided by the 1 m, we are conducting a survey of bright stars ($H \leq 8$) with accurate Hipparcos parallax measurements ($\mu_{err} \leq 10\%$), which are not accessible to the main APOGEE survey. These data can be reduced and analyzed in the same way as main survey data, resulting in detailed chemical information for hundreds of nearby stars. The atmospheric parameters combined with the Hipparcos distances allow for age estimates of these stars. We present initial age estimates from isochrone matching to Padova isochrones, and an age-metallicity relation for the current sample.

Erek H. Fuchs & James Witcher; Civil Engineering, Water Science and Management, NMSU
Central Palomas Basin Aquifer Investigation

New Mexico experiences periodic and severe drought of decadal length. Farmers in the Hatch-Rincon Valley along the Rio Grande in southern New Mexico are especially impacted by the current severe and sustained drought because of the unique geology of the immediate area that does not allow significant augmentation of water for irrigation from pumping groundwater. Groundwater that is readily accessible is currently deteriorating in quality as salinity is increasing in the shallow Rio Grande alluvium aquifer. The economy in the Hatch-Rincon Valley is highly dependent on irrigated agriculture in the immediate area.

In response to this apparent crisis, interests in the Hatch-Rincon Valley have been investigating the potential of a groundwater drought reserve. Earlier studies suggested, but did not investigate in detail the possibility of a significant resource, the Central Palomas Basin Aquifer (CPBA). A preliminary geologic cross-section model has been developed by Dr. John Hawley. Surface resistivity and EM geophysical surveys and water chemistry analysis are in progress by David Hyndman and James Witcher to define the CPBA, a buried and confined fluvial channel predating the Rio Grande. Investigation is designed to define and characterize this aquifer as an emergency supply during extreme drought by applying existing water rights of the water users in the Hatch-Rincon Valley. Much work is yet to be performed to fully quantify the aquifer but it may represent an important undeveloped shallow potable groundwater system in New Mexico.

Andrea Gallegos; Physics, NMSU

Lg Attenuation in the Central and Eastern United States as Revealed by the EarthScope Transportable Array

Lg waveforms recorded by EarthScope's Transportable Array (TA) were used to determine interstation crustal attenuation in the central and eastern United States (CEUS). Attenuation was calculated based on Lg spectral amplitudes filtered at a narrow band from 0.5 to 1.5 Hz. The two-station and reverse two-station techniques were used to invert the spectral amplitudes for Q . 39 events occurring from 2010 to 2012 and ranging from magnitude 3 to magnitude 6 were used in this study. 39,258 and 4,627 interstation Q values were determined using the two-station and reverse two-station techniques respectively. The results show northeast trending high Q regions (low attenuation) ranging from eastern New Mexico to Wisconsin. Regions of low Q (high attenuation) are seen along the Minnesota-Wisconsin border, the Gulf Coastal Plain (GCP), along the South Dakota-Nebraska border, and along the Oklahoma-Texas border. A positive correlation between heat flow, sediment thickness, recent tectonic activity, fluids, and low Q was observed. Areas with low heat flow, thin sediment cover, no recent tectonic activity, and a lack of fluids were observed to have consistently high Q . These new models use a greater amount of data and attain more coverage than previous studies and better constrain attenuation. The attenuation maps generated are highly detailed. This increase in detail can improve high frequency ground motion predictions of future large earthquakes for more accurate hazard assessment and improve overall understanding of the structure and assemblage of the CEUS.

Robert Gueth; Biology, NMSU*Temperature effects on the electric discharge and gene expression in the electric organ of Eigenmannia virescens*

Environmental factors affect protein composition and behavioral outputs of motor systems. For instance, ambient water temperature alters the physiological and contractile properties of skeletal muscle of teleosts (Watabe 2002). The weakly electric gymnotiform fish *Eigenmannia virescens* possesses a highly specialized electromotor system that evolved from skeletal muscle and generates an electrical discharge (EOD) used for communication and navigation. Unlike muscle, this electric organ (EO) tissue does not contract and is activated continuously by distinct electromotoneurons at frequencies between 250-600Hz (Assad 1998). Previous studies showed that the EOD frequency in *E. virescens* is affected by changes in water temperature (Enger 1968; Boudinot 1970). However, these studies examined the duration of this effect for only short durations of time of less than 20 minutes. This work will expand these data by characterizing the effect of water temperature on *E. virescens* EOD and EO gene expression over at least 2 weeks. To date, we have developed a wireless multi-sensor framework capable of monitoring EODs (under review, IEEE BioCAS 2013) and are expanding this system to continuously record water temperature. This will allow long-term, continuous EOD recordings from fish kept at different water temperatures (25° vs 30°C; n=5 each). Following stabilization of EOD frequencies at 2 weeks, EO tissue will be harvested and analyzed for changes in gene expression. These data will expand our current understanding of long-term effects of ambient temperature on EO activity, and furthermore help elucidate the role of temperature in regulation of gene expression in electromotor systems.

Mohammad A. Haque; Electrical & Computer Engineering , NMSU*Item Implementation of low quiescent current low-dropout (LDO) regulator using Split Length Compensation technique with Enhanced Transient Recovery*

This paper presents a three-stage Low-Dropout Voltage Regulator~(LDO) with a class-AB output stage using the Split “Length Compensation~(SLC) technique. In this technique a transistor M of length L is split into two series transistors, M_a and M_b , of length L_1 and L_2 , where $L_1 + L_2 = L$. The input V_{in} and output voltage V_{out} are 2~V and 1.5~ V, respectively. The load current range is 0 to 50~mA. Due to the class-AB output stage, the LDO shows a low average load transient recovery time of 14 μ s using a low quiescent current (I_Q) of only 4.3 μ A. The dropout voltage V_{DO} achieved is 124~mV. The design is compared with state-of-the-art LDO designs and achieves comparable results.

Michael Hayden; Astronomy, NMSU*Chemical Cartography with APOGEE: Large-scale Mean Metallicity Maps of the Milky Way Disk*

We present Galactic mean metallicity maps derived from the first year of the SDSS-III APOGEE experiment. Mean abundances in different zones of Galactocentric radius ($0 < R < 15$ kpc) at a range of heights above the plane ($0 < |z| < 3$ kpc), are derived from a sample of nearly 20,000 stars with unprecedented coverage, including stars in the Galactic mid-plane at large distances. We also split the sample into subsamples of stars with low and high-[alpha/M] abundance ratios. We assess possible biases in deriving the mean abundances, and find they are likely to be small except in the inner regions of the Galaxy. A negative radial gradient exists over much of the Galaxy; however, the gradient appears to flatten for $R < 6$ kpc, in particular near the Galactic mid-plane and for low-[alpha/M] stars. At $R > 6$ kpc, the gradient flattens as one moves off of the plane, and is flatter at all heights for high-[alpha/M] stars than for low-[alpha/M] stars. Alternatively, these gradients can be described as vertical gradients that flatten at larger Galactocentric radius; these vertical gradients are similar for both low and high-[alpha/M] populations. Stars with higher [alpha/M] appear to have a flatter radial gradient than stars with lower [alpha/M]. This could suggest that the metallicity gradient has grown steeper with time or, alternatively, that gradients are washed out over time by migration of stars.

Gizelle Hurtado & Dr. Karen Mabry; Biology, NMSU

Impact of urbanization on kangaroo rat abundance in Las Cruces, NM

Urban development can fragment and degrade remnant habitat. These alterations in habitat can have profound impacts on wildlife populations that are isolated by development. Urban populations can also be exposed to novel urban pressures and stimuli that may impact their ecology. I investigated the influence of urbanization on populations of Merriam's kangaroo rat (*Dipodomys merriami*). I hypothesized that urban development would affect the number of kangaroo rats in urban areas as compared to non-urban (wild land) areas. I live trapped 10 sites in Las Cruces, NM: 5 urban and 5 non-urban, from May to November 2013. There was no difference in kangaroo rat abundance between urban and non-urban sites, indicating that kangaroo rats are able to survive and reproduce in urban areas.

Laura Ana James; Counseling & Education Psychology, NMSU

Exploring the psychological impact of the Mexican Drug War in the border Mexican community

This qualitative study explores the experiences of Mexican immigrants in relation to the exposure to violence in Mexico prior immigration to the U.S. Eight participants were interviewed and the data was analyzed using a Descriptive Phenomenological approach. Two main themes that emerged from the data analysis are presented in this study which describes the participant's experiences, including the lack of trust in the police reported by four participants, and the impact that the exposure to violence had in their mental health. All participants reported being exposed directly and indirectly to violent events before immigration.

Yufeng Jiang, Liu Fang, Hongmei Luo, & Yunfeng Lu; Chemical Engineering, NMSU

Titanium oxide nanocrystal on carbon 3D-Scaffold for electrochemical energy storage

Effective energy conversion and storage are required for better use of energy due to the inevitable depletion of fossil fuels. Energy storage technology is the key factor in harvesting kinetic energy. In the past decades, there has been an ever-increasing demand for environmental friendly, high performance energy storage systems. Titanium oxide has been extensively investigated as electrode candidate for electrochemical energy storage, such as lithium ion battery. However, the poor conductivity of titanium oxide has limited its application. Carbon black, graphene, and carbon nanotubes (CNTs) are common supplements to electrode materials in order to increase their conductivity.

Three-dimensional (3D) carbon scaffold was made to be an additive to titanium oxide to improve its conductivity. It was made by CNTs (one dimensional) and graphene oxide (two dimensional). Titanium oxide was prepared by two-phase hydrothermal method, when the scaffold was introduced to titanium oxide, the specific capacity was 170 mAh/g at 0.3C and it is very close to the theoretical capacity of titanium oxide (175 mAh/g) and performed good cyclic data.

Manasi Jogalekar; Molecular Biology, NMSU

A three-dimensional culture system for breast cancer cell line HCC70

Tissue and organ failure are major health problems in the United States. Tissue engineering is a tool that can assist with identifying treatments for tissue and organ disorders, such as breast cancer, a disease that comprises about a fifth of all cancers in women. Three-dimensional cultures of breast cancer cell lines may be more similar to native cancer tissue in terms of morphology and gene expression, as compared to typical monolayer cell cultures. This pilot study was carried out with the goal of establishing a three-dimensional breast cancer cell culture system, and comparing its morphology with that of breast cancer cells grown in monolayer. To this end, the breast cancer cell line HCC70 was cultured in 3D matrix GeltrexTM (Invitrogen, 12760-021) and with conventional monolayer culture methods. Fluorescent probes were used to stain the cytoskeleton (Alexa Fluor[®] 488; F-actin) and the cell nucleus (Hoechst 33342; DNA) and images were captured using an epifluorescence microscope (Nikon TE2000). We noted that as expected, cells in monolayer culture appeared flat, adhered to the stiff plastic surface, and spread horizontally. In contrast, HCC70 cells maintained in GeltrexTM grew in multiple layers within a complex microenvironment, in close association with neighboring cells. Future studies will continue to evaluate the 3D culture system by assessing mitochondrial function with fluorescent probes, and cell ultrastructure with transmission electron microscopy. This research is supported by NIH P20RR016480.

Dusan Jolovic, Aleksandar Stevanovic, & Cameron Kergaye; Civil Engineering, NMSU

A Review of Traffic Management Center Practices for Contemporary Technological and Service Improvements

Traffic Management Centers require dedicated management and staff with specialized skills and training. They rely on advanced technologies and require operating and capital funding. Investments in new technologies and services should allow agencies to proactively manage and control traffic to optimize performance of a surface transportation system. The Utah Department of Transportation has commissioned a study to identify potential technological and service improvements for its TMC. The goal was to synthesize the current state of practice on applying innovative and advanced procedures, applications, and tools in TMC operations. This paper presents a summary of a broad web-based survey of transportation agencies and field visits to TMC agencies whose practices were recognized as most interesting for UDOT. The survey contained 22 questions which were developed for UDOT's need to investigate improvement areas in its own operations. After reviewing responses from 54 agencies, a technical advisory team selected TMC candidates to interview during field visits. Two tours were organized: "Eastern", touring TMCs in Minnesota, Pennsylvania, Ohio, and Virginia; and "Western" visiting TMCs in California and Missouri. This report summarizes the best practices from these field visits and provides a comprehensive list of highlights from all visited TMCs.

**Christianne Jane Jones, Dr. Linda Spencer, Genevieve Munoz & Stephanie Morales;
Communication Disorders, NMSU**

Spelling as a Window of Phonological Development in Children with Diverse Learning Backgrounds

Understanding how sound representations develop in typically developing children, struggling readers and in students who are English Language learners and those with hearing loss is important, because each group varies with experience in the amount of consistent exposure to English within their ambient language in the early years of their lives. Information learned in this study will help us to ascertain strengths, and weaknesses within the learning strategies of these groups for the development of interventions that exploit strong areas, and build upon weak areas.

Seda Karayazi Ozsayin; Special Education, NMSU

Teachers Attitudes towards Inclusion in Different Countries: a review of the literature

Inclusion is a term which means to educate all individuals, to the least restrictive environment, in the mainstream schools. Inclusive education is a first and foremost reform strategy which aims to include students with different abilities in regular schools. Successful of inclusive education in the schools or classrooms depends on teachers' attitudes and beliefs about inclusion and individuals with disabilities. This present study will provide a review of the literature on teachers' attitudes, beliefs, and cultural values towards inclusion in different countries. Results will reveal differences between teachers' attitudes towards inclusive education in the world.

Randa Keeley; SPED/CD, NMSU

Co-Teaching Model Preferences for Students and Teachers

This study is associated with the experimental and quasi-experimental group research.

Student perceptions of co-teaching models are integral to improving inclusive practices for students with disabilities. This study measured student perceptions of the effectiveness of the five co-teaching models in the inclusion classroom based on pre-established categories related to co-teaching (i.e., teacher authority, classroom management, student learning, behavior, etc.). This study has aided in refining evidence-based inclusive practices in the classroom in order to improve instruction in co-taught classrooms.

Despite the available research on the benefits and effectiveness of co-teaching as an instructional strategy/method, there is no research available regarding teacher and student preferences for each of the five co-teaching models (Murawski & Swanson, 2001; Weiss, 2004). In order to implement the models most effective for the students being served, we need to know what students and teachers perceive as most effective from a learner and teacher perspective and why.

This session will include the results of a survey study that measured student perceptions of the five co-teaching models. The results from the study indicated that differences existed with regard to student perceptions of the five co-teaching models. Recommendations for effective co-teaching will be offered following the session.

Naima Ansar Khan; Water Science and Management, NMSU

Combined natural attenuation processes in vadose zone for produced water in oil & gas operations

Produced wastewater (i.e., oil and gas) have significant environmental impact through releases or through applications that support various beneficial uses. The potential risks of soil and groundwater contamination associated with produced water are due to the high concentrations of petroleum hydrocarbons (some of them are carcinogenic) and salts (deteriorate irrigation or drinking water quality and also have an adverse impact on plant growth). Different methods like GC-MS, GC-FID, GC-TOF-MS - can be used to analyze the volatile and semi-volatile characteristics of produced water for There are significant natural attenuation processes inherent in both vadose zone and groundwater contaminant transport that serve to diminish concentrations or retain contaminants within porous media. Extensive research is underway to assess produced water contaminant transport and attenuation processes (adsorption, volatilization, diffusion/dispersion, biodegradation) and rates acting in soil and groundwater to mitigate potential groundwater contamination. Particularly the quantification of attenuation rates from each individual processes can be used to predict the coupled/overall contaminant attenuation in soil. Comparing attenuation rates between individual and combined natural attenuation processes will be one of the methods for this research. Moreover it will possible to evaluate the success of this process by comparing 1st order kinetics for individual and combined application of natural attenuation processes.

Mayra Lovas, Mario Gutierrez Casale, & Janeth Sanchez; Public Health Sciences, NMSU

Using Cancer 101 to increase cancer knowledge among public library staff in Southern New Mexico.

Background: Cancer 101 has been utilized as an effective educational tool to increase cancer knowledge among community members and to train health educators with accurate cancer information. Providing effective training for other professionals who serve as points of cancer information dissemination is vital. Past research suggests that public libraries are a source of health information for many individuals of low socioeconomic status. This study assessed the Cancer 101 curriculum as an effective training educational tool among public library staff.

Methods: Three public libraries in Southern New Mexico agreed to participate in Cancer 101 train-the-trainer sessions. The curriculum is comprised of ten modules each containing a pre- and posttest with five items. Participants were asked to complete a pre-test before each module and a posttest immediately after. Paired-samples T-tests were performed to examine changes in knowledge gained between pre and posttest.

Results: A total of 27 public library staff participated in the trainings, with 81% being female. Overall, participants demonstrated a significant increase in cancer knowledge for nine of the ten modules (all p values < .05). Participants did not exhibit increased knowledge on the role of genes in cancer most likely due to insufficient information in the training materials

Conclusions: Past research has shown that Cancer 101 is an effective tool for increasing cancer knowledge among communities and health educators. Results from this study suggest that Cancer 101 is an effective train-the-trainer tool among potential health information resources, such as public library staff.

Candyce Luna & Alma Gross; Public Health Sciences, NMSU

Pediatric Pesticide Exposure: Proximity of Selected Elementary Schools to Agricultural Crops in Doña Ana County, New Mexico

Background: Children experience a higher risk of pesticide exposure because their organs are still developing during critical periods where exposure to toxins can be permanently altering to their biological systems. Children living near agriculture have statistically significantly higher pesticide exposure. Agriculture is an important part of New

Mexico (NM) history and continues to be a significant part of the state's economy. In NM, there is a lack of pesticide monitoring and pesticide application records are unavailable. Methods: For this report, indirect methods to estimate pesticide application were necessary because records in NM are not available. Data mapping was used to estimate the amounts of pesticides used in Doña Ana County based on the crop acreage, and the most common used chemical pesticide agents used for a particular crop. Pediatric pesticide exposure locations were identified by targeting and mapping public elementary schools and measuring the proximity to local agricultural crops. Results: Children living in Doña Ana are at an increased risk of pesticide exposure as a result of potential pesticide drift from nearby agricultural farmland due to lack of sufficient environmental protections in place, such as adequate buffer zones. Conclusion: Issues identified included the lack of transparency present in the community's monitoring and reporting of pesticide applications and exposures. An accessible pesticide surveillance system would provide the necessary data to identify potential environmental health risks. More urgent is the need for a community wide assessment, to better understand the environmental health impact present in Doña Ana related to pesticide exposure.

Eribel Lupercio, Azucena Mayorga, & Teresa Román; Communication Disorders, NMSU
Somos Bilingües: The Need for Specialized Training Through the Eyes of Bilingual Graduate Clinicians

Few Speech Language Pathologists have specialized training to assess children for language difference versus a language learning disorder. Thus specialized training in working with the bilingual population becomes crucial for future clinicians. Four graduate students share their experiences in attaining specialized training in working with this fast-growing and dynamic population.

Laura Mayorga; Astronomy, NMSU
Disentangling the Planetary and Stellar Components of Transit Light Curves

The difficulty in confirming Kepler planet candidates from the ground drives the creation of more sophisticated transit light curve analyses. These analyses attempt to isolate planetary effects on the light curve and determine important planet properties such as size, mass, albedo, and temperature. The out-of-transit planetary signals can be dominated by seemingly minor stellar effects such as star spots which are not accounted for in the Kepler data pipeline. Fast rotating host stars can cause undulations in the light curve and become entangled with planetary phase effects. We compare two methods to remove these stellar effects. In the first method, we model the stellar star spot signal. The second method requires the filtering out the stellar rotation signal indicated by star spots through Fourier decomposition. We present preliminary results on the effectiveness of these two methods.

Sarah Ann McCormick, Kayla Hurd & Elizabeth Arnold; Anthropology, NMSU
An ethnoarchaeological examination of the utility of tool preparation methods for the production and use of bone and antler needles.

Previous ethnoarchaeological research evaluated the ease and expedience of various preparation techniques of bone and antler for tool manufacture. Using both fresh and dry bone, specimens were soaked, frozen and boiled as preparation methods prior to fashioning into a variety of needles. Control samples were selected and exposed to no additional processing. The same was repeated for antler in both fresh and dry condition. No preparation method yielded a clear choice for ease of manufacture as it was possible to create usable tools in a timely manner in all cases. However, boiling and/or soaking as a means of preparation does not enhance (and may impede) manufacture of bone and antler tools. The new research presented here examines questions of use and utility of the artifacts produced. How well would each tool hold up to use over time? Which material would need or tolerate reshaping? Each bone and antler needle produced in the first phase of research has been utilized for leather working and single needle knitting (naalbinding). Both qualitative and quantitative measures are used to evaluate and test the utility and durability of the tools. Size and shape of the needles were significant factors on duration of use (until breakage).

Amanda R. Miller; Social Work, NMSU

Strengths of the Homeless Population in a Rural Southwest Community

Homelessness is not a new phenomenon and is social issue that has been heavily researched since the 1980s. Homeless individuals are one of the most vulnerable populations in the United States and homelessness is highly stigmatized. One theme that has often not been associated with homelessness is the individual's strengths. This study seeks to address this lacuna by exploring the importance of viewing the strengths within the homeless population. Qualitative methodology using grounded theory was utilized to examine the stories of ten homeless individuals in order to examine the strengths they possess and how their strengths are assets for their current living condition. The researcher did ten semi-structured interviews with homeless individuals to hear their personal stories. The findings indicate that the homeless individuals to some extent struggled to see their personal strengths, but throughout the interview process identified several strengths without recognition. The homeless individuals interviewed are resilient and resourceful. A specific strength that was identified was the strong social support networks that they possess. The research findings strongly indicate the need and viability of social work practice recognizing the homeless' strengths and empower them to utilize them in their everyday life.

Alireza Moghimi; Industrial Engineering, NMSU

An observational before-after study of the of City of Las Cruces camera enforcement program

The goal of this research is to assess the impact of the red-light and speeding camera enforcement program on traffic safety. The City of Las Cruces, New Mexico introduced the program in March 2009, to improve traffic safety by reducing traffic violations, and consequently traffic accidents at signalized intersections. Initially, there were eight cameras in four different intersections. However, three of them were shut off in May 2010. The current research also includes crash data from six control intersections for comparison study which is a necessary requirement in conducting a proper evaluation of the camera enforcement program. This research includes about 1,700 crash records collected from ten signalized intersections in the city between March 2006 and February 2012. Empirical Bayes method was used to perform before-after analysis. The Empirical Bayes analysis uses the crash data from the control intersections along with ones from the camera intersections to predict the number of crashes in the absence of the camera enforcement program. Since the Empirical Bayes method can increase the precision of estimation even for limited data, and more importantly, it corrects for the regression to the mean bias; the corresponding results are more accurate than other traditional before-after analyses. The results show that two of four camera intersections experienced an overall positive impact as a result of the camera enforcement program. The current research also includes a total of 38,169 red-light violation records collected between March 2009 and February 2012, and about 12,400 speeding violation records collected from five camera sites in the city between May 2010 and April 2012, for the violation data analysis.

Cesar Eber Montelongo; Biology, NMSU

Bioinformatics analysis and gene expression studies of Complement-like factors in Biomphalaria glabrata

The complement system is an important component of vertebrate and invertebrate immunity. The complement pathways and its factors have been involved in key immune responses such as pathogen opsonization, tissue inflammation, recruitment of immune cells and direct cell lysis. The snail *Biomphalaria glabrata* serves as an intermediary host for the blood fluke *Schistosoma mansoni*, and although *B. glabrata* is essential in the transmission cycle for the human disease Schistosomiasis, immunological interactions between the snail host and parasite are still not fully understood. Here we focus in identifying and characterizing complement-like factors in the snail vector, *Biomphalaria glabrata*, using the newly published genome provided by the Snail Genome Consortium. We have identified multiple sequences in the *Biomphalaria* genome that code for potential transcripts containing complement-related domains such as the complement control protein domain, C1q domain, and the alpha-2-macroglobulin family signature. Furthermore, using this preliminary information, we have begun sequencing a C3-like sequence in the resistant strain of *B. glabrata*, BS90. Our immediate goal is to compare the expression of this C3-like sequence between *S. mansoni* uninfected and infected strains of BS90, in order to test whether this factor is up-regulated during the snail is exposure to the parasite. Future directions include using bioinformatics tools to further annotate the genomic sequences of the snail complement candidates, computer modeling and phylogeny analysis of the proteins, and mRNA expression and regulation analysis using RNAseq.

Stephanie Morales, Genevieve Munoz, & Christianne Jones; Communication Disorders, NMSU
Spelling development in four populations: Hard of hearing, ELL, struggling readers and typically developing third grade students

This study has the aim to investigate the different routes children use to develop their awareness of individual sounds in their environment and how this awareness impacts their spelling and reading. Phonologic (sound) representations are intrinsic to reading, writing and spelling in children and this project will elucidate on the spelling skills of three groups of third graders who are 1) typically developing English speakers, 2) English Language Learners (ELLs) 3) students with hearing loss. Participants will include 30 children from the following demographic groups: typically developing 3rd graders within the Las Cruces Public Schools, typically developing 3rd graders in the ELL program in the Las Cruces Public Schools, 30 children in 3rd grade whom are teacher-identified as struggling readers and 3rd grade children with hearing loss from within schools within the region.

Genevieve Munoz, Dr. Linda Spencer, Dr. Deborah Rhein, Christianne Jones, & Stephanie Morales; Communication Disorders, NMSU
Spelling as a Window of Phonological Development in Children With Diverse Learning Backgrounds

Phonological knowledge has been defined as an important skill for learning to read, write and spell in hearing children, thus information about how children develop phonological representations is intrinsic to advancing the three fields. Infants who have hearing are sensitive to more sound contrasts than are adults, but if certain sounds are not used within their ambient language they lose the ability to make those sound distinctions (Best, 1994). Understanding how these sound representations develop in typically developing children, struggling readers and children who are English Language Learners (ELLs) and those with hearing loss is important, because each group varies with experience in the amount of consistent exposure to English within their ambient language in the early years of their lives. Information learned in this study will help us to ascertain strengths, and weaknesses within the learning strategies of these groups for the development of interventions that exploit strong areas, and build upon weak areas.

Nikole Nielsen; Astronomy, NMSU
Characterizing the MgII Circumgalactic Medium Using MAGIICAT Galaxies

We probe the circumgalactic medium within 200 kpc of 180 galaxies using MgII absorption lines in the spectra of background quasars. We determined the colors, luminosities, and halo masses for all galaxies and have obtained the detailed CGM gas kinematics from high-resolution quasar spectra for ~ 40 of the galaxies. We find that the covering fraction of MgII gas depends strongly on galaxy properties such that higher luminosity galaxies have larger covering fractions at every impact parameter and for all MgII absorption thresholds. In contradiction to theoretical predictions that cold-mode accretion shuts off for halo masses $\log(M_h/M_{sun}) > 12$, we find no evidence for a drop-off in the gas covering fraction as a function of halo mass up to $\log(M_h/M_{sun}) = 13.8$, indicating that the MgII absorbing CGM in high mass halos is sustained by other means, possibly outflows. Lastly, the gas cloud-cloud velocity correlation function (velocity dispersion probability distribution normalized to galaxy circular velocity) reveals enhanced velocity spreads in bluer, higher redshift, and lower luminosity galaxies. Interestingly, lower mass halos have a highly pronounced larger velocity dispersion than higher mass galaxies, indicating that gas is more kinematically “active” in lower mass galaxies. Our results provide a clear picture of how the evolution of galaxies is strongly connected to CGM properties and place strong constraints on currently accepted theoretical ideas on galaxy evolution.

Winona J Patterson; Anthropology, NMSU
Captivating, Sacred Place at Tank Mesa Village in Montezuma Canyon, Utah

Tank Mesa Village, an archaeological site located in southeast Utah, shows at least three occupational events during the late Basketmaker III/early Pueblo I, Pueblo II, and Pueblo III periods. Unlike many of ancestral Pueblo sites in the Four-Corners area, settlement patterns at Tank Mesa Village display multiple occupations that are uninterrupted. The earliest occupation occurred around A.D. 600, and a hiatus took place for at least one generation; ancestral Pueblo people returned and constructed two different villages around mid-1100’s and around 1200. On the basis of

recent reconnaissance and mapping of the site, we argue that the Tank Mesa Village site was a captivating, sacred place for ancestral Pueblo people for several generations. Our argument is not only supported by the evidence of uninterrupted, multiple occupations of the site but also by the existence of a nearby, elaborate rock art panel as well as potential water shrines.

Javier Perez-Ramirez; Electrical & Computer Engineering, NMSU

Anchor-cum-Relay Nodes for Localizing a Mobile Source and Relaying Source Signals

The problem of selecting anchor-cum-relay (ACR) nodes for the dual purpose of tracking a mobile source as well as serving as relays for the source signal is considered. The proposed approach uses particle filters (PFs) with node selection based on the received signal-to-noise ratio (SNR) along with a localization constraint derived through the Fisher information matrix (FIM). The detail steps of implementation are given. A posterior Cramer-Rao lower bound approach is also explored to exploit information from previous node selections. Numerical results demonstrate that the proposed FIM-SNR approach achieves more than 16 dB in average source localization mean-squared error (MSE) over nearest node (NN) selection, while performing very close to FIMbased optimal localization. At the same time, the proposed FIMSNR provides a received SNR nearly identical to NN selection but outperforming FIM-based selection's SNR by more than 5.5 dB.

Kelsey E. Quinn; Animal and Range Science, NMSU

CXCL12 Expression Increases in Sheep Uterine and Fetal Tissues during Early Gestation

Improving livestock fertility is paramount for sustainability of food supplies. It is evident that without proper cellular communication between fetal and maternal tissues, pregnancy complications arise. Chemokines may be fundamental factors in regulating implantation and placental development. The C-X-C chemokine receptor 4 (CXCR4) is up regulated in endometrium during implantation and has only one recognized ligand, (C-X-C motif) ligand 12 (CXCL12). We have recently shown increased CXCL12 and CXCR4 protein expression in ovine fetal membranes (FM) and uterine caruncle (CAR) tissue during the timeframe of fetal attachment and placental development. However, the specific localization of CXCL12 and CXCR4 in FM and CAR tissues during early gestation has not been evaluated. We hypothesized that CXCL12/CXCR4 expression would increase in uterine tissues and FM as early pregnancy progresses. To test this hypothesis, uterine tissues with FM intact were collected on days 14, 16, 18, 20, 22, 24, 26, 28 and 30 of gestation and used for immunofluorescent detection of CXCL12 and CXCR4 proteins. Greater CXCL12 protein immunoreactivity was observed in FM compared to luminal epithelium on days 16-30. The increase of CXCL12 in FM suggests that CXCL12 promotes communication at the fetal-maternal interface. Because CXCL12 supports proper invasiveness and improves cell proliferation in human trophoblast cells, it is probable that it has similar functions in sheep. To our knowledge, this is the first report characterizing localization of CXCL12 in uterine and fetal tissue of sheep during early gestation, thus providing new insights into the importance of this chemokine during early gestation.

Gholamali Rahnavard; Computer Science, NMSU

Applying Big Data Approaches for Experimental Biological Data Mining: A Case Study

Biologists produce many expensive experimental data these days to test their hypotheses. Each experiment may contain some data that is not needed for the current hypothesis, but could be used to extract some interesting knowledge in the research area of the hypothesis. Depending on the labs, the order of the data and the storage mechanism could vary. If we collect and store this massive data, we could be able to apply Big Data analysis techniques and discover valuable knowledge beyond the data. In this talk I present a case study that illustrates how bioinformatics techniques could help to analyze experimental biological data. I used the BLT mice model experiments as a case study here which shows how we can apply multivariate analysis methods to the experiment data as a Big Data technique.

Jamey L. Rislin, Dr. Ivelisse Torres-Fernandez; Dr. Ralph James Crabbe; Desa Daniel; & Jessica Jackson; Counseling & Educational Psychology, NMSU

The Invisibility Syndrome: Understanding Black Men's Experiences with Contextual-Cultural Discontinuity

Individuals are born with a specific set of social identities that predispose them to certain levels of power and privilege in society (Harro, 2000). Individuals are often socialized to engage their social identities in the codified and stereotyped way that society condones (Franklin, 1999). Traditionally, African-American men have often been perceived as pillars of strength in the African-American community and have been revered as men that are immune to psychological and physical weathering (Head, 2004). Simultaneously, African-American/Black men struggle to define themselves amidst racialized and gendered messages that indicate that they are unintelligent, incapable of caring for their families, lazy, irresponsible, aggressive and hypersexual (Akbar, 1996, Beckley, 2008; Ferber, 2007; Hall, 2001; Landrum-Brown, 1990). In essence, African-American/Black men negotiate chronic challenges of prejudice and discrimination often associated with their social identity (Stevens & Englar-Carlson, 2010).

Franklin (1999) notes that Black men experience The Invisibility Syndrome, a preponderance of negative racialized-gendered experiences that occur when Black men engage in (1) culturally dissimilar/culturally disaffirming environments and (2) situations and interpersonal interactions that leave them contemplating how their choices, mobility and rights have been restricted or have been impacted by their racial and gender identity. These chronic challenges can manifest in a number of ways (e.g physical ailments/cognitive stress/psychological weathering/mental health problems/reduced work/school performance and medical issues) that impact one's sense of self and ability to negotiate environments. The current study is a qualitative study that seeks to understand the phenomenological experiences of Black males and their experience with The Invisibility Syndrome.

Aaron Rosenthal, Andrew Garcia, Marcus Wolschlager & Alejandro Castro Jr.; Electrical & Computer Engineering, NMSU

NMSU Power Generating Capacity: Vision and Roadmap for 2050

New Mexico State University's power generating capacity must increase to meet the energy demands of campus facilities by the year 2050. In its current configuration, NMSU's co-generation plant can only supply around 40% of the present campus load. The remainder of the demand is provided by the El Paso Electric Company, primarily from the Tortugas substation. With the student population on the rise and the price of electrical energy increasing due to political climates, inflation, and growing scarcity of resources, NMSU faces a classic challenge seen in the utility industry: current power generation is being utilized at its economic maximum and is being rapidly outpaced by growing demand. This poster explores potential solutions that would help NMSU keep up with growing demands.

At a minimum, if present power generating capacity is maintained, all campus facilities must employ alternate means to generate power in order to contribute towards meeting increased growth in campus energy requirements. New building construction must integrate energy harvesting capabilities to harness energy from air exhaust systems, utilize available space on rooftops for solar energy, and explore other innovative ideas in energy storage and generation toward developing sustainable environments. The goal is to create environments that are self-sufficient in their energy requirements. The integration of such novel energy harvesting technologies will transform NMSU's campus into a true microgrid configuration.

Teresa Ross; Astronomy, NMSU

Metallicity Distribution Functions of 4 Local Group Dwarf Galaxies

Metallicity, age, and mass are fundamental characteristics of a stellar population. Metallicity distribution functions (MDFs) along with chemical evolution models, contain information on the history of enrichment, inflow, and outflow within the galaxy. MDFs for Leo I, Leo II, IC 1613, and Phoenix dwarf galaxies were derived from photometry from the Wide Field Camera 3 (WFC3) instrument aboard the Hubble Space Telescope (HST). While the metallicity accuracy (~ 0.2 dex) in our study is lower than spectroscopic measurements we can reach fainter magnitudes and measure every star in the field, producing an order of magnitude more stellar metallicities than previous studies. We fit the MDFs of four Local Group dwarf galaxies to analytical chemical evolution models to quantify the affect of gas flows and star formation within the galaxies.

Claudia Salaña; Education, UTEP

Art as a Tool of Communication of Meanings in Children with Disabilities

This proposal is focused on the study of art as a voice to children with disabilities that promotes inclusivity and diversity through the recognition of their space in society. The diverse research shows the importance of continued exploration in child-learning and social environment. In that sense, the meta-analysis of the research explores the relation between art as a semiotic tool and social environment signs, which are immersed in child interaction. This study reveals that the environment plays an important role in the expression of meanings. The relationships that are established through the different places help to shape the sense of identity and autonomy of children with disabilities.

Liliana Salazar; Department of Public Health Sciences, NMSU

Colonia Residents' Perceptions of Water Quality in Dona Ana, NM and El Paso, TX

Colonias are unincorporated settlements along the U.S.-Mexico border which emerged without the services normally provided by local government. Consequently, water lines do not reach all *colonia* residents; even when they do, many residents live in substandard housing not meeting county building codes and, therefore, not qualifying for hook up to public water. Alternative water sources for these households include water wells and hauled water stored in tanks. This study examined *colonia* residents' perceptions & concerns regarding water quality in their home. Methods. *Promotoras* recruited participants who relied exclusively on hauled or well water. Participants. Forty-seven *colonia* residents participated across five focus groups, two in El Paso, TX and three in Dona Ana, NM. Instrumentation. A survey assessed demographics, water source characteristics, and access to potable water. Focus group questions assessed residents' perceived water quality, concerns for domestic use, current water treatment practices, and preferred filtration systems. Procedure. Participants completed consent forms and a survey, then participated in a one hour focus group discussion. Analyses. A thematic analysis was conducted on the focus group responses using two independent coders. Results. Although water quality, concerns, and treatment practices were reported by both El Paso and Dona Ana *colonia* residents, the former referred to hauled water stored in large water tanks, while the latter referred to well water. Overall, impoverished *colonia* residents spend a great deal of their income purchasing additional drinking water, filter and appliance/pump replacements. They also revealed a need for health education on water safety and proper water treatment procedures.

Bahar Sayoldin; Computer Science, NMSU

Applying Data Mining and Bioinformatics Techniques to Analysis Capsicum Species Transcriptome

Chile peppers such as *Capsicum* spp. are an important agricultural and economic crop that have a wide variety of uses especially in food and medical purposes. Identifying genetic variations that differentiate pepper species is very important. The genetic variation of chile peppers affects the pungency and pigmentation, and are products of unique bioactive classes of compounds such as capsaicinoids (heat), and carotenoids (color and pro-vitamins) are easily recognized. The goal of this work is to identify transcript in two major species of cultivated *Capsicum*, *C. chinense* and *C. annuum* transcriptome data sets to identify unique expressions by comparing transcript expression patterns and using bioinformatics and data mining tools for annotating the transcript profile of these two species.

Harmandeep Sharma; Plant & Environmental Sciences, NMSU

Partial root zone drying helps conserve water while maintaining chile growth and yield

Growth and yield of chile crop depends upon amount and timing of irrigation. Chile is an important specialty crop of arid New Mexico. Surface water availability is limited in the state and there is need to practice water saving irrigation strategies like partial root zone drying (PRD). The objective of this study was to test suitability of drip irrigated PRD techniques for water conservation while maintaining growth, and yield of greenhouse chile (NuMex Joe Parker; *Capsicum annuum*) for two consecutive growing seasons. Three treatments include: (i) Control where water applied at surface using standard operating procedure, (ii) PRDv where water is applied at 100% of control at 20 cm depth, and (iii) PRDc where water is applied at 70% of the control in alternate root compartments at fortnight interval during first year. Deep percolation was measured throughout the growing season. In the second

year, to reduce water loss to deep percolation, less water was applied in the control and PRDv than first season, but same amount in PRDc. Plant physiological parameters such as photosynthetic rate, stomatal conductance, leaf temperature, stem water potential, plant height, and root length density were measured throughout the season. Crop yield and yield components such as no. of pods/plant, pod length, pod width etc were also evaluated. The water balance was conducted from known irrigation amounts, volumetric water content measured using TDR sensors and hydra probes, evapotranspiration and deep percolation. Evaporative demand inside greenhouse was estimated using measured meteorological data including net radiation, air temperature, wind speed, and relative humidity. Results from first year showed that water usage can be decreased by up to 30% while maintaining total fruit yield. Results indicated that PRD methods can be adopted as water saving methods for chile crop in arid environments.

Sukhbir Singh, Sangu Angadi, Sultan Begna & Kulbhushan Grover; Plant & Environmental Sciences, NMSU

Water use depths across root zone of spring safflower in the Southern High Plains

A field experiment was conducted during 2012 and 2013 seasons at Clovis, NM to assess seasonal patterns of water extraction of two diverse spring safflower cultivars under different irrigation levels with or without refilled profile moisture. Half of experimental blocks were pre-irrigated with 160 mm of water to refill the empty profile from previous crop of corn (PI), while the other half remained depleted (NPI). Of five irrigation levels used in the trial, three levels I1 (75 mm), I3 (225 mm), and I5 (375 mm) were used for the assessment of seasonal patterns of water extraction. During the first observation period from 17 to 50 days after planting (DAP), the extraction depth and amount varied by both pre-irrigation and irrigation levels. Water extraction increased by 40 to 77% in PI over NPI at I1 and I3 irrigation levels. However, further increasing irrigation level to I5 decreased reliance on soil moisture, especially under NPI. During this period almost all of water extraction was from the top 0.9 m depth. The next 35 days period (50 to 85 DAP) saw steep increase in water extraction from almost all depths to 1.5 m. Water extraction during this period from PI blocks was 36 to 59 % higher over NPI including I5. About 25 to 60% of that increased extraction was from 0.9 to 1.5 m depth, the lower per cent being in I5 treatments. Although the total extractions during the period were higher in PI compared to NPI, fraction of water extracted below or above 0.9 m remained the same. The water extraction during the final 34 days (85 to 119 DAP) saw steep decline in water extraction and the major fraction of extraction was coming from below 0.9 m depth. Second year results will be added to the poster.

Swati Somuri; Public Health Sciences, NMSU

Weight Management Practices in College Students and Their Underlying Eating Motives

A meta-analysis by Vella-Zarb & Elgar (2009) found an average weight gain of five pounds in freshmen college students attributed to dietary practices, reduced physical activity, psychological stress, and alcohol consumption. With increasing overweight and obesity trends in the young adult population, this study examined weight management practices (WMP) among college students and their underlying motivational tendencies. Gender and ethnic differences were also examined. METHODS. Participants included 681 students attending New Mexico State University. MEASUREMENT. The WMP online survey (Shamaley, 2011; 36 items) included nine subscales assessing different WMP for weight control or loss. The Eating Motives Inventory (EMI; 37 items) consisted of three Behavioral Inhibition (BIS) and four Behavioral Activation (BAS) subscales. ANALYSES. We conducted multivariate analysis of variance using gender and ethnicity as the independent variables and WMP as the dependent variables. We also conducted bivariate correlations between the EMI and WMP subscales. RESULTS. Almost half of this college sample was overweight or obese. Gender differences were identified in regards to WMP. Men engaged in greater exercise and protein supplementation whereas females engaged in greater use of diet aides and caloric restriction. With regard to eating motives, both BAS and BIS motives were related to unhealthy WMP (laxative and vomiting). A single BAS subscale, Sensation Seeking positively related to recommended WMP (caloric restriction and healthy eating).

Ian Sturdevant & Dr. Kwong Ng; Electrical & Computer Engineering, NMSU

Preconditioning and Ionic Current Modeling for Element Free Simulation of Cardiac Propagation

Accurate numerical simulations of electric field propagation in detailed cardiac models using conventional numerical methods such as the finite element method require a mesh consisting of elements connecting a set of nodes. Generation

of such a mesh for a complex geometry is usually both computationally and labor intensive. The Element Free Galerkin (EFG) method has shown promise in simulating such complicated geometries. It eliminates the need for mesh generation by using two sets of nodes, a set of evaluation nodes at which field values will be calculated and another set of integration nodes to enforce the weak integral form of the governing equation. This is accomplished by describing interaction between nearby nodes via a shape function with finite support associated with each evaluation node. However, the nonlinear ionic current required for simulating cardiac propagation is both spatially and temporally dependent. As such, direct integration of the current model would require it to be repeated at each time step, making the integration computationally prohibitive. This work studies three techniques for representing the current as an expansion in terms of the shape functions with time-dependent expansion coefficients or weights. This turns the current integration into an integration of the shape functions, which only needs to be performed once. The choice of matrix solver and preconditioner is also considered, in an effort to find the optimal combination for efficient simulation of cardiac propagation using EFG.

Richard Raymond Torres; Education, UTEP

'Conquering' the World: Differing Discourses in Global English

This poster will examine the differing theories concerning the spread of Global English. There will be an examination of David Crystal's neutrality theory as contrasted with Robert Phillipson's theory of linguistic imperialism. The poster will utilize color and easy to follow concepts that will illicit discussion.

Addison Warner; Anthropology, NMSU

Exploring Chultun Functionalities: An Experimental Assessment of Food Storage in Chultuns at Uaxactun, Guatemala

Research was focused on replicating particular principles of Dennis Puleston's food storage experiment in chultuns at Uaxactun, Guatemala. Investigations were conducted during the 2013 Uaxactun-SAHI field season under the supervision of the Slovak Archaeological and Historical Institute (SAHI). The experiment was conducted over 47 days, with observation made every 3-4 days depending on the climate and rain. Food observations were made by weighing, photographing, and detailed recording of decomposition conditions. The eight varieties of foods utilized were macal, camote, cacao, yucca, dried corn, smoked corn, black beans, and red beans from Belize. Results showed great preservation of the camote and macal following the experiment. The yucca and both types of beans decomposed completely with a high presence of fungus and mold. Whereas the other foods of cacao, dried corn, and smoked corn all presented varying levels of preservation, though a percentage of each food was still edible following the experiment. For future experiments the environmental conditions should be closely monitored including the humidity index due to their influence on the overall preservations. Alterations should be made to the types of foods used and measurement of the water content of each food would be vital to understanding their preservation abilities.

Lea Wise-Surguy; Art, NMSU

Untitled (Agar Box)

In the realm of today's eco arts, Lea Wise-Surguy is exploring the relationship between ourselves and our environment. In Wise-Surguy's piece *Untitled (Agar Box)*, a life-sized, rectangular Petri dish was built and inoculated by the artist's touch of her full-frontal body. The bacterium that grows large enough to be seen by the naked eye simultaneously resembles both micro- and macro- landscapes as peaks and valleys and planes of differing colors emerge. There the bacterium grow and change with time, and are both a real and symbolic form of life started by human remains. Definitions of self, life, body, and death are blurred and in contemplating the ecology that grows there, it symbolizes environments and ecologies and asks questions about sustainability and the inter-connected relationships of any system.

Cat Wu; Astronomy, NMSU
How to Analyze a Spiral Galaxy

Spiral galaxies can exhibit many types of phenomena, such as thin disks, thick disks, outflows, flares, warps, and lagging halos. Sometimes they show all of these and sometimes they are simply a quiescent disk, but most of the time they show various combinations of these. I will explain what each of these phenomena is, describe how astronomers use galaxy modeling to determine which of these characteristics are present in their observed galaxies, and explain what implications this might have for a particular galaxy's evolution.

Jacob Vander Vliet; Astronomy, NMSU
Structure and Evolution of a Dwarf Galaxy's Circumgalactic Medium

The halo structure of dwarf galaxies are predicted to be unique when compared to larger galaxies. We test this prediction by examining mock quasar spectra of the circumgalactic medium (CGM) of three simulated dwarf galaxies to determine the properties of their halos at redshift zero, and the CGM of a single galaxy as it experiences a star formation burst. All three galaxies have the same initial conditions but are simulated with different feedback mechanisms. We measure the absorption lines of several commonly observed ions including HI, MgII, CIV, and OVI and compare the covering fraction and equivalent width distribution for all simulations.

Yuliana Zaikman; Psychology, NMSU
Ambivalent Sexism and the Sexual Double Standard

The sexual double standard is the notion that that men and women are evaluated differently for identical sexual behavior. The goal of the present study was to investigate the relationship between sexism (prejudice against individuals based on their sex) and the sexual double standard. There are two types of sexism: hostile (negative prejudice) and benevolent (positive prejudice). We hypothesized that participants high on hostile or benevolent sexism would exhibit the sexual double standard to a greater degree relative to participants low on either types of sexism. Participants completed the Ambivalent Sexism Inventory (ASI) and the Ambivalence Towards Men Inventory (AMI) and then evaluated a target individual who reported having 0, 1 or 12 sexual partners. Results show that female participants' sexist attitudes were related to more positive evaluations of sexually active men than women, whereas male participants' attitudes were related to more positive evaluations of sexually active women than men.