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UNDERGRADUATE RESEARCH

RESEARCH SHOWCASE

Fall 2016



I want to thank you all for participating in the Second Annual Fall Undergraduate Research Showcase. This is a TREMENDOUS event highlighting the incredible campus-wide research of our UNLV undergraduates and their work with our world-class faculty and graduate student research mentors. Research is the heart of your education here at UNLV and undergraduate research is an essential element of our Top Tier aspirations. The research represented at this forum has the incredible and exciting potential to impact our Las Vegas community and beyond!

Liam Frink

Executive Director of Undergraduate Research

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Sophia Phan, *Student Worker*
Nicole Thomas, *Student Worker*
Amber Turner, *Student Worker*

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Research AMBASSADORS

OUR Research Ambassadors are undergraduates with extensive research experience who represent a range of interests and fields across campus. The Ambassadors exist to promote undergraduate research on our campus, and represent the Office of Undergraduate Research at a variety of events.



Alexandria Bragg
School of Life Sciences



Bernajane Palisoc
Department of Psychology



Delon Roberts
*Department of
Mathematical Sciences*



Sophia Phan
Business



Nicole Thomas
School of Life Sciences



Amber Turner
*Department of
Geoscience*

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By Academic Unit*
- 44-45** **Undergraduate Research
Funding & Opportunities**

Thank YOU!

We thank you all for your contributions to this event. Without your collaboration recognition of the efforts of undergraduate researchers would not have been possible.

Faculty Research Mentors

Volunteer Judges

Full list on next page

Student Union Event Services

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The Division of Research and Economic Development

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*Judges Room
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Schedule of EVENTS

All events take place in the SU Ballroom
B & C

12:00 - 12:30 p.m. : Luncheon/ Registration

SU Ballroom

12:30 - 12:45 p.m. : Opening Remarks

Dr. Liam Frink

Executive Director of Undergraduate Research

Dr. Andrew Hanson

Associate Dean, Honors College

Fabian Doñate

CSUN Public Relations Administrator

Dr. Diane Z. Chase

Executive Vice President and Provost

12:45 - 3:15 p.m. : Poster Presentations

See map on next page for event setup

3:30 - 4:00 p.m.: Awards for Outstanding Presentations/Final Remarks

Dr. Scott Mensing

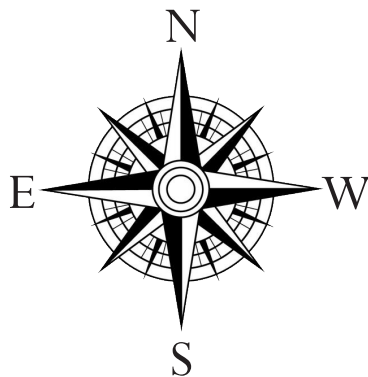
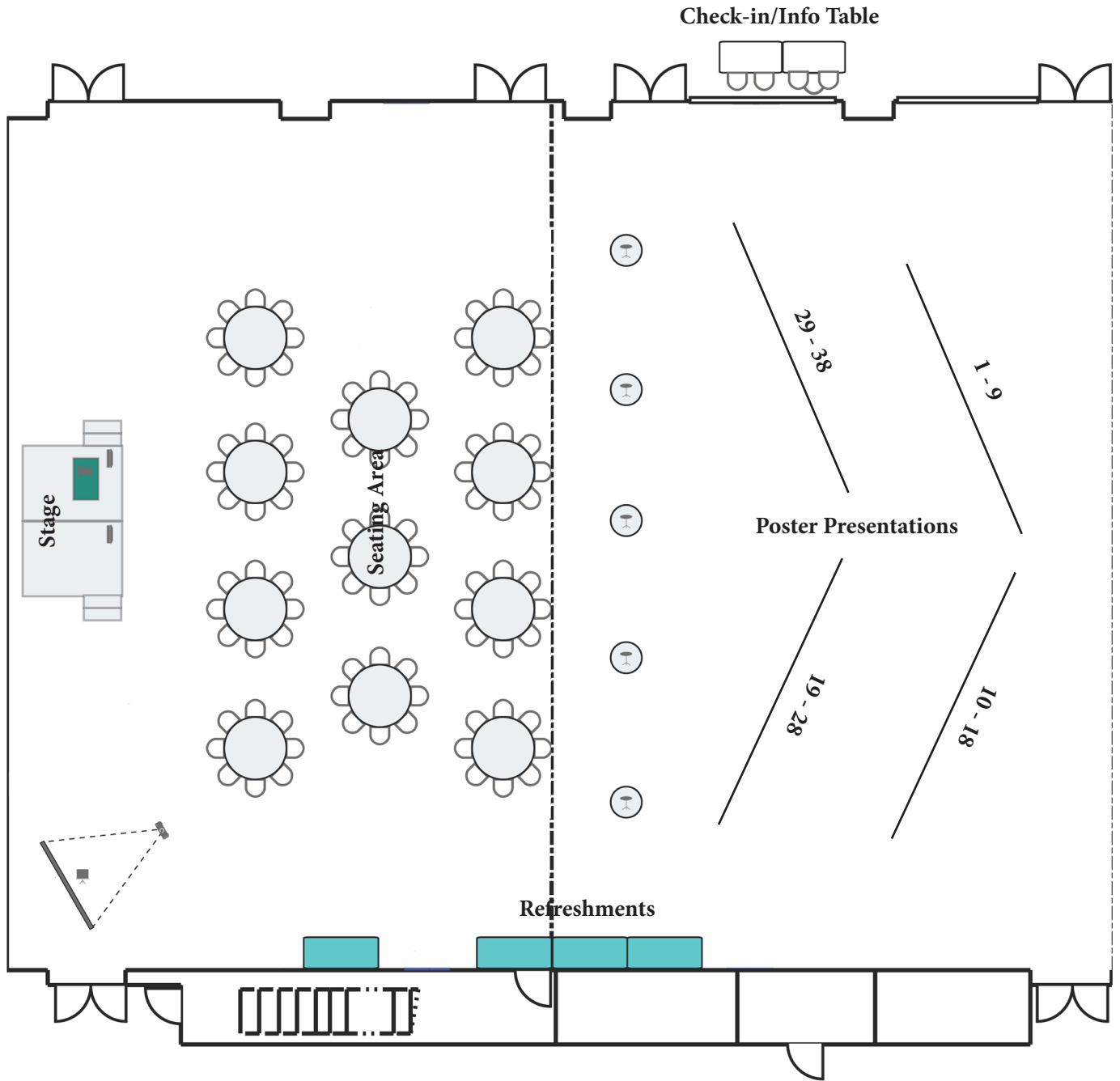
*Gibson Professor of Geography and
Director, Office of Undergraduate Research,
University of Nevada, Reno*

Melissa Bowles-Terry

Head, Educational Initiatives, UNLV Libraries

Event MAP

Student Union Ballroom B & C
2nd Floor



Poster SESSION I:

Science, Health Science, &
Engineering

Presenters 1 - 9

12:45 - 3:15PM

Break: 2:00 - 2:15

- 1 *Characterization of Alcohol Dehydrogenase by Bile Salts*
Amber Consul & Amber Howerton, Nevada State College
Faculty Research Mentor: Amber Howerton, Ph.D., Nevada State College, Department of Physical and Life Science
- 2 *Sexism in The Stem Fields: The New Age of Microaggressions*
Nicole Thomas
Faculty Research Mentor: Sharon Hughes, Ph.D., Women's Studies
- 3 *Polymerase Chain Reaction Optimization for The Identification of Coyotes from Scat*
Mariah Jackson, Kristen Kujat, & Autumn Pietras, Nevada State College,
Faculty Research Mentor: Bryan J. Sigel, Ph.D., Nevada State College, Department of Physical and Life Science
- 4 *Microsatellite Fragment Analysis of Population Structure of Coyotes in the Las Vegas Valley*
Mariah Jackson, Kristen Kujat & Autumn Pietras, Nevada State College,
Faculty Research Mentor: Bryan J Sigel, Ph.D., Nevada State College, Department of Physical and Life Science
- 5 *Exploring Epigenetic Influences During Embryonic Development in a Turtle with TSD*
Cristien Corral, Whitney M. Gallios, Rachael White & Kayla Bieser
Nevada State College,
Faculty Research Mentor: Kayla Bieser, Ph.D., Nevada State College, Department of Physical and Life Science

6 *Assessing The Source Of Fecal Contaminants in Las Vegas Valley Urban Watersheds*
Lara A. Turello, Ariel D. Friel, Hodon Ryu, Mayra Sarria, Daniel Gerrity, Nancy N. Menzel & Brian P. Hedlund
Faculty Research Mentor: Brian P. Hedlund, Ph.D., School of Life Sciences

7 *Potential of Hyperspectral Imaging For Showing Differences in the Storage Condition of Bacon*
Carlos Lemus
Faculty Research Mentor: Emma Regentova, Ph.D., Department of Electrical and Computer Engineering

8 *A Numerical Analytical Approach to the Lotka-Volterra Equations*
Delon Roberts
Faculty Research Mentor: Monika Neda, Ph.D., Department of Mathematical Sciences

9 *Infant and Maternal Mortality and Pregnancy Loss During the Healthy Beginning Initiative (Hbi) Trial in Nigeria (2013-2014)*
Samantha A. Slinkard & Tamara Bruno
Faculty Research Mentor: Tamara Bruno, MPH., Las Vegas, School of Community Health Sciences



Poster SESSION II:

Science & Engineering

Presenters 10 - 18

12:45 - 3:15PM

Break: 2:00 - 2:15

10 *Determining the Association Between Circulating Cell-Free DNA and Sarcoma*

Wynona Dizon

Faculty Research Mentor: Yu Kuang, Ph.D., Department of Health Physics and Diagnostic Sciences

11 *What's Growing in Your Ice Cream?*

Alex Babero, Nevada State College

Faculty Research Mentor: Samantha Oliphant, Ph.D., Nevada State College, Department of Physical and Life Science

12 *How Does a Mathematician Interpret Patterns in the Aztec Calendar and the Early Number Systems?*

Elizabeth Gonzalez,

Faculty Research Mentor: Miriam Melton-Villanueva, Ph.D., Department of History

13 *Mechanical Actuation of Eyelids via Electroactive Polymers*

Michelle Quizon & Kwang J. Kim

Faculty Research Mentor: Kwang J. Kim, Ph.D., Department of Mechanical Engineering

14 *Snow Algae-Microbe-Mineral Interactions and Implications for Snow Algae Growth*

Zoe Harrold, Ph.D., Elisabeth Hausrath, Ph.D., O. Tschauner, **Angela Garcia**, A. Murray, J. Raymond & C. Bartlett

Faculty Research Mentor: Elisabeth Hausrath, Ph.D., Department of Geoscience

15 *Temperature Exerts Strong Control on Microbial Community Structure and Function in Terrestrial Geothermal Systems*

Cale O. Seymour, Senthil K. Murugapiran, Jeremy A. Dodsworth, Timothy A. Alba, Gisele B. Goertz, Scott C. Thomas, Hilairy E. Hartnett, Hailiang Dong & Brian P. Hedlund
Faculty Research Mentor: Brian Hedlund, Ph.D., School of Life Sciences

16 *Comparison of Different Iron Nanoparticles in Their Potential To Combat Contaminants in Water*

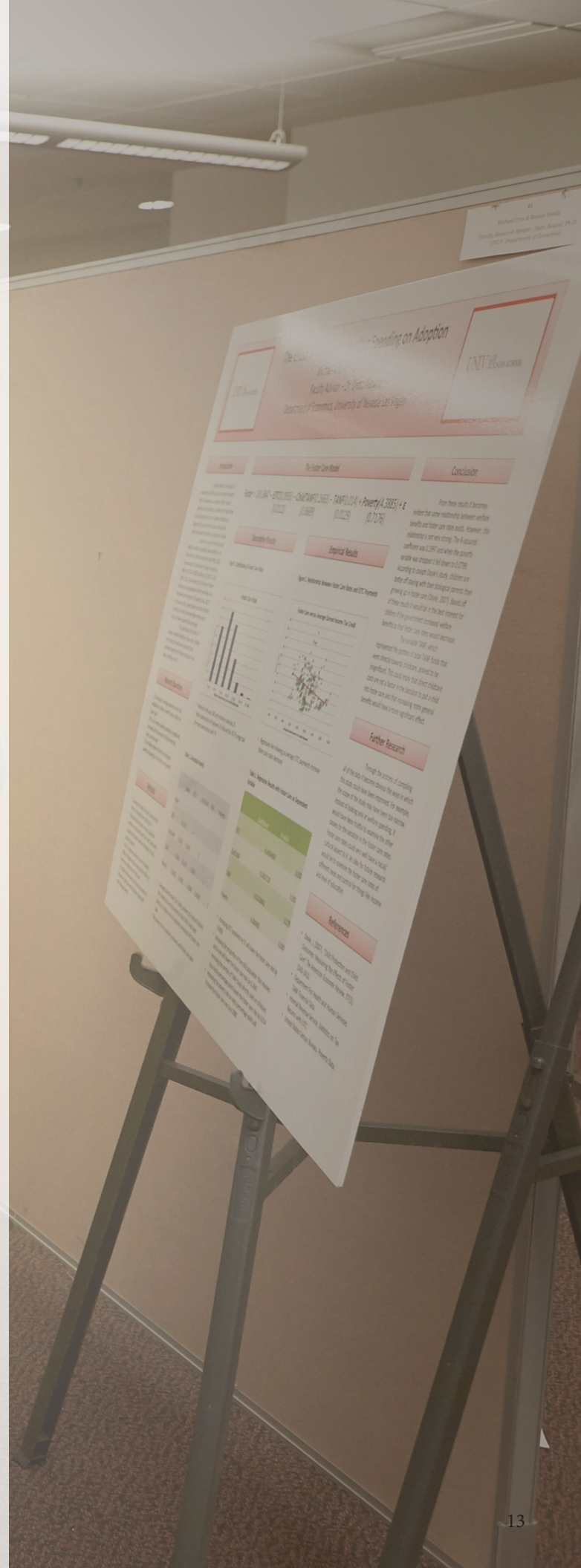
Helga Sato, Erick Bandala & Jaeyun Moon
Faculty Research Mentor: Erick Bandala, Ph.D., Desert Research Institute, Division of Hydrological Sciences

17 *An Integrative Review of Association Between Posttraumatic Stress Disorder and Telomere Length*

Jonica Estrada, Marianne Tejada, Andrew Reyes, Katrina Isla & Hyunhwa Lee
Faculty Research Mentor: Hyunhwa Lee, Ph.D., School of Nursing

18 *Automating the Functionality of a Low Cost Prosthetic Hand*

Patrick Messimer
Faculty Research Mentor: Brendan O'Toole, Ph.D., Department of Mechanical Engineering



Poster SESSION III:

Business, Liberal Arts, &
Urban Affairs

Presenters 19 - 28

12:45 - 3:15PM

No Break

19 *An Empirical Study on the Effect Inequality and Poverty Has on the Literacy Rate In Sub-Saharan Africa*

Tabetha John

Faculty Research Mentor: Djeto Assane, Ph.D., Department of Economics

20 *Granny's Cry for Help: Loneliness in Diaries of The Digital Age*

Kelley Huckeby, Mariah Mancini, Sara

Meraz, Brittney Monreal & Miriam Melton-Villanueva

Faculty Research Mentor: Miriam Melton-Villanueva, Ph.D., Department of History

21 *Coping with the Psychological Effects of Racial Microaggressions in College*

Victoria Copeland

Faculty Research Mentor: Janice McMurray, Ph.D., Department of Psychology

22 *Intersectional Needs for a Diverse Student Body*

Micajah Daniels, Jessica Smith, Nikolai

Tran, Ilana Bundage, Xiomara Gonzalez,

Nicole Labelle, Tyler Pindar, Linden James

Rodis & Brian Thammavong

Faculty Research Mentor: Anna C.

Smedley-López, Ph.D., Department of Sociology

23 *Effects of Voter ID Laws on Voter Turnout*

Nicholas Sphar

Faculty Research Mentor: Djeto Assane, Ph.D., Las Vegas, Department of Economics

24 *#ProtectGoldButte*

Camisha Fagan, Ariana Macias, Danica Albright, Anvar Huizar, Sebastian Suarez & Alexander Larson

Faculty Research Mentor: Anna C. Smedley-López, Ph.D., Department of Sociology

25 *Was it Genocide? Local Laws Directed Against Native Americans in California Territory*

Sammy Bakir

Faculty Research Mentor: Miriam Melton-Villanueva, Ph.D., Department of History

26 *Music Perception.com: Perceiving Hierarchical Musical Structure in Diverse Populations*

Jared W. Leslie, Anthony Romero, Whitlee Manor, Jessica E. Nave-Blodgett, Erin E. Hannon, Joel S. Snyder

Faculty Research Mentor: Erin E. Hannon, Ph.D., Department of Psychology

27 *The Water Crisis in Nevada: The Causes, Effects, and Solutions*

Tanner Bates

Faculty Research Mentor: Miriam Melton-Villanueva, Ph.D., Department of History

28 *Tempo Perception Across Cultures: The Beat is All it Takes*

Kendall Lyons, Jessica Nave-Blodgett & Erin E. Hannon

Faculty Research Mentor: Erin E. Hannon, Ph.D., Department of Psychology



Poster SESSION IV:

Business, Education, &
Urban Affairs

Presenters 29 - 38

12:45 - 3:15PM

No Break

29 *Undocumented Students Navigating the Higher Education Pipeline in Nevada: A State without Legalized In-State Tuition*
Mariana Paola Sarmiento-Hernández
Faculty Research Mentor: Anna C. Smedley-López, Ph.D., Department of Sociology

30 *The Central American Refugee Crisis in Las Vegas Courts*
Sara Meraz, Sarah Kane, Joe Paisano, Michael Haddad, Londy Madrigal & Alyssa Medina
Faculty Research Mentor: Anna C. Smedley-López, Ph.D., Department of Sociology

31 *Bracero*
Maria Carrillo
Faculty Research Mentor: Miriam Melton-Villanueva, Ph.D., Department of History

32 *Bipolar Disorder and Substance Use: Examining Drug Preference and Frequency*
Summer N. Millwood, Melissa Saucedo, Breanna Garcia, & Andrew J. Freeman
Faculty Research Mentor: Andrew Freeman, Ph.D., Department of Psychology

33 *Reference Dependence in the Age of Uber*
Matthew Parkins
Faculty Research Mentor: Djeto Assane, Ph.D., Department of Economics

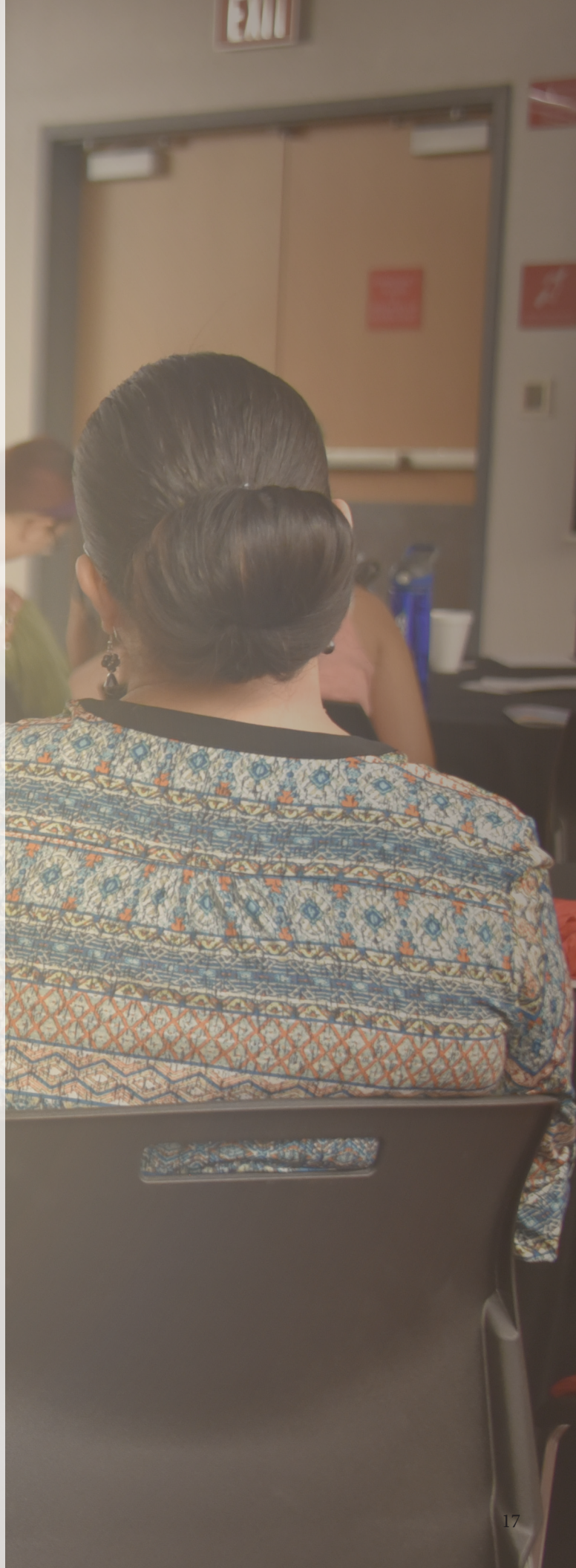
34 *Latin Nightlife in Las Vegas*
**Benjamin Thomas, Juliet Summers-
Hernandez, Andrea Mata & Elizabeth
Alvarez-Montoya**
Faculty Research Mentor: Miriam Melton-
Villanueva, Ph.D., Department of History

35 *Financial Aid and Scholarships at UNLV for
Undocu/Documented Students*
**Vanessa Hernandez, Johanna Hernandez,
Akaisha Cook, Diego Madrigal, Candy
Bravo, Jacob Speaks & Valerie Lujan**
Faculty Research Mentor: Anna C.
Smedley-López, Ph.D., Department of
Sociology

36 *The Effects of Rising Healthcare Prices on
Income and Well-Being*
Alora Gillogly
Faculty Research Mentor: Djeto Assane,
Ph.D., Department of Economics

37 *The Contribution of Visual Culture to the
Development of Revolutionary Insurrections
during the Precursory Period of the Mexican
Revolution*
Lee Cannarozzo
Faculty Research Mentor: Miriam
Melton-Villanueva, Ph.D., Department of
History

38 *Life in the Borderlands*
Jenni Ochoa
Faculty Research Mentor: Miriam
Melton-Villanueva, Ph.D., Department of
History



CHARACTERIZATION OF ALCOHOL DEHYDROGENASE BY BILE SALTS

Amber Consul & Amber Howerton
Nevada State College, Department of Physical and Life
Science

Faculty Research Mentor: Amber Howerton, Ph.D.
Nevada State College, Department of Physical and Life
Science

Alcohol Dehydrogenase I (ADH1) is an enzyme involved in the metabolism of alcohols within the liver. Increased activity of ADH1 has been linked to alcoholism and to the formation of formaldehyde, the toxic metabolite of methanol poisoning (Edenberg 2007). Previous research has shown that the bile salt chenodeoxycholic acid (CDCA) can influence the expression level of ADH1 (Langhi et al. 2013). This project is intended to further elucidate the effect of both natural and synthetic bile salts on the expression and activity of ADH1, as well as investigating the mechanism of this effect. The results of this study could potentially point to bile salts as a therapeutic for alcohol hypermetabolism and hypometabolism.

This research will be presented at the American Chemical Society Southwest Regional Meeting in Galveston, Texas, November 2016.

Funding was provided by the Nevada INBRE Program and the Nevada EPSCoR Program.

Poster ABSTRACTS

In order as shown by poster number. See index beginning on page 38

SEXISM IN THE STEM FIELDS: THE NEW AGE OF MICROAGGRESSIONS

Nicole Thomas

University of Nevada, Las Vegas, School of Life Sciences

Faculty Research Mentor: Sharon Hughes, Ph.D.
University of Nevada, Las Vegas, Women's Studies

Women have historically been regarded as the more timid and emotionally fine-tuned sex. Until recently, it has been uncalled for women to attempt to obtain any job that did not involve staying home and taking care of her offspring. Although there have been record amounts of women involved in "male-oriented" careers, the number of women involved in science, technology, engineering, or math (STEM) careers is still quite low— as of 2009, only 24% of STEM jobs were held by women— a small proportion of the 48% of jobs that are held by women overall (1). This disparity is only perpetuated by the treatment that these women receive in labs— they are viewed as fragile and lesser, and they quite often do not receive the amount of financial and community support that their male counterparts do. This project aims to identify the source of the low participation of women in STEM-oriented careers, as well as providing quantitative support for these claims. The aim of this project is to shed light on these underlying issues, as well as provide tangible solutions to solving these larger problems.

POLYMERASE CHAIN REACTION OPTIMIZATION FOR THE IDENTIFICATION OF COYOTES FROM SCAT

Mariah Jackson, Kristen Kujat, & Autumn Pietras
Nevada State College, Department of Physical and Life Science

Faculty Research Mentor: Bryan J. Sigel, Ph.D. Nevada State College, Department of Physical and Life Science

Our goal is to identify coyotes through the collection and analysis of scat samples collected from the Las Vegas Valley to determine relatedness among individuals. We want to determine how urban development is affecting coyote populations. Before samples are sequenced, a segment of mitochondrial DNA (mtDNA) is analyzed using restriction fragment length polymorphism (RFLP) to verify whether the scat was from coyote. Several problems were encountered during the amplification of this segment, including primer dimer formation, non-specific binding and faint bands during gel electrophoresis. It became our priority to troubleshoot the protocol to determine the cause of the problems, and to optimize the procedure for future research. First, we believed smearing was due to non-specific binding, so we reduced the number of cycles during PCR was from 35 to 25, and our results improved. Next, we thought the faint bands were due to an improper annealing temperature. The original protocol called for an annealing temperature of 52oC. We ran a temperature gradient from 48.2oC - 53.6oC in seven lanes of our thermocycler, and found the boldest band was seen at 50oC. Finally, our protocol suggested that we incubate our Restriction Enzyme, TAQ1, at 65oC for 60 minutes. To ensure this was the proper length of time, we ran an time gradient of 5, 15, 30, 45, and 60 minutes, and found that bold bands were seen at all temperatures.

Funding for this project was provided by the Nevada INBRE Program.

MICROSATELLITE FRAGMENT ANALYSIS OF POPULATION STRUCTURE OF COYOTES IN THE LAS VEGAS VALLEY

Mariah Jackson, Kristen Kujat, & Autumn Pietras
Nevada State College, Department of Physical and Life Science

Faculty Research Mentor: Bryan J. Sigel, Ph.D.
Nevada State College, Department of Physical and Life Science

Collecting coyote scat is a non-invasive way to scientifically study their populations. Our research is based on the following questions: Where are coyotes found in the Las Vegas Valley? Is city development creating an isolated urban population of coyotes, or are individuals entering to the city from outside areas? Four known locations to have coyote populations in the South Las Vegas Valley include Sunset Park, Wetlands Park, Lake Las Vegas and Horizon Ridge. Scat samples were collected and georeferenced from each site using a GPS unit. Additional methods for our research include, DNA extracted from scat using the miniQAMP stool extraction kit. DNA was then amplified using Polymerase Chain Reaction (PCR) that targets a 200 base-pair segment of mitochondrial DNA. TAQ1 restriction enzyme (RE) was added to the amplified DNA and incubated at 65 degrees C. The RE targets a coyote specific sequence and cuts the 200 base-pair section into 100 base-pair segments, then visualized using gel electrophoresis to confirm that the sample is from coyote. Alleles from each microsatellite loci are compared using Gene Marker software, and a dendrogram is generated to visualize relatedness of coyotes. Results indicate that out of 179 scat samples collected since 2013, 13 samples were confirmed being coyote using Microsatellite analysis. DNA from the 13 samples was then amplified and compared for relatedness. Our research concludes that samples from Sunset Park appear less related to each other than those samples found at Wetlands Park, indicating some population structuring within the Las Vegas valley. This research was presented at the Nevada State College INBRE Undergraduate Research Poster Symposium, September 2016.

Funding for this project was provided by the Nevada INBRE Program.

EXPLORING EPIGENETIC INFLUENCES DURING EMBRYONIC DEVELOPMENT IN A TURTLE WITH TSD

Cristien Corral, **Whitney M. Gallios**, Rachael White & Kayla Bieser
Nevada State College, Department of Physical and Life Science

Faculty Research Mentor: Kayla Bieser, Ph.D.
Nevada State College, Department of Physical and Life Science

In red-eared slider turtles, *Trachemys scripta*, the mechanism behind sex determination is dependent on the temperature at which eggs are incubated. While many reptilian species, including all crocodiles, some lizard, and turtle species use temperature sex determination (TSD), other animal species use heteromorphic chromosomal sex determination (e.g. XX/XY, ZZ/ZW). Previous studies in turtles with TSD illustrate that DMRT1 is an important part of gonad development during crucial periods of sex determination. This study examined the epigenetic factors associated with TSD in *T. scripta* during embryonic development. More specifically, the doublesex and mab-3 related transcription factor 1 (DMRT1) gene has been associated with testis development in *T. scripta*. However, the entirety of the DMRT1 gene sequence has yet to be resolved. Identification of the DMRT1 transcriptional start site will allow for study of DNA methylation and further elucidate its importance to gonadal development in *T. scripta*, as well as other animals with TSD.

This research was presented at the Nevada State College INBRE Undergraduate Research Poster Symposium, September 2016.

Funding for this project was provided by the Nevada INBRE Program.

ASSESSING THE SOURCE OF FECAL CONTAMINANTS IN LAS VEGAS VALLEY URBAN WATERSHEDS

Lara A. Turello¹, Ariel D. Friel¹, Hodon Ryu², Mayra Sarria³,
Daniel Gerrity³, Nancy N. Menzel⁴ & Brian P. Hedlund^{1,5}

¹University of Nevada, Las Vegas, School of Life Sciences

²U.S. Environmental Protection Agency, Cincinnati, Ohio

³University of Nevada Las Vegas, Department of Civil and
Environmental Engineering and Construction

⁴School of Nursing, University of Nevada, Las Vegas, School of
Nursing

⁵University of Nevada, Las Vegas, Nevada Institute of
Personalized Medicine

Faculty Research Mentor: Brian P. Hedlund, Ph.D.

University of Nevada, Las Vegas, School of Life Sciences

Homelessness in Nevada has increased drastically in recent years, with unsheltered homeless populations reaching 62% from 2013-2014. A large portion of the homeless population finds shelter in watersheds flowing through the Las Vegas Valley, leading to public urination and defecation in immediate proximity to urban waterways. This research aims to assess the source of fecal contaminants in the Las Vegas Wash, a collection of urban runoff, shallow groundwater, and reclaimed water. Fifteen sampling locations were chosen based on their proximity to possible homeless encampments and location relative to the Las Vegas Wash effluent. Locations were sampled three times within a two-month period. Results from qPCR assays targeting six fecal indicators and four fecal microbial source tracking (MST) markers suggest there are substantial human and bird fecal contaminants in the Las Vegas urban watersheds. The range of abundance (gene copy/100 mL) for the highly specific human marker HumM2 among the three sampling events was 3.21×10^3 ($\sigma = 1.86 \times 10^3$) to 3.50×10^6 ($\sigma = 8.34 \times 10^5$), whereas the range for the highly sensitive, but less specific, human marker HF183 was 3.70×10^3 ($\sigma = 4.50 \times 10^2$) to 2.74×10^7 ($\sigma = 6.06 \times 10^6$). The ranges of abundance for fecal indicators *Bacteroides* spp., *Campylobacter* spp., and *Enterococcus* spp. were 2.70×10^3 ($\sigma = 3.80 \times 10^3$) to 2.48×10^8 ($\sigma = 3.58 \times 10^7$), 3.44×10^3 ($\sigma = 3.81 \times 10^2$) to 1.05×10^5 ($\sigma = 1.45 \times 10^5$), and 5.64×10^2 ($\sigma = 3.91 \times 10^2$) to 5.55×10^6 ($\sigma = 2.84 \times 10^6$), respectively. Studies have proposed a link between the presence of *Campylobacter* spp. and instances of bird fecal contamination. The fecal contaminants were predominantly human, suggesting a possible link to homelessness. This indicates the need for improved homeless management strategies.

This research was presented at the Summer 2016 Undergraduate Research Symposium.

Funding for this project was provided by the NIH Program.

POTENTIAL OF HYPERSPECTRAL IMAGING FOR SHOWING DIFFERENCES IN THE STORAGE CONDITION OF BACON

Carlos Lemus

University of Nevada, Las Vegas, Department of
Electrical and Computer Engineering

Faculty Research Mentor: Emma Regentova, Ph.D.

University of Nevada, Las Vegas, Department of
Electrical and Computer Engineering

Hyperspectral imaging (HSI) is an emerging modality for various applications ranging from remote sensing to non-destructive material testing, food quality evaluation and biomedical research. HSI simultaneously captures the spatial and spectral information and thus it is a vigorous non-invasive and external source of information about the material of the study. The goal of this study is to investigate the potential of hyperspectral imaging in the near-infrared range (NIR) of 400-900 nm for evaluating the contents, moisture level, and freshness of the food that is demonstrated on the example of bacon. Bacon samples refrigerated, frozen, and left at room temperature undergo hyperspectral scanning. Based on the analysis of the spectral signatures, that is the reflection of the light from the food samples in 240 bands and data in spatial area, one can infer about various quality and nutrition factors of the food under the test. The study has a potential of extension to biomedical applications as the literature review suggests.

A NUMERICAL ANALYTICAL APPROACH TO THE LOTKA-VOLTERRA EQUATIONS

Delon Roberts

University of Nevada, Las Vegas, Department of
Mathematical Sciences

Faculty Research Mentor: Monika Neda, Ph.D.
University of Nevada, Las Vegas, Department of
Mathematical Sciences

Computational analysis of the Lotka-Volterra equations is essentially the numerical analysis of a system of nonlinear Ordinary Differential Equations. This system must be analyzed with the use of computers due to the complexity of its solution set and the inability to solve the system analytically while maintaining an overall understanding of the system.

The research questions that we are attempting to answer are twofold:

- I. What manner of numerical techniques may be created to acquire a more robust comprehension of the Lotka-Volterra equations?
- II. May Tensor Calculus be employed to acquire a better understanding of the system by means of providing a new qualitative outlook?

To answer these research questions, the methods that we are using in our research are the C, C++, Python and Matlab programming languages. Other programming languages may be added to our methodology as we attempt to potentially create new numerical methodologies to answer our research questions. Languages such as Haskell and Julia may be applicable.

Due to a preliminary analysis, we expect to find that more robust computational algorithms may be created to better understand the qualitative nature of the system. We also expect to find that tensor calculus may be employed to acquire a completely new perspective, but only if the variables are greater than three. If the variables are less than three, then we suspect that no new significant information may be ascertained by the application of tensors.

This research was presented at the Summer 2016 Undergraduate Research Symposium.

INFANT AND MATERNAL MORTALITY AND PREGNANCY LOSS DURING THE HEALTHY BEGINNING INITIATIVE (HBI) TRIAL IN NIGERIA (2013-2014)

Samantha A. Slinkard & Tamara Bruno

University of Nevada, Las Vegas, Department of
Anthropology

Faculty Research Mentor: Tamara Bruno, MPH.
University of Nevada, Las Vegas, School of Community
Health Sciences

The Healthy Beginning Initiative (HBI) is a congregation-based intervention that targets pregnant women and their spouses/partners and provide them with access to free health screening and education in the context of baby showers and baby receptions. The pregnant women were screened for HIV, syphilis, malaria, sickle cell trait (SCT), hepatitis B, and hemoglobin levels to ensure a healthy pregnancy and a healthy baby. Despite the intervention and preventative screening, a number of the female participants experienced pregnancy loss or death of their infant during the trial period. There were also several cases of maternal death related to complications in their pregnancy or delivery. For this study, the main objective is to measure infant and maternal mortality during the initial trial period from 2013-2014. Secondary objectives include (1) measuring rates of pregnancy loss (miscarriage and stillbirth), (2) determining pertinent socioeconomic factors and reproductive history that may contribute to mortality or loss of pregnancy, and (3) comparing these results to the 2013 Nigeria Demographic and Health Survey, conducted by the National Population Commission of the Federal Republic of Nigeria. This study will review 3,047 participant records to identify maternal or perinatal infant deaths and pregnancy loss and trends in contributing factors.

NSURJ

Nevada State Undergraduate Research Journal



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For more information, please contact Anita Albanese at aalbanese@asun.unr.edu



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DETERMINING THE ASSOCIATION BETWEEN CIRCULATING CELL-FREE DNA AND SARCOMA

Wynona Dizon

University of Nevada, Las Vegas, School of Life Sciences

Faculty Research Mentor: Yu Kuang, Ph.D.

University of Nevada, Las Vegas, Department of Health Physics and Diagnostic Sciences

Primary sarcomas (cancerous tumors) of soft tissue and bone are a diverse group of cancers that affect both children and adults. Although the incidence is small, many years of life are lost. Despite the long-standing efforts of clinicians and researchers to identify methods of early detection, the overall prognosis of sarcoma patients with metastatic (spreading) and recurrent diseases remains quite dismal. The aim of this study is to quantify circulating cell-free mitochondrial DNA (ccf mtDNA) levels in the serum from sarcoma patients in order to elucidate the association between altered levels of ccf mtDNA and sarcoma. The findings of this study show a correlation between the two factors: patients with sarcoma have higher levels of mtDNA compared to those without sarcoma.

Funding for this project was provided by the NSF EPSCoR UROP Program.

WHAT'S GROWING IN YOUR ICE CREAM?

Alex Babero

Nevada State College, Department of Physical and Life
Science

Faculty Research Mentor: Samantha Oliphant, Ph.D.
Nevada State College, Department of Physical and Life
Science

When it comes to the cleanliness of many ice cream shops, many are not as sanitary as one would think. At many locations employees work multiple positions: cashier and food server leading to concerns about hand hygiene. The purpose of this research is to discover and identify bacteria that are found present in frozen dairy products. To examine the frequency of bacterial contamination of vanilla frozen dairy products at selected locations across the Las Vegas valley, three distinct locations were determined (D) Luvit Custard; (E) Art of Flavors; and (F) McDonalds. To assist, in my prediction of the frequency of bacterial contamination the cleanliness of each facility was recorded. Luv it Custard is a local shop that serves custard made everyday using fresh ingredients. The other location visited was McDonalds. The vanilla ice cream from McDonalds was inside a Chevron gas station. There are many different tests used to identify bacteria; some tests had bacteria being inoculated onto different types of agar to see if it would inhibit or enhance bacterial growth. With this experiment there were some variables in the ingredients and the cleanliness of the environment. The first trial found bacteria on all three samples; Luvit Custard had the most with more than one type of bacteria. The second trial denoted bacteria on two samples of ice cream from Luvit Custard and McDonalds. From the two trials only one sample of bacteria was repeated, Luvit Custard.

Funding for this project was funded by the Nevada INBRE
Program

HOW DOES A MATHEMATICIAN INTERPRET PATTERNS IN THE AZTEC CALENDAR AND THE EARLY NUMBER SYSTEMS?

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Faculty Research Mentor: Miriam Melton-Villanueva,
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Fermat, Gauss, Pythagoras, and Fibonacci are some of the most recognized mathematicians of all time. The field of mathematics would not be what it is today without their outstanding contributions; but is it correct to use the term "of all times" when the oldest of them only goes back a couple hundred years B.C.? Some of the earliest mathematical patterns can be traced back to thousands of years B.C. Combining Art History of Mesoamerica with contemporary mathematics; one can see the immense mathematical knowledge prior to some of the most recognized and greatest mathematicians in modern history. Specifically, I find exponentials, modular arithmetic, and even Isomorphisms in Mexican graphic systems hundreds of years prior to when modern mathematicians discovered them. This can further open the door to other mathematical discoveries that may have been overseen in the past but have been available to all in ancient Aztec Sculpture.

MECHANICAL ACTUATION OF EYELIDS VIA ELECTROACTIVE POLYMERS

Michelle Quizon & Kwang J. Kim
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Mechanical Engineering

Faculty Research Mentor: Kwang J. Kim, Ph.D.
University of Nevada, Las Vegas, Department of
Mechanical Engineering

Electroactive polymers are valuable intelligent materials due to their low-driven voltage, high force response, and easy customizability. An electroactive polymer bends in response to an applied electrical field and the corresponding mobility of cations in the polymer network. These characteristics lend to advantageous applications in a variety of research areas, including that of artificial muscles in biomimetics. Unlike most muscles of the body, eyelid muscles require relatively low forces, making them perfect candidates for introductory research of artificial muscle replacements. The orbicularis oculi muscle is primarily responsible for eyelid protraction; whereas, the levator palpebrae superioris muscle is primarily responsible for eyelid retraction. Eyelid paralysis is currently treated by 1) transferring leg muscle into the face or 2) suturing a small gold weight in the eye. Both surgical treatments are time-consuming and leave patients with subpar eyelid muscle movement. This work is a preliminary project for an effective method of treating mechanical eyelid disorders. The only published research project dedicated to recreating the eyelid blink with artificial muscle was conducted in 2010, at the University of California, Davis, with silicon electroactive polymers. At the AMSL Laboratory, we aim to build upon the findings with few of our electroactive polymers, including Nafion. More specifically, we must determine the force requirements and optimal vectors of those particular materials. For people who cannot close their eyelids due to nerve injury, combat-related injury, and stroke, this research furthers the development of technology that will recreate realistic eyelid blinking.

SNOW ALGAE-MICROBE-MINERAL INTERACTIONS AND IMPLICATIONS FOR SNOW ALGAE GROWTH

Zoe Harrold, Ph.D., Elisabeth Hausrath, Ph.D., O. Tschauer, **Angela Garcia**, A. Murray, J. Raymond & C. Bartlett University of Nevada, Las Vegas, Department of Geoscience

Faculty Research Mentor: Elisabeth Hausrath, Ph.D. University of Nevada, Las Vegas, Department of Geoscience

Snow algae, which can reach densities of millions of cells per mL [1], can accelerate the melting of snow and ice fields by significantly lowering their albedo [2-4]. Studies have even suggested the effect of snow algae on albedo should be considered in quantitative albedo models. One of the factors controlling snow algae growth is nutrient availability. Previous observations of minerals and microbes attached to the cell walls of snow algae, and the preferential growth of snow algae in dusty snow, have suggested that snow algae-microbe-mineral interactions may help snow algae meet their trace nutrient needs. Understanding how snow algae are able to reach such high concentrations in a low nutrient snow environment is critical for predicting the extent to which snow algae blooms can impact snow albedo, snow and ice melt rate, and global climate change. We use synchrotron X-ray fluorescence (XRF), X-ray diffraction (XRD) and X-ray absorption near edge structure (XANES) to study the interactions between snow algae, microbes and minerals in both field and laboratory derived samples. Field samples were collected from Mt. Anderson Ridge, CA, and prepared using a Percoll density separation technique to isolate algae cells from bulk dust. Cell and mineral fractions were analyzed using synchrotron micro-XRF, micro-XRD and XANES. Results show the presence of ferric material similar to ferrihydrite surrounding snow alga. Growth experiments of xenic *Chloromonas brevispina* cultures incubated with Fe-bearing minerals, including nontronite, goethite, pyrite and olivine, suggest Fe-bearing minerals can support snow algae growth. Synchrotron XRF, XRD and XANES analyses of *Cr. brevispina* algae cell communities indicate the formation of cell-associated Fe-bearing mineral phases not present in the unreacted minerals. The sample preparation and synchrotron techniques described herein provide an approach for investigating a wide range of microbe-mineral interactions and their impacts on microbial growth and mineralogical biosignatures.

This research was presented at the Fall 2016 American Geophysical Union, the UNLV Geosymposium, the UNLV Office of Undergraduate Research Showcase, the UNLV Research Experience for Undergraduates, the Biosignature Preservation and Detection in Mars Analog Environments Conference, the Nevada NASA 2016 EPSCoR Statewide Meeting, and the Lunar and Planetary Science Conference.

Funding for this project was provided by the NASA EPSCoR Program, the NSF REU Program, Nevada NASA Space Grant Program, and the NSF EPSCoR Program.

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TEMPERATURE EXERTS STRONG CONTROL ON MICROBIAL COMMUNITY STRUCTURE AND FUNCTION IN TERRESTRIAL GEOTHERMAL SYSTEMS

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Microbial communities living in extreme environments can provide insight into the physiological and ecological strategies of early life on Earth. In such systems, temperature and taxonomic richness are inversely correlated. However, no systematic study has explored the relationship between temperature and ecosystem function or complexity. Using standard bioinformatics techniques, we analyzed two datasets: (i) Illumina 16S rRNA gene sequences (“iTags”) from 73 hot spring sediments and microbial mats in the U.S. Great Basin and (ii) 454 16S rRNA gene sequences (“pyrotags”) from 224 hot spring samples around the world. We compared the relative abundance of taxa with known ecological functions to temperature, revealing that certain functional groups experience statistically significant declines in relative abundance with increasing temperature, including Cyanobacteria (oxygenic photosynthesis), Planctomycetes (anaerobic ammonium oxidation), methanogenic Euryarchaeota (methanogenesis), and nitrite-oxidizing bacteria (chemolithotrophic nitrite oxidation). In contrast, the abundance of Thaumarchaeota, which are capable of aerobic ammonia oxidation, showed no significant relationships with temperature. Within the Great Basin dataset, we calculated Spearman’s Rho rank correlation coefficient of the relationship between temperature and the relative abundance of each operational taxonomic unit (OTU), revealing significant relationships in 39% of phylum-level groups (80% identity), suggesting that temperature exerts a strong control on microbial community structure in general. Taken together, these results suggest a trend where, with rising temperature, the microbial community loses ecosystem complexity and specific functions as a diverse community is replaced by a less taxonomically and functionally diverse cast of thermophilic and hyperthermophilic specialists.

Funding for this research was provided by the NSF IIA-1301726 grant and the NSF OISE-0968421 grant.

COMPARISON OF DIFFERENT IRON NANOPARTICLES IN THEIR POTENTIAL TO COMBAT CONTAMINANTS IN WATER

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Nanoscale Zero-Valent Iron (nZVI) particles are known to be a great driver in combatting organic contaminants found in water. Following the Fenton reaction model, the iron nanoparticles are able to oxidize the contaminants into harmless by-products such as carbon dioxide and water. The conventional method to synthesize these nZVI particles presents an issue with toxic by-products such as sodium borohydride, therefore another proposed method for producing various metallic nanoparticles provides the use of plant extracts as the reducing agent to reduce Fe²⁺ or Fe³⁺ into the desired zero-valent iron, or Fe⁰. *Larrea tridentata* (also known as creosote bush) is commonly found in our desert region, and will be used as the plant material extract utilized in the plant based production of nZVI particles. There is an optimal polyphenol content in the plant for the reaction with the iron salt solution to occur and produce the desired hydroxyl radicals. To test the potential use of nZVI produced from plant mediated procedures, commercial nZVI was tested against conventionally synthesized nZVI and plant extract synthesized nZVI in their ability to produce OH⁻ radicals; the main transient species for oxidizing pollutants. The characteristics of the three types of nZVI will be assessed, as well as the yields in hydroxyl radicals when reacted with hydrogen peroxide and UV radiation.

AN INTEGRATIVE REVIEW OF ASSOCIATION BETWEEN POSTTRAUMATIC STRESS DISORDER AND TELOMERE LENGTH

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Purpose: An emerging marker of cellular aging is telomere length (TL) and recent studies have investigated the link between TL and symptoms of posttraumatic stress disorder (PTSD). The purpose of this study is to review and critically evaluate the current state of knowledge regarding TL in humans with PTSD.

Methods: A thorough search using Pubmed, Scopus, and CINAHL returned 137 articles. Search key words included “telomere” and “posttraumatic stress disorder.” Only original studies published with human subjects were included for the review.

Result: A total of 16 articles were selected for full-text review. All studies were published between 2011-2016. Majority of the studies are cross-sectional (n=11). Four articles studied soldiers, four studied women, and five studied general populations. The sample size ranges from 43 to 4441 subjects. Quantitative polymerase chain reaction is a method often used to measure TL by extracting leukocyte DNA (n = 10). To determine the symptom severity of PTSD and/or relevant clinical symptoms, the studies utilized the Clinician-administered PTSD scale (CAPS) (n=3), the MINI International Neuropsychiatric Interview (M.I.N.I.) (n=2), or the Beck depression inventory (BDI) (n=2). The studies concluded that there may be a significant correlation of TL and PTSD based on shorter TL with PTSD compared with ones in controls.

Conclusion: Cellular aging may occur more in PTSD than in healthy controls. Further studies are needed to examine the association of TL with treatment outcomes and to identify factors that influence TL in PTSD, such as ethnicity, gender, and physical activity.

AUTOMATING THE FUNCTIONALITY OF A LOW COST PROSTHETIC HAND

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In 2014, a team of UNLV engineering students and staff produced a prosthetic hand for then four-year-old Hailey Dawson who was born with Poland Syndrome. The UNLV hand was a modified version of two public domain prosthetic designs: Robohand and the Flexyhand. The prosthetic was a 3D-printed structure that used Hailey's wrist rotation to open and close the fingers. Since then, engineering faculty, student researchers, and senior design students have continuously worked to improve the prosthetic hand design. Current research is focused on improving the functionality of the robohand by adding battery powered actuators and control systems. A well implemented actuator system will allow the user of the prosthetic to open and close the fingers without the need to flex their wrist. This should allow users, like Hailey, to handle more objects with greater control. It should also be easier to use and maintain aesthetic appeal. Researchers also aim to make the robohand and the actuator system more modular so it can be used by people with other hand deformities and hand sizes. To achieve these design goals, researchers are using computer aided design programs to model and evaluate alternative design solutions. Progress so far has focused on development of the actuator system, specifically actuator selection, actuator placement and mounting on the system, and the connection of the actuators to the tendon lines that open and close the fingers.

AN EMPIRICAL STUDY ON THE EFFECT INEQUALITY AND POVERTY HAS ON THE LITERACY RATE IN SUB-SAHARAN AFRICA

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This study sheds light to the poverty and inequality trends in Sub-Saharan Africa (SSA) and their effects on literacy rates of youth and adults in those regions. Low literacy rate has always been an issue to not only the youth, but also the adults in various regions of Africa. There are many factors that contribute to this epidemic killing Africa, intellectually; however, the unequal distribution of wealth present in each region, remains a vital factor as to why illiteracy is so prevalent in Africa. Many individuals live in abject poverty due to the inadequacies of economic and political policies that are widespread throughout the continent. As a result, one's education is put to the side to focus on daily life struggles. In this study, a statistical analysis is used to explain determinants of illiteracy rates in SSA which include population growth, GDP per capita, household size, unemployment rate, share of agricultural sector in GDP and schooling in elementary and high schools. Using data from World Bank and UNESCO, I hope to find a common trend as to why literacy amongst individuals in Sub-Saharan Africa is often neglected.

GRANNY'S CRY FOR HELP: LONELINESS IN DIARIES OF THE DIGITAL AGE

**Kelley Huckeby, Mariah Mancini, Sara Meraz, Brittney
Monreal & Miriam Melton-Villanueva**
University of Nevada, Las Vegas, Department of History

Faculty Research Mentor: Miriam Melton-Villanueva,
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Loneliness, known as a human emotion, occurs through either physical, emotional, or mental isolation. Different coping mechanisms are practiced in order to assess the depressing feelings. A journal collection dating in the 1800s by an elderly woman whose last name was Rockefeller is being used in this research project. She journaled every day and filled them with the smallest details of her life, including many entries describing her loneliness. This research focuses on the evolution of personal journalism by combining the historical record with sociological categorizing. Since the late 20th century technology has evolved to become a social mediator for people to communicate with one another like never before, which has great implications for mental health. Elderly people have begun to journal using the personal computer. The audience has become more public, yet the need to be heard and escape the loneliness remains visible in contemporary writings. We argue that blogging has creating a platform that allows individuals to be heard. By comparing journaling and blogging we lay the groundwork for research analyzing the efficacy of blogging as a tool for health in isolated populations like elderly and college students.

COPING WITH THE PSYCHOLOGICAL EFFECTS OF RACIAL MICROAGGRESSIONS IN COLLEGE

Victoria Copeland
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Faculty Research Mentor: Janice McMurray, Ph.D.
University of Nevada, Las Vegas, Department of
Psychology

The goal of this study is to investigate the negative psychological implications, potential moderators, and coping mechanisms of college students who experience racial microaggressions. The study's sample consists of undergraduate African-American students recruited via SONA system at the University of Nevada, Las Vegas. Participants were asked to complete the following questionnaires: the Racial and Ethnic Microaggressions Scale (REMS), the Depression Anxiety Stress Scales (DASS), the Buss-Perry Aggression Questionnaire (BPAQ), the Rosenberg Self-Esteem Scale (SES), and the COPE Inventory (COPE). Data collected from the completed questionnaires were inputted into the SPSS for analysis. The findings of this study will potentially help provide faculty members, students, and health care providers with ways in which they can create a more inclusive and welcoming academic environment for all students.

This research will be presented at the 2016 McNair Scholars Institute at UNLV & the 2016 AANAPISI Undergraduate Research Symposium at UNLV.

Funding for this project was provided by the McNair Scholars Institute.

INTERSECTIONAL NEEDS FOR A DIVERSE STUDENT BODY

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Faculty Research Mentor: Anna C. Smedley-López, Ph.D.

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The purpose of our study is to assess the access to higher education and identify methods towards a meaningful educational experience for a diverse student body as a way of improving student retention and academic achievement. Using community based participatory action research strategy, we are targeting strategies for student engagement to develop a more inclusive environment at UNLV. S.L.I.C.E.S (Service Learning Initiatives for Community Engagement in Sociology) and the Intersection, an Academic Multicultural Center at UNLV, work together and provide tools that are needed to enable student advocacy for their own academic and social well-being during their time at UNLV. Also, both community partners facilitate action plans to address campus needs. Our CBPAR gathers data from literature reviews of peer-reviewed articles about how addressing the intersectional needs of a diverse student body and providing a sense of belonging for students impacts their academic achievement and retention. Students are also assessing resources on campus to construct a database that outlines a network of available financial, academic, and mentorship opportunities on campus. Faculty and students are organizing the workshop Scholarship, Internship, Research, and Resume on Campus Help (SIRRCH). SIRRCH includes campus experts and examples provided in our study's database. This study works to emphasize intersectional needs of a diverse student body and explain how student retention and academic achievement are affected by a student's sense of belonging.

EFFECTS OF VOTER ID LAWS ON VOTER TURNOUT

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Faculty Research Mentor: Djeto Assane, Ph.D.
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Voter ID laws are on the books in 32 states, but in recent years, some states have imposed stricter ID laws. The stated reason for these laws is usually given as preventing voter fraud, but the common perception is that these laws unfairly target minority voters, making it harder for them to vote, and less likely for their vote to be counted if they vote provisionally. This study will look at voter turnout in states that imposed strict voter ID requirements both in the periods before the new ID laws were put in place, as well as after, to determine if voter turnout is impacted. Specifically, the study seeks to determine if either major party is affected more than the other, as well as if minority voters turned out in fewer numbers than before the laws were in place, and, in cases where the laws have been in place for some time, if the voter turnout recovers over time. The study will look at data from affected counties or municipalities, and it will account for the normal differences in voter turnout between general and midterm elections.



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Camisha Fagan¹, Ariana Macias², Danica Albright³, Anvar Huizar², Sebastian Suarez⁴ & Alexander Larson⁵

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Faculty Research Mentor: Anna C. Smedley-López, Ph.D.
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The purpose of our study is to focus on the importance of sacred site protection, specifically preserving the cultural and environmental land of Gold Butte. Being a part of the organization S.L.I.C.E.S. (Service Learning Initiatives for Community Engagement in Sociology) we strive for achieving social justice with this project. Gold Butte is ancestral land tied to the Moapa Band of Paiutes, which has been neglected and abused. Through Community Based Participatory (Action) Research, we plan to academically provide literature that stresses the significance of protecting sacred sites. Furthermore, engaging within the community by: aiding in trash pickups in Gold Butte, writing letters to the President and secondary resources, in addition to attending an organizer’s workshop. Ultimately, our findings will aid in expanding the knowledge of our community partners The Sierra Club, who hope to make Gold Butte a national monument someday.

**WAS IT GENOCIDE? LOCAL LAWS DIRECTED
AGAINST NATIVE AMERICANS IN CALIFORNIA
TERRITORY**

Sammy Bakir

University of Nevada, Las Vegas, Department of History

Faculty Research Mentor: Miriam Melton-Villanueva,
Ph.D.

University of Nevada, Las Vegas, Department of History

When people argue that the population decline of indigenous Americans was not technically genocide, they rely on the common assumption that the deaths were not intentional, nor institutional. Through an analysis of state and local legal code from late 19th century California, I present evidence of institutional physical violence with the intent to destroy indigenous cultures, and take control of Native land and resources. I also present population statistics to show how these laws correlated with population decline before and after the implementation of these policies. I conclude that population decline suffered by indigenous Americans, by this definition of institutional intentional action, was in fact an act of genocide.

**MUSIC PERCEPTION.COM: PERCEIVING
HIERARCHICAL MUSICAL STRUCTURE IN
DIVERSE POPULATIONS**

Jared W. Leslie, Anthony Romero, Whitlee Manor,
Jessica E. Nave-Blodgett, Erin E. Hannon, Joel S. Snyder
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Psychology

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Musical beats are structured into hierarchical relationships of stronger and weaker events, called musical meter. Humans tap, clap, or move to the beat in music with ease. Perception of metrical structure may allow individuals to synchronize with the music in more complex ways over longer periods of time, such as in partner dances or musical improvisation. Previous work at the University of Nevada, Las Vegas has tested the ability of musically trained and musically untrained individuals in perceiving these hierarchical structures in music. Listeners rate metronomes that fit music at two metrical levels as fitting musical excerpts better than metronomes that match the music at only one or no levels of meter. However, age can affect musical perception, and a listener's perception of metrical structure is shaped by the musical culture they are raised in. To examine the impacts of age and culture on music perception, we need to bring our research to new populations beyond undergraduate campuses. Moving to an online version of this study, we will be able to reach a more age- and experience-diverse sample, and reach individuals in other countries, raised in other musical cultures. This will also serve the secondary goal of attempting to replicate the original findings, an important step in the advancement of scientific research.

THE WATER CRISIS IN NEVADA: THE CAUSES, EFFECTS, AND SOLUTIONS

Tanner Bates

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Faculty Research Mentor: Miriam Melton-Villanueva,
Ph.D.

University of Nevada, Las Vegas, Department of History

It is evident from the white rim around Lake Mead that there is a severe water shortage in Nevada, with consumption outpacing replenishment. Las Vegas, the largest city in the state, is the top offender. Though per capita water consumption is down 40% from 1989, the population has tripled in that same time period, and aggregate water consumption continues to rise. The casinos on the Strip are not the culprits, as one might assume; 70% of the city's water usage is from landscaping. There is an undesirable implication: it is Las Vegas' own residents that are threatening the city and the state by proxy. Las Vegas officials are calling for consumption of 199 gallons a day per person by 2035, but San Francisco already uses only 50 gallons per day. The purpose of my research project is to analyze the differences between these two metropolitan cities in order to see what cultural and political factors enable San Francisco to be a leader in water conservation. Using government policies, economic data and news reports, I evaluate whether it is possible to emulate the San Franciscan model in Las Vegas, so as to preserve the city both environmentally and economically. In my conclusion, I find that it is financially feasible to enact policies similar to San Francisco's in Las Vegas, while discussing some of the consequences of failing to do so.

TEMPO PERCEPTION ACROSS CULTURES: THE BEAT IS ALL IT TAKES

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University of Nevada, Las Vegas, Department of
Psychology

Faculty Research Mentor: Erin E. Hannon, Ph.D.
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Psychology

Our brains organize sensory information coming in from the world around us, which allows us to create a sense of events in time. However, the rules that we learn are based on our experience. When listening to unfamiliar music, do our learned "rules" for organization help us or hurt us? Listeners tap at faster rates to music from unfamiliar cultures, and they tap slower to familiar music, even when the musical pieces are roughly equivalent in speed (Drake & El Heni, 2003). When listening to music, perceived speed is affected by familiarity with the musical culture, how many musical events occur in a short time span, and how we are dividing time in the musical piece (Drake, Gros, & Penel, 1999). We will perform the first systematic cross-cultural, comparative study of perceived speed of music. We will begin by looking at how participants from many different cultures rate the perceived speed of familiar and unfamiliar music clips. Our study will be presented online, allowing us to recruit participants from outside of the United States to create a culturally diverse study. This comparative study design allows us to compare how people from different cultures perceive music and language that is familiar to them and unfamiliar to others, giving us the opportunity to see if patterns of perception hold across cultures, or if they differ, all using the exact same stimuli.

This research was presented at the AANAPISI and the McNair Undergraduate Research Symposium.

Funding for this project was provided by the McNair Scholars Institute and the UNLV AANAPISI Program.

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UNDOCUMENTED STUDENTS NAVIGATING THE HIGHER EDUCATION PIPELINE IN NEVADA: A STATE WITHOUT LEGALIZED IN-STATE TUITION

Mariana Paola Sarmiento-Hernández

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Faculty Research Mentor: Anna C. Smedley-López,
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This research seeks to understand the ways in which undocumented and DACAmented students in the state of Nevada, a state without legalized in-state tuition for undocumented students, navigate the high school to higher education pipeline. Through in-depth interviews with undocumented and DACAmented students currently enrolled in a higher education institution in Nevada, who are former high school graduates of the same state, this study will highlight the experiences of these students, while documenting their suggested best practices for institutional support for this population. This study will investigate best-practices for working with these student in overcoming barriers in college enrollment, retention and degree attainment, as well as highlight cultural capital that undocumented and DACAmented students utilize to navigate the high school to higher education pipeline.

THE CENTRAL AMERICAN REFUGEE CRISIS IN LAS VEGAS COURTS

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The national average of refugee cases that were granted asylum is 48%; compare that to a dismal rate of 3% in Las Vegas immigration courts and a problem begins to unfold itself. The purpose of our research is to find the negative trends in our courts to prepare future asylum seekers to represent themselves in court. Working in a community based participatory research framework, we are working with a local non-profit that is providing aid to this marginalized community. The Immigrant Justice Initiative provides free and low-cost legal services to primarily Central American refugees fleeing the Northern Triangle. Together with the SLICES program at UNLV, community knowledge and awareness is being built through academic research into the court system, data collection of country conditions and action in the form of free legal workshops to aid the asylum seeking community in Las Vegas.

BRACERO

Maria Carrillo

University of Nevada, Las Vegas, Department of Teaching & Learning

Faculty Research Mentor: Miriam Melton-Villanueva, Ph.D.
University of Nevada, Las Vegas, Department of History

In 1942, the mobilization of labor and the demands created by the Second World War created the grounds for the first and largest guest worker program that officially operated in the United States. The Bracero program was a binational agreement between the United States and Mexico as both expected to benefit from the program. The United States saw this program as the solution to the shortness of labor in mines, railroads and especially agriculture caused by the war. Farmers also saw in the program a weapon against strikes and unions. The Mexican government would help by providing the labor and mobilized the country expecting that the Braceros would make money and return home to invest in their own farmlands, employ new technology and use the techniques they would learn from working in the United States. The contracts presented to Mexican farm workers looked promising, but reality was much different. The Bracero program turned from promises of a better future to one of the worst violations of human rights in recent times. This program was devastating for families, including my own; and entire communities were left with fatherless families and poverty. Many children would not see their fathers again and many others would follow their father's footsteps. The effects of this program are still seen today, yet, this part of history is kept invisible.

BIPOLAR DISORDER AND SUBSTANCE USE: EXAMINING DRUG PREFERENCE AND FREQUENCY

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Psychology

Faculty Research Mentor: Andrew Freeman, Ph.D.
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Psychology

Objectives: Bipolar disorder (BD) is associated with increased risk of substance use (Hunt et al., 2016). Young adults with BD report using substances to control mood states (Lorberg et al., 2010). Prior studies do not identify the relationship between symptoms and substance use nor differentiate among specific types of substances. The purpose of this study is to examine whether depressive or manic symptoms are more closely related to substance use early in illness and specific substances.

Methods: Participants (N=601) were recruited from a large, diverse urban university. Participants were 20.34 years (4.18), female (68%) and 29% were Hispanic/Latino. The General Behavior Inventory measured depressive and manic symptoms (Depue et al., 1989). Substance use was measured by the CDC Youth Risk Behavior Surveillance System.

Results: Manic (O.R.=1.04, $p<.001$), not depressive (O.R.=.99, $p=.23$), symptoms were associated with increased odds of current substance use (Nagelkerke $r^2=.08$). Only manic symptoms were associated with increased current use of nicotine (O.R.=1.04, $p<.001$), alcohol (O.R.=1.03, $p<.05$), cannabis (O.R.=1.03, $p<.02$), and stimulants (O.R.=1.06, $p<.01$). After categorizing symptoms into those most at risk for depression or mania diagnoses, mania increased risk for any substance use (O.R.=5.26, $p=.03$) and alcohol (O.R.=5.79, $p=.02$). Nicotine, cannabis, and CNS stimulant use were not associated with clinically elevated symptom severity, $ps > .10$.

Conclusion: Presence of recent manic symptoms is associated with increased current substance use. Substance use, particularly alcohol use, and (hypo)mania co-occurs in young adults, who are early in their symptomatic presentation, at similar levels as to older adults.

REFERENCE DEPENDENCE IN THE AGE OF UBER

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University of Nevada, Las Vegas, Department of
Economics

Faculty Research Mentor: Djeto Assane, Ph.D.
University of Nevada, Las Vegas, Department of
Economics

In the fields of psychology and behavioral economics one interpretation of reference dependence is that individuals choose their level of effort based on their expectation of outcome. Most workers do not have the freedom to choose the shifts they work within a particular field, as day of work and shift length are set by their employer, but there are occupations where individual workers are free to determine for themselves which days they will work and the number of hours they will work each day. Such occupations include exotic dancers, roving vendors at sporting events, and taxicab operators. Considering for the moment just taxicab drivers, how do drivers determine the days they will work each week, and how do they determine when to start and end their day – do they work a set shift, do they work a set number of hours, or do they work until they have earned a certain amount in a shift? Do workers work longer on good days and less on bad days? This research project will build on two seminal studies by Camerer et al. (1997) and Farber (2005) and will use Uber or Lyft data for major U.S. cities to test whether or not drivers adjust their normal routine for foreseeable income shocks, such as large spectator events or subway system closures.

LATIN NIGHTLIFE IN LAS VEGAS

**Benjamin Thomas¹, Juliet Summers-Hernandez²,
Andrea Mata³ & Elizabeth Alvarez-Montoya²**

¹University of Nevada, Las Vegas, Department of English

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Faculty Research Mentor: Miriam Melton-Villanueva,
Ph.D.

University of Nevada, Las Vegas, Department of History

In the fiscal year of 2014, the top ten nightclubs in the United States grossed over half a billion dollars in profits; \$550 million according to Forbes magazine. Seven of those ten clubs line the Las Vegas Strip. On the Las Vegas Strip, there are fourteen major nightclubs and most do not host “Latin Nights” or have Resident DJs of Hispanic or Latino descent. This is astounding when one takes into consideration the fact that in a city of over 600,000 inhabitants, 31.5% identified as Hispanic or Latino in the 2000 Census. The majority of venues that have resident DJs that are Hispanic or Latino or play the music of the cultures of Latin America are smaller venues such as Señor Frogs, The Blue Martini, Embassy, Rincon Catracho, and Centro America. Even then there is a larger problem faced when the aforementioned venues employ the same five DJs throughout the week. There is a market, so why is there not more money being invested in the Latino community? Through research methods that included an in depth examination of modern local, primary, and secondary sources such as social media posts, flyers, music set lists, music sharing sites, phone books, and books, we were able to identify a trend within the Latin dance scene in Las Vegas. This research found a large underrepresentation of Hispanics and Latinos despite the popularity of the culture in modern popular music.

FINANCIAL AID AND SCHOLARSHIPS AT UNLV FOR UNDOCU/DACAMENTED STUDENTS

**Vanessa Hernandez¹, Johanna Hernandez¹, Akaisha
Cook², Diego Madrigal³, Candy Bravo⁴, Jacob Speaks¹
& Valerie Lujan⁴**

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Work

Faculty Research Mentor: Anna C. Smedley-López,
Ph.D.

University of Nevada, Las Vegas, Department of
Sociology

The purpose of our study is to better understand financial aid and scholarship resources available to Undocu/DACamented students at UNLV. This project is part of Department of Sociology Service Learning Initiative for Community Engagement (SLICES). This is a community based participatory action research project that begins by looking at what previous literature has said about the psychological effects and anti-sentiments on undocumented and DACamented students. It engages in identifying funding sources within UNLV. The action taken will be to develop a resource guide and bring awareness and give support to workshops put on by the UNLV UndocuNetwork.

**THE EFFECTS OF RISING HEALTHCARE PRICES
ON INCOME AND WELL-BEING**

Alora Gillogly

University of Nevada, Las Vegas, Department of
Economics

Faculty Research Mentor: Djeto Assane, Ph.D.
University of Nevada, Las Vegas, Department of
Economics

The purpose of this study is to identify and analyze the effects of rising prices on necessary medication in the healthcare industry. Particularly, I will analyze how the prices of pharmaceutical drugs have risen over time. Many of the pharmaceutical drugs in use are medications where it is not only recommended but also essential for people to take these drugs or they will suffer severe health consequences or even death from their medical conditions. However, the prices of these pharmaceutical medications have risen disproportionately high compared to the rise in the average income of the people that need them. I will identify and analyze what effects these rising prices on pharmaceutical drugs in the healthcare industry have had on the income and the general wellbeing of the people who need them.

**THE CONTRIBUTION OF VISUAL CULTURE
TO THE DEVELOPMENT OF REVOLUTIONARY
INSURRECTIONS DURING THE PRECURSORY
PERIOD OF THE MEXICAN REVOLUTION**

Lee Cannarozzo

University of Nevada, Las Vegas, Department of Art
Faculty Research Mentor: Miriam Melton-Villanueva,
Ph.D.
University of Nevada, Las Vegas, Department of History

This is a case study on the effect of political cartoons upon the incitation of proletariat unrest against the Porfirio Diaz Regime. The publication dates of two incendiary political periodicals, *Regeneracion* and *El Comillo Publico*, will be examined in order to correlate their publications with the revolutionary insurrections that took place between 1906 and 1907. Two significant events will be highlighted in order to demonstrate the contributions of visual culture upon the nascent revolutionary movement: The Cananea Mine strike, and the nationwide textile strike that ended in the Rio Blanco massacre. These events along with the outbreak of armed resistance by the PLM in the same years spurred on by the political writings and images of the before mentioned publications, would contribute to the culmination of forces that drove Mexico towards nationwide insurrection in 1910.

LIFE IN THE BORDERLANDS

Jenni Ochoa

University of Nevada, Las Vegas, Department of History

Faculty Research Mentor: Miriam Melton-Villanueva,
Ph.D.

University of Nevada, Las Vegas, Department of History

This project analyzes the lives of common soldiers and indigenous people living near Texas forts prior to the Texan Revolt and contrasts them to the Tejano military leaders' policies, actions, and attitudes. The goal is to get a far more cohesive picture of life in the borderlands. Examining primary sources are necessary in order to find specific examples and accounts of military leaders, soldiers, and indigenous peoples who lived in and around the forts. The chronicles of the aforementioned people, as well as official correspondence between the viceroy and the military commanders, and legal codes pertaining to the Tejanos in the area paint a comprehensive depiction of the events that transpired. Another goal is to contrast the manner in which Tejano leaders dealt with foreigners and immigrants in the early 1800s with the manner in which current Texas leaders deal with foreigners and immigrants. The disparity between the welcoming attitude of the Tejano leaders in reference to the Anglos and the current desires to build a wall to keep foreigners out of Texas is stark and shocking. The contention is that life in the borderlands of Texas was, and continues to be, largely shaped by shifting domestic and diplomatic policies, which were influenced by Tejano leaders' policies, attitudes, and actions, as well as by the lives of common soldiers, indigenous, nomadic tribes, and immigrants.

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Research & Funding OPPORTUNITIES

CSUN Scholar Program Research and Development Scholarship

The CSUN Scholar Program was established by members of student government to recognize high achieving undergraduates at the University of Nevada, Las Vegas. Recipients of the nine different CSUN scholarships are distinguished as “CSUN Scholars” and are admitted to the CSUN Scholar Program, in which they are required to participate in university events throughout the school year. Scholars in this program are high achieving students with diverse backgrounds engaged in contributing to all aspects of the UNLV campus community.

The Research and Development Scholarship was created for the purposes of recognizing students who display academic abilities and potential. This scholarship includes a monetary award of \$3,000 that will be awarded to students who will be actively working on a research, scholarly, or art project during the academic year in which they apply for the scholarship.

For more information about CSUN Scholarships, visit <http://unlvcsun.com/scholarships/>

National Science Foundation’s Experimental Program to Stimulate Competitive Research Undergraduate Research Opportunity Program (NSF EPSCoR UROP)

Nevada INBRE sponsors 15 undergraduate research scholarships each year. Those selected for the program will spend the summer doing a lab research project in a faculty mentor’s laboratory. Summer research opportunities often lead to longer-term collaborations between students and faculty, publishable research, and careers in medicine or biomedical research. Opportunities are available for research

in emerging areas such as genomics, proteomics, molecular modeling, imaging, and bioinformatics. However, any area of research that might be supported by the NIH is appropriate. Students are selected in a statewide, merit-based competition. As part of the application process, students are required to identify a faculty mentor at UNR, UNSOM, UNLV, or Nevada Cancer Institute with whom they are interested in conducting research.

For more information about this opportunity, visit unlv.edu/sciences/urop/inbre

Nevada IDeA Network of Biomedical Research Excellence Undergraduate Research Opportunity Program (INBRE UROP)

The Undergraduate Research component of the current NSF EPSCoR award provides lab and field research experiences, through summer scholarship programs and annual fellowship opportunities, to full-time NSHE undergraduate students.

These programs fund eligible students either majoring in mathematics, science, or engineering, or majoring in education and specializing in teaching K-12 in the fields of mathematics, science, or technology. Research is conducted under the guidance of NSHE faculty mentors. The hands-on experience gained through these programs has proven to supplement classroom learning and serve as gateways to new and exciting opportunities for all participants.

For more information about this opportunity, visit unlv.edu/sciences/urop/epscor

Nevada NASA Space Grant

The goal of NASA EPSCoR is to provide seed funding that will enable jurisdictions to develop an academic research enterprise directed toward long-term, self-sustaining, nationally competitive capabilities in aerospace and aerospace-related research. This capability will, in turn, contribute to the jurisdiction’s economic viability and expand the nation’s base for aerospace and other NASA

related research and development.

Funding opportunities are available for students interested in doing research in engineering and related fields.

For updates on NASA EPSCOR opportunities, visit nasa.epscorspo.nevada.edu/funding-opportunities/

University Libraries Lance & Elena Calvert Undergraduate Research Awards

The Calvert Award recognizes undergraduate students who demonstrate sophistication and originality in research projects. Up to five prizes will be awarded in three categories: Emerging Scholars with a \$750 prize, Advanced Undergraduate and Creative Works with a \$1000 prize. Project length will be dictated by the course instructor or project advisor who supports the application. Projects by individual or groups in all formats are eligible including: research paper or thesis, design portfolio, theatre designs, visual/fine arts performances accompanied by program notes, creative work (writing, art in any format), film/digital media, & poster presentations.

Applications due in April. For more information, visit library.unlv.edu/award#criteria

UNLV McNair Scholars Summer Research Institute

During the UNLV Dr. Ronald E. McNair Summer Research Institute, student scholars work on the research projects that they propose and design under the guidance of faculty research mentors. Scholars come from virtually all academic disciplines, such as the fine arts, social sciences, life sciences, engineering, hotel administration, and business.

To be eligible for consideration to participate in the UNLV McNair Scholars Summer Research Institute, applicants must be active participants in the UNLV McNair Scholars Post-Baccalaureate Program, and must be classified as a junior with no less than 60 credit hours.

For more information about the McNair Scholars Program and the Summer Research Institute, visit cao.unlv.edu/mcnair/

UNLV Office of Undergraduate Research Summer Funding

The Office of Undergraduate Research (OUR-UNLV) is rolling out the brand new Summer Research Fund for undergraduate students conducting research under a Faculty Research Mentor during the summer months, starting summer 2017.

Information and applications will be available Spring 2017 at unlv.edu/our

UNLV Office of Undergraduate Research Travel Funding

The Office of Undergraduate Research (OUR-UNLV) is accepting applications for OUR-UNLV Travel Funding. This award allocates up to \$500 to assist undergraduate student researchers with travel to an academic conference, symposium, or other venue to present their scholarly work, or travel for research purposes (e.g., data collection, sample analysis, etc.).

2016 -2017 Application Deadlines:

Spring 2017 (travel from 12/18/16 - 5/13/16): Due by November 20, 2016

Summer 2017 (travel from 08/29/16 - 12/17/16): Due by April 20, 2017

For more information and to apply, visit unlv.edu/our

PLEASE NOTE: *The deadlines for most of these research funding and opportunities, especially those that disperse in the summer, typically occur early in the spring semester.*

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