UNLV Office of Undergraduate Research

Friday, April 27th  |  9:00AM-11:30AM

Spring 2018
OUR Undergraduate research CONFERENCE

• Lightning Talks • Poster Presentations • Traditional Presentations

Location
Student Union 2nd Floor

This event is co-sponsored by /
Podium Presentation
Abstracts:
10 Minute Traditional Talks
Extent of Mutation and Sex Influence the Risk of Mortality in a Mouse Model of Developmental Epilepsy

Rosalie Chaleunsouck
Department of Chemistry and Biochemistry

Faculty Research Mentor: Rochelle Hines, Ph.D.
Department of Psychology

Sudden Unexpected Death in Epilepsy (SUDEP) is characterized by the abrupt mortality of seemingly healthy individuals and continues to be a leading cause of death in epilepsy. SUDEP appears to be particularly prevalent in severe childhood epilepsies, such as Dravet and Dup15q syndromes. This increased risk of mortality places many families in unbearable positions of emotional stress. However, little is known of the molecular and genetic mechanisms contributing to SUDEP. Our recently developed model for developmental epilepsy, the Gabra2-1 mouse, has been observed to exhibit behavioral seizures during development, resulting in mortality in a subset of these mice—peaking at postnatal day 20. In the present study, we examined the Gabra2-1 genotype (heterozygous or homozygous) and sex of the offspring found dead using polymerase chain reaction (PCR). The PCR was run using specialized primers to detect the Gabra2-1 mutation and the SRY gene, the resulting products were run through an agarose gel. The results were compiled into a database to examine: 1) the relationship between the mutation genotype and mortality 2) the influence of sex on mortality 3) comparisons between pups that died during development and those that survived to maturity. Preliminary data suggests that homozygous mice will display higher likelihood of mortality. We predict that male mice will have an increased susceptibility to SUDEP, mirroring observations in human populations. This study aims to determine the viability in using the GABRA2-1 strain as a model for SUDEP and provide insight into the genetic mechanisms that may contribute to epileptic mortality.

Differential 5HT2A and 5HT2B Receptor Expression in Non-Principal Cells of the Frontal Cortex and Hippocampus

April Contreras, Dustin Hines, and Rochelle Hines
Department of Psychology

Faculty Research Mentor: Rochelle Hines, Ph.D.
Department of Psychology

Serotonin, 5-hydroxytryptamine (5HT), is a monoamine neurotransmitter responsible for a variety of nervous system functions, including mood regulation, appetite, and arousal more globally. Released serotonin may bind to an array of 5HT receptor subtypes, each with specializations of structure and mechanism of action. Of the seven types of 5HT receptors, the 5HT2 family appears to be particularly relevant for mood regulation in humans, with 5HT2A and 5HT2B function implicated in psychiatric disorders such as schizophrenia, depression, anxiety, and obsessive-compulsive disorder. Both principal excitatory cells and non-principal (inhibitory interneurons and glia) cells express these 5HT2 receptors, however, a comprehensive and comparative localization of these receptors at non-principal cells has yet to be completed. In the present study, we examined receptor expression of both 5HT2A and 5HT2B on parvalbumin-positive inhibitory interneurons, GFAP-positive astrocytes, and Iba1-positive microglia in the mouse cortex and hippocampal CA1 region. Using immunohistochemistry and confocal microscopy, we highlight differential receptor expression patterns of 5HT2A and 5HT2B that vary both by cell-type and brain region. In particular, we detected a substantial level of 5HT2A expression in microglia cells, which is unexpected as these cells are conventionally thought to not participate in serotonin signaling. Our findings help to elucidate the potential contributions of specific 5HT2 receptor subtypes to normal brain function and may have implications for the mechanisms of action of drugs that target these receptors.
La Lucha Sigue: Making the Case for Institutional Support of Undocumented Students in High Education

Esmeralda Cruz Lopez, Anna Smedley-López, and Vanessa Núñez
Department of Sociology

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

Nevada is home to the largest share of undocumented immigrants, making up 7.6 percent of the state’s population in 2012 (Pew Research Center 2014). As a state, Nevada does not have concrete policy to address access to higher education for undocumented students and as a result the number of undocumented students enrolled at UNLV is unknown. This unknown number further results in lack of institutional resources that can effectively aid these students. This study aims to explore how undocumented students perceive resources at UNLV and the role student activism played in the institutionalization of resources. Through a set of individual and group interviews we found that: 1) participants feel a sense of responsibility to advocate for institutionalizing resources through their activism 2) a shared experience of institutional neglect, 3) needs for resources and support vary depending on whether participants were undocumented or DACAmented, and 4) participants embraced their agency to be social change makers and exhibited a resiliency for navigating an institution that had very few resources publicly available to them. This study employed a community based participatory research approach (CBPR) to center the voices of the community and highlight lived experiences as valid academic knowledge. This CBPR methodology also serves as an alternative method to traditional ways of conducting research, as such methodology allows a collaborative work between community and researchers. Finally, CBPR highlighted the voices of community members and has transformed the ways students and their faculty advisers conduct research.

Cryo-Orthotic Regenerative Elbow Splint

Julio B. Figueroa,1 Gideon Brillantes,1 Ashley Lamb,1 Alex Dahlgren,1 Dr. Samir Moujaes,1 and Dr. Anis Khair2

1Department of Mechanical Engineering
2Institute of Clinical Research

Research Faculty Mentor: Samir Moujaes, Ph.D.
Department of Mechanical Engineering

This research project prototypes a biomedical device that takes the form of an elbow splint with cryotherapeutic properties to help patients suffering from acute elbow injuries. This orthotic uses a thermo-electric element known as a Peltier device. We designed a thermoelectric controller (TEC) and an ABS plastic mechanical splint with an embedded ratchet hinge. The TEC runs a 15A board powered by parallel lithium polymer batteries at a nominal 11.1V. Per Peltier, we constructed an H-bridge to take control of bidirectional current. Heat transfer into the system is monitored by NTC thermistors measured inside a Wheatstone bridge and calibrated using a Steinhart-Hart curve-fitting equation. Within 15 minutes the Peltier device went from body temperature down to -1 °C. In order to protect the patient a PID controller tuned by using Ziegler-Nicholas methods was used to prevent overshooting past 37 °C.
Identification of CHST15 as a Candidate Gene for Schizophrenia from Whole Genome Sequencing

Xiangning Chen, Jingchun Chen, Arvin Wu, Travis Mize, Marvi Moreno, Mahtab Hamid, Bita Bashy, and Francisco Servin

1School of Life Sciences
2Department of Psychology

Faculty Research Mentor: Xiangning Chen, Ph.D. & Jingchun Chen, M.D., Ph.D.
Department of Psychology

Recent results imply that rare variants contribute to the risk of schizophrenia. We conducted whole genome sequencing for 99 subjects from 20 Chinese families (parents and at least two siblings with a schizophrenia diagnosis and one unaffected sibling). Of the 9 frameshift mutations identified in more than 2 families, one was at chromosome 10:125780762 on the Carbohydrate Sulfotransferase 15 (CHST15) gene. At least two types of mutations (one or three bases insertion) have been identified in 6 families. Given the frequencies of these mutations observed in the general population (data from ExAC database: http://exac.broadinstitute.org/) are between 0.002 to 0.00001, the largest p-value that CHST15 is associated with schizophrenia is less than 0.002^6, or 6.4E-17. This finding was replicated in an independent Chinese sample of 85 subjects from 17 families, where 7 families were found with similar mutations at the same location. We are in the process to validate these mutations by PCR- and cloning-based Sanger Sequencing. CHST15 has been reported to be associated with cancers but never with schizophrenia. Further study of the biological function of CHST15 gene is warranted to understand its contribution to schizophrenia.

Examining Changes in Excitation and Inhibition in Models of NDDs

Christina Joya and Rochelle Hines
Department of Psychology

Faculty Research Mentor: Rochelle Hines, Ph.D.
Department of Psychology

Neurodevelopmental disorders are a prevalent and heterogeneous class of disorders that share common genetic factors and symptomatology. Many neurodevelopmental disorders are associated with dysregulation of the ratio of excitatory to inhibitory signaling within the brain, as evidenced by excessive cortical activity and the high incidence of epilepsy. Inhibitory signaling in the adult brain is controlled by the neurotransmitter gamma aminobutyric acid (GABA) acting on GABAA receptors, and multiple neurodevelopmental disorders, as well as epilepsy, have been linked to GABAA receptor dysfunction. We are examining the cellular and molecular changes that underlie features of epilepsy in multiple mouse models of neurodevelopmental disorders. Our studies will examine the excitatory to inhibitory synaptic ratio in the medial prefrontal cortex of in a mouse model of developmental epilepsy (Gabra2-1) and a neurodevelopmental disorder model that has a high incidence of epilepsy (Mecp2 +-/-) using immunohistochemistry with antibodies for the vesicular glutamate transporter (VGluT) and the vesicular GABA transporter (VGAT). Sections will be examined using confocal microscopy to quantify the density and intensity of staining for the excitatory (VGluT) and inhibitory (VGAT) terminals. Future experiments will examine postsynaptic proteins associated with the excitatory to inhibitory ratio to indicate if imbalance is seen at both the presynaptic and postsynaptic sites, as well as physiological studies of excitatory and inhibitory synapse function. Understanding the molecular mechanisms behind dysregulated cortical circuitry in neurodevelopmental disorders will lead to the development of novel therapeutic strategies for these complex disorders.
Courtly Love and the Woman’s Voice in Medieval France

Jennifer Kimball
Department of History

Research Faculty Mentor: Elspeth Whitney
Department of History

This paper is a historical and literary exploration of the lesser-known women love poets of medieval France and their interaction with courtly love as a doctrine and literary theory. Through the course of my research, I studied the songs of the women troubadours, or trobairitz, of Southern France in a gender-based cross-comparison between select male and female subjects. I approached this research seeking to discern, from a literary and historical perspective, what made their lyrics unique. Were they merely copying the tradition of the troubadours, or did they add something new that should make us revisit this canon of literature? Using literary analysis and utilizing an array of primary and secondary sources, I concluded that while the songs of the women poets were similar in style, they possessed a distinct feminine perspective. The boldness and sensuality of their words gave these women a kind of literary agency they did not necessarily possess in medieval society. I also concluded that one cannot categorize these women’s writings under the bounds of courtly love; as the study itself is so diverse and there is no general consensus on the definition of courtly love; the scholarship on this subject was based on the poetry of men, not women. This is an era we traditionally associate with the total repression of women and the marginalization of their voice. By studying the lyrics of these women, we as academics can experience the richness and diversity of the Middle Ages and see this era in a fresh perspective.


Laura Lomeli,1 Michael Haddad,1 Richard Henderson,1 Natalie Manka,1 and Aria Reeder2

1Department of Sociology
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Faculty Research Mentor: Anna C. Smedley-López, Ph.D.
Department of Sociology

Nevada is home to the largest proportion of undocumented immigrants in the country, yet has no specific legislation that supports undocumented students’ access to higher education. In a “don’t ask, don’t tell” state, lack of explicit support for undocumented students can create barriers for undocumented students who want to pursue college degrees. This project is part of the NUEVO Project, a larger community-based participatory research project that is a partnership between the UndocuNetwork and SLICES. We are collaboratively designing a survey to administer to CCSD professionals that will assess knowledge and gaps in knowledge about access to college and resources for undocumented students in southern Nevada. Middle school and high school professionals often serve as gateways to information about college. Our survey data will be used to inform outreach programming to CCSD in hopes of increasing supports for undocumented students who want to attend college in southern Nevada.
A Feasibility Study of Artificial Eyelid Muscle Using Ionic Polymer-Metal Composites

Michelle Quizon and Kwang Kim
Department of Mechanical Engineering

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

Various injuries and disease, i.e. combat-related injuries, stroke, and diabetes, can result in eyelid muscle paralysis. Eyelid muscle paralysis is currently treated by 1) transferring leg muscle into the face or 2) suturing a small gold weight in the eye. However, these surgical treatments are time-consuming and leave patients with subpar eyelid movement. There exists a potential alternative: artificial muscle. Unlike most muscles of the body, eyelid muscles require relatively lower forces, making eyelid muscle good candidates for introductory research of artificial muscle replacements. Ionic polymer-metal composites (IPMCs) comprise a promising group of intelligent materials for this application in terms customization and dynamics. However, exploration of IPMCs for artificial eyelid muscle is primitive. This study was an initial attempt to find the force requirements and geometries to characterize the feasibility of IPMCs for artificial eyelid muscle. For a geometry chosen, maximum displacement achieved was 0.475 mm and maximum force achieved was 0.125 N. The aims of the investigation were not reached in terms of complete closure of the eyelid prototype; however, the prescribed geometry did succeed in mimicking the convex path of eyelid movement. Herein, errors are addressed and future work is recommended. Later investigations can build upon these preliminary findings for future clinical implementation.

Stress-Induced Synaptic Dysregulation is Preceded by Astrocytic End-Feet Withdrawal

Beatriz Torres, Rochelle Hines, and Dustin Hines
Department of Psychology

Faculty Research Mentor: Dustin Hines, Ph.D.
Department of Psychology

The stress response is established to consist of a series of orchestrated physiological events that enhance the body’s ability to deal with a threat. Further, repeated activation of the stress response, or chronic exposure to stress, is known to produce cellular changes that can result in maladaptive behavior. In the brain, these cellular changes are marked by morphological alterations of dendritic spines. However, these changes have only been identified following extensive periods of stress, leaving the progression of this stress-induced plasticity unclear. An emerging concept in the study of stress on the brain is the role of astrocytes. Their structural and functional role at the synapse provide the opportunity to study both the spatial and temporal dynamics of stress. The present study examined the role of astrocytes in the synaptic dysregulation of mice subjected to 2 or 4 weeks of social isolation (SI), a major form of chronic stress. We hypothesized that longer periods of isolation would reduce spine densities preceded by astrocytic end-feet withdrawal. Our results indicate that 2 weeks of SI were enough to decrease spine densities, and this was associated with astrocytic withdrawal. Longer periods of SI exacerbated these synaptic alterations and produced depressive phenotypes. These results suggest that dendritic spine reductions are regulated by astrocytic processes. Furthermore, these results suggest that astrocytes are temporally and spatially critical in the progression of stress and provide a novel target for the development of pharmacotherapies intended to rescue the neuropsychiatric effects of chronic stress.
In his book, *Simulacra and Simulation*, Jean Baudrillard speculated how as a society we are moving away from a definable, original reality, and instead, are becoming perpetrators of a world in which we are unable to discern the difference between a simulation and a hyperreality. As we move forward into a more technological era, one where preference is given to online resources such as social media, blogs, and e-books, a difficult question arises, how do we combat the over saturation of readily available literature and echo chamber influenced narratives? Invoking the works of Michel Foucault and Jacques Derrida, this essay investigates the usage of the author-function in literature-to-come and how the echo chamber effect continues to produce the same repurposed opinionated narratives. It does this by investigating the language that is used in this modern technological era, and how key words are utilized within specific discourses in order to further one’s position. The use of Roland Barthes’ critically acclaimed book, *S/Z*, demonstrates the five different linguistic codes that are used in interpreting a text, and will be essential in disentangling the simulacra that is literature online. I hope to show the inevitably in trying to combat the future of online literature, and instead, unravel the same simulated discourses that are utilized through social media and blogs in order to arrive at an original discourse, one that guarantees literary works a secure position in the future, and whose narratives will survive the rapidly changing technological era.
Podium Presentation
Abstracts:
3 Minute Lightning Talks
The Role of the Extracellular Matrix Protein OprF in Pseudomonas Aeruginosa Biofilms

Sophia Araujo and Boo Shan Tseng
School of Life Sciences

Faculty Research Mentor: Boo Shan Tseng, Ph.D.
School of Life Sciences

Most bacteria in the environment reside in biofilms, but our mechanistic understanding of how biofilms form is limited. Bacterial biofilm cells live in a protective, self-produced extracellular matrix, consisting of DNA, polysaccharides, lipids, and proteins. It has been suggested that matrix proteins play many roles in the biofilm, but to date, few matrix proteins have been identified. Using Pseudomonas aeruginosa, an opportunistic pathogen that is also a model biofilm organism, we previously identified 51 candidate matrix proteins and investigated the effect of mutating these matrix proteins on the ability of P. aeruginosa to produce mature static biofilms. Here we investigate the role of one specific candidate matrix protein, OprF, which is the major large porin in P. aeruginosa. Our work shows that an interruption or deletion of oprF significantly reduces biofilm production. Previous literature, however, shows that an interruption of this gene in a different strain background increases the amount of biofilm produced. We hypothesize that this variation in biofilm production is due to differences in the protein being produced by these different mutant strains. To test this hypothesis, we are currently investigating the effect of different oprF mutations in different strains of P. aeruginosa. We expect that different amounts of biofilm will be produced depending on the strain background and the functional domains of OprF that are disrupted. Ultimately, investigating the roles of the different OprF domains in biofilm production will provide insight into how P. aeruginosa biofilms form.

Building a Better Convention

Thuon Chen
College of Hospitality

Faculty Research Mentor: Robert Rippee, Ph.D., Mehmet Erdem, Ph.D.
College of Hospitality

Conventions are big business here in Las Vegas and from my own experience and what I hear, they follow this pattern: you leave where you live to go out of town, you park your car, walk to the check-in and registration, get your badge, you walk around, it's a little overwhelming at first, you see some booths, get the lay of the land, you come back, you might meet some people, learn some new things, maybe even do a little bit of business, and after a few days, you go home. Putting on conventions has become a conventional way of doing business. Current retail technology has heat maps for visitation, touch, and eye movement, where red signifies high visitation, items that are highly picked up and touched, areas of a sign or shelf space or stand that are highly gazed at. Much like Pandora, Google, Amazon and Netflix, where you can search for items that interest you by keywords, where you can get suggestions and recommendations based on the songs or movies or website topics you’ve visited before, the same principle can apply to vendor booths and vendor booth items and signs you expressed interest in, with recommendations and suggestions based on vendor booths you visited, items you picked up and touched, whatever seemed to draw your gaze and have you looking at it, our service will provide recommendations on what other people who looked at what you looked at also looked at, in vendor booths at other parts of the convention, perhaps at booths you weren’t even aware of. This service promises to level the playing field, to help the little guy, the small vendor, who might have a superior product or service, get noticed in the overwhelmingly immense space and event of the convention.
Dendritic Spine Morphology in a Mouse Model of Developmental Epilepsy

Shyrun Karandikar, Adam McNeela, Beatriz Torres, Dustin Hines, and Rochelle Hines
Department of Psychology

Faculty Research Mentor: Rochelle Hines, Ph.D.
Department of Psychology

Epilepsy is the fourth most common neurological disorder, and is characterized by recurrent, unprovoked seizures. Seizures are disruptions in normal neuronal activity, often resulting from a failure of inhibitory signaling in the brain. Epilepsy and or seizure activity is a prominent feature of a number of neurodevelopmental disorders. Seizures can cause changes in the morphology of dendritic spines to varying degrees respective to the intensity and duration of the seizure endured. More severe instances of seizures can even result in severance of dendritic spines.

Neurodevelopmental disorders are also associated with underdevelopment of dendritic spines. We will use the Golgi-Cox staining method to visualize and analyze dendritic spine number and morphology within the CA1 region of the hippocampus in the Gabra2-1 mouse model of developmental epilepsy. For morphology, spines are classified into six different categories, based upon measurements of length from the base to the top, width at the head, linear density, and cross sectional area. The preliminary results from analysis are indicative of greater numbers of immature, filopodia-like spines in the adult GABRA2 mouse model. These findings help to establish this model of developmental epilepsy, and also to advance our understanding of dendritic spine dysfunction in neurodevelopmental disorders more globally.

From Bison to Cattle: The Ecology of the Southern Plains 1500-1750

Jenni Tifft-Ochoa
Department of History

Faculty Research Mentor: Jeff Schauer, Ph.D.
Department of History

Bison made their home on the Southern Plains for millennia. However, their migratory patterns began to shift in the 17th and 18th centuries. My research investigated what caused this drastic shift and how it had far reaching effects on the ecology of the Southern Plains. Using archives from two prominent Catholic priests, I began to piece together why the bison left the Southern Plains. Rather than focus on the Europeans as the main players, I instead focused on the Indigenous peoples, the animals, and the land as the centralized actors in this project. I discovered that the introduction of cattle by the Spanish missions was the leading factor. As the cattle quickly consumed the resources, the bison had to find additional inhabitable spaces. Their swift departure from the Southern Plains resulted in upheaval for the Indigenous inhabitants and the ecology of the Plains themselves.
Poster
Presentation
Abstracts:

3 Minute
Lightning Talks
Sustainability of Factory Farming

William Allen, Alex Schulz, and Jill Tabacon

1Department of Anthropology
2Department of Criminal Justice

Faculty Research Mentor: Levent Atici, Ph.D.
Department of Anthropology

In this research, we examine the sustainability and effects of factory farming in today’s agricultural climate. The purpose of this research is to compile data on factory farming’s long-term sustainability, to be able to address its large contributions to human health problems, environmental impacts, and the ethical treatment and breeding of farm animals. Our research will be conducted using government sources and scholarly data on the subject. These will be used to examine in-depth, the nuances that contribute to long-term sustainability issues with factory farming and industrialized agriculture. Among these issues include, human health concerns from the consumption of meat, dairy products and produce from factory farms. Our research also looks at the environmental impact due to factory farms on ecosystems, its contributions to greenhouse gas emissions, and the breeding, raising and unethical treatment of factory farm animals. The results of this research will show that major changes need to be made to the current system of factory farming to increase sustainability and reduce major health and environmental concerns we are currently facing.

Moving Beyond Traditional Sources of Trauma: A Qualitative Examination of Justice Involved Women’s Adverse Childhood Experiences

Breanna Boppre, Saleena Alvarez, Cassandra Boyer, and Emily J. Salisbury
Department of Criminal Justice

Faculty Research Mentor: Breanna Boppre and Emily J. Salisbury, Ph.D.
Department of Criminal Justice

It has been well established that victimization and trauma play a central role in women’s criminality and continued justice involvement. Prior research examining women’s trauma largely focused on the effects of physical and sexual abuse. However, adverse childhood experiences (ACEs) constitute a wide array of traumatic incidents, including emotional abuse, neglect, poverty, divorce, witnessing violence and abuse, as well as familial substance abuse, offending, and involvement in the criminal justice system. To provide a fuller understanding of the role of ACEs in women’s justice involvement, we conducted semi structured interviews with 19 women on community supervision in Northwestern Oregon. Subsequent analyses will develop common themes in women’s childhood experiences related to trauma and disadvantage. Theoretical and policy implications will also be discussed.
Red Rock Canyon Land Development

Nicholas Antonio,1 Joseph Bauma,2 and Kevin Tompkin3
1Department of Anthropology
2Department of Finance
3Department of Sociology

Faculty Research Mentor: Levent Atici, Ph.D.
Department of Anthropology

This report will examine the repercussions of housing development in an ecological environment. The focus of the report will be on the case of the development of houses in Red Rock Canyon and the surrounding area. Data will be provided concerning water pollution in Lake Tahoe, housing development in Blue Diamond Hill, as well as other data concerning urban sprawl and its effect on the nearby ecosystems. The aforementioned data is relevant to the development of housing in Red Rock Canyon in that each set of data pertains to an issue that is expected to be found in the case of development in Red Rock Canyon. This data will be analyzed to determine what degree urban development will affect the surrounding ecosystem. Specifically, the report will determine what causal relationships exist between human activity and changes in the associated environment from the data provided. Then the report will utilize the established relationship between human activity and environmental impact to predict how Red Rock Canyon may be affected by housing development. Finally the report will state conclusively the potential impacts of housing development in Red Rock Canyon and propose a recommendation of should be done about the issue.

Developmental Upregulation of TSPO During Puberty

Kayla Bland
School of Life Sciences

Faculty Research Mentor: Rochelle Hines, Ph.D. and Dustin Hines, Ph.D.
Department of Psychology

Neurosteroids are steroids that act as signaling molecules in the brain and can rapidly alter neuronal excitability via interactions with ligand-gated ion channels. Despite neurosteroid production being a key factor in the onset of puberty, we have little understanding of the mechanistic changes that upregulate neurosteroids during the development of the brain. The 18 kDa translocator protein (TSPO) is a mitochondrial receptor known to transport cholesterol into the mitochondrial matrix as the first step in the production of pregnenolone. TSPO is known to be highly expressed in neurodegenerative and inflammatory diseases of the brain, particularly in microglia cells, but we do not know how TSPO expression is controlled during brain development, and further, what impact this has on neurosteroid production. The focus of this study is to examine the expression of TSPO during development and determine the relationship between TSPO expression and neurosteroid production. We will examine TSPO expression using immunohistochemistry and confocal microscopy, examining samples from 5, 10, 20 and 25 days postnatal. In parallel we will strain for cell type markers, as well as markers of ligand-gated ion channels. Subsequent experiments will use ELISA to examine neurosteroid production at matching time points. Further understanding of neurosteroid production during development has implications for control of neuronal excitability during development and may help us to understand the mechanisms of developmental disorders such as catamenial epilepsy.
Detrimental Health and Environmental Effects of Meat Consumption and Production

**Ariana Burton,**1 Hanna Andersen,2 and Mayra Arzate2

1Department of Anthropology
2College of Urban Affairs

**Faculty Research Mentor:** Levent Atici, Ph.D.
Department of Anthropology

Our research study investigates the detrimental effects of meat consumption/production to the environment and human health. The design of our project consists of collecting secondary data from scientific journals and articles to aid our findings. The project’s field work will consist of research being done at local grocery stores. Directing a series of questions to the store’s staff and management, will help us record and understand how they prepare their meats for packaging. We will be asking questions regarding where their products come from, and the product costs. By aiding to collect photos from packaging labels such as; beef, pork, and chicken we will attain evidence to identify if any health concerned preservatives or additives are being used on these meats. The categories of grass fed, enriched, and organic meat will be noted. Helping the uninformed consumer to be informed is a goal we aim to achieve. Our research project will provide valuable information on the negative effects of meat consumption. In the process of this we find out the investigated environmental impacts of cultured meat production in comparison to the production of conventional meat. Exploration of the under regulation of the food production industry in the United States in comparison to the production methods in the European Union will give us contrast. After examining our collected data, the results of our research study will conclude that there is a significant relationship between meat consumption and impacts on human health, as well as damage to the environment.

An Investigation of Alternative Maternal Health Care Practices

**Emily Carter,**1 **Aaron Cheng,**1 **Karissa Grotjohn,**2 **Nicole Thomas,**4 and **Sharon Young**4

1West Career and Technical Academy
2Veterans Tribute Career and Technical Academy
3Advanced Technologies Academy
4Office of Undergraduate Research

**Faculty Research Mentor:** Sharon Young, Ph.D.
Office of Undergraduate Research

Research on the use of complementary, alternative, and holistic medical practices (CAM) suggests that women use CAM treatments more frequently than men and use of CAM increases during pregnancy and postpartum. Women’s use of CAM during reproductive periods has been studied, including the types of treatments used and reasons for their use, however, the literature suggests that they may be reluctant to share this information with their doctors. It is unclear where women may get information about alternative medicine, why they trust CAM treatments, and who they see as reliable sources of information. One postpartum CAM practice, maternal consumption of the placenta postpartum, or placentophagy, is practiced by a small number of individuals who believe the practice provides therapeutic benefits. The use of placentophagy has been largely ignored in research on women’s use of CAM during the postpartum period. Using data collected as part of a randomized controlled trial investigating the effects of placentophagy in postpartum mothers, we identified how women’s use of CAM changed from late pregnancy to the early postpartum and their motivations for engaging in placentophagy. Later stages of this research will investigate women’s experiences with and beliefs about CAM during pregnancy and the postpartum period, and who/what women believe to be reliable sources of information about reproductive health care.
Solar Energy

Gerardo Castillo,1 Leonardo Carrillo,2 and Taylor Milner3

1Lee Business School
2Department of Kinesiology and Nutrition Sciences
3Department of Psychology

Faculty Research Mentor: Levent Atici, Ph.D.
Department of Anthropology

The pollution from fossil fuels and the rising costs of electric energy is deemed a major problem in the United States. However, fossil fuels are a contributor to a more global problem, which if not addressed soon can cause severe problems for the future of our planet. Fossil fuels release various oxides and nitrogen into our atmosphere which in turn is toxic to our air supply. Not only that, but these gases released by the burning of fossil fuels are considered greenhouse gases. Greenhouse gases are the reason that the atmosphere is trapping too much heat which is the sole cause of global warming. Global warming is considered one of the most serious environmental issues going on today. Fortunately, we are discovering different, more environmentally friendly ways to receive the energy we need to operate and function as a society. Renewable energy is a safer, just as effective way to receive the energy we need without putting the planet at such a risk. There are many types of renewable energy such as hydropower, wind energy, ocean energy, and solar energy. Since the sun is already human’s main source of energy as well as the most available, solar energy has quickly become one of the most popular forms of renewable energy used around the world. Through advanced technologies such as the usage of solar panels, we are able to catch the energy from sun rays and utilize it in our homes and businesses. The usage of renewable energies such as solar energy could be the saving grace this planet needs in order to stop the contribution to air pollution, climate change and various other harmful consequences that are followed by using the burning of fossil fuels as our sole provider of energy.

Nutritional Composition of Placenta Supplements Compared to Other Meat

Aaron Cheng,1 Karissa Grotjohn,2 Emily Carter,3 and Nicole Thomas4

1Advanced Technologies Academy
2Veterans Tribute Career and Technical Academy
3West Career and Technical Academy
4Office of Undergraduate Research

Faculty Research Mentor: Sharon Young, Ph.D.
Office of Undergraduate Research

Placentophagy, the act of consuming the placenta postpartum, either raw or in any processed form (e.g., cooked, encapsulated), has experienced an increase in popularity in recent years. The scientific literature has shown that women who practice placentophagy have reported experiencing benefits such as a decrease in postpartum depression or “postpartum blues,” increased breast milk production, improved iron rebound, and an increase in energy. There are various ways in which the placenta is prepared for consumption, however, little research has been done regarding how the different preparation methods affect the nutritional composition of the placenta. Critics of the practice suggest that processing the placenta to be ingested as a supplement could decrease the concentration of nutrients and hormones in the organ and that placentophagy may offer little or no benefit for postpartum mothers compared to other meat. Using published values for placenta and other meats, this study investigates the potential impact of different processing techniques on placental hormones and nutrients, and whether placentophagy may provide unique nutritional or hormonal benefits to postpartum mothers.
Cultural Impacts on Perception of Auditory Rhythm and Tempo

Natalie Contreras, Jared Leslie, Jessica Nave-Blodgett, and Erin E. Hannon
Department of Psychology

Faculty Research Mentor: Erin E. Hannon, Ph.D.
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Listeners perceive foreign speech as faster than native speech, even when both are the same speed. This phenomenon is called the ‘Gabbling Foreigner Illusion.’ This illusion may occur because language-specific experience is necessary to temporally parse speech into intelligible units as it unfolds over time. Similarly, one study reported that people tap faster to music that is culturally unfamiliar than to music that is culturally familiar. Like the gabbling foreigner illusion, lack of cultural expertise with music might interfere with listeners’ capacity to find temporal units (the beat), leading them to perceive the tempo of the music as faster. We directly address the question of whether listeners are less accurate at perceiving the beat and tempo of culturally unfamiliar music as compared to culturally familiar music by asking them to rate the tempo of music from various cultures (West African, American, Indian, Turkish, and Latin). Musical excerpts will be presented in pairs and listeners will choose which of the two is faster. If listeners systematically rate culturally unfamiliar music as faster than familiar music, it will suggest that listeners experience a “gabbling foreigner illusion” for music, which we hypothesize. We will also ask listeners to tap along to the music and examine if their tapping speed corresponds to their perceptual judgments of tempo. In summary, this research is a first step towards investigating how our culture-specific experiences influence our temporal perception of music.

The Effects of a Culturally Adapted Intervention for Student-Athletes on Engagement in Mental Health Services, Treatment Adherence, and Client Satisfaction with Services

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Athletes evidence a high proportion of mental health concerns, but continually demonstrate significantly lower help-seeking behaviors compared to their non-athlete peers. The present study aims to understand associations of a culturally sensitive cognitive-behavioral intervention with athletes’ help-seeking behaviors and satisfaction with services. Present data is part of a larger randomized controlled trial funded by the National Institutes on Drug Abuse (NIDA; 1R01DA031828) that evaluates the efficacy of The Optimum Performance Program in Sports (TOPPS) compared to treatment as usual (i.e., Counseling and Psychological Services; CAPS) in a population of collegiate athletes evidencing substance misuse. TOPPS is founded on the tenets of Family Behavior Therapy (FBT), an evidence-supported, significant-other-based intervention adapted to fit sport culture. Participants were 78 student-athletes who were assigned to receive services either TOPPS (n = 38) or CAPS (n = 40). Of athletes assigned to CAPS, only 43% pursued services (at least one meeting), whereas 89% of TOPPS athletes pursued services. The following analyses (e.g., independent t-tests for group comparisons) were completed with athletes who participated in services. Compared to CAPS athletes, TOPPS athletes attended significantly more meetings (p < .001) and were significantly more satisfied with services based on the Client Satisfaction Questionnaire-8 (CSQ-8; p = .003). Research has demonstrated that duration and regularity of intervention attendance predicts more favorable outcomes, but unfortunately premature dropout rate averages around 20%. These findings appear to support that culturally adapted evidence-based interventions can engage special populations into mental health services.
Food Insecure At-risk Schoolchildren in the United States

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Throughout the United States, there are many at-risk schoolchildren who are food insecure. Therefore, there are programs such as the School Breakfast Program, National School Lunch Program (NSLP), Kids Cafe Program (KCP), and Backpack for Kids to assist these at-risk schoolchildren. School Breakfast Program is a federally subsidized program for at-risk schoolchildren where they are provided breakfasts. National School Lunch Program (NSLP) is a federally assisted meal program. Kids Cafe Program (KCP) is an after school and summer program that provides nutritious meals including snacks. Backpack for Kids provides an assortment of nutritious easy-to-eat foods and juice boxes to at-risk schoolchildren. These programs are guaranteed to keep at-risk schoolchildren nourished. On October 11th, 1966 the Child Nutrition Act (CNA) was established by President Lyndon B. Johnson. The Child Nutrition Act (CNA) was created in order for at-risk schoolchildren to be well nourished.

An Examination of Pubertal Timing Effects on Drive for Muscularity in Men

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Research has examined links between the timing of pubertal onset and risk for a number of disordered eating symptoms (e.g., body dissatisfaction, dieting); however, very few studies have explored whether differences in pubertal timing predict differences in drive for muscularity (DM) – a form of body disturbance that is particularly evident in males. Moreover, in males, pubertal maturation results in decreases in body fat and increases in muscle mass, which moves boys closer to the socially-prescribed muscular body-ideal. Boys who mature later than peers may be at heightened risk for DM, relative to their peers, given their delay in physical/masculine maturation. This study examined whether later pubertal onset is predictive of greater DM in 97-136 young adult men. The Retrospective-Pubertal Development Scale assessed perceived (i.e., perception of timing compared to peers) and objective (i.e., age at onset of secondary sex characteristics) reports of pubertal timing on voice changes, body hair, facial hair, and spontaneous erections. The Drive for Muscularity Scale assessed behavioral and cognitive aspects of DM. Only objective indicators of pubertal timing predicted DM symptoms. Specifically, later pubertal timing showed stronger predictive effects on behavioral aspects of muscle-building than on cognitive aspects, independent of BMI. These findings highlight the importance of differentiating perceived versus objective measures of pubertal timing and provide evidence that later pubertal timing may exhibit differential effects on various types of DM symptoms. Future studies should empirically identify the explanatory factors (e.g., internalization of the muscular body-ideal) underlying later pubertal timing effects on risk for DM behaviors.
**Comparison of *Clostridium Difficile* Infection (CDI) Signs Severity Between Male and Female Mice**

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*Clostridium difficile* is a rod-shaped gram-positive bacterium that can exist in a vegetative or spore form. Particularly, the spore form of *C. difficile* can survive extreme environments such as high temperatures, harsh chemicals, antibiotics, and exposure to ultraviolet light. Because *C. difficile* spores are resistant, they can remain in the gastrointestinal tract of patients and cause severe diarrhea once they germinate into toxin-producing cells. In recent years, *Clostridium difficile* infection (CDI) is becoming increasingly common and has exhibited a rise in severity due to emerging hypervirulent strains such as strain R20291. In our recently used murine CDI model, there has been observed heterogeneity of signs between female cagemates given the same treatment regimen. Several studies have shown that women who are post-menopausal, pregnant, or use oral contraceptives are at higher risk for intestinal disease such as inflammatory bowel disease (IBD) and Crohn’s disease. Estrogen has also been suggested to play a role in mediating gut inflammatory response and modifying intestinal permeability. Moreover, past studies have also found that females have a smaller bile acid pools and reduced pool of chenodeoxycholate (CDCA), a natural inhibitor of *C. difficile* spore germination. Furthermore, we have previously shown that steroid hormones can affect *C. difficile* spore germination. Therefore, it is possible that female susceptibility to CDI may be unlike their male counterparts and a possible cause for variation. In this study, male and female mice were infected with spores from the hypervirulent *C. difficile* strain, R20291. Throughout the duration of the study, we observed heterogeneity of signs in both male and female mice. However, female mice showed more severe CDI signs compare to male mice. Male mice demonstrate delayed CDI onset of milder signs. This analysis encourages us to further examine the details of bile acid composition and the estrous cycle of female mice and their possible effects on heterogeneity in CDI signs.

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**Ceramic Typology Distinctions: the Fremont from the Great Basin**

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Traditionally, temper says a great deal about ceramic assemblages, in determining the materials that people utilized for vessel construction. Archaeologists value this information because it features occupational patterns and cultural phases; although, temper has its own limitations because it does not represent cultural ideas that manifest social ideologies. Currently, the system of classification in place for the Fremont typology merely, defines characteristics of temper that undermine the intent of ceramic thought, or the kinds of images that render design style. Perhaps, temper delineates the functional use of a given vessel, in describing the material that those people chose to incorporate, when constructing certain types; however, location and everyday use cannot represent complexity, in terms of those same motifs that are shared in design elements. I intend to regroup temper and surface design by series, to increase genetic-linking among Fremont types, from a type-ware-system. This research would demonstrate how vessels maintain interrelations, to one another from compositional analysis. Thus, representing how a majority of the Fremont ceramics, also share common lineages by way of temper, and how they remain distinct from one another, on account of variations in surface design. Optimally, in treating temper and surface design at the series level, the frameworks of Fremont culture would be presented, in terms of common origin from known geographic points. These changes would aid in redefining the typology, since the existing types that are grouped around temper have not represented the ideas that these people had about style, imagery, and design.
The Effects of Pressure and Thermal Stress on Confined Diffusion

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The goal of this research is to study how pressure and thermal stress on confined diffusion couples with a varying elemental matrix affects diffusion. This method is useful in studies relating to nuclear fuels, including fuel-cladding chemical interactions. In previous experiments, the samples were under thermal stress and not confined, which led to creep. For this project, an apparatus was to be developed to house and confine the diffusion couples to prevent creep, as well as create a device that could apply a constant downwards pressure. A confined chamber was designed and produced that consisted of a cylindrical tube housing multiple dies which the samples fit in between. A shaft protrudes from this which connects to a press specifically designed to house this chamber. This pressure device utilizes a lever to create mechanical advantage at the center point of contact. Weights are loaded onto one end to utilize the effects of gravity to produce a constant force on the samples. Once the experiment has taken place, the samples are mounted in epoxy, cut, polished, and analyzed using scanning electron microscopy (SEM). Using quantitative line scans, the composition at various points can be measured and used to determine diffusion flux and coefficients. In preliminary testing of the creep-confinement chamber, the device seized and fused together. Due to this, designs have been altered and materials have been changed and are in the testing phase.

Sensitivity and Specificity of the Trail Making Test (TMT) to Traumatic Brain Injury (TBI) in Spanish Speaking Individuals

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Objective: The sensitivity of the TMT to brain damage is well-established, making it one of the most commonly used tests in clinical neuropsychological evaluations with English and Spanish speaking individuals. However, important validity questions are raised when English based norms are used to interpret test scores with Hispanic populations. The current study examined the validity of TMT scores in a sample of Spanish speakers with TBI using different English based norms to interpret their scores. Method: Participants included 126 adults (mean age = 39.9, sd = 18.8, 52.1% females), 83 with sustained TBI and 43 normal controls, of Puerto Rican descent. The TMT was administered in Spanish to all participants as part of a larger neuropsychological battery for individuals referred to a department of neurology for further evaluation. Results: Raw scores were converted to standard scores using the Heaton and Tombaugh norms. Receiver operator characteristic analysis was then used to examine sensitivity, specificity, positive and negative predictive value of the TMT Part A and Part B related to TBI. Results indicated that for the Heaton norms, area under the curve (AUC) was 0.77 for TMT Part A and 0.78 for TMT Part B. Comparable AUC’s for the Tombaugh norms were 0.80 and 0.76, respectively. Conclusions: Differences were present between the normative systems. The Heaton norms produced scores that had the highest classification accuracy for TMT part B, while the Tombaugh norms had better classification accuracy for part A. Results are discussed in the context of problems associated with using norms based on English speakers with Spanish speaking clinical populations.
Building with SuperAdobe

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This project examines the potentials of building homes with SuperAdobe in urban and suburban areas; its efficiency compared to standard building methods and its practicality with current regulations and norms. SuperAdobe uses little more than sand bags, barbed wire, and earth from the build site for construction materials, resulting in a highly affordable shelter that can be built by anyone, anywhere on the planet. The simple materials and building principles make these homes earthquake, fire, and flood resistant; safe and sustainable. This technique also allows a high level of personalization for the eventual inhabitant to mold and sculpt features of the interior (shelving, bed frames, nooks, etc.) or exterior (gathering pits, work spaces, wall décor, etc.) to their liking.

Food Waste at Home

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Food waste is a global and local issue that is critical to resolve; it can alleviate hunger and improve the environment by reducing landfill usage. Our research topic illuminates the rippling effect of food waste starting at home and its lasting effects on the environment once it accumulates in local landfills. To successfully reduce food waste, government officials and private corporations in the Las Vegas region will need to forfeit current forms of waste management. This type of involvement includes developing sustainable solutions that control the waste that Nevadans have already produced and reducing any further waste consumption. The framework to establish minimal waste in the Las Vegas Valley would require a “start-small” approach from which we can build upon.
Auditory Processing in Children with and without Autism Spectrum Disorder

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In comparison to typically-developing children, research regarding auditory processing in individuals with Autism Spectrum Disorder is not as abundant. In order for us to understand our surroundings, we must distinguish changes in our constantly changing auditory environments and determine particular sounds in degraded conditions. Failing to do so leads to experiencing change deafness, the inability to notice relevant auditory changes in our environment, or the inability to perceive speech in noise. Past research has shown ASD individuals are superior with processing lower-level features, such as pitch discrimination and identification, when completing certain tasks at the expense of higher-level hierarchical processing, such as difficulty in processing speech in noisy environments. It was also found that deficits exhibited by ASD individuals in processing correlates with deficits in social communication, everyday functioning, and academic achievement. To further understand the possible differences in auditory processing between typically developing children and children with ASD, both groups completed a change deafness task and a speech-in-noise task (R-SPIN). The objectives of these tasks were to (1) determine if children with ASD relied more on lower-level (e.g., pitch and harmonicity) or higher-level (semantic context and categorical knowledge) features when detecting auditory changes and perceiving speech in noisy environments and (2) determine how ASD symptom severity and verbal IQ relate to their performance on these perceptual tasks. The results of this research will lead to an improved understanding of ASD and pave the way to develop clinical treatments and therapies to enhance everyday functioning of those with ASD.

Processing Methods of the Human Placenta and their Effect on Potentially Harmful Substances

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Many individuals choose to rely on complementary and alternative medicine (CAM) to supplement conventional medical treatments or wholly support their health and well-being. An increasingly popular alternative medical practice is postpartum human placentophagy, or the maternal ingestion of the placenta. Mothers claim they engage in this practice for many therapeutic reasons, such as an increase in breast milk production, rebalancing of essential hormones and nutrients lost during pregnancy, and a decrease in postpartum depression and “blues” symptoms. There are a various forms of placental preparation for ingestion - dehydrated and encapsulated, cooked, and unprocessed - which have led to concerns by some researchers and medical practitioners about the concentration of potentially harmful substances in placenta prepared for ingestion. Currently, there is little information available in the scientific literature on the possible concentration of harmful pathogens or environmental contaminants in placenta prepared for consumption. This research aims to identify potential harmful substances present in the human placenta, including heavy metals, pathogens, and environmental contaminants, and how different preparation methods may affect the concentration of these substances.
Determining How Misfolded Proteins are Recognized by the Cell

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San1 is an enzyme responsible for degradation of misfolded proteins. 30% of proteins synthesized in the cell get misfolded, and it is important to correct the folding, or degrade the aberrant protein. Misfolded proteins that are not taken care of can lead to large protein aggregates, which are responsible for severe neurodegenerative diseases, such as Alzheimer's (Gardner, Nelson, & Gottschling, 2005). Before treatments can be formed for these types of diseases, the mechanisms of recognizing and degrading misfolded proteins need to be understood. Previous studies have found multiple hydrophobic stretches of amino acids in San1 that are likely substrate binding sites (Rosenbaum, et al., 2011). Our hypothesis was that truncated mutants of San1 with less substrate binding sites would have reduced enzymatic activity compared to wildtype San1, due to having a less stable interaction. After experimentation, we conclude that San1 does not require all its binding sites for robust substrate modification.

Solution Processed Wide-Bandgap Perovskite Materials for Tandem Solar Cells

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In single-junction solar cells, organic-inorganic halide perovskites that are solution processed have proven to be excellent absorbers. Halide based perovskites also offer bandgap tunability which make them good candidates for wide bandgap top-cell in a dual junction solar cell. Organic-inorganic halide perovskites are however prone to degradation due to formation energies, and tolerance factors low. Our research group has been working on developing inorganic perovskite materials by replacing $\text{CH}_3\text{NH}_3\text{Pb}(\text{Br}_x\text{I}_{1-x})_3$ cation with Cs, with reasonable success. In this study, we aim to develop a stable perovskite phase with bandgap close to 1.75 eV and high doping density to enable a high-efficiency tandem device with CIGS thin film solar cells in the future. By controlling the halide concentration, the bandgap of ($\text{CH}_3\text{NH}_3\text{Pb}(\text{Br}_x\text{I}_{1-x})_3$) can be tuned between $1.6\leq\text{eV}\leq2.3$. This research effort replaces the methylammonium cation ($\text{CH}_3\text{NH}_3$) with cesium (Cs), and dopes cadmium (Cd) on lead (Pb) cation site to obtain a $\text{Cs}_x\text{Pb}_{1-y}\text{Cd}_y\text{Br}_x\text{I}_{1-x}$ composition at $0\leq x \leq 1$ and $0 \leq y \leq 1$; which has the potential for a bandgap of 1.75 eV, and high doping density. Bansal group has previously demonstrated effect of CdCl2 treatment on doping density of CsPbI2 Br. This NSF UROP project aims to incorporate Cd through precursor solution for higher process control. Thin films of $\text{Cs}_x\text{Pb}_{1-y}\text{Cd}_y\text{Br}_x\text{I}_{1-x}$ were processed via spin coating and doctor blade process, and effect of composition and solvent on bandgap was determined via UV-Vis-NIR spectroscopy.
Rhythmic Priors in Speech and Music

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Research suggests when listening to musical rhythmic ratios, humans tend to prefer specific simple integer ratios known as priors. However, these ratios have not been examined in speech. The current study aims to find whether humans use the same priors in speech as music. We present pairs of stimuli composed of various three-part rhythmic ratios to participants. To judge how different they perceive the ratios to be, they will be asked to rate that difference on a 9-point Likert scale, with 1 referring to no perceived difference in ratios, and 9 referring to a perceived extreme difference. They will listen to three, three-syllable stimuli (“tututu”, “tabletop”, and “sensation”) that are aligned to rhythmic ratios and are composed of a length pattern of long-short-short. Stimuli are ordered in pairs so that each appears both first and second. If the participants perceive a significant difference when one stimulus plays first, but not when the stimulus plays second, then the ratio of the specific stimuli may function as a prior. This would demonstrate that a preference exists for the first ratio, but not the second. This study will allow us to narrow further in on the specific areas where speech and music differ, and allow us to pinpoint key areas where they overlap and may be used for future research and interventions.

Groundwater Contamination from Animal Feeding Operations

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Contamination of groundwater is a reality many communities encounter around the world. A source of groundwater pollution that many overlook or don’t even consider is from livestock waste, particularly from animal feeding operations (AFOs). Data from multiple sources have been complied to access the danger, and identify possible solutions. Animal waste pollutes groundwater through infiltration of the soil or by contaminating surface water which will eventually connect with a groundwater source. The potential of groundwater contamination comes from large concentrations of manure or manure in lagoons or storage tanks in which the protective barrier is inadequate. These large concentrations of manure create plumes which percolates through the soil to a groundwater source. The components of animal manure that may pose danger are nitrogen, phosphorus, potassium, microorganisms and pharmaceutical drugs. Not only do these pollutants affect the environment they always contribute a risk to human health as well. Although there are some fines and policies for AFOs who pollute, it still isn't enough and local, state and/or federal government need to put more policies in place; or the companies or families that run the AFOs need to implement new operation measures in order to protect the environment and the health of its residents. These new measures should be focused on farming practices, storage facilities, and soil management.
Association of Post-Traumatic Stress and Conspiratorial Beliefs in the Aftermath of the Route 91 Mass Shooting

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On October 1st 2017, attendees of the Route 91 Festival experienced one of the largest mass shootings in the United States. Following a mass tragedy there can be confusion and distress surrounding the factual details of an event. Conspiratorial beliefs after a catastrophe are common in many countries and throughout history. According to Van Prooijen & Van Dijk (2014), people wish to develop an understanding and try to make sense of tragic events. Many studies have found that the more tragic an event is, the more likely people are to believe in the conspiracies surrounding it. Following the Route 91 tragedy, there was factual information that circulated through the community, as well as many conspiratorial beliefs surrounding the event. A substantial amount of post-traumatic stress disorder (PTSD) symptoms were found in participants, both in those who did and did not attend the event, within 1 month of the shooting. This poster explores how symptoms of PTSD (PCL-5) and/or depression (PHQ9) may be associated with various personal beliefs (factual or conspiratorial) about the traumatic events. We also examined the associations of these two kinds of beliefs, normal-range personality traits and the abnormal traits involved in meanness in psychopathy. Method: Participants (N=135) were recruited through convenience and snowball sampling within the Las Vegas community through social media, word of mouth, and flyers posted around local businesses and event centers. Using an online self-report, we collected measures that included total scores from the PTSD Checklist (PCL-5) and the Patient Health Questionnaire-9 (PHQ9), which assess DSM-5 criteria for PTSD and depression, respectively. We also included 7 fact-based beliefs gathered from reputable news sources and 7 conspiratorial beliefs that were prominent within the community 1-week post-shooting. Both of these beliefs were scored using a 6-point scale. Participants were assessed within 1-month post-shooting to analyze acute stress responses. Results: After controlling for multiple comparisons within families of measures, PTSD symptoms (but not depressive symptoms, normal-range personality, or meanness) were associated with conspiratorial thinking. No scores were associated with factual beliefs. Conclusion: Only post-traumatic stress was associated with conspiratorial beliefs about the Route 91 mass shooting. Future research should examine the relationship between post-traumatic stress and beliefs after other kinds of tragedies to understand the depth and consistency of this relationship.

Response Themes to Inequity in STEM

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Gender and ethnic disparities in STEM remain a source of concern for researchers and students alike. This underrepresentation is most present in math-intensive STEM fields. Participants from diverse ethnic backgrounds were asked for their thoughts on this. While many participants acknowledged STEM inequity as a problem, other participants either downplayed the scope of STEM inequity, or wholly disagreed with the statement question. Those who acknowledged STEM inequity as problem tended to respond with philosophical objections, as well as mentioning why women and people of color might be underrepresented, including, but not limited to, lack of confidence or resources, and existing stereotypes. Participants who saw STEM inequity as less of an issue were more inclined to mention that discrimination is not unique to STEM fields, and asserted that the “best-qualified” people, regardless of their gender or race, should hold jobs in STEM.
Analysis of Pressure Distribution and Non-Hydrostaticity within the Diamond Anvil Cell

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Diamond anvil cells are routinely used in high pressure and high temperature experiments. Studying materials under these extreme conditions provides indispensable contributions to materials science and engineering, and broadens our understanding of the physical world around us. However, major obstacles in these studies include the accurate characterization and uniform application of pressure. The purpose of this experiment is to test for, and reduce, significant pressure variances within the diamond anvil cell. Ideally, pressure is applied on a sample equally from all directions, in what is known as 'hydrostatic' pressure. Non-hydrostatic pressure during an experiment negatively affects the pertinence of results by causing inhomogeneous stress on a sample. Therefore, it is important to improve hydrostaticity in the diamond-anvil cell by whatever means. In our study, we implement 3 sample chamber designs for use in a diamond anvil cell: four holes, two holes, and a single hole (standard) using a laser driller. The pressures in each sample chamber are measured using the widely used ruby fluorescence method. With silicon oil as a pressure transmitting medium (PTM), ruby fluorescence measurements will be taken in steps at pressures < 30 GPa. We have investigated Co\textsubscript{2}Fe\textsubscript{2}O\textsubscript{4} nanoparticles using Raman spectroscopy within a single-holed gasket. Results of the high pressure study are presented and its implications are discussed in this poster. Structural changes and pressure data will be factored in with data from the other two experimental gasket designs and coupled with different pressure transmitting media.

Effects of Perceived Career Stagnation on Full and Part-Time Faculty

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Previous research demonstrates lack of support for part-time faculty leads them to perceive less organizational worth and affective commitment to their institution. Nonetheless, they often feel that the institution has maintained their promises. Past research has also failed to examine non-traditional colleges and how career choices or stagnation impact faculty outcomes. The present study hypothesized that perceived career stagnation greatly contributes to differences in how full-time and part-time faculty at Nevada State College tend to evaluate themselves within the institution. The study was based on self-reports from 56 full-time (78.87% response rate) and 43 part-time (22.28% response rate) faculty. Results for main effects showed part-time faculty reported significantly higher levels of psychological contract fulfillment, perceived organizational worth, morale, and lower levels of relational closeness with coworkers. Also, faculty who felt their career was stagnant reported significantly lower levels of perceived organizational worth, affective commitment, teamwork, and pay satisfaction. Results for interaction effects showed that career stagnation negatively impacted full-time faculty more than part-time faculty in areas such as perceived fulfillment of psychological contract, perceived organizational worth, morale, and pay satisfaction. Moreover, when part-time faculty did not perceive their career to be stalled, they tended to have higher levels of perceived organizational worth, morale, and pay satisfaction. Based on the results, colleges should create conditions that encourage full- and part-time faculty to develop their careers and not stagnate.
Pathologizing Child and Adolescent Behavior: The Evolution of Conduct Disorder Over 40 Years

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Criminal justice systems in the United States largely view children who break the law as members of one indistinguishable group, despite many advances in the clinical conceptualization and treatment of disruptive childhood problems. The current study cross-compares conduct disorder types (childhood-onset, adolescent-onset, callous-unemotional) in over 100 academic articles from 1980 to 2018 to examine the evolution of conduct disorder as a diagnosis. We systematically coded each study for the conceptualization of conduct disorder, participant demographics, participant adverse childhood experiences, medical history, diagnostic measurement, treatment, and results. Early academic studies often mirror current criminal justice language, using terms such as “acting-out,” “performing,” or “aggressive” to make simple, “bad kid” causal claims. We argue that this language creates false assumptions about conduct disorder when compared to more recent understandings of conduct disorder, including the role of environmental causes and the influence of cultural biases on diagnosis. In particular, ambiguous information regarding ethnicity or gender also appears prominent in academic studies until the most recent decade, which has likely encouraged the continued use of limited stereotypes involving children in the criminal justice system.

Many of these accounts and views appear to stem from lack of information, technology, or medical understanding, corresponding with research disparities between each time period. Such misinformation can limit treatment options, especially for children and adolescents in detention centers and other prison settings. We conclude with a treatment recommendation that focuses on multidimensional approaches, including a combination of biomedical, family, group, interpersonal, and individual talk based therapies.

Indicators of Sustainability and Degrees of Democracy: A Correlational Analysis

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The purpose of this study is to examine whether a correlation exists between measurable indicators of sustainability and degrees of democracy. Democracy may be generally defined as a system of government in which power is vested in the majority. In this paper, democracy is defined and measured by citizen participation. Sustainable development may be defined as development that meets the needs of the present without compromising the ability of future generations to fulfill their needs. The complexities of this relationship are explored through analyzing the percentage of people participating in their respective democracies, as reported through the Democracy Index by the Economist Intelligence Unit, and comparing these data with the Sustainability Society Index by the Sustainable Society Foundation. Although the literature has not always been conclusive regarding the relationship between democracy and sustainability, we hypothesize that there will be a positive correlation between a country with a higher degree of democracy and its sustainability index.
Differential Raytracing and Multiresolution Analysis for Chemical Synthesis Optimization of Nanomaterials

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For solar energy applications, a special class of inorganic oxides can be synthesized as nanoparticles via hydrothermal and co-precipitation methods, with this material successively ported to spectrally-selective absorber coatings. With solar concentrators, these coatings support the conversion efficiency of solar-thermal energy storage, supporting the viability of solar technologies for renewable power generation. In observing the surface morphology of such coatings, determined by Field-Emission Scanning Electron Microscopy (FESEM) data, significant correlation is calculated to the spectral absorptance, optical scatter, and irradiance distributions of interacting solar radiation. Surface texturing can also improve the material’s absorber efficiency by enhancing spectrally-selective behavior: the capacity for coatings to achieve high UV-VIS absorptance and low thermal emittance to reduce waste heat. While surface and volume modifications can be made to the coating material’s structure in post-treatment, we have demonstrated the use of sacrificial polymer beads to simplify the formation of porous structuring, generating light-trapping structures for specific wavelengths that improve absorber performance. A cuprous bi-metallic inorganic oxides are synthesized as nanoparticles for their use as potential material candidates for solar absorbing applications. Image processing on coating microscopy data is then used in a custom simulation to correlate material properties and structuring. Multiresolution analysis using wavelet transforms is performed to construct approximated surface profiles of the material. This mathematical model is used in conjunction with differential raytracing methods to calculate the resulting optical scatter from re-radiated solar energy. We propose this simulation for broader applications of chemical and material analyses, supporting advances in computational chemistry.

Epigenetics and Food Insecurity in Nevada

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Breakthroughs in epigenetics have enabled researchers to track transgenerational transmission of trauma as they relate to caloric restriction (Feinberg, 2015). Food insecurity is then a multifaceted issue that extends beyond economic and political implications. Adverse health outcomes as a direct result of altered methylation patterns in children stands to modify the biological landscape of poorer communities for multiple generations (Zaneta & Kuzawa, 2011). This health inequality is an issue throughout the United State but is especially pronounced in Nevada. As of 2012, one in six residents in Nevada are classified as food insecure (Nevada Department of Health and Human Services, 2013). While governmental action is currently underway, there is virtually no discussion on epigenetic ramifications of a long withstanding trend of regular hunger. We argue that an epigenetic perspective is necessary when understanding the broader health outcomes of affected individuals and when calculating future economic impacts.
Impacts of the Route 91 Mass Shooting on Post-Traumatic Stress, Depression, and Well-Being

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There were 58 killed and 546 injured at the Route 91 festival, but there were countless others affected by this tragedy due to the onset of post-traumatic stress disorder (PTSD) and depression symptoms. It was hypothesized that people present at the festival would have higher levels of these psychological symptoms and lower levels of well-being, gratitude, satisfaction with life, meaning in life, and religiosity than those in the broader Las Vegas community who were not present at the festival. 136 participants were recruited through convenience and snowball sampling within the Las Vegas community through social media, word of mouth, and flyers posted around local businesses and event centers. Through the online Qualtrics platform, self-report measures assessed whether or not an individual was present during the mass shooting in addition to their post-traumatic stress (PCL5) and depression (PHQ9) symptoms, psychological well-being (PWB), meaning in life (MLQ), satisfaction with life (SWLS), gratitude (GQ), and religiosity (RCI) scales. Participants were assessed within 1-month post shooting to analyze acute stress reactions to the shooting. Individuals that were present yielded more severe symptoms of PTSD and depression but did not differ in their mean levels of well-being after controlling for multiple comparisons. PHQ9 scores were negatively related to PWB, SWLS, and GQ scores. However, there were no significant relationships between PCL5 scores and any measures of well-being. The results suggest reduced well-being was only associated with symptoms of depression.

Children Synchronize Their Finger Taps to Rhythms Through Iterated Reproduction

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Rhythm is ubiquitous to human communication. The ability to speak with a native accent or play music depends on listeners’ ability to perceive, reproduce and synchronize with rhythmic patterns. Previous research has shown that rhythms are perceived and reproduced as having an integer ratio, even when the rhythm’s physical structure does not actually support an integer ratio structure. In a recent study, adult participants listened to non-integer ratio rhythm intervals, and on each successive trial, were presented with the iteration of the rhythm that they tapped on the previous trial. Results showed that participants were biased to conform their tapping to integer ratios on consecutive trials. No one has investigated whether children’s tapping also converges on integer ratios when listening to non-integer rhythms. In the proposed study, children ages six to twelve years will complete an interactive tapping computer game. In this computer game, the children help an astronomer communicate with aliens by tapping to the rhythms sent to Earth from the aliens’ home planet. If preference for integer ratios changes across development, then we would expect older children (8-12 years) to converge their taps on integer ratios of the rhythms more quickly than younger children (6-7 years). It is possible that younger children have not developed preference for rhythm integer ratios, and thus may not show any convergence to integer ratios after successive iterations. Results will have implications for the development of rhythm processing and will pave the way for subsequent studies of rhythmic tapping in children.
Examination of GABA<sub>α</sub> Receptor Expression in the Enteric Nervous System

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We all know that sensation of a “gut feeling” where our digestive system seems to inform our decision making, but the intimate connection between the gut and the brain is still becoming appreciated. We also know that a number of neurodevelopmental, psychiatric, and neuroinflammatory conditions are associated with digestive dysfunction, but again our understanding of this connection is limited. Within our digestive system we house a “second brain” known as the enteric nervous system. The enteric nervous system produces and releases multiple neurotransmitters, and expresses and utilizes a number of neurotransmitter receptors, mirroring brain signaling. In particular, the major inhibitory neurotransmitter of the central nervous system, γ-amino butyric acid (GABA), is known to increase the force and frequency of colonic contractions, and colonic contractility can be influenced by GABA<sub>α</sub> receptor ligands. Despite this indicated role, we do not know what subtypes of receptors are expressed and where these receptors are localized. Our studies examine the expression of GABA<sub>α</sub> receptor subunits in the enteric nervous system using Swiss roll preparations of the mouse digestive tract. We hypothesize that the enteric nervous system will express GABA<sub>α</sub> receptor α subunits that are a key component of ligand binding and receptor function in central nervous system synapses. These studies are expected to provide a platform for the examination of abnormalities in GABA<sub>α</sub> receptor expression in the enteric nervous system of mouse models of nervous system disorders, known to have enteric dysfunction.

Finding the Common Time: Similarities and Differences in the Temporal Aspects of Speech and Music Perception

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Speech and music share many similarities: they are both forms of auditory communication, they are patterns of sound that occur over time, and they are universal human behaviors. To comprehend speech and music, listeners must parse a continuous sound stream into meaningful units such as syllables or notes, words or melodies, and sentences or musical phrases. Research examining the relationship between individuals’ beat perception and language skills is mixed; some studies link phonological processing or reading-readiness skills to beat perception, others do not. We have designed a natural-language speech segmentation task in which listeners to identify target words embedded in spoken sentences in familiar (English) and unfamiliar (Turkish) languages. Participants performed all of the following tasks: speech segmentation in English and Turkish, a cross-cultural meter perception task examining sensitivity to multiple metrical levels in culturally familiar (American) and unfamiliar (Turkish) music, and tapping to American and Turkish music. The use of culturally familiar versus culturally unfamiliar stimuli allows us to assess the relative impact of enculturation and experience on speech segmentation and meter perception. Preliminary analyses suggest that speech segmentation is influenced by target language and sentence language, with participants performing poorer for unfamiliar target words regardless of sentence language, and poorer for all targets embedded in unfamiliar-language sentences. Individuals also took longer to start tapping to culturally unfamiliar than familiar music, and tapped faster to culturally unfamiliar music. Additionally, participants had higher sensitivity to multiple levels of metrical structure in culturally familiar than unfamiliar music.
Autonomy, Agency, and Absolution: A Rhetorical Criticism on Baby Driver

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Baby Driver, an action/drama movie released in the summer of 2017, follows the story of a young man, Baby, who is caught up in a life of crime as a getaway driver. Throughout the film, viewers see how Baby experiences hardships of poverty, disability, and past trauma. However, despite his limitations, Baby is portrayed as a fully-functioning and autonomous person. Through qualitative research, I isolate two methods of rhetorical criticism that can be applied to film: dramatism and ideological criticism. By both understanding and integrating the Burkean pentad of dramatism along with the ideological implications of hegemony and current power structures, Baby Driver can be analyzed for its underlying societal meaning. Through such a lens, Baby Driver evokes a scene:act ratio that shows how all humans are susceptible to life’s pitfalls and can be constrained by poverty, crime, and personal situations. In emphasizing the scene, Baby Driver tells a story about a person’s perceived disability (as commented on throughout the movie by those he interacts with), which is not actually detrimental or restrictive; Baby is equally and sometimes more capable of action than those around him. Because the film emphasizes these underrepresented themes through a unique perspective, it exists as a meaningful rhetorical artifact that informs societal perceptions of the human condition and agency.

Development of Self-Sustained Musical Beat Perception

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Through music, listeners are exposed to rhythm as early as infancy. Adult listeners easily perceive the beat (period pulse) in music, and some evidence suggests that children as early as 4 years can use the beat to discriminate rhythms. However, it is unknown when subjective beat perception (the ability to self-sustain a musical beat pattern) develops. In this study, we investigated subjective beat perception in 4- to 17- year-olds. Participants completed a computer game where they acted as an assistant music teacher and judged whether a student drummer was accurately playing along with a piano teacher. On each trial, participants listened to a musical excerpt that strongly supported a particular beat pattern (context phase), followed by an ambiguous rhythm consistent with either beat pattern (ambiguous phase). During the last two measures, the drummer played either on or off the beat, and the participant had to judge whether he was matching or not matching the music. Results showed that older children were able to maintain the beat and, thus, performed well on the task, but younger children could not. Furthermore, results showed that young adolescents continue to show improvements in self-sustained beat, and performance continues to develop into late adolescence, supporting a developmental trajectory of beat perception skills through adulthood. These findings suggest that while detecting the beat in music may develop earlier in childhood, the ability to self-sustain the beat may develop in older childhood to adolescence.
The Influence of Policy and Culture and the Influence of Culture and Policy with Food Subsidies

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Laws and policy that governs a society guides the culture and the culture constructs laws and policy. When it comes to the types of provisions and subsidies for food, the US government could aid the citizens that it governs to eat healthier and allow for farmers to focus on fruits and vegetables than corn and meat. The average American consume about 2,000 calories a day of sweetener and fat from corn that is not including other foods the individual might eat in the day. The US government gives more subsidies to corn and wheat farmers than fruit and vegetable, which causes more consummation of grains and corn to go down and the prices of fruits and vegetables to go up. These kind of policies influences the American people to eat unhealthier than the rest of the developed world. By examining the policies around the world, we could see how to spend our subsidies properly. By doing so, we could change the eating habits of the American people.

Neural Mechanisms of Bistable Stimulus Perception in Auditory Processing

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The presentation of a stimulus that does not physically change over repeated presentations, but has the potential to branch into two separate percepts is known as ’bistable’. A bistable stimulus provides researchers with a powerful experimental approach to study the neural processes that underlie a”switch” in conscious perception from one percept to the other without a confounding change to the physical stimulus. Here we investigated the neural processes underlying auditory bistability using an intermittent stream segregation paradigm during electroencephalography recordings. Participants heard triplets of low (A) and high (B) pitch tones, where every other B tone is replaced with a silence(-)resulting in an ABA- pattern. Each trial consisted of three triplet repetitions (700ms duration each) followed by a 700ms silence in which participants indicated whether they heard one combined “galloping” stream of tones, or two separate streams of tones (high tones, low tones). We compared the neural activity during the perception of one versus two streams, and between trials where a perceptual switch occurred versus when a perceptual switch did not occur. Results show a greater sustained negativity approximately 400-600 ms post-trial onset during the triplets, when participants indicated a two-stream percept relative to a one-stream percept. This could reflect enhanced top-down attention required to maintain a two-stream percept. A reversal negativity was also observed during trials where a perceptual switch was reported, occurring at approximately 150-200ms post-stimulus onset. This could reflect the neural activity associated with facilitating a switch to a new percept and/or suppressing an old percept.
Phosphate Availability in Arid Environment Exposed Lacustrine Sediments the Potential for Future Phosphate Mobilization

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This study aims to quantify phosphate stored in exposed sediments at Lake Mead, Nevada, and the potential for phosphate to be freed upon submersion. Field samples were collected, phosphate fractions were isolated by sequential extraction, and the phosphate concentration of each fraction in each sample was analyzed by UV-Vis spectrophotometry. Our findings indicate that exposed sediments at Lake Mead serve as a phosphate sink. If these exposed sediments were to be reintroduced to the lake and undergo a change in redox conditions, by the lake level rising or by another mechanism, there is the potential for release into the water column. Lake Mead is susceptible to nutrient pollution and eutrophication. Eutrophication costs billions of dollars to US fisheries and tourism annually (Dodds, et al 2009). Lake Mead faces increased total dissolved solids and decreased oxygen levels as its elevation falls (LaBounty and Burns, 2007). These factors could make eutrophication more frequent in the future (EPA, 2013). Since Lake Mead is phosphorus limited (LaBounty and Burns, 2005) any increase in phosphate could lead to large toxic algae blooms, as seen in Lake Mead in 2001 (LaBounty and Burns, 2005). Our results indicate that Lake Mead’s sediments retain phosphate that is deposited, even after years of exposure at the surface. More study is required to determine how much of this phosphate could be released into Lake Mead, but it is reasonable that it may become available to biota should it be reintroduced to the lake.

Heavy Metal and Soil Pollution

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The quality of information and the study at hand, has a set focus on the effects of heavy metal contamination on the soils around the world. Heavy metal contamination and soil pollution in general has been a long standing environmental issue that has set planet Earth’s future spiraling backwards, due to the tremendous amount of harm to the planet. Toxic E-waste, bioavailability, and heavy-metal pollutants such as, Arsenic, Cadmium, Copper, Manganese, Lead, and Zinc are detected in areas around the globe. In conclusion in determining how, how much, and why soil pollution is occurring at an extremely harmful rate, to the environment and to people, this specific study will ultimately offer beneficial solutions of pollution remediation. All in all, the best way to save the soils and the environment of the Earth in general, is to seek all possibilities of limiting the amount of E-waste, over-consumption of products that are declared useless, and to have a positive impact on the environment.
**Grocery Surplus Redistribution in America: Progress, Hurdles, and International Examples**

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Although American society produces/imports enough food to feed every citizen, our surplus often ends up in landfills instead of with the hungry. One effort to curb this waste is collecting the food grocery stores would otherwise throw away and redistributing it to the poor. With this project, our goal is to track the progress of existing local grocery redistribution efforts and to analyze their current and potential efficacy in reducing food insecurity and waste, as compared to similar international programs.

Nevada has private organizations that redistribute surplus groceries through food banks, like the group Three Square. Private and public food redistribution efforts are being made countries like England and France, with recent laws passed in the latter country aimed at the goal of minimizing waste through surplus donation. We believe that local charitable efforts would be best assisted by legislation that mandates the donation of excess food by grocery stores in the same vein as France’s new laws, assuming there is sufficient demand/access to outside redistribution services. We also recommend public funding toward redistribution services as part of public food insecurity relief efforts. Further analysis of current food insecurity levels and current grocery waste levels will help us in discerning the scale of the efforts required to significantly reduce food insecurity in Clark County.

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**The Impact of Dance Experience and Cultural Background on the Perception of Musical Tempo**

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Music is a universal element of the human experience. However, our personal musical experiences are dependent on our culture. Manifesting these auditory experiences through embodied ones, such as dance, changes the way we perceive different musical qualities.

Musical speed, or tempo, is an important characteristic in determining how an individual will move to the music. To better understand the ways in which cultural familiarity and dance experience are involved with the perception of tempo, we will compare Latin dancers with non-Latin dancers. We will present sets of two Latin songs, and participants will decide which song sounds faster. One potential result would be that both Latin dancers and non-Latin dancers can accurately tell which song is moving faster, indicating that knowledge of dance steps and cultural familiarity does not influence our perception of musical speed. An alternative result would be that Latin dancers may interpret a song to be faster or slower than it actually is by focusing on the feel of the music and the ways they would move their body, rather than the actual musical tempo, while non-Latin dancers would not. Effectively, dance training would have changed their perception of the speed of music, hindering their performance on this task. These results would inform us on the influence of culture and dance experience on the perception of tempo. Music is an integral component of our cultures and everyday lives and this work would help us understand how connected our body is connected to the music we listen to.
Uranium Mining in the Grand Canyon and the Implication on the Water Quality of Local Springs

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Recently, a U.S. court of appeals voted to uphold a uranium mining ban in the Grand Canyon, however, up to 11 claims in the nearby region could still be eligible for development. Mining in the region has been debated for several decades with opponents claiming that the mining has led to the contamination of water that runs through the canyon including springs, which host a diverse ecology. Within the region, there are several jurisdictions that conduct water quality testing and there is little sharing of this data, making it difficult to determine the extent of contamination.

Over the last two years, a master database has been developed with the aim of consolidating the data sources and make it available to various organizations. For this project, the database was sorted to isolate all the data pertaining to springs, excluding wells, creeks, and rivers. From there, the springs were analyzed for contaminants that exceeded the maximum contaminant level. The results show that more than 180 water quality tests detected uranium above the maximum contaminant level of 35 ug/L. This implies that springs within and around the Grand Canyon have been exposed to uranium contamination and further testing is warranted to ensure appropriate remediation action is taken and continued mining within the region is limited.

Blood Cell Dynamics in an Ancestral Hibernator, the Common Tenrec, Tenrec ecaudatus

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Common tenrecs, *Tenrec ecaudatus*, are medium-sized mammals endemic to Madagascar which have many ‘ancestral’ traits like a cloaca. Tenrecs are capable of effectively hibernating at temperatures between 12 and 28°C and do not undergo periodic arousals during hibernation, a feature common to all other known hibernators. During the active season, these mammals experience profound plasticity. Body temperatures in active tenrecs can approximate ambient temperature from 12-28°C or be relatively high at 28-32°C. Active season tenrecs can even experience spontaneous bouts of torpor (facultative torpor). Other hibernators like ground squirrels have a profound leukocytopenia (sequestration of white blood cells to tissues like the spleen) and it is thought to be temperature-dependent. We found tenrecs have a profound leukocytopenia but also may sequester red blood cells. We demonstrate the spleen to be a primary site for this sequestration. Importantly, neither state (e.g. hibernation or active) or body temperature dictates sequestration dynamics. Instead, we believe tenrecs employ a pulsatile metabolism wherein the availability of blood cells is related to overall metabolism.
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