



UROC-PREP

Thea Van Gorp



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“Changes within Museums

A Case Study of Interpretation and Communication at the Arizona State Museum”

ABSTRACT: Many museums are changing ways in which they create exhibits and programming in attempts to become more inclusive institutions for community education. As museums make changes, it is crucial to look critically at the effects of these changes on the populations museums serve. This case study is conducted at the Arizona State Museum (ASM) in Tucson, Arizona to better understand a) What methods of communicating knowledge are effective in this setting, and; b) How visitors are engaging with and understanding this knowledge. This study aims to answer these questions for two exhibits in the ASM called *2,000 Years of Planting* and *Life Along the River* through mapped observations and volunteer interviews. Each exhibit is different both in presentation and in content. Data collection and analysis will be completed in the upcoming Fall of 2018. Analysis of the collected data from these exhibits will help to inform ASM staff as to what methods of communication and content was most impactful for visitors as they develop new exhibits and programming.

Steven Barrera



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“Normalizing death: A descriptive analysis of periodical news coverage of migrant deaths in the Sonoran Desert”

ABSTRACT: Since 2001 there have been over 2,100 undocumented migrants whom have died and had their remains reviewed by the Pima County Office of the Medical Examiner (PCOME). Media coverage of migrant deaths has fluctuated greatly over the past 20 years. This study uses data from PCOME to record the occurrences of Undocumented Border Crossers (UBCs) deaths within the Arizona-Sonora Desert. This study also utilizes full-text searches of previously published *Arizona Daily Star* articles pertaining to migrant deaths. By recording the prevalence of these articles or the lack thereof, I establish the framework of my research question which asks if the media’s declining coverage of migrant deaths furthers a discourse of dehumanization and a normalization of migrant deaths. The purpose of this study is to inform the public about the prevalence of UBC deaths in the Sonoran Desert as well as shed light on the declining media coverage of dead migrants. The prevalence of migrant deaths in the Sonoran Desert has primarily been exemplifying an increasing trend since the mid-1990s. *The Arizona Daily Star’s* publication of articles concerning migrant deaths has decreased dramatically since the early 2000s, while the amount of migrant deaths are primarily remaining at constant rates, especially after the early 2000s. While these findings showcase a declining trend in printed *Arizona Daily Star* periodical articles regarding UBC deaths, further research across various media platforms and publications is needed to better understand media coverage trends regarding migrant deaths.

Sara Torres Inda



“Implications of International Trade on Mexico’s Economic Development”

ABSTRACT: Poverty is a phenomenon significantly prevalent in Mexico despite the country’s rank as the 11st largest economy in the world (International Monetary Fund, 2018). Factors behind existing poverty levels in Mexico include, high degree of corruption, economic and political institutions, weak rule of law, large quantity of informal firms, and inefficient FTAs regulations (National Bureau of Economic Research, 2005). This study examines why some Mexican municipalities face higher levels of poverty than others. The study is completed by correlating the levels of poverty, or the levels of economic growth, from municipalities in Mexico with the number of labor-intensive enterprises, to the trade balance activity with the U.S. This study uses data on the magnitude of poverty in Mexico constructed by CONEVAL (Indice de Rezago Social), NAICS stats on U.S.-Mexico trade balance, and information of businesses in Mexico from INEGI, to draw connections between independent (businesses and trade balance) and dependent (economic growth levels) variables. The purpose of this research is to inform and to make the reader considerate an alternate factor (labor-intensive enterprises) to the existing economic inequalities across towns in Mexico.

Rebekah Ulmer



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“Remunicipalisation of Water Supplies in the United States”

ABSTRACT: During 1990s and into the 2000s there were a growing number of municipalities turning to privatization in order to solve their water problems. This surge in, and subsequent failure of, privatization led to the implementation of remunicipalisation as way to counteract private companies from gaining power over water resources. A brief overview of global trends indicates that over the course of the past several decades there is a movement towards remunicipalisation around the world. This study examines remunicipalisation in the U.S. using eight case studies chosen from fifty-eight remunicipalisation sites across the country in an attempt to establish common associations between instances privatization and remunicipalisation. Preliminary findings suggest the U.S. is in the process of following the global trend of remunicipalisation as a result of the general public pushing to reclaim accessibility and financial control from private entities.

Sandra Mungaray



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“Transport Behavior of Per- and Polyfluoroalkyl Substances in Soil”

ABSTRACT: Per -and polyfluoroalkyl substances (PFASs) are chemical compounds with a wide range of uses. Perfluorooctanoic acid is a type of PFAS of particular concern within the scientific community because of its ubiquity and toxicity to humans and the environment. It has been found in drinking water in amounts orders of magnitude greater than the recommended amount set by the EPA. Characterizing the transport behavior of such compounds is important in developing methods to control and mitigate the spread of these contaminants in the environment. Using column studies paired up with UV-Vis analysis, this experiment took the first steps in characterizing the behavior of this particular compound.

Morganne Myers



“Phonetic Inventory Complexity Levels in Bilingual Speech”

ABSTRACT: It is more likely that misdiagnoses of speech disorders will occur for bilingual youth than their monolingual counterparts because diagnosis methods developed for speech disorders have focused on monolingual speakers. The lack of information about typical and atypical bilingual speech development is a key factor in misdiagnosis. The purpose of this research is to compare the complexity level of phonetic inventories in bilingual and monolingual children in order to observe similarities and differences in acquisition of speech sounds. Children ages three to six were recorded naming pictures to produce single word samples used to collect phonetic inventories. Qualitative observations suggest the complexity level of bilingual inventories differs across languages but is not indicative of the presence of speech disorders. The four year old bilingual children’s complexity levels indicated separation of language specific phonetic inventories despite the presence of cross linguistic interactions. Further research into the typical development of monolingual Spanish speakers is warranted to better understand the differences in complexity levels as well as typical acquisition rates of monolingual Spanish phonetic inventories.

Matthew Lemke



“Analysis of Light-induced Reactive Oxygen Species Signaling Pathways from Chloroplasts in *Arabidopsis thaliana*”

ABSTRACT: Plants have evolved complex mechanisms that allow them to sense and respond to photo-oxidative stress caused by abiotic stresses, such as photosynthesis-produced reactive oxygen species (ROS). The purpose of this study was to explore pathways involved in light-induced stress responses in *Arabidopsis* mutants using forward genetic screens followed by genetic analysis. Plants used in this study have a mutation in their *Ferrochelatase 2 (FC2)* gene that leads to a buildup of the tetrapyrrole, protoporphyrin IX, in natural cycling light conditions, which can generate singlet oxygen (1O_2). This triggers a signal that prompts chloroplast degradation and cell death. To identify genes involved in this cellular degradation signal, we screened for mutations that suppress the cell death phenotype of the *fc2* mutant. First, *fc2* mutants were transformed with the pSKI015 vector, which upregulates gene expression downstream of the vector insertion site due to enhancer sequences in the vector. We screened for plants that regained the ability to properly develop in cycling light conditions. Once identified, suppressor candidates will be further analyzed using biochemical assays. This will determine if suppression was caused by simply altering tetrapyrrole synthesis, thus avoiding 1O_2 damage. Candidate genes will be mapped by extracting genomic DNA from suppressor mutants followed by plasmid rescue. Rescued plasmids will then be selectively cloned in *Escherichia coli*. DNA sequencing will be used to identify the region of DNA affected by the vector insertion. With further research, this method may allow for the identification and analysis of genes involved in photo-oxidative stress signaling.

Marleen Ibarra



“Subcutaneous adipose tissue therapy: a deep manual therapy that decreases fat in lipedema and dercums disease”

ABSTRACT: Lipedema is painful nodular subcutaneous adipose tissue (SAT) on legs and arms of women with sparing of the trunk. People with Dercum disease (DD) have painful SAT masses. Lipedema and DD fat resists loss by diet and exercise. Treatments other than surgery are needed. The study design was single arm, non-blinded prospective trial for six women with lipedema who underwent 12 SAT therapy sessions 4.5 months previous, and one woman with diffuse (very small nodules in fat over the body) DD new to SAT therapy was added. Body composition by dual X-ray absorptiometry scan, leg volume, weight, pain, bioimpedance, tissue size by caliper and ultrasound were analyzed before and after SAT therapy by paired t-tests. There was a significant decrease from baseline to end study in weight, 87.6 ± 21 to 86.1 ± 20.5 kg ($P=0.01$), leg fat mass 17.8 ± 7.7 to 17.4 ± 7.6 kg ($P=0.008$), total leg volume 12.9 ± 4 to 12 ± 3.5 L ($P=0.007$), six of twenty caliper sites, and tissue edema. By ultrasound, six women had 22 hyperechoic masses in leg fat that resolved end study. Fascia improved by ultrasound to end study. Treatment of fat tissue with a manual SAT therapy improved the structure, reduced masses and nodules, and reduced the amount of tissue fluid in lipedema and DD. These data suggest that improving the structure of fat tissue may allow for weight loss in fat disorders. SAT therapy needs to be tested for benefits against other manual therapies.

Moana Hala'ufia



“Extraction of Natural Molecule Gedunin and its Effects on Heat Shock Proteins”

ABSTRACT: The purpose of this study is to justify the use of natural molecules in modern medicine in order to create safer treatments. This project aims to demonstrate this by examining the effects of natural molecule gedunin on heat shock proteins (HSP) which then can lead to gedunin’s integration into cancer therapy. Given that heat shock proteins are a key proteins utilized by cancer to proliferate, if gedunin is shown to have the ability to cleave these proteins, its use in cancer medicine can be justified. In this study, gedunin will be extracted from crude bark samples of *Xylocarpus granatum*, a mangrove indigenous to the eastern tropics. After gedunin has been extracted and purified, this study hopes to introduce gedunin to HSP70 and examine its possible degradation effects. This research will provide valuable information on the use of gedunin and will also provide insight into methods of eradicating cancer via HSP inhibition.

Elizabeth Culpepper



“The Effects of Stapled Peptide Therapy on the EGFR Signal Transduction Pathway”

ABSTRACT: The Epidermal Growth Factor Receptor (EGFR) is an extracellular trans-membrane tyrosine kinase that binds to its ligand EGF (Epidermal Growth Factor). When EGFR binds to EGF, it triggers a cascade of downstream signals, promoting cancer cell differentiation and proliferation, survival, and migration. This cascade of signals is mainly derived from the EGFR signal transduction pathway. Due to the activation and signaling of a prior protein, a protein in the EGFR pathway is expressed and activates a subsequent protein, thus producing a cascade of signals. Inhibiting EGFR activity using anti-EGFR therapies such as Cetuximab could efficiently suppress downstream regulation and overall cancer progression. However, due to the significantly low survival rate for metastatic triple-negative breast cancer patients and the possible therapeutic resistance they face, developing & researching therapies to overcome these challenges is pertinent to patient survival. Previously, researchers constructed a stapled peptide therapy, SAH-EJ1, to target EGFR. The purpose of this study is to determine how SAH-EJ1 affects EGFR and proteins expressed within its signaling pathway. To find this, we performed western blots on tissue lysates from mice tumors treated with SAH-EJ1 or saline to establish how protein expression changed in tumors when treated with the therapy versus the control. From these experiments, it was concluded that more samples from tumors treated with SAH-EJ1 expressed components of the signal transduction pathway, specifically phosphorylated STAT3 and phosphorylated ErbB3, than in tumor samples treated with the control.

James William White
Winslow



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“Western Blot Analysis of Manganese Transporters in Mice Liver”

ABSTRACT: Manganese is required for several physiological processes such as cell growth, reproduction, maintenance of nervous and immune cell function, regulation of blood sugar and vitamins, and antioxidant defense. DMT1, ZIP8, ZIP14, and ZnT10 are manganese transporters involved in maintaining manganese homeostasis in the body. The purpose of this research is to examine the differential expression of manganese transporters DMT1, ZIP8, ZIP14, and ZnT10 in the liver in 20-week-old ZIP14 knock out mice. Mouse liver was grounded from wild-type, or ZIP14 $-/-$ mice with (1) NETT was used to produce total cell lysates from mouse liver samples. (2) HEM buffer or NETT buffer was used to produce a total cell lysate. The total cell lysate was ultra-centrifuged to isolate membrane. The membrane was resuspended in SDS buffer or NETT buffer to produce membrane fraction. The protein concentration of the total cell lysates or membrane fractions was determined using an RC DC protein assay. Specific proteins in total cell lysates or membrane fractions were detected utilizing western blot. Collectively, these results were used to optimize a protocol to detect the expression of manganese transporters in mouse liver. Future studies will examine ZIP8, ZIP14, ZnT10, and DMT1 expression in newborn to 20-week old wild-type mice.

Ariana Monique Frisby



“Acquisition levels of typical and atypical phonetic inventories in bilingual and monolingual children”

ABSTRACT: Accurate clinical procedures catered to bilingual speakers are not as readily available, as they are for monolingual speakers. A lack of resources, such as access to a trained speech language pathologist who specializes in bilingualism and clinical assessments developed specifically to bilingual populations leads to misdiagnosis of speech sound disorders. This study uses a collected sample of phonetic inventories from a larger ongoing study conducted by The Bilingual Phonology Lab. The purpose of this study is to compare differences and similarities between the phonetic inventories of typically and atypically developing monolingual and bilingual children. The study also compares the complexity differences across bilingual children’s both languages. The comparison of typically developing monolinguals’ phonetic inventories to those of typically developing bilinguals’ developing phonetic inventories demonstrate that both groups are acquiring their phonemes at a typical rate. The results from this study indicate a need for research of bilingual children's phonetic inventory across the developmental span in order to map out the standard for bilingual acquisition, rather than utilizing assessments and clinical therapy developed for monolingual phonological acquisition.

Meaghan Lucas



“Response to Treatment for Naming Impairment in Individuals with Aphasia ”

ABSTRACT: Aphasia is an acquired language impairment characterized by difficulties in the comprehension and production of spoken and written language. It is caused by damage to critical language regions of the brain associated with a neurological event, such as a stroke, or a progressive loss of neurons in that region. Difficulty with naming (anomia) is a primary complaint of people with aphasia. There are many treatments that help those with aphasia improve their naming ability. The lexical retrieval cascade treatment developed at the University of Arizona is an approach that trains individuals to use self-cueing strategies to support word retrieval. The lexical retrieval cascade treatment involves training individuals to provide information about a word that they cannot say. This includes talking about the item (semantic information) or coming up with the first sound or letter of the word. These self-cueing strategies can help the person with aphasia say the correct word and can offer enough meaningful information for the listener to understand even when the actual word is not recalled. The purpose of the current study was to characterize and quantify improvements in naming and conveyance of meaningful information. To do so, we examined responses on a standardized picture naming test, the Boston Naming Test (BNT), from 12 individuals with aphasia before and after lexical retrieval cascade treatment. As a group, the participants improved naming of items that were directly trained. The Boston Naming Test remained challenging, but there was a significant improvement in meaningful information that supported overall communication success.

Mia Carvalho Guimaraes



“A descriptive analysis of breast and cervical cancer screening adherence among Latina patients of a mobile health unit”

ABSTRACT: Introduction: This study contains a descriptive analysis of demographic, health-related, and self-reported breast and cervical cancer screening characteristics of women, primarily Latinas, who frequent a mobile health unit in Pima County, Arizona.

Methods: Aggregate data was used from intake questionnaires from a Juntos por la Salud mobile health unit. Data was analyzed using frequency tests by demographic and health-related category based on women who reported receiving a mammogram or a Pap test. Categories included country of origin, monthly income, education level, and English proficiency. Health information regarding physical activity, dietary habits, and family medical history was analyzed.

Results: The majority of women in the sample reported receiving screening (breast cancer: 75%; cervical cancer: 71%). Most of them were from Mexico (75%). 55% of the women who reported being screened declared not speaking English well or at all. 74% of women who had family members diagnosed with cancer reported receiving screening for either breast or cervical cancer. For income, there was 10% increase in women who received both cancer screening among those who make more than \$5,000 a month compared to women making from \$1,000-\$5,000. In terms of level of education, women who reported having no education received on average 18% less screening than women who had at least some schooling.

Conclusions: Results from this study will be utilized in the future to implement an education-based intervention aimed at increasing breast and cervical screening among Latinas who frequent the mobile health unit.

Ally Janowski



“Circadian Function in Age-Related Macular Degeneration”

ABSTRACT: Circadian rhythms play an essential role in the maintenance and performance of many functions in the body. Recent research has suggested that there may be a correlation between the circadian rhythm functions, and the various neurochemicals and processes that occur within the eye. Every day when the first light hits the eye, the photoreceptors in the retina shed their outer segments, and these segments are then metabolized. If there is dysfunction in the circadian rhythm and the photoreceptor segments are not phagotized, the segments may accumulate in the retina. This accumulation is known as “drusen” and is one of the causes of age-related macular degeneration. In this study, volunteers with age-related macular degeneration were asked to wear an actigraphy watch that recorded their daily activity levels and ambient lighting for 14 days to determine whether we could test if their circadian rhythm is dysfunctional. Future plans for this study involve observing the effects of re-entrainments of patients into a regular circadian pattern, and observing the change within their retinal damage. With this knowledge, further studies regarding treatment, prevention, and potentially a cure for age-related macular degeneration may be conducted.

Elizabeth Bolton



“Novel paramyxovirus found in California sea lions”

ABSTRACT: Paramyxoviruses are of the family *Paramyxoviridae* and subfamily *Paramyxovirinae* and occur frequently among a range of species including mammals, birds, reptiles and fish. They are single-stranded, negative-sense ribonucleic acid (RNA) viruses that are transmitted horizontally by aerosols, body fluids, faecal material, or vectors. Although there have been notable breakouts of morbilliviruses, a clade of the paramyxovirus family, over the last forty years, there is still a lack of research indicating which viruses may be spread by CA sea lions asymptotically. A sample set of California sea lion urine, collected from San Miguel Island, has been utilized in the study of paramyxoviruses and the detection of a novel jeilong virus. By methodically testing these urine samples using DNA and RNA extraction, PCR and gel electrophoresis techniques, the samples were processed and tested for the presence of paramyxoviruses. Electrophoresis indicated the presence of viral DNA and the samples that formed bands were then sequenced. The study has identified the presence of a *jeilong virus*, which is a largely uncharacterized member of the subfamily *Paramyxovirinae*. The genus *Jeilongvirus* consists of the species J virus and Beilong virus which are both of rodent origin. Although these viruses are thought to have a broad host range and zoonotic potential, there is little evidence of this virus in carnivores. Continued future study will focus on whether co-speciation has occurred between the viral phylogeny and that of the potential host.

Jaclyn Larson



“A Qualitative Examination of Families’ Experiences of Tube Feeding Children with Gastrostomy Tubes while in Public Community Environments”

ABSTRACT: Children with developmental disabilities and other complex medical conditions may have feeding or swallowing difficulties which can lead to inadequate fluid intake, undernourishment, and malnutrition. If a child cannot adequately consume enough fluids or nutrition orally, then a gastrostomy feeding tube may be necessary. The present study examines families’ experiences when feeding their child with a gastrostomy tube in public community environments. Four caregivers, including parents and foster parents, were interviewed to obtain their families’ experiences. Data for this study was collected using semi-structured and open-ended interviews and analyzed to find themes. Preliminary findings suggest four key themes: (1) unsolicited curiosity; (2) feeding at school; (3) social perceptions; and (4) negative GT self-perceptions. This is an ongoing study and interviews will continue. Present results indicate all caregivers had an essential understanding of their child’s need for the feeding tube in spite of their frustrations with feeding in the community. Regardless of their understanding of the necessity of the gastrostomy tube, the majority of parents expressed their distaste for the unwarranted comments they received from individuals while in public. Understanding the family experience can be useful for professionals when coaching families of how to incorporate tube feedings into their daily lives by sharing what techniques other families have used.

Jen Ngo



“Paper-Based Organ-on-a-chip for Herbal Medicine Toxicity Screening”

ABSTRACT: Herbal medicine have been considered as alternative medicines for certain groups of patients due to their “natural ingredients” character. Contrary to their belief, however, there are reported cases of severe hepatotoxicity which requires the patient to undergo a liver transplant. The possible cause of this herbal medicines induced toxicity is pyrrolizidine alkaloid (PA), commonly found in plants. Unfortunately, the US Food and Drug Administration (FDA) views herbal medicines as dietary supplement. In this work, the paper-based organ-on-a-chip (OOC) was designed and fabricated to evaluate the toxicity of herbal medicines in a low-cost and field-applicable manner. Four herbal medicines were chosen: green tea, kava kava, gymura segetum, and chaparral. The rat vascular endothelial cells (RVEC) was cultured in a 96-well plate. The well-plate was also covered in two different types of surfaces: tissue culture plate (TCP) and nitrocellulose (NC) paper. The RVEC were then treated with various concentration of herbal drugs and incubated for 40 minutes. The toxicity resulted from the herbal drugs was investigated by counting the remaining cells attached to the surface and determining cytotoxicity level (%). As a result, the cytotoxicity of the kava kava had the highest level while green tea had the lowest. However, the NC paper surface shows an indistinguishable trend between the cell counts and cytotoxicity levels. Following this work, a flow will be incorporated to these paper-based OOCs, which can evenly distribute the drugs on the cells, thus generating physiologically relevant and more reproducible assay result.

Dalaena Rivera



“Effect of Ascarosides on Male-Female Attraction and IJ Formation in *Steinernema carpocapsae* nematodes”

ABSTRACT: Increased usage of chemical pesticides in the world has led to the development in research of entomopathogenic nematodes (EPNs) as a biological pesticide. Due to their ability to persist in the environment and act as successful killing agents for pests, EPNs make suitable candidates for microbial biopesticides. However, commercialization of EPNs remains an issue. Recent research has considered using nematode pheromones, or ascarosides. Ascarosides have been implicated in mating and dauer formation in model organism, *Caenorhabditis elegans*. It is unknown what the role of these signaling molecules is in *Steinernema* nematodes' reproduction. Understanding their role in reproduction may help enhance current formulation practices of these nematodes as biological insecticides. In *Steinernema* nematodes, four ascaroside molecules have been identified: Asc-C11, Asc-C7, Asc-C6, and Asc-C5. To study the influence of ascarosides on *S. carpocapsae*, an assay from Simon and Sternberg (2012) has been adopted and revised. Bacterial lawns of bacterial symbiont, *Xenorhabdus nematophila*, are standardized to an OD of 0.8 on 5-cm lipid agar plates. 0.8 μ L of varied synthetic ascaroside concentrations are placed in the center to condition the arena. 10 males and 10 non-gravid females are placed in their respective areas within the arena. Movement toward and away from each other is observed and recorded throughout a 1-hour period with an additional observation taken 24 hours later. Final results are pending. One major limitation of this project was time and weather, which made completing reps difficult. Further plans include testing synergistic blends of ascarosides as opposed to isolates.

Courtney J. Comrie



“Human EGF from Soy: Potential for Cost-Efficient Chronic Wound Care”

ABSTRACT: Chronic wound ulcers of the lower extremities are an increasingly prevalent complication with high morbidity worldwide. In the United States, chronic ulcers affect more than 4 million people. Ulcers are often symptoms of an underlying health conditions (i.e. diabetes, vascular disease), making them difficult to cure and require repeated high-cost treatments. Common methods include applying growth factors at the site of the wounds. Human epidermal growth factor (EGF) is a protein found in the fluids of the human body and is a potent skin growth stimulus. While current methods to incorporate EGF into treatments are expensive, the recent advent of genetically modified soy (Agriculture Department, UA) introduces the opportunity for inexpensive human EGF to be implemented into wound care. However, a method for extracting human EGF from soy beans is non-existent. Our study focuses on determining the optimal processing methods of soy to extract EGF. Specifically, we aim to identify solvents and soy components with high concentrations of EGF from dried soy beans. ELISA and UV/Vis spectrophotometer were used to quantify the amount of EGF present from the different soy processing methods (i.e. soy pulp, curd, whey, protein isolate). We find that soy protein isolated in acetone produced the highest extraction of protein. However, quantifiable concentrations of the EGF in soy were inconclusive due to a saturated optical density from both the EGF and non-EGF soy samples. With further research, genetically modified soy may be processed and translated to a more cost-efficient treatment for healing recurring chronic wound ulcers.