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Donnell, Catherine, The role of T-cell lymphoma invasion and metastasis 2 (TIAM2) in the barrier function of mammary epithelial cells following *Streptococcus uberis* inoculation, Animal Science, March, 2019, University of Tennessee, Knoxville, Tennessee.

Mastitis in dairy cows reduces milk yield, milk quality, and overall profits throughout the dairy industry. Mastitis frequently results from an intramammary infection of bacteria, commonly *Streptococcus uberis*, and is typically treated with antibiotic therapy. However, further exploration of genes associated with mastitis recovery and alternatives to antibiotic treatment of mastitis should be considered. In a recent study, novel phenotypes were generated from somatic cell counts following a *S. uberis* experimental challenge on Holstein dairy cows. Significant single nucleotide polymorphisms (SNPs) across the novel phenotypes were then identified. Several SNPs were located in genes associated with cell migration, cell signaling, and apoptosis. One such gene was T-cell lymphoma invasion and metastasis 2 (TIAM2), a Rac guanine nucleotide exchange factor connected to cell migration, barrier function, and production of antimicrobial peptides. Our study aims to develop a successful genotyping technique of the TIAM2 gene and analyze the barrier function of primary bovine mammary epithelial cell lines with differing TIAM2 genetic backgrounds. A successful method of genotyping the TIAM2 gene was developed using polymerase chain reaction and restriction fragment length polymorphisms. This method was utilized to identify two primary cell lines with the heterozygous genotype and one primary cell line and the MacT cell line with the homozygous genotype. The primary cell lines and MacT cell lines were cultured on inserts, and transepithelial resistance was measured daily using a portable ohmmeter and electrodes. The cultures were then inoculated with fluorescently labeled *S. uberis* and the quantity of bacteria that passed through the epithelial layer was measured at 24 hours. Fluorescent images also were taken to analyze cellular morphology and bacterial adherence at the epithelial surface. Results indicate a correlation between transepithelial resistance and the quantity of bacteria that passed through the epithelial barrier ($r=-0.641$) with quantity of bacteria increasing as resistance measures decrease. In addition, the homozygous primary cell line generated greater resistance measurements throughout the experiment as (AVG=2.85kWWcm2) compared to the heterozygous primary cell lines (AVG=1.21 kWWcm2, 1.23 kWWcm2). Lower resistance measurements and fluorescent microscopy suggest variations in TIAM2 genotypic backgrounds influence cell barrier functions and ability for bacteria to migrate into tissue. By further determining TIAM2’s direct connection to bovine epithelial barrier function, future use of the gene as a genetic marker and target for mastitis recovery may be explored.
Optimizing metagenome assembly in the rumen of cattle provides researchers the means to better understand the microbiome functions and their effects on the animal. Current DNA isolation methods for ruminal microbes utilize both a chemical cell lysis and a bead-beating step to obtain DNA from fiber-adherent, harder-to-lyse cells. These methods work for short-read, amplicon-based community analyses but result in DNA shearing and nicking. These isolation methods limit application for metagenome assemblies that benefit from longer-fragment DNA sequences. Utilizing a proprietary lysis and isolation system, longer DNA fragments (>10 kb) can be sequenced, allowing better metagenome assembly. Therefore, the objective of this study was to use the proprietary isolation system to develop a novel method of nucleic acid isolation that allows for greater accuracy in rumen metagenome assembly. Rumen content from GPE steers (USMARC) was collected. DNA was extracted from the content using the system, fragment size analyzed by 2% TBE gel electrophoresis, and quantified via the DeNovix spectrophotometer and Invitrogen Qubit fluorometer. Gel analyses identified bands ≥15,000 bp with limited smaller banding throughout, indicating high-quality, long-fragment DNA. Future studies will compare the metagenome assemblies from this DNA extraction method to traditional methods for accuracy and precision of microbial data.
Effects of ant chemical secretions on deterring myrmecochore seed mortality agents

Jamie L. Albert, Chloe L. Lash, Kimberly D. Gwinn, and Charles Kwit

Abstract

Seed dispersal is a critical portion of the life cycle of many plant species. Ant-seed dispersal, myrmecochory, is a diffuse mutualism. Attracted by the elaiosome (fleshy seed coat appendage), ants transport seeds to the nest, removing elaiosomes as a food source. Seeds are then either re-dispersed to nearby locations or remain in the nest. Thus, the plant gains dispersal-related benefits including protection from seed predators. Ant glands secrete chemicals, potentially coating seeds during dispersal and further deterring seed predators post-dispersal. Ant chemicals effects on myrmecochore seed fate has not been tested and likely impacts ants’ seed dispersal effectiveness. Field experiments at Mountain Lake Biological Station (Giles Co., Virginia) were conducted to investigate whether the presence of pentadecane, a chemical found in Aphaenogaster secretions, influences rodent seed predation. Results indicated that pentadecane did not influence rodent predation of Sanguinaria canadensis or Asarum canadense seeds, two common myrmecochores. However, microorganisms, such as pathogenic fungi, are also mortality agents in seed dispersal systems. Current experimentation focusing on effects of ant glandular chemicals on the pathogenic fungus Botrytis cinerea will provide further insights into the chemical ecology of myrmecochory.
Batrachochytrium salamandrivorans (Bsal) could decimate green salamanders (Aneides aeneus) Bailee Augustino*, E. Davis Carter, Markese Bohanon, Brittany Bajo, Pattarawan Watcharaanantapong, Daniel Malagon, Rajeev Kumar, Debra L. Miller and Matthew J. Gray. University of Tennessee Center for Wildlife Health, baugust3@vols.utk.edu

Green salamanders (Aneides aeneus) are declining throughout their Appalachian range and are listed as an IUCN Near Threatened species and are endangered in North Carolina. Habitat loss has been identified as a driver; however, other factors such as pathogens could play a role as individuals become confined to fewer habitat fragments. Batrachochytrium salamandrivorans (Bsal) is an emerging fungal pathogen that is causing declines in European fire salamanders (Salamandra salamandra), and could be introduced into the United States through international trade. Understanding the threat of Bsal to native species is key to understanding invasion risk and organizing disease intervention strategies if the fungus is introduced. We tested the susceptibility of green salamanders to infection and development of Bsal chytridiomycosis by exposing individuals housed at 15C to one of four Bsal zoospore doses (5x10^3-6). Nearly all animals exposed to Bsal became infected, developed necrotic ulcers through the epidermis, and died in <2 months post-exposure. Salamanders exposed to the highest two zoospore doses died in <2 weeks and there was a trend for individuals to stop using cover objects as chytridiomycosis developed. These results demonstrate that Bsal is a significant threat to green salamanders, and precautions should be taken to ensure introduction does not occur in North America.
Deer abundance vs. rodent abundance: which is the more important driver of Lyme disease dynamics in the southeastern US?

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A recent surge in Lyme disease cases in Virginia has raised concern that this disease may soon increase in Tennessee and adjacent southeastern states. The bacterium *Borrelia burgdorferi* senso stricto, the causative agent, is vectored by the black-legged tick *Ixodes scapularis*. Juvenile *I. scapularis* commonly feed on rodents, which are competent reservoir hosts for *B. burgdorferi*. In contrast, adult *I. scapularis* typically feed on white-tailed deer, which are not reservoir-competent for *B. burgdorferi*. Modeling studies in the Northeast have concluded that rodent abundance is the key driver of Lyme disease dynamics, but it is unclear whether these models apply in the Southeast. To assess the relative importance of deer vs. rodents in southeastern forests, we gathered data on deer, rodent and tick abundance, and *B. burgdorferi* prevalence, from multiple field sites in Virginia, North Carolina, Kentucky, Tennessee and Alabama. Analysis of the data revealed that neither deer abundance nor rodent abundance were statistically significant predictors of tick abundance at our sites; variation in habitat type and abiotic factors seem to obscure any such relationships. Nevertheless, with the exception of one outlier site in Tennessee, deer abundance was strongly predictive of *B. burgdorferi* presence and prevalence among the ticks at our sites. No equivalent relationship between rodent abundance and prevalence was found. Lyme disease dynamics in the Southeast are clearly complex and multifactorial; nevertheless, we conclude that high deer abundance plays a key role in supporting tick populations large enough to maintain persistent *B. burgdorferi* infection in these states.
Abstract

The bacterial pathogen, *Mycobacterium avium subsp. paratuberculosis* (or MAP), causes Johne’s disease (JD) in livestock as well as wildlife. In the United States, JD causes an estimated annual loss of $220 million to the agricultural economy. In addition to the significant economic loss, MAP has also been suspected as an etiological agent of Crohn’s disease in humans. One of the features of many mycobacterial infections including MAP infection is the formation of granulomas – structures containing bacteria, macrophages, and lymphocytes. Granulomas are thought to play an important role in containing the bacteria and limiting the spread of infection. However, mechanisms that control granuloma formation and bacterial killing in the granulomas remain poorly understood. We employed a combination of *in vitro* granuloma assay experiments and an agent-based modeling approach to better understand immunological processes in JD granulomas and to identify factors that enhance bacterial killing within these cellular structures. Our *in vitro* granuloma assay generated a new data set on dynamics of granuloma formation, MAP viability, and cytokine expression, which was used in simulations with our agent-based model. In this study, I optimized parameter values to match model outputs to *in vitro* data. Also, sensitivity analysis was conducted to identify a parameter that is most influential for granuloma formation.
Recent extirpations of European salamanders by a novel chytrid fungus (Bsal) have been cause for alarm. With Bsal being detected on animals in the pet trade, it is highly probable that Bsal will find its way to the North American continent, which harbors the highest diversity of salamanders on the planet. Despite growing concerns and research, there is still much ambiguity regarding the host immunological responses and pathogenesis regarding Bsal chytridiomycosis. We used serum protein electrophoresis (SPE) to analyze blood protein fractions (albumin, globulins alpha, beta, and gamma) in eastern newts (Notophthalmus viridescens), and compared estimates between infected and uninfected individuals. Additionally, infected individuals were compared among the 5 (5 x 10^3-6) zoospore exposure doses. We found that albumin decreased and alpha globulin increased in infected animals, which is suggestive of an acute immune response (innate not adaptive). More specifically, decreased albumin we found in infected animals may impair osmoregulation (a known factor of chytrid pathogenesis). We also found reduced beta and gamma which suggest inhibition of acquired immunity. From our results, it seems infected NOVI may mount immune responses to Bsal infection, but because nearly all animals that were exposed to Bsal at 14 C in our experiment died, the immune response is likely either too slow or insufficient to prevent disease progression.
Batrachochytrium salamandrivorans (Bsal) is an invasive fungal pathogen that is emerging in Europe and appears to be highly pathogenic to many salamander species, particularly those in the family Salamandridae. The Eastern Newt (Notophthalmus viridescens) is a member of Salamandridae and known to be susceptible to Bsal. This species is one of the most widely distributed salamanders in North America. Given their widespread distribution and high abundance, this species has the potential to significantly influence Bsal epidemiology if the pathogen emerges in the USA. We designed two studies to estimate contact rates given different densities and habitat structure, and the probability of transmission from infected to susceptible individuals. We found that Bsal transmission due to contact was very efficient between infected and susceptible newts even at early stages of infection when pathogen loads were low. We also found that contact rates were density dependent, and that adding habitat structure (i.e., plants) reduced contact at higher newt densities. Simulations from a system of ordinary differential equations show rapid transmission of Bsal among individuals, such that an entire population can become infected quickly under most scenarios. Disease-induced mortality of susceptible individuals following contact with an infected individual was relatively high (>85%) and fast (<30 days post-contact). These results demonstrate that Bsal can have severe population impacts on eastern newts. Moreover, this abundant species could play a major role in Bsal emergence if it is introduced. Reducing newt density or increasing habitat structure at Bsal positive sites might reduce transmission and outbreak size.

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Abstract: *Toxoplasma gondii* is a zoonotic protozoal parasite that can cause morbidity and mortality in birds and mammals, including humans. *Toxoplasmosis* is considered a leading cause of human foodborne illness in the United States and infection of this parasite leads to lifelong infection due to the parasite forming tissue cysts within its hosts. *Toxoplasma gondii* infection can be detected using one of several sensitive serological methods including the Modified Agglutination Test (MAT). The MAT works by binding host antibodies of *T. gondii* to whole cell antigen and forming a precipitate that can visually identified. Given the simplicity, convenience, and cost effectiveness to detect *T. gondii* infection, the MAT has been previously used for numerous published *T. gondii* studies in wild and domestic mammals and birds. We will use the MAT to test serum of Black vultures (*Coragyps atratus*) from different regions of Pennsylvania to determine the environmental prevalence *T. gondii*. Due to the scavenging nature of vultures, this avian species should serve as an excellent sentinel of environmental contamination of the parasite.
Motivations for utilizing urban forest resources vary considerably, ranging from recreation and fitness to escaping daily stress to socialization. This study, conducted by undergraduate students from the University of Ljubljana in Slovenia and the University of Tennessee in the United States, used data collected in an urban forest setting in Central Europe to understand the motivations of urban forest users. Specifically, 160 visitors to Rožnik Park, a heavily-used area within Ljubljana, Slovenia, were interviewed to identify their primary motivations for visiting Rožnik, and to model the level of use based on these motivating factors. Respondents were asked to rank the importance of a series of potential benefits from park use, as well as park features. This information was used to identify three groups of users: those seeking solitude/relaxation, social interaction, or more developed facilities. Based on these identified motivations, sociodemographic characteristics, and other variables, we modeled the level of use. The results reveal that as expected, use was positively related to the number of years that users had been using the area, but negatively related to the distance that respondents live from the park. None of the sociodemographic variables were significantly related to the level of use. Interestingly, the importance of solitude and/or relaxation was positively related to amount of use, while the importance of social interaction was negatively related. No statistically significant relationship was identified by the motivation for developed facilities.
During reforestation, heterogeneity in the composition and spatial distribution of planted trees will lead to a mosaic of microclimates, which should increase the diversity of resident flora and fauna. We investigated the hypothesis that spatial heterogeneity in several microclimate variables would be greater in mixed plantings of white oak (*Quercus alba*) and loblolly pine (*Pinus taeda*) at different spacings than monocultures of each species planted alone. To assess microclimate heterogeneity, we measured six microclimate variables: relative humidity, soil temperature, soil moisture, soil surface temperature, light, and canopy cover. Each microclimate variable was measured in each of four treatments established in three blocks: white oak and loblolly pine planted together at two different spacings, loblolly pine planted alone, and white oak planted alone. There was a slight trend towards greater variability in several microclimate factors in the mixed species treatment with greater spacings, patterns in variability often changed across blocks and time periods. Volunteer shrubs and tree saplings likely obscured the effects of the planting treatments. As canopies begin to close, the variability in microclimates will likely increase. If so, land managers may be able to use mixed-species planting practices as a tool to increase microclimate heterogeneity and overall biodiversity.
Title: A Survey of Domestic Hosts of *Cimex lectularius* in an Urban Setting

Abstract:

The common bed, *Cimex lectularius* L., is a known urban pest and an obligate blood feeding ectoparasite. Past research has shown that bed bugs can feed on a variety of warm-blooded animals including humans, bats, poultry, and rabbits. The purpose of this study was to determine if domestic pets (canines and felines) serve as a blood host for the bed bug in a natural urban environment with humans present; and if so, then to determine how frequently this occurs. DNA was extracted from 229 bed bugs collected from twelve lower-income housing apartments with pets (six with canines, five with felines, and one with both canine and feline). Host-specific primers were used to amplify the cytochrome b gene within each host and the presence of a bloodmeal was determined with gel electrophoresis. Results of this study will be verified by sequencing 10 samples from each species. Overall, the objective of this research is to determine if bed bugs feed on companion animals (canines and/or felines) and provide knowledge about bed bug host selection to the fields of entomology and veterinary medicine.
Although soccer is normally played on natural turf (NT), the use of synthetic turf (ST) continues to gain in popularity. One concern with the use of ST for soccer is that the ball may react differently on ST compared to NT. The Federation of International Football Association (FIFA) has developed test method standards for ST playability. This study compared vertical ball rebound (FIFA test method 01, VBR) for two NT surfaces and two ST surfaces. The NT surfaces included bermudagrass (*Cynodon dactylon x C. transvaalensis* Burt-Davy, BG) and Kentucky bluegrass (*Poa pratensis* L., KBG) over a sand-based root-zone. The ST surfaces included a hybrid mono/slit filament (MS) and a monofilament (MF) both infilled with sand/ rubber over a crushed gravel base. The surfaces were subjected to simulated sports turf traffic. Regardless of traffic, the MF treatment always failed FIFA standards for VBR by exceeding 100cm. Traffic increased VBR on all treatments. Only after 30 simulated traffic events did the KBG fail VBR. The BG and MS never failed the VBR. More work is required to look at ball roll and angle ball rebound.
Plants are subjected to many biotic and abiotic environmental factors that hinder growth and development. These stimuli trigger an internal stress response which modulates the expression of thousands of genes through epigenetics. In an attempt to cope with changing environments, plant hormone levels are adjusted. For this, DNA methylation leads to the silencing of genes necessary for plant development in harsh environments. While DNA methylation-driven hormone modulations are known components of the critical stress response, DNA demethyltransferase gene expression remains to be characterized. The expression patterns of the four known DNA demethyltransferases- REPRESSOR OF SILENCING1 (ROS1), DEMETER (DME), DEMETER-LIKE2 (DML2) and DML3 will be assayed upon treatment with two key phytohormones, auxin and cytokinin. Using the GUS reporter system, we expect to see differences in the expression patterns of roots and shoots for treated versus untreated plants among these four genes. This experiment will reveal the temporal and spatial differences between the expression of the DNA demethyltransferases under hormone-treated and untreated conditions. Ultimately, this builds on our understanding of when and where DNA demethylation is happening as a result of environmental stress.
Clustered regularly interspaced short palindromic repeats (CRISPR) and CRISPR associated (Cas) protein 9 reagents have revolutionized genome editing. CRISPR/Cas9 genome editing is simpler and faster than earlier platforms and capable of targeting multiple genes and/or DNA regions simultaneously. When a CRISPR-mediated genome edited plant is vectored for commercialization, it is very important to assess off-target mutagenesis effects. When we evaluated off-target mutagenesis effects in CRISPR-mediated genome edited Arabidopsis plants, potential off-target loci along with PAM sequences were predicted with the web-based tool CRISPOR. Potential off-target sites containing up to 4-bp mismatch of each target were selected. Primers were designed to amplify flanking regions of potential off-target sequences in extracted genomic DNA from T2 plants. The amplicons were purified from an agarose gel and sequenced to determine mutagenesis. The results show that off-target mutagenesis is zero percent when utilizing CRISPR/Cas9 mediated genome editing in Arabidopsis.
Title: Gene Expression Changes Due to Ozone Stress Across a Phylogenetically Diverse Set of Tree Species

Authors: Richards, Casey; Huff, Mathew; Chen, Ming; Staton, Margaret

Intro: As ozone (O\textsubscript{3}) increases and is expected to continue to increase in the future, plants, specifically trees, have different stress responses which can lead to change in gene expression. These physiological reactions can impact trees by growth reduction, photosynthesis reduction, and mortality. Understanding these responses can be critical if we want to predict how certain species of trees are going to react to the increasing O\textsubscript{3} levels in the future. Data was previously collected on O\textsubscript{3} response in eight ecologically and economically important tree species. Two-year-old saplings were exposed to increased O\textsubscript{3} levels in a controlled environment. O\textsubscript{3} levels included 10, 80, 125, 225 ppb for exposure times of 7hrs, 14 days, and 28 days. Leaves were collected from six biological replicates per species, RNA was extracted and sequenced to profile gene expression changes.

Methods: This experiment provides an opportunity to compare molecular responses to O\textsubscript{3} across phylogenetically diverse species. Analysis of orthologous genes and gene families provides insight into common O\textsubscript{3} defense response among all trees. Gene function was predicted by computational sequence similarity searches and protein domain profiling. Differential gene expression and other statistical analysis were conducted in R.

Conclusion: The increasing O\textsubscript{3} on our planet will continue to be a rising issue as all plants are going be impacted. Experiments like this are going to provide valuable information to researchers who study response genes in trees. We expect these insights to provide a basis for future research into forest health under evolving changing climate scenarios which open the possibility for tree breeding or improvement for O\textsubscript{3} resistant trees.
Hemp (Cannabis sativa), an annual herbaceous plant grown and harvested for fiber and medicinal compounds worldwide, is becoming an increasingly valued crop in Tennessee. In hemp, cannbigerolic acid is primarily converted to cannabidiol (CBD); whereas, in marijuana (C. sativa or C. indica), it is converted to tetrahydrocannabinol (THC). Our overall research goal is to identify pathogens causing hemp diseases. The specific goal of this study was to identify a disease-causing pathogen in greenhouse-grown varieties, ‘Futura’ and ‘Fedora’. Symptomatic leaves were placed in moist chambers to stimulate sporulation. Fungi isolated from leaves were cultured. Four isolates were identified as Chaetomium globosum based on colony characteristics, spore and perithecium morphology, and sequence of the ITS region. Koch's postulates were fulfilled using detached leaf assays; symptoms on both varieties were the same as those originally observed. Leaves and flowers of ‘Delores’ were also symptomatic after inoculation with a C. globosum isolate. Koch’s postulates will be fulfilled upon isolating C. globosum from in planta assays. The lack of symptoms on ‘Wife’ led to our hypothesis: resistance to C. globosum in hemp germplasm may be correlated with terpenoid concentration. Ongoing studies will ascertain the roles of host genetics and plant stress in these host-pathogen interactions.
Phyllocoptes fructiphilus is an eriophyid mite native to North America and inhabits Rosa spp. The mite is about 140 to 170 micrometers in length and requires a microscope to be visible. The mite floats in air currents (ballooning) as its main mode of travel for infecting new plants. Phyllocoptes fructiphilus is the vector for Rose Rosette Virus, a virus that infects Rosa spp. in North America. The virus currently has no cure and causes plants to die within three to five years after infection. The goal of this research was to pinpoint the location of overwintering Phyllocoptes fructiphilus females through plant mapping. By plant mapping Phyllocoptes fructiphilus, we can formulate ways to control mite populations and reduce plant infection. Healthy Rosa spp. were excluded from this research due to low mite populations. Methods used, included extraction of mites from plant tissue and conducting live mite counts. Tissue samples were collected from West and North Knoxville, TN and from The University of Tennessee Gardens. Data were recorded into Excel and a plant map was generated from the resulting data. During our studies, we discovered a new eriophyid mite, Callyntrotus schlechtendali, in Tennessee.
Rose Rosette Disease Research in Knoxville

Abstract:

The U.S. rose industry is rated a billion dollar contributor to the U.S. economy. Roses are used at weddings, in funerals, given on anniversaries and Valentine’s Day, and are an important landscape commodity. This industry is threatened by Rose Rosette Disease which has caused millions of dollars of losses in the U.S. In 2018, the disease caused more $1.8 million losses in Tennessee landscapes. The disease is caused by Rose Rosette Virus and is vectored by an eriophyid mite, *Phyllocopetes fructiphilus*. This disease is spread by the shipping of infected plants and once at a location, the vector floats in the air (ballooning) from one plant to another. Once the virus infects a rose bush, the bush has anywhere from 2-5 years after initial symptoms before death. Symptoms are proliferant and unnatural redness of leaves, sepals, and stems, distorted, strapped leaves, sepals, buds, and flowers, excessive thorniness, and witches’ brooms. The goal of this research is to determine the where Rose Rosette Disease is located in the Knoxville area and how severe the outbreaks are. These findings will provide a baseline for further research into finding new control methods and possibly a cure.
Further investigations into azoxystrobin resistance in *Cercospora nicotianae* isolates after single spray regimes in the Southern United States

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Azoxystrobin (Quadris) is a commonly used quinone outside inhibitor (QoI) fungicide utilized in the control of plant disease in fruit and vegetable crops. This drug utilizes a single-site mechanism of action which is easily overcome by point mutations within the cytochrome b (cytb) gene making it subject to resistance upon selective pressure.

*Cercospora nicotianae* is a fungal pathogen that causes frogeye leaf spot in tobacco. Frogeye leaf spot is a common disease occurring in nearly every burley tobacco crop. In recent years, several crops in Tennessee and Kentucky have been documented to be severely impacted by frogeye. In 2016 and 2017, research was conducted at the University of Kentucky to assess Kentucky isolates of *C. nicotianae* for sensitivity to azoxystrobin. Many isolates were found to be 1/10 as sensitive as baseline isolates, and some were found to be 1/100 as sensitive.

This work attempts to document the level of fungicide resistance of *C. nicotianae* upon a single treatment of azoxystrobin. Diseased leaf tissue was collected before and after treatment. Fungal samples were obtained from each set totaling to 100 obtained isolates. *C. nicotianae* isolates were plated, purified and screened for azoxystrobin resistance through spore germination and radial plating assays with varying concentrations of azoxystrobin fungicide. Observational resistance levels above an $EC_{50}$ threshold of 0.1 ug/ml were deemed “resistant”. Based on spore germination tests, the majority of isolates were found to be resistant, with a mean $EC_{50}$ of 0.698 ug/ul. However, three isolates displayed intermediate resistance with an $EC_{50}$ between 1 ug/ml and 10 ug/ml with a single isolate displaying resistance above 10 ug/ml suggesting resistance may be present amongst a small subset of isolates. Our results carry direct significance to local growers and epidemiologists by citing the location and severity of growing azoxystrobin resistance in *C. nicotianae*. 
Aichi virus reduction on Formica coupons by grapeseed extract and curcumin with light

Aichi virus causes human gastroenteritis worldwide associated with the consumption of contaminated oysters. This foodborne virus is small, with a non-enveloped, single-stranded, positive-sense RNA. Control strategies against Aichi virus are being researched. An emerging control method is photodynamic inactivation (PDI) that utilizes light, oxygen and a photosensitizer (PS) to inactivate microorganisms. This research aimed to determine the effect of grape-seed extract (GSE) and curcumin together with ultraviolet (UV) light to inactivate Aichi virus on Formica coupons, a model food-contact surface. Aichi virus was dried on sterile Formica coupons at room temperature and treated with UV light, 50 µg/ml curcumin, 10 mg/ml GSE, UV with 50 µg/ml curcumin or 10 mg/ml GSE, or control for up to 60 min. Recovered viruses were enumerated by plaque assays using confluent Vero host cells. Aichi virus from initial ~5.7 log PFU/ml was decreased by 0.66 and 1.26 log PFU/ml with curcumin and GSE, respectively, and >3 log by UV light alone after 30 min. Both, light and GSE and light and curcumin after 30 min caused higher reduction of 2.88 log and 3.41 log PFU, respectively. Natural plant extracts together with UV light have potential to control Aichi virus transmission from contaminated surfaces.
In the United States alone there are over 48 million cases of foodborne illness, with most of these cases deriving from food cooked in the home (Young 2016). Many themes have been assessed such as confidence, knowledge, habits, taste in food preferences, and societal/social influences (Young 2016). However, when targeted towards younger populations including young adults and children, attitudes and behavior change (Mullan 2018 and Young 2016). As there is a lack in home economics education in today’s current curriculum, students and their families may not know food safety behaviors (Finch 2005; Young 2016). It has also been shown that families are influenced by what their kids learn in school and are likely to change their food safety behaviors because of it (Young 2016). As more bilingual kids come over to the United States, they are becoming a target population to teach public health and food safety concepts to. This study will target primarily 20-22 Spanish-speaking youth of ages ranging anywhere from 5-12 and assessing their knowledge of food safety concepts such as hand-washing and cross-contamination.

These students will participate in hands-on activities such as using Glo-Germ and sensory evaluation of fruits, vegetables, and candy. The kids will then participate in a focus group to determine the efficacy of the activities and if these lessons instituted a behavior change. Data is limited due to the small sample size. Many students believe that they did not learn anything; however, they understood the importance of washing their hands. Students also enjoyed the activities and would recommend the curriculum to their friends/family.
Quinoa is an ancient crop cultivated for its seeds and eaten as grain. It is high in protein which leads to specific physicochemical properties such as solubility, emulsification, and foaming. The objective of this experiment was to determine the effect enzymatic hydrolysis with alcalase had on these physicochemical properties, specifically in quinoa flour. Quinoa was first defatted using petroleum ether extraction and then dried. It was then treated with alcalase enzyme for 1 hour at 37°C in a shaking water bath. The mixture was centrifuged and the supernatant was freeze dried along with the precipitate. The physicochemical properties of quinoa flour were then compared to the supernatant as well as the precipitate after alcalase hydrolysis. Thus far, the preliminary results show alcalase hydrolysis affects the solubility of the protein as well as the protein content within the quinoa flour. Currently, the effect alcalase hydrolysis has on quinoa flour’s functional properties is being investigated. The possibility of an effect on the proteins’ functional properties may have an impact on the use of quinoa flour in processed food products.
Utilization of tofu by-products as an alternative source of bioactive peptide Lunasin

Lunasin is a 5kDa water-soluble bioactive peptide present in soybeans with anti-inflammatory, anti-carcinogenic, and chemotherapeutic properties. Current mechanisms for obtaining Lunasin from soybeans involve complicated and expensive methods that limit its utilization to a laboratory scale. Tofu is a cheese-like product obtained from soybeans. Whey and okara are the major by-products of the process and are mainly destined for animal feeding or as ingredients for food preparations, but their potential application as a sources of lunasin remains unexplored. Therefore, the aim of this study was to establish if tofu by-products are suitable sources for obtaining lunasin enriched material by applying simple and easily scalable methods. Tofu was prepared from soybeans by a standardized procedure, and calcium was used to induce preferential precipitation of lunasin present in the by-products. Precipitate and supernatant fractions were characterized by measuring protein content, protein profile, lunasin content, and presence of isoflavones via Bradford assay, electrophoresis, western blot and HPLC respectively. Liquid fractions showed a wide distribution of proteins while calcium precipitates only contained low molecular weight proteins (<15kDa). Both fractions contain negligible amounts of isoflavones and a significant concentration of lunasin, indicating that tofu by-products can be used as a source of lunasin enriched material.
Tripal Developer Toolkit: Facilitating development in Tripal

Joseph West, Abdullah Almsaeed, Bradford Condon, Margaret Staton

Developing Tripal\(^1\) websites requires knowledge from many disciplines (biology, databases, web development), yet finding new developers who have experience across all these disciplines is rare, and they would likely find themselves with tasks that may require knowledge from other fields. The Tripal Developer Toolkit is a collection of modules and command line tools which focuses on smoothing the Tripal learning curve so that a new developer can get up to speed quickly and ensuring that developers are using best practices in code development. One of these tools is the Composer\(^3\) package Tripal Test Suite. Tripal Test Suite makes it easy to set up Drupal-connected PHPUnit\(^2\) testing environments for each of your Tripal modules. Furthermore, it allows simple continuous integration environment setup with Travis\(^4\). This is particularly helpful for developers with a biology background unfamiliar with configuring these tools, as well as more experienced developers who want to avoid the repetition of setting up a testing environment for each module. Tripal Test Suite provides methods for creating test files, database seeders, database transactions, and data factories. This tool works in conjunction with Tripal Dev Seed, a bundle of easily accessible test data for your Tripal site that you can use to quickly seed a new Tripal site with data. This protects developers from having to learn about certain complexities in the field of biology, primarily working with Chado databases. The Tripal Developer Toolkit facilitates best programming practices by automating the configuration of powerful software development tools to work with Tripal’s specific environment.

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The Effect of Four Nitrogen Treatments on Microbial Degradation of Plastic Mulches using a Soil Microcosm

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Abstract
Plastic accumulation is a growing problem in the agricultural industry where plastic mulches are applied during planting. Plastic residues, however, can still remain in the soil after harvest. Biodegradable plastic mulches (BDMs) promise a sustainable alternative to popular polyethylene plastics because they can be incorporated into soils and degraded by resident microbes. This study attempts to determine how nitrogen amendments impact microbial degradation of BDM plastics. Using a microcosm study, 250 mg of starch-polyester based BDMs were added to two soils from Tennessee and Washington State. The effects of four different nitrogen treatments were studied: urea, amino acids, ammonium nitrate, and no additional nitrogen. Headspace gas samples from the microcosm were analyzed using gas chromatography (GC) to measure CO$_2$ and N$_2$O concentrations as by-proxy indicators of cellular respiration and nitrogen cycling in the system. Enzyme assays determined the nutrient cycling pathways utilized by microbes during plastic breakdown. The activity of cellubiosidase, β-glucosidase, leucine aminopeptidase, N-acetyl-β-glucosaminidase, phosphatase, and xylosidase can be studied to determine cellulose, sugar, protein, chitin, and hemicellulose degradation and phosphorus mineralization. Preliminary GC data exhibits significantly higher CO$_2$ concentrations from soils treated with 250mg BDMs than soils with no added BDMs, indicating a microbial response to mulch treatments.
Weathering Impacts on Organochloride Pesticides in Oostanaula Creek Pond Sediments

Erin Essington

The removal of low-head dams may be a potential environmental concern due to the release of contaminated sediments. These contaminate may include organochloride pesticides (OCPs) that are banned in the U.S.A. but have been found in the pond sediment. The effect of aerating the sediment on OCPs after dam removal is not known; therefore, the objective of this study was to perform a simulated laboratory weathering study to monitor the stability of OCPs during oxidative weathering. Laboratory weathering of the sediment was investigated on a dam site in Athens, TN on the Oostanaula Creek, a tributary to the Hiwassee River. The sediments are air dried then extracted with water; the weathering cycle repeated over an eight-week period. Of the sixteen OCPs analyzed, 4,4′-DDD and endrin aldehyde were commonly detected, while aldrin and dieldrin occurred in a small number of samples. The percent detection of the four were: 44% aldrin, 58.8% dieldrin, 78.5% endrin aldehyde and 100% 4,4′-DDD. The average concentrations throughout the study of the two commonly detected compounds, 4,4′-DDD and endrin aldehyde, were $35.87 \pm 9.33 \mu{g/kg}$ and $38.17 \pm 16.52 \mu{g/kg}$. These concentrations were above the threshold effect levels (TEL) but below the severe effect levels (SEL) for freshwater ecosystems. During the weathering study, the OCP concentrations did not significantly decrease. Based on this simulated study, there is a potential for the OCPs to have a long-term impact on the reclamation on sediment from the low-head dam.
Over the past twenty years, scholarship on Paul’s letter to the Galatians has shifted to focus on Paul’s central theological question: how is it possible for gentiles to be incorporated into the Jesus movement without converting to Judaism? A separate body of scholarly literature explores Paul’s reinterpretation of Hebrew Scripture in his New Testament letters. When Galatians 4:21-5:1 is cited in scholarly literature, however, scholars rarely examine the exegetical strategies Paul employs in his attempt to apply Hebrew scripture to his particular theological problem. Nevertheless, the uniqueness of the allegory of Hagar and Sarah, in addition to a quotation from Isaiah 54, make Galatians 4:21-5:1 an interesting test case in Paul’s exegetical strategy.

To that end, this poster investigates Paul’s interpretation of Hebrew scripture using exegetical methods known from the wider Rabbinic world. Specifically, the poster systematically examines the application of the figures of Hagar and Sarah and the quotation of Isaiah 54:1 in Galatians 4:21-5:1 in light of stated rules of exegesis from Rabbinic literature. In doing so, this poster demonstrates the unique role that the allegory of Hagar and Sarah plays in Paul’s mechanics of gentile incorporation into the Jesus movement.
This research creates a visual system for analyzing Dostoevsky’s *The Idiot*. I define five factors—space, time, character (individual actor), network (unique aggregate of certain actors), and narrative voice—and visually explore their dyadic and triadic relationships. Taking the dyad of character and network, I identify all named entities within the novel and describe each person to whom they are connected. I then define factors for determining the degree of closeness in each of these relationships, and represent the degree via line value; those more closely related will be connected by thicker, darker lines. Other dyads and triads rely on visualizing schemes inspired by music notation, thermal imaging, and set theory. In visualizing and representing the novel’s varied mechanisms and parts, I track the evolution of Dostoevsky’s narrative and artistic system at a bird’s eye view. *The Idiot* is a vast narrative universe rich in events, actors, and narratorial turns; the reader’s task is additionally overwhelmed by the novel’s sheer mass and density. *The Idiot*’s layered sources of complexity invite the visual approach undertaken in this study.
The Hohenstoffeln as Home: 20th Century German Environmentalism and the Ethics of Memorialization

Benjamin Effinger, Kelly Knag, Tomas Starr, Christopher Crouch, & Aubrey Bader

Environmentalism has become a part of the national German identity after the turbulence experienced in the 20th century left the Germans without a defining characteristic. Nationalist attitudes in the early 20th century shaped Germany’s developing environmentalist movement from conception to implementation. Using theoretical perspectives from the field of home studies, this research project examines the differing interests in the Hohenstoffeln mountain that clashed in 20th century Germany. Quarrying, beginning in 1913, was met with prompt criticism by local and national environmentalists. Ludwig Finckh, a German nationalist local to the mountain, sought an end to the quarrying as it threatened the integrity of the landscape. He succeeded and has since been memorialized on the mountain for his efforts in the preservation of the Hohenstoffeln.

The research topic was chosen to understand and examine the relevance of heimat [home, though extending to the imagined nation] in German conservation during the Weimar Republic and developing Third Reich. Conceptions of heimat were found to be extensively prevalent in the conservation movement of the Hohenstoffeln, especially at the scales of landscape and nation. The Hohenstoffeln mountain is marked—both physically and symbolically—with sentiments of heimat by a multitude of stakeholders. This project examines the ethical complexity of memorializing environmentalist projects stained with racism and anti-semitism.
Abstract/Scope of Thesis: This thesis examines the impact of using social media applications to foster the acquisition of the German language as a native English speaker. The importance of this discussion lies in the fact that during this modern era, there are multiple advances in technology that have enabled more efficient and more effective learning processes in various fields. One of these advances derives from the introduction of Web 2.0 technologies, which are widely held to have the ability to positively impact a foreign language learner. I will look specifically into the realm of social media and social networking applications, as to determine their impact on German language acquisition. More specifically, the analysis will be focused on one social networking platform, namely YouTube, and the concept behind the analysis is to determine whether social influencers—users of this platform that have aggregated a large fan base within their respective “fields”—can offer benefits to language learners indirectly and simply through following their online activity. This activity includes, but is not limited to, the videos they post, their interactions with other social influencers, and the comments added to each video from other viewers.
Abstract:

In August of 1492, Cristopher Columbus set sail from Western Europe with a plan to locate a western passage to the West Indies. Two months after his departure, he came across, not the East Indies, but rather a new part of the globe that had been previously untouched by any major European powers of the time, the Western Hemisphere. After this making of the first permanent connection between the East and the West, a widespread transfer of food, culture, livestock, and technology took place. This transfer, later known as the Columbian Exchange, served as the mechanism by which two distinct biological systems gradually became one. As with any instance where new biological factors are introduced and consequences arise, this trend towards biological homogeneity was no different. One such consequence, and arguably the most impactful, was that which related to the transfer of disease.

Syphilis, *cocoliztli*, Mumps, Measles, and Smallpox were 5 of the most prominent diseases during the 16th century. It is estimated that over 90% of the indigenous population of modern-day Mexico died from *cocoliztli* alone; with many more falling victim to the other diseases, in both the East and the West. As a result of these diseases, and their subsequent deaths, the Europeans were able to gain a foothold in the West and colonize it. These diseases drastically changed the social landscapes of both hemispheres.

My research is focused on identifying and gathering information on what these diseases were and understanding how they were able to have such a large impact on the process of colonization and resistance.
In my essay, I write about the political complexities of the Incan societies in Peru both before and in the early years of the Spanish conquest. To achieve this, I use texts from Guaman Poma, a Jesuit writer who sympathized with the Incas, and Garcilaso de la Vega, a historian contemporaneous to Guaman Poma that wrote about governmental structures of the Incas. I also incorporate a number of secondary sources to help dissect these primary texts. I will draw comparisons of the language that Guaman Poma uses to describe the indigenous people (sacred Christian language) and the Spaniards (a language of condemnation) with some of Guaman Poma’s contemporaries that described the native people and the Spaniards in the exact opposite manner. In the end, I show that the language used by Guaman Poma and Garcilaso de la Vega that praises the native people is a direct result of the complex society and political system that they had had before they were destroyed by the Spanish conquest.
What the @!&#?: UT Students’ Bad Language Ideologies
Authors: Hannah Nelson
Faculty Mentor: Dr. Jessi Grieser

Most languages in the modern world have a whole host of words that are “off limits” or “bad”. These words have been deemed taboo by the social elite. Taboo words are usually related to taboo topics; for instance, the American social elite have determined that words referring to sex, scatology, and blasphemy are under the taboo umbrella. The social elite then teach the social underclass that these words are ‘bad language words’ (BLWs) and are not to be used by upholding members of society. However, the times are changing; as people change, so do their language ideologies. Much research has been conducted on BLWs, particularly around older generation’s swearword language ideologies (Jay 1992), the relationship between purity and power (McEnery 2006), and the relationship between gender and BLW usage (Kiesling 1998, Klerk 1992, Wells 1989, etc.). There is little research revolving around Millenial/Generation Z language ideologies of BLWs, though. This study is a sociolinguistic analysis of the BLWs University of Tennessee (UTK) students’ use of and ideologies concerning BLWs. I restricted the survey sample to UTK students as most every student registered at UTK is in the Millenial/Generation Z population.

In order to gather data regarding UTK student language ideologies, I distributed a survey (n=60) through various social media platforms and online group chats. The survey asked students what BLWs they personally used most frequently and in what context (description, anger, sarcasm, etc.), their daily usage of five specific BLWs- fuck, god, cunt, bitch, and nigger/nigga-, and their thoughts on the offensiveness of these particular words using a 1 (not offensive) to 10 (highly offensive) scale.

The data shows that UTK students’ usage of BLWs does not directly correlate with how offensive students find each word. Gendered or racial pejoratives showed more consensus on offensiveness, but there was little consensus on the contexts students used them. The findings that UTK students know there is social stigma around BLWs, but they aren’t entirely sure why. This generates a need for more research on language ideologies of taboo words and the social reasons for the restricted usage of BLWs.
“Photoshop of the Past”

Artist: Casey Ricketts

The purpose of my study is to determine if the cuisine revolution happening during the French Revolution affected the way bodies were portrayed in French art by comparing paintings before and after the Revolution. However, I discovered the distortion that developed in post French Revolutionary art or during the Romanticism era was primarily due to cultural ideals and not to the subjects’ eating habits. These cultural shifts led to the change from pre-revolutionary idealized Greco Roman bodies to the more distorted, anatomically incorrect style found in Romanticism. The idea of Romanticism is that it evokes emotion rather than repeating the traditional technique used by Neoclassical artists.

La Grande Odalísque, painted by Ingres, is a standard example of the viewer’s pleasures and emotions being taken into account more than the true dimension of the human body. I found this distortion to be similar to Photoshop. My photo is an illustration of the dimension of the Odalísque in Modern times. The manipulation of women’s bodies from this time period is similar to what magazines do today. Like other artists, many French Romantic artists painted by their imagination and to a standard of perfection rather than what they observed.
Metaphor Theory and Its Relation to Social Policy—Eureka Abstract

My research poster will focus on metaphor theory and the ways in which metaphors structure language and social policies. I argue that metaphors are not just decorative but have the power to shape and change how we view concepts within the world. I look to Lakoff and Johnson for much of my research. They argue that metaphors are not decorative entities but rather have functional purposes and performative connotations for society.

I will be evaluating metaphors within the social issues of gun control, immigration, and human trafficking. Within all these problems, there are metaphors we use that shape and change our discourse around them. I will be employing some of Charteris-Black’s work as well to identify how critical metaphor analysis is utilized by politicians to sway voters toward their policies and away from their opponents.

Based on these concepts by Lakoff, Johnson, and Charteris-Black, I will be analyzing metaphors within contemporary issues. I will evaluate how metaphors used when discussing social policy issues frame and change our interpretations of several social matters. The words we use when discussing various issues frame the policies government makes. These policies, in turn, affect the ways people are treated within a country. The social issues and metaphors within them I will be looking at are gun control, human trafficking, immigration. Within these three major social issues, I will evaluate the metaphors commonly used by politicians, journalists, and policy makers that fundamentally shape society’s view of them and response toward them.
The exhibit “Kingship and Sacrifice” at the National Museum of Ireland-Archeology is home to four Irish bog bodies dating back to the Iron Age. The ethics of display regarding human remains are incorporated into the exhibit through the dignified space design and the written interpretation. Through this respectful public display of the human remains by the curatorial staff, the exhibit is given the space to be rhetorically framed as a culmination of Ireland’s larger work in the public sphere toward a cultural reclamation of their ancestral Celtic identity post-British colonization. The research I am conducting is focused on critically examining the exhibit as a unique space of post-colonial cultural reclamation in museology, and analyzing the vital role of educational and respectful visual rhetoric in the exhibition of human remains. Across the world, the majority of colonized descendant cultures and groups do not have sovereignty over cultural items and/or ancestral human remains, so this specific exhibit can provide a unique basis of understanding on how and why these items and remains are crucial for reclaiming heritage in the public sphere. National identity in post-colonial countries is another matter of global significance, and helps to inform the exigency of this research. The unique properties of “Kingship and Sacrifice” are tied into those facts. The bog bodies are not stolen human remains, and they are treated as a common cultural ancestor by their curators; and furthermore, they are specifically framed as part of the post-colonization Irish national identity being renewed through Celtic heritage.
Over the course of this fall semester, our professor, Dr. Annachiara Mariani had her Italian 412 class (most of whom belong to the Italian program as majors or minors) work on translating into English a novella written by students from Roseto Degli Abruzzi, Italy. The novella, called *La Leggenda del Borgo*, is based on historical research they have done on some of the legends surrounding the local village of Montepagano, and the Turkish invasions in the region during the 16th century.

We were challenged by the format and the beautiful language of this novella, as most of us in the Italian program had never done such extensive, thorough, and artistic translation work as this. However, the story was well worth it - what our Italian counterparts put together was a beautiful piece of fiction about the romance between an Italian *castellana* and a Turkish soldier. The story also effectively addresses prejudice and discrimination, issues that are prevalent in both America and Italy as we face the rise of nationalism and xenophobia.

The Tennessee students who translated the novella have been graciously invited by city officials to the conference, “Premio di Saggistica 17th Edition,” the main event of which will occur on June 1st, 2019. Those of us participating have been able to correspond with the students who worked on the Italian version, and we are all very eager to present our hard work before its publication in Italy under the sponsorship of the city of Roseto Degli Abruzzi. We look forward to meeting one another, and continuing what has been an incredible opportunity for cultural exchange.
"Thou Art Nothing": Nothingness in *King Lear*

One of the recurring central images in Shakespeare’s *King Lear* is the absence of any image at all: nothingness. The play’s events are set in motion when Cordelia answers her father’s demand of flattery by replying “nothing” (1.1.85). This enrages her father, who retorts “nothing will come of nothing” and banishes her. He misinterprets the honesty behind Cordelia’s “nothing” for disloyalty, banishing her from the kingdom. He then rewards his conniving daughters Goneril and Regan, who feed his ego with flattery but whose praise contains moral nothingness. Lear is confronted for his folly by his Fool, who states that his rejection of his only honest daughter has resulted in him becoming “nothing”. Due to Lear’s fundamental misunderstanding of the concept of nothing, his identity as king and father descends into nothingness.
Title:
Pipe(ing) Up about Pipe Fragments: An Analysis of Woodland Period Pipes from the Topper Site (38AL23)

Authors:
Megan E. Belcher and Martin P. Walker

Abstract:
From 2015 to 2017 the University of Tennessee conducted excavations at the Topper Site targeting Late Woodland period occupations. This paper presents metric, residue, and contextual analyses of multiple pipe fragments recovered during these excavations. These analyses have opened a discussion about the unique social landscape amongst the site’s Late Woodland inhabitants. We discuss historical socio-cultural smoking practices within the Woodland and Mississippian periods. We focus on smoking practices within the context of foodways during this time and the significant implications that these artifacts contribute to the understanding of Late Woodland village life at Topper and within the broader southeast.
Tate Cemetery: Preliminary Ground Penetrating Radar
By Jasmine Diamond Nichole Wilson

Tate Cemetery is late 19th century African American Cemetery in Cumberland County, Tennessee. The cemetery is the resting place of Reverend John C. Tate, a former slave, farmer and Methodist clergyman. The cemetery was established in the 1870’s for members of Tatetown, a self-sufficient colony of “freedmen”. Landowner James Davis and Cumberland Country Historian Barbara Parsons expressed concerns that the site contains unmarked graves that could be destroyed or negatively impacted by farming, development, and construction activities. With the guidance of staff members at UTK’s Archaeological & Environmental Research Lab, I conducted a ground penetrating radar (GPR) of the Tate Cemetery. GPR is a non-intrusive geophysical technique that is used as a scientific prospecting method to determine the presence of subsurface anomalies (such as human burials). The goals of this preliminary survey were to confirm the locations of known graves and locate unmarked graves within the cemetery boundary. The results of the survey and background historical research will be used to help protect Tate Cemetery and nominate it for the National Register of Historic Places.
In this study, I present the results of a comprehensive graphic, spatial analysis of the ruins of Tabernae near Larache, Morocco. This archaeological site was once a prime location in northern Morocco thousands of years ago but, now all that is left are a few stones and remnants of broken walls of what was. In 2017, the site was surveyed by the Moroccan-American project, Gardens of Hersperides: The Rural Archaeology of Loukkos Valley (INSAP-UTK). There the team took photos of the archaeological remains of the Roman occupation. These photos can be used to reconstruct a 3-dimensional model using photogrammetry. Photogrammetry is a computational measurement technique for constructing an 3-D model from 2-D photos. Using Agrisoft Photoscan, the distance of an object is able to be analyze based on the coloration of the pixels. The final model serves as documentation, digital reconstruction towards assessing states of preservation, and historical analysis of the Roman occupation of Morocco.
This poster will investigate how microartifact analysis allows us to better understand land management and the natural environment at the site of ‘Ayn Gharandal, Jordan. The site lies along the Wadi Arabah, a hyper-arid desert region in southern Jordan. ‘Ayn Gharandal was first occupied during the Late Roman Period (fourth century C.E.) by the Roman military to provision the legions along the eastern edge of the Empire and to control trade through the Wadi. Roman occupation ceases before the end of the fourth century, though the causes for the end of occupation area only poorly understood.

One of the primary objectives of the ‘Ayn Gharandal Archaeological Project is to better understand the role the environment may have played in both the founding and the abandonment of the military settlement. To address that question, the project has undertaken a full suite of geoarchaeological analyses that help reconstruct the natural landscape at the time of Roman occupation and assess possible human impact. In this paper, I focus on laboratory procedures conducted at the UT Geoarchaeological Core Facility, particularly microartifact analysis, which constitutes a vital source of information in determining interactions between the environment and human occupation. By integrating the results of microartifact analysis, excavated stratigraphy and artifacts from ‘Ayn Gharandal, and geoarchaeological testing, this analysis will help shed light on the occupation sequence at the site and shifts in land management and the environment that may have contributed to abandonment.
Pointing out the Variance: Statistical Analysis of Woodland Triangular Points from the Topper Site (38AL23)

Abstract:

Approximately 200 small triangular projectile points have been recovered from the University of Tennessee excavations targeting the Late Precontact occupations at the Topper Site. Along with these points, thousands of Late Woodland pottery sherds were recovered that have helped provide more refined information towards understanding the Late Woodland, information that the blanket typology “small triangular” has not been able to provide. An ongoing analysis of this assemblage attempts to expand upon this classification. Through morphological and statistical analyses, we examine the variability existing within small triangular points at Topper and compare our findings to findings of the South Atlantic Slope.
Fifteen percent of youth will experience at least 1 specific phobia (e.g., animals, the dark) in their lifetime. This anxiety disorder increases risk for developing mood disorders, other anxiety disorders, and substance abuse problems. In terms of understanding risk, there is evidence for the intergenerational transmission of specific phobias. Specifically, parental anxiety is related to the onset and course of phobias in children. A test commonly used to assess the severity of a specific phobia is the Behavioral Approach Test (BAT), in which children are asked to approach their feared object/situation in a controlled setting with a parent present. In past research, parenting behavior predicted child performance on the parent-present BAT, but surprisingly, self-reported parental anxiety did not. This may be because parental anxiety was not measured in the context of the BAT. The current study addresses this by examining the relationship between child BAT performance and parental fear perceptions about the BAT. We predict that child performance will be negatively related to parental perception of child’s fear, parental fear for their child, and parent’s own fear during the BAT. This has important implications for intervention and prevention efforts with phobic youth.
Attachment is thought to play a critical role in adaptive functioning, because the patterns formed in the relationship between the parent and the child inform how the child engages in future relationships (Groh, Roisman, van Ijzendoorn, Bakermans-Kranenburg, & Fearon, 2012). Bretherton suggests that the structure of communication between the mother and the child is a key driver in the young child’s development of social behaviors, which are vital for maintaining interpersonal relationships (Bretherton, 1990). Despite other studies linking interpersonal communication to the relation between attachment and the development of somatization (Stuart & Noyes, 1999), in the present study, a moderation framework will be used to examine if communication moderates the relation between attachment and functional problems in a clinically-referred sample of 33 children aged 8-12 years. Preliminary analyses suggest that attachment significantly predicts functional problems, even when controlling for age ($p=0.005$). Preliminary findings suggest that attachment is related to both functional problems ($r=-0.354; p=0.043$) and consistent communication ($r=0.616; p=0.000$). Communication, however, was not related to functional problems ($r=-0.201; p=0.262$). Our goal is to better understand possible protective factors that shield some children from developing maladaptive interpersonal problems in the framework of attachment relationships.
This study looks at the relationship between maternal borderline personality disorder (BPD) diagnoses and the use of negative talk in elementary school age children while completing a puzzle task. The study also examines the correlation between the amount of negative talk a mother uses, regardless of psychopathology, and their child’s externalizing and internalizing symptoms as reported by their teacher. Using the Manual for the Dyadic Parent-Child Interaction Coding System, DPICS and Achenbach’s Teacher Report Form, 70 children and their mothers were studied. These two measures allow for researchers to directly compare how mothers who are and are not diagnosed with BPD interact with their children and how their children behave in class. These associations can help inform preventative interventions and work through a cyclical relationship between the use of negative talk and a child’s internalizing and externalizing symptoms.
Understanding the Relation Between Core ADHD Symptoms and Lower- and Higher-Level Reading Abilities

Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder that is characterized by a “persistent pattern” of attention problems and/or hyperactivity/impulsivity concerns. ADHD symptoms interfere with functioning in academic, social, and occupational domains (American Psychiatric Association, 2013). Current and past research connects the core symptoms of ADHD (i.e., inattention and hyperactivity/impulsivity) to reading abilities in children. While most contemporary studies link reading impairments to attention symptoms (Pham, 2016), Kagan’s (1965) seminal work documents a significant positive relation between cognitive impulsivity and reading abilities in children (Kagan, 1965). The present study examines whether subjective and/or objective measures of attention problems, and hyperactivity/impulsivity concerns predict both lower- and higher-level reading abilities (i.e., reading comprehension and reading decoding) in a sample of school-age children (Mean=9.94; SD=1.59). Preliminary results utilizing a sample of 35 school-age children found no significant relations among ratings of hyperactivity/impulsivity, inattention, and reading abilities (all ps>.05). However, we will further examine the relation between objective measures of hyperactivity/impulsivity and inattention which may have a unique relation with reading abilities. Our goal is to understand the etiology (i.e., root cause) of impaired reading abilities in school-age children diagnosed with ADHD. Clinical and research implications will be discussed.
Executing saccades result in shifts of objects’ retinal locations. However, our visual system is efficient in correcting these shifts and enabling us to perceive a stable world. Transsaccadic object correspondence was originally tested with the intrasaccadic target displacement paradigm (Bridgeman, et al., 1975) in which the saccade target’s spatial location is shifted during the saccade. Participants are asked to report the direction of the shift. Previous studies have consistently found that perception of shift detection is poor unless the target object’s continuity is disrupted during the saccade. For instance, disrupting the target’s continuity by removing it for a brief period after the saccade (i.e., blanking the target) results in significantly more accurate reports of shift direction (Deubel et al., 1996). Other studies have shown that changing target’s surface features, such as shape (Demeyer et al., 2010), contrast polarity (Tas et al., 2012), or changing the target’s identity (Tas et al., 2012) result in similar improvements in displacement detection performance. However, a more recent study has found that orientation does not improve performance, suggesting that not all features may contribute to transsaccadic object correspondence (Balp et al., 2018). In the present study, we tested whether color changes can disrupt target’s continuity and result in improved displacement detection performance. We employed the target displacement paradigm where the target’s continuity is not disrupted (no-blank), its continuity is disrupted with a blank, or its continuity is disrupted with a color change. We also manipulated the magnitude of color change (ranging from 15° to 180°). Preliminary results suggest that small color changes (e.g., 15°) are not sufficient to disrupt target’s continuity. However, as the magnitude of color change increased, displacement detection performance improved. These results demonstrate that not all features are consulted for transsaccadic object correspondence, and only salient changes disrupt visual stability across saccades.

Methodology/Approach: Behavior/Psychophysics
Primary Topic Descriptor: Eye movements: Saccades
Presentation Preference: poster only
Award Consideration:
Acknowledgements:
THE EFFECTS OF STATIC AND DYNAMIC VISUAL STIMULI ON SPEECH PREFERENCE IN INFANCY

The current study utilized eye tracking to examine infant preference for visual and auditory stimuli in a multimodal looking paradigm. Previous studies have indicated that infants prefer infant-directed speech (IDS) over adult-directed speech (ADS) (Fernald, 1985). IDS is characterized by exaggerated prosody and pitch contour in comparison to ADS. Additionally, it has been shown that infants prefer dynamic visual stimuli over static visual stimuli (Courage et al, 2006). We aimed to examine the effects of static and dynamic fixation stimuli on infant preferences for IDS or ADS. Forty-eight 13-month-old infants were exposed to repeated presentations of a colored checkerboard, either static or dynamic, paired with female IDS or ADS. Using an infrared eye-tracker, the average look duration was analyzed as a measure of infant attentional engagement. Results revealed infants preferred dynamic visual backgrounds over static visual backgrounds. Furthermore, infants only preferred IDS over ADS when the fixation stimulus was static. These findings indicate that 13-month-old infants' preference for dynamic over static visual stimuli is stronger than their preference for IDS over ADS. Future work should examine the effect that matching dynamic visual stimuli (e.g., talking faces as opposed to geometric patterns) may have on infant preference for IDS speech.
The other-race effect is characterized by increasing difficulty discriminating other-race faces in infancy (Kelly et al., 2007). This affects selective attention to facial features. White 9-month-olds look most at eyes of own-race and mouths of other-race faces (Wheeler et al., 2011).

This eye tracking study investigated the effects of race and affect, or emotional expression, on selective attention to facial features. Ten-month-old infants \(N=14\) accumulated 20 seconds of looking to a static image of a woman’s face displaying either a neutral or angry affect. Infants repeated the procedure with the same actor displaying the other affect. Infants saw either own- or other-race faces. Visual fixations to the eyes, nose, and mouth were analyzed.

Results showed a main effect of race \(p=.002\) and a marginally significant interaction of race and affect \(p=.05\) on selective attention to eyes. Infants looked more to own- than other-race eyes. Infants looked similarly across affect to other-race eyes but looked more to angry own-race compared to neutral own-race eyes. These findings show differential visual scanning based on affect when viewing own-race but not other-race faces. Thus, the other-race effect may be associated with enhanced emotional processing of own- compared to other-race faces by 10 months of age.
THE EFFECTS OF INTERSENSORY REDUNDANCY ON INFANT ATTENTION TO PROSODY IN NATIVE AND NON-NATIVE SPEECH

The Intersensory Redundancy (IR) Hypothesis proposes synchronous presentation of information to two or more senses (e.g., audiovisual) facilitates infants’ processing of amodal information (Bahrick & Lickliter, 2000). This study utilized eye tracking to investigate effects of IR on infant detection of change in prosody (amodal information) in audiovisual speech. Twelve-month-old infants (N=40) viewed synchronous or asynchronous videos of a woman speaking native or non-native speech. Halfway through, the speaker changed their speech to convey a different prosody. We hypothesized the synchronous condition would facilitate discrimination of the change in prosody for both native and non-native speech as evidenced by an increase in looking following a change of prosody (recovery of looking). In contrast, we predicted infants in the asynchronous condition would only demonstrate recovery of looking to a change of prosody during native speech. Findings revealed the synchronous group showed recovery of looking for native but not non-native speech. They also showed stronger recovery to native over non-native. The asynchronous group showed recovery of looking for native speech. There were no differences in looking recovery based on IR during non-native speech, indicating IR only facilitates discrimination of a change in prosody in native speech for 12-month-olds.
The effects of stress and anxiety on a cued attention task

Catalina Gonzalez, Esther Reynolds, and Shannon Ross-Sheehy

University of Tennessee

Previous research has shown visual attention tasks like the Infant Orienting With Attention (IOWA) Task are effective in identifying individual differences in spatial attention (Ross-Sheehy et al., 2015). Given visual attention is influenced by factors like stress/anxiety (Grillon et al, 2016) it may be possible to use attention tasks to identify participants high in stress and/or anxiety. Fifty-four adults completed a modified version of the IOWA task. Participants then completed the Perceived Stress Scale and Beck Anxiety Inventory, and were divided into three groups: Low_Stress/Low_Anxiety (LSLA), High_Stress/Low_Anxiety (HSLA), and High_Stress/High_Anxiety (HSHA). A Condition x Stress Group ANOVA revealed only a main effect of Condition—Interestingly, stress group was not significant suggesting that reaction time was not influenced by anxiety or stress. We then assessed accuracy across stress groups using a one-way ANOVA. Results revealed a significant effect of stress group: HSLA subjects made significantly more errors than both LSLA and HSHA subjects. This suggests that although high stress was the best predictor of error rate, these errors were partially ameliorated by high levels of anxiety. We interpret this finding as evidence of hypervigilance, such that increased stress experienced by highly anxious individuals was more likely to trigger heightened control mechanisms.
Attention is the preferential allocation of cognitive resources to the processing of task or context relevant information. Selective attention to dimensions is the ability to preferential process and extract relevant featural information from an object in the presence of distractors. Flexible attention to dimensions is the ability to disengage with previously relevant featural information and re-engage with newly relevant information. Stable attention to dimensions is the ability to continually engage with relevant featural information within a specific dimension. Previous behavioral work suggests there may be a common underlying mechanism influencing performance in tasks assessing these attentional functions (e.g., Benitez, Vales, Hanania, & Smith, 2017; Hanania & Smith, 2010). In the current study, we assessed the neural activation across these functions via a battery of dimensional attention tasks.

Hemodynamic data was collected via Techne Cw7 software sampled at 25Hz where probes were bilaterally placed over frontal, temporal, and parietal cortices. There were a total of 10 channels in the current probe design. Results revealed that children who were better at producing and comprehending featural labels in the color task performed better across the battery of attention tasks, suggesting that label learning influences attentional functioning in preschoolers.
Abstract

Elizabeth Martens and Kaleb T. Kinder

Achieving goal-directed behavior requires selective attention, a cognitive control component essential for maintaining engagement to goal-relevant information and suppressing goal-irrelevant distractors. The deployment of selective attention has been shown to depend on the type of distractor information. Specifically, research has reliably shown that reaction times (RT) are slower when distractors are incongruent (elicit response conflict) than when distractors are congruent (same) or neutral (unrelated) to a goal-relevant target (B. A. Eriksen & Eriksen, 1974). However, research has also demonstrated inconsistencies in distractor processing. Specifically, congruent trials have been shown to either have faster or no difference in RT compared to neutral trials. In this study, we examined the distractor-target relationship by metrically manipulating the features of distractors and utilized mouse-tracking to capture real-time behavioral dynamics associated with selective attention. We found no RT difference between congruent, similar-congruent and neutral trials. However, mouse-tracking measures revealed that congruent and similar-congruent trials resulted in more efficient (e.g. less movement curvature) response processes than neutral trials. In addition, movement velocity was faster earlier in congruent trials than in neutral trials. These results demonstrate a dynamic relationship between goal-relevant and goal-irrelevant information processing that impacts the underlying processes of selective attention.
Attention is the preferential allocation of cognitive resources to the processing of task or context relevant information. Attention in early development moves from being exogenously drawn to endogenously controlled. The Flanker task is one measure of executive attention, the ability to regulate attentional processing in a goal directed way. Robust neural changes occur during this time frame within and between frontal and parietal cortices and these changes have been attributed to attentional functioning during this age range (Columbo, 2001; Posner & Peterson, 2012). The current project aims to characterize the relationship between neural profiles and executive attention ability from toddlerhood to early childhood. In the current study, hemodynamic responses were collected via CW7 fNIRS system at a sampling rate of 25 Hz in 2.5- and 3.5-year-olds. Results revealed that frontoparietal rFC was predictive of accuracy on congruent and incongruent trials during the Flanker task in both age groups. Further, rFC was predictive of event-related activation in those same cortical regions. The current study is the first to link rFC to both performance and event-related activation during the Flanker in these age groups.
Why do people listen to sad music? One possibility is that sad music elicits more positive than negative affect. Available self-report data are inconclusive, so we turned to facial expressions of emotion. 45 undergraduates listened to the first minute of three sad songs of their choosing, as well as three experimenter-selected neutral pieces. Participants reported how much positive and negative affect they felt while listening to each song. Video recordings of participants’ facial expressions were shown to seven trained coders who were naive to the purpose of the experiment. These coders provided moment-to-moment ratings of the degree to which the participant expressed positive or negative affect. The self-report data show that participants felt more negative affect after listening to sad songs than neutral songs. However, the coders detected more positive affect on participants’ faces during sad songs than neutral songs. These results show an interesting disconnect between self-report and facial expressions. This shows some evidence that sad music elicits more positive affect. If facial expressions prove to be a more apt means of measuring felt emotion, then these results could be a possible explanation for why people listen to sad music.
Abstract

People define themselves and derive a sense of worth from the groups with which they affiliate (Turner, 1999). Perceiving oneself as similar to others can boost self-esteem when those individuals possess positive characteristics. Conversely, learning one is similar to negatively-characterized individuals can threaten the self and cause one to disassociate from those individuals (Novak & Lerner, 1968). However, would learning of a biological and group-defining similarity with a negatively-characterized outgroup affect prejudice towards that group, particularly when membership in that group is believed to be fixed and immutable? Previous research has found that when investigating this question within the context of race and sexual orientation, a change to perceived group membership led to decreases in implicit prejudice towards the previous outgroup (Fritzlen et al., in press). We investigated whether participants were changing their beliefs about the essence of social groups in response to this recategorization threat and found evidence of dissonance-motivated attitude change on essentialist beliefs. We found that those in the gender inconsistent condition showed less endorsement of naturalness beliefs (i.e. beliefs about the biological basis of gender) but increased endorsement of entitativity beliefs (i.e. beliefs about the informativeness of gender) compared to the other conditions.
The Convergent and Discriminant Construct Validity of the SCORS-G as a Measure of Personality Functioning

Abstract

The Social Cognitive and Object Relations Scale-Global Rating Method (SCORS-G; Stein, Hilsenroth, Slavin-Mulford, & Pinsker, 2014; Westen, 1995) consists of 8 indices of object relational constructs. It is a flexible, clinician-rate method that has been traditionally used to code various forms of narrative material, such as TATs, clinical interviews, dream narratives, and psychotherapy process, to translate object-relational theory into workable clinical data. While the SCORS-G has been shown to represent constructs important to personality disorders, it use has not been applied to whole-person ratings, which is most often utilized by clinicians when conceptualizing real patients. Using clinical vignette methodology and applying whole person ratings, this study sought to accomplish four main objectives: (1) Determine whether clinicians can use the SCORS-G rating method to reliably capture clinically relevant object-relational content when rating whole-person case summaries, (2) uncover whether we can reliably use the SCORS-G and other similar object-relational measures that reflect personality functioning, (3) reveal whether or not the SCORS-G ratings demonstrate convergent relationships between conceptually similar object-relational measures in theoretically appropriate ways, and (4) demonstrate divergent relationships between the SCORS-G ratings and related but conceptually dissimilar variables. Overall, results support the object-relational theoretical foundations of the SCORS-G as a valuable way to assess relational functioning and suggests that it may be used as a “proxy” when assessing personality functioning.

Keywords: personality disorder, personality functioning, object relations, severity, personality assessment, personality traits
The Clery Act requires college and university campuses to issue annual crime reports and “timely warnings” about crimes occurring on campus or nearby. But schools have significant discretion to determine which crimes necessitate a warning. Schools’ choices shape perceptions of safety on and off campus, and can possibly exacerbate problems of racial profiling and sexual assault.

This paper compares schools’ crime reports to “timely warning” alerts to assess which categories of crime elicit an alert, and which do not. We find a large discrepancy in sexual assault statistics between annual reports and warnings, indicating that schools are not treating these crimes as representing a threat to other students. Meanwhile, robberies are reported at a much higher rate, perhaps because they conform to stereotypical images of “crime”. We conclude by hypothesizing what accounts for these discrepancies, and why schools may be fundamentally misinterpreting Clery requirements. This innovative paper shows how racial and gender inequality can be linked through a single institutional practice.
Over a year since Hurricane Harvey hit Texas in August of 2017, the impact this storm had on people is still present. Throughout my time in Texas in the summer of 2018, I heard several people express their frustration and dissatisfaction with large disaster relief and aid organizations, such as FEMA and the Red Cross, following Hurricane Harvey. I returned to Texas in October and December of 2018, specifically focusing my research in Houston, in order to survey and conduct semi-structured interviews with those who had been affected by Harvey, as well as community organizations that helped to provide disaster relief and aid. The purpose of this study was to understand how and why peoples’ perspectives of these organizations may have changed after their experience with Harvey, what factors are causing this shift in perspective, and how these shifts could influence their future economic and social relationships with organizations in their communities and government. In this poster, I will approach these questions using the data collected from those surveys and semi-structured interviews with people from Houston.
LGBTI+ Terminologies, Identities, and Activism in Nepal

The 1990 Nepali Constitution opened up opportunities for many forms of activism as the ban on political parties was lifted, and identity groups thus began solidifying to advocate for social change and justice (Karki 2012). Such groups included gender and sexual minorities. After the Nepali Supreme Court ruling in 2007, Nepal became one of the first countries to offer a third gender category “Other” for passports, becoming a leader for human rights in South Asia and the world (Mahato 2017). Yet, as Coyle and Boyce (2013) point out, there is little research on LGBTI individuals in Nepal. Not much research exists on gender and sexual minority identities and activism in the Global South, particularly in Nepal.

This research attempts to increase understanding of Nepali LGBTI people’s lived realities and daily experiences, while focusing on the language and terms used by these individuals and in government legislation. To do so, I conducted 17 semi-structured interviews with LGBTI individuals and activists in Nepal. Relying on queer phenomenology theories (Ahmed 2006, Muñoz 2013) and queer linguistic methodologies (Motschenbacher 2013), I analyze how these individuals understand their identities and desires, how they grapple with prevailing heteronormative discourses in Nepal, and how gender and sexuality are conceived of in Nepal and in the Nepali language. Additionally, I examine how global north terminology (e.g. LGBTI, transgender) has simultaneously helped and hindered activist efforts in Nepal.
Despite the declining crime rates, the United States continues to incarcerate more people than any other country. While it varies from state-to-state, many states have adopted reforms - such as, reducing lengthy prison sentences, removing mandatory minimums, among other measures - in hopes of reducing recidivism and incarceration rates. While these efforts appear to have impacted men’s incarceration rates, women’s incarceration rates remain stubbornly resistant. This study analyzes and compares state incarceration rates of men and women in all fifty states. Studies comparing similar statistics have focused too greatly on solutions to male mass incarceration, overlooking the level of impact women’s incarceration rates can have. Women makeup only 7.5% of the 1,316,000 people incarcerated in state prisons (Carson, 2018). While there are more men in state prisons, the incarceration rate for women has grown rapidly, as it is more than twice as high than men’s since the 1980’s (Sawyer, 2018). This is not uniformly true across all states and yet, women’s incarceration rates continue to have a strong effect on the total prison population. By addressing the mass incarceration of women, there exists potential to decrease the prison population and reduce recidivism.
Since the formation of the European Union (EU), the EU has been recognized globally as a body of states dedicated to reflecting on the past and rebuilding Europe after the horrors of the Holocaust. For example, in 2012 the EU was awarded the Nobel Peace Prize “for over six decades contributed to the advancement of peace and reconciliation… in Europe” (Nobel Prize.Org). Although the EU’s efforts to remember and learn from the past are celebrated, its response to the “migrant crisis” calls its memory of colonialism and imperialism into question. In this thesis, I argue that certain EU responses to black and brown migrants from MENA and other regions (demonstrated through right-wing populism, rhetoric and policy) stem from legacies of colonialism and imperialism in Western Europe. This thesis uses existing research to discuss the “migrant crisis” and certain EU member states’ responses to black and brown migrants to support claims about its weakened identity as a reflective body and the explicit and implicit racism generated by the lasting impacts of colonialism and imperialism.

*Keywords:* personality disorder, personality functioning, object relations, severity, personality assessment, personality traits
China, a rising global hegemon, has become increasingly interested in close economic and political relations with Latin America since the turn of the century. These relationships have been centered around two traits, foreign direct investment (FDI) and the export of raw materials. China has fully invested itself into the region in order to develop and maintain the production of certain goods necessary for upkeep of its massive population and industrializing economy. I test the significance of four prominent raw materials in Chinese trade with Latin America to determine their impact on Chinese FDI. Using this method, I gather and gauge the strength of Chinese relations with certain Latin American countries, explaining the specific features of China’s greatest partners in the region, as well as nations with lesser, though more unique, relationships, and finally some nations with no relations (or recognition) of the Chinese superpower whatsoever. My findings explicate the massive significance of Chinese investment into the region, hinting at what these relations could mean for the future of the region, and whether or not Chinese investment is as beneficial as it seems.
What makes for a successful state?

In this essay, I outline the characteristics necessary for a state to develop successfully. Success can be determined along three dimensions: (1) economic prosperity; (2) human and civil liberties; and (3) fair government. The question of successful development is important because if a state does not develop successfully, it may devolve into anarchy. Unfortunately, state formation is frequently violent itself. As for what technically makes a state, the Montevideo Convention is an obvious precedent of the declarative theory of statehood and introduced the idea that a state does not have to be recognized by other states to be valid in international law. In contrast, the constitutive theory claims that states do not exist until they are formally, de jure recognized by other states.

What characteristics produce a more “successful state?” How do strong versus weak borders, ethnographic populations, democratic governments, and international involvement determine success? I describe what policies, structures, and decisions can help a state thrive. Then, I survey states that have been moderately successful in preventing failure: particularly island nations and Baltic states. In contrast, many modern developing states miss critical characteristics for success, approaching state failure, primarily ex-Soviet nations in the Balkans, Caucasus, Central, and Southern Asia.
Convective Mode and Communication in Tennessee: Tornado Warning Challenges for Forecasting within the National Weather Service

Megan Porter

The purpose of this study was to assess how storm convective mode influences National Weather Service (NWS) warning procedures and communication between officials and their county warning area (CWA). Interviews were conducted at the Morristown, Nashville, and Memphis NWS Weather Forecasting Offices (WFOs) to gain insight of operation challenges during tornadic events and how these might be correlated with false alarms rates (FAR), lead times, and amount of engagement in communication with the public. Qualitative analysis was performed by coding the interviews to evaluate what convective modes were the easiest and the most difficult to detect and warn. It is a consensus of the state’s NWS forecasters that the supercellular storms are easiest to warn and prepare for. Due to the high number of linear storms in Tennessee, there is greater risk and vulnerability with quasi-linear and linear convective modes. These capricious linear modes are difficult for forecasters to warn, leading to more individual decision making and variation in FAR and lead times. The varied procedures within these offices have the potential to be consolidated and used for updated policy measures throughout the state in order to more effectively convey potential convective-mode related risks and vulnerability of the public, particularly communities with inadequate infrastructure and a misunderstanding of appropriate weather safety response. This project demonstrates the variability of state convective modes and WFO warning procedures, and may be replicated in other states to expand and maximize forecasting and warning methods, ultimately lessening public vulnerability.
Conflicting Processes in U.S. Refugee Resettlement: When Facilitators to Integration Become Barriers

Alex Webb

Abstract

Global figures of human displacement have recently reached record-breaking numbers. Meanwhile, the United States has grown increasingly ambivalent toward refugee resettlement. Public interest in the outcomes of refugee resettlement has increased, and the integration of refugees is the subject of ongoing academic debate. Integration is generally understood to be a process, yet scholars and policymakers alike diverge on what determines integration, and specifically, what factors can be seen as a hindrance or facilitator of success. While employment, housing, education, and health are understood to be both "markers and means" of integration (Ager and Strang 2008), U.S. resettlement policy emphasizes early employment and economic self-sufficiency. This poster examines the relationships between the different factors within the process of integration through 27, in-depth qualitative interviews with resettled refugees and resettlement actors. The interviews focus on the resettlement experiences of refugees in Louisville, KY via the perspective of informants involved in resettlement agencies, housing, and civil society organizations. The ways in which these resettlement actors conceptualize and seek to facilitate integration has a large impact on refugees’ experiences. This poster demonstrates that when employment is exclusively prioritized in resettlement policy and delivery, it becomes a barrier to the overall integration of refugees.
Disneyfication and Education

Disneyfication in theater means the increase in popularity of Disney plays and the resulting reshaping of modern plays to more resemble those of Walt Disney, in order to gain viewership. In most cases, this means a shift to a musical format featuring upbeat ballads and gaudy but family-friendly costumes. While many theatre elitists frown upon such trends, this project shows how Disneyfication fosters renewed interest and enjoyment in theatre across age groups. A case study of the Knox and Sevier County school systems in Tennessee examines patterns of interest and enjoyment in the nation’s most popular plays via snowball method questionnaire, as well as how modern school curriculums foster this interest. A survey of Knox and Sevier County students, both past and present, collected their favorite plays and degree of enjoyment of the play, and a geographic analysis of the placement of theaters near schools, as well as the incorporation of the arts into schools and the rise of Disneyfication in plays, aids in explaining this deep degree of enjoyment and engagement. This enjoyment then feeds back into schools, with the engagement of students in the arts improving their overall academic performance.
Abstract

Energy poverty in the United States is the cost of energy and the strain that this cost places on citizens, especially those living in low-income areas. According to the 2010 census, there were approximately 60,000 people living in poverty in Knox County. The installation and use of solar panels in low-income neighborhoods could play a significant role in alleviating some of the economic stresses felt by families living in poverty. The purpose of this project is to pinpoint census block groups containing houses that would most greatly benefit from the installation of solar panels. We conduct this analysis by taking low-income census block groups; and, using remote sensing, analyze the polygons and corresponding roof angles to determine which block groups will be most positively affected by the installation of solar panels. The results of this analysis measure the impact the installation of solar panels has on low-income block groups. This alleviation could have impacts that range from increasing the quality of life for a large portion of Knox County, to the integration of natural, renewable resources in local and federal policies.
We are going to be exploring the effect that creeks in Knoxville (First Creek, Second Creek, etc.) have on home prices. To do this, we will be constructing what in Economics is called a hedonic pricing model. In practices, we will be collecting data on housing prices in Knoxville and generating a regression to describe the housing prices using a range of socio-economic indicators alongside some variable that denotes a relationship between home prices and creeks. We plan to take this a step farther than some similar studies by including acknowledgements and/or corrections for geostatistical phenomena like spatial autocorrelation. We will be gathering home pricing data and socio-economic data from the Census while using hydrology data from the USGS. The hedonic pricing model will take the following general regression form:

\[ HousingPrice = \beta_0 + \beta_1 \text{CreekProx} + \beta_2 \text{SECharacter} + \epsilon \]
Haslam College of Business

Poster #77
Student(s): Eunice An
Faculty Mentor: Youngs, Lynn
Project Title: The Selca

“Where do you guys go to take pictures?”
“It’s so hard to find places.”
“I don’t know how influencers find the best places.”

These are often conversations I have with my friends, friends who I’ve never actually met, because we communicate with each other through Instagram. During one of our conversations, we ran across the issue of trying to find locations to take photos. When I am in shortage of great photos to post, I find it is because I cannot find eye-catching places to take photos in. I decided to actualize a business that would provide a solution to this problem in the Los Angeles area. The Selca creates a space that inspires people to not only make art but be art themselves. It strives to produce striking setups that allow people to capture equally striking photos and share them with the world. The Selca enlists artists to design and construct visually-stunning and photogenic sets. These sets will be Selca’s draw, attracting individuals to take photos of themselves within the art for the purpose of posting it on their respective social media. The target customer are younger individuals, millennials and Gen Z’ers, who own any photo-sharing platform/social media outlet.
Tennessee’s Qualified Opportunity Zones: An Analysis of Tract Selection

The 2017 Tax Cuts and Jobs Act was a major piece of tax reform legislation which included a federal strategy to drive investment in low-income and underserved American communities in the form of Qualified Opportunity Zones (“QOZs”). These zones, which are designated at the discretion of state governors, meet certain criteria in terms of income levels and poverty rates. After designation, taxpayers can make eligible investments into Qualified Opportunity (“QO”) funds to receive significant tax benefits. Our study seeks to provide insight into Tennessee governor Bill Haslam’s selection of census tracts for designation by utilizing QOZ tract summary data consisting of economic, demographic, housing, educational, and geographic measures. Using this data, we conduct state-level, regional, and combined-statistical-area analyses, as well as a comparative analysis with national QOZs. Further, using a comprehensive indexing strategy, we seek to understand whether the selected tracts are likely to maximize public investment by deploying a tract-level change flag to understand whether tracts are experiencing significant socioeconomic change and gentrification.
ABSTRACT:

Deep Reinforcement learning is a subset of deep learning that is comprised of an agent, an environment, and a reward system. The agent operates in the environment and receives a reward based upon the outcome of its actions. It then adjusts its future behavior accordingly. In this work, I examine various deep neural network architectures and their abilities to learn the Atari game PONG through a policy-gradient based reinforcement learning approach. Each network’s ability to win against the stock PONG computer opponent is evaluated after 2500 episodes of training. The mean reward score determines which architecture had the optimal performance given a fixed training time. I vary the number of hidden layers in the DNN, the number of neurons within each hidden layer, and the discount factor for both the reward system and the policy optimization.
Executive Summary- Ben Dale- One Shot Pub

Industry Analysis
One Shot Pub proposes to merge two mature industries into one lucrative one. The average bar makes a profit of $5,000 monthly, but with game commissions, 3D printing, and private room reservations we will increase that to roughly $8,000 a month in average profit with the peak season coming in the late summer and early winter months. The biggest factors to utilize to increase those earnings would be to sell more 3D printed goods and to carefully monitor the drink prices and categorize them into winners, losers, re-pricers, and too popular to have a stockout based on pour cost.

Market Analysis
Atlanta is a strong market in nerd culture and bar attractiveness. There are around one thousand other competitors in the area, but with no other venues targeting the same niche market it will not be difficult to carve out a core group of loyal customers. Furthermore, Atlanta ranks in the top twenty-five cities in the country in terms of alcohol spending per capita which means even carving out a small portion of the market will be fruitful.

Marketing Plan
Our annual marketing budget is currently listed to reach $15,000 annually by year 3. OSP will also offer a reward program for customers who are constantly making use of our private rooms. The pricing of drinks, private rooms, and happy hour deals fluctuates based on the day of the week.

Operations and Service Plan
Partnerships are key for One Shot Pub’s profitability, with the three most crucial partnership opportunities being with local food trucks/food delivery services, game developers, and craft beer manufacturers. OSP’s employees will make well-above minimum wage- and even more than the owner for the first several years- but will be expected to be well-versed in game systems and cocktail creation.

Financial Projections
The company expects to be cash positive from operations alone within its first two quarters due to its various revenue streams in a lucrative market and low variable costs once the bar is established. The company will focus on minimizing inventory costs- the largest variable cost for the bar- through Economic Order Quantity (EOQ) analyses for each product. OSP will also evaluate the condition of its games on a regular basis and restock quarterly while donating the most worn games to local schools to spark creativity and a love for games at an early age.
Investment Funds Allocation

The $200,000 initial investment will largely be used to establish the bar. Setting up the equipment, building the private rooms, procuring a reserve of top-quality games and alcohol, and acquiring a liquor license all takes upwards of $130,000. The company will also need at minimum $5,000 to build a quality website which can function as an online store, make reservations for tables, and look appealing enough to get consumers in the bar before tacking on other marketing costs like adverts and Search Engine Optimization (SEO). The remainder will go to help the pub’s cashflow in its early quarters before revenue begins pouring in.

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Poster #81
Student(s): Leah Deakins
Faculty Mentor: Graves, Thomas Houston
Project Title: Red Barre

Leah Ashley Deakins

The purpose of this business plan was to create a barre fitness studio located in Shanghai, China for Chinese women. The location, Shanghai, was chosen for the reason of American business influence and the economic potential. Red Barre, the first solely focused barre studio in Shanghai will help promote a mind-body connection and allow the women of Shanghai to take a step back from the hustle and bustle of the city and spend an hour on themselves. The barre method combines ballet and pilates, making this method of exercise relaxing but the most effective way to transform your body. It is a high-intensity, low impact workout that will keep the women of Shanghai coming back for more as it will not only reduce stress, but it will also help women feel more confident and allow them to further their fitness goals and healthy lifestyle. Red Barre will be funded by a venture capitalist in the first year of operation.
The purpose of this study is to determine whether more recent poison pill data supports the Shareholder Maximization Theory or the Management Entrenchment Theory. In sum, this is an event study in which I will explore whether the stock price for a company goes abnormally up or down immediately following a poison pill announcement. I examine the cumulative abnormal returns of 28 companies within the following event windows: the event itself and the following day (0;+1), periods of three (-1; +1), five (-2; +2) and seven (-3; +3) days, and longer periods of pre-adoption (-15; -4) and post-adoption (+4; +15) which represent “neutral” times. I will then compare these returns to the S&P 500 returns, The CRSP value weighted returns, and the CRSP equal weighted returns for the same time period. My null hypothesis is that there will be abnormal cumulative returns, and my alternative hypothesis is that there is no relation between poison pill announcements and shareholder return. If there are positive abnormal returns I will attribute it to the Shareholder Maximization Theory. If there are negative abnormal returns, I will attribute it to the Management Entrenchment Theory.
This study is intended to evaluate the Fortune 500 Chief Executive Officer make up, with an emphasis on female CEOs analysis. Transitions within the C-suite are particularly important to a company’s strategy and practices, effects on a business industry, and financial markets and perceptions of investors. In today’s era, why are so few females included in the Fortune 500 CEO club? Is the “glass ceiling” affect pertinent in the top grossing firms and trickled down into the media’s perception of women in CEO transitions?
ABSTRACT

The gradual adoption of defined contribution plans has been a significant change in the occupational pension system in the United States over the last few decades. By transitioning from defined benefit (DB) plans to defined contribution (DC) plans, companies are shifting the financial risk of saving for retirement onto the employee. Though the shift of this financial risk is the primary concern for many, there are other side effects that this transition may bring about. The principal side effect that will be observed in this research is the potential of DC plans to dis-incentivize employee loyalty and contribute to increased employee turnover in a company. This will be explored through univariate analysis of access to DB and DC plans across various characteristics including worker characteristics, establishment characteristics, and geographic areas as well as analysis of quit rates across various industries and geographic regions. Data will also be collected from S&P 500 returns through Bloomberg in an attempt to understand the shifts in access and participation rates in DB and DC plans offered by employers.
The Chance You'll Win - NBA Basketball Game Win Predictor

Brian Haney

Abstract

This research project aims to recreate and to critique the currently used time-based logistic model that gives basketball fans and analysts alike an educated and informed prediction of the winning team in any given game at any given moment within that game. Using NBA team historical data (as early as the 2008-2009 season) collected and provided by STATS.com, different logistic models are built and tested on their ability to correctly predict previous games. Models used include simple logistic regression, random forest modeling, gradient boosting modeling and support vector machine learning. All models take into consideration statistics that occur before the current game as well as statistics occurring during the current game in order to make their prediction at any given minute during said game. After each model is evaluated on the recorded data, those predictive models are then compared on their performance, and the model with highest performance (determined by the lowest misclassification rate) is then selected as the best predictive logistic model. Modeling and evaluation were performed in R. Ideally, the best performing model should be further tested on new, live data in order to further evaluate and better the model.
This is an investigation into the reporting and presentation of how the economic implications of stock-based compensation are shown in their entirety in publicly available filings. The basis for this paper is about whether financial statement users can see the underlying economics of stock-based compensation solely through publicly available statements. The topic of stock-based compensation is rarely thought about in terms of how compensation awards are settled. There are many questions that are looked at in this paper such as, if the company issues new stock, what is the dilutive effect on current shareholders? If they have to buy treasury stock at today’s price, what is the effect of this? If they are optimizing treasury stock purchases over time, how is the expense truly aggregated? These questions are assessed in the paper first, then I secondly answer the overarching question of if current reporting standards allow financial statement users to see the underlying economics behind these transactions. For this paper, I utilized Apple Inc. as the company to be tracked as they’re known for generally transparent and clear financial statements. In addition to their transparency, Apple also has a very straightforward stock-based compensation program for its employees. This paper provides the basis for further research into stock-based compensation reporting and presentation issues.
Abstract on the Consumer Perspectives on the Enhancement of brick and mortar J. Crew locations

In this day and age of retail disruption, more consumers than ever are shopping online as opposed to visiting store locations. Shopping in-store has become almost a chore to the average shopper and due to this, brick and mortar locations have been closing across the country at a growing rate. This study is an inquiry into the consumer perspectives of the average J. Crew customer to see what kind of enhancements J. Crew could incorporate to motivate potential customers to continue to shop in-store. The goal of this study is to come to beneficial conclusions that J. Crew managers could implement into their stores to increase sales and grow customer retention. The conclusions of this study were drawn from interviews with various J. Crew store managers and from collecting survey data from 200 respondents that are from the United States of America, over the age of 18, and have previously visited a J. Crew location. This study is to be completed as the senior capstone project for the Greg and Lisa Smith Global Leadership Scholars.
In this research, we use the novel metric called martingale difference correlation to select the effective sets of explanatory variables which are relevant to the conditional mean or conditional quantiles of the response variable. Our approach considers the joint effect of the independent variables and selects the best sets which most contribute to the dependent variable in the context of regression and quantile regression. We apply our approach to a housing price dataset and are able to screen the explanatory variables for regression and quantile regression modeling. Interestingly, the effective sets for different models are different.
Abstract for Melton Scholars Research

Scott A. Lawson

**Purpose**: To examine the data delivered from Anonymous Company and deliver insight into their supply chain.

**Objective**: Identify a simple linear regression to describe and predict the amount of time spent delivering an order to a customer based on the dollar amount of the order, total weight of the order, total cubes in the order, and total items in the order.

**Description**: A simple linear regression was fit and had an R-Squared of 32% and an RMSE of 13 minutes. There are many known deficiencies in the data however, so I set out to manually clean the data of a single route. My cleaning process used the companies Geo tracking system to review the actual times and locations of the trucks to verify when and where they were. A simple linear regression fit on this data produced a marked improvement in R-Squared of 76% and an RMSE of 7 minutes.

A multitude of automated and manual reporting methods contribute to the dataset being unusable in its raw format. Approximately 95% of records have some sort of data integrity issue. Most, if not all, of these issues can be resolved by fixing issues within the reporting technologies or implementing stricter policies for reporting by drivers.
As companies continue to see the increasing need for sustainability reporting, many have been accused of green washing their sustainability initiatives in order to position themselves better. It is becoming increasingly difficult to weed out the greenwashing from the real triple bottom line sustainability projects. What do companies that are actually perceived as “green” convey in their corporate social responsibility reports and how does this differ from the companies which have poor environmental records? Using the Newsweek Green Rankings to identify high and low environmentally performing companies and the Global Reporting Initiative as a mechanism to identify environmental reporting standards, this research explores the differences between the two groups of reports. After analysis in Wordstat, I found that high environmentally performing companies go beyond compliance in their corporate social responsibility reporting. These companies set themselves apart by reporting not just metrics, but with words that convey a dedication to their sustainable initiatives. The conclusion of this research makes insights into the key differences between both sets of companies.
Illness to Incarceration: Imprisonment as a False Substitute to Inpatient Mental Health Care

Grace D. Malone

Abstract

I contribute new evidence regarding the substitution of incarceration for inpatient mental healthcare. I estimate the empirical relationship between state-level mental health care expenditures and incarceration rates using standard panel data methods. Results indicate increased public expenditures on inpatient mental health reduce the number of imprisoned individuals. Providing funding for one additional inpatient hospital bed reduces incarceration rates 1.05. However, if we just consider incarceration and inpatient mental health as a way to remove individuals from society, incarceration saves the state $220,000 per-person per year. My results indicate that states have the financial motivation to substitute imprisonment for incarceration, despite their lack of substitutability from a therapeutic standpoint.
This study explores the relationship between different configurations of a firm’s Corporate Social Responsibility (CSR) strategy and Corporate Financial Performance (CFP). Building on previous Instrumental Stakeholder Theory and CSR-CFP research, we question whether the correct assessment of a firm’s CSR level has been utilized in the search for a correlation between doing good and doing well. By doing so, we develop a measurement of firm CSR as a congruent assessment of the firm’s CSR strengths and CSR concerns. We develop multiple hypotheses based on how these different potential firm combinations of CSR strengths and CSR concerns would affect CFP. We test our research questions through a times series regression model on a sample consisting of S&P 500 members from the years between 1991 – 2009. Our results offer a ranking system of which combinations of CSR strengths and CSR concerns yield the best financial performance. Our conclusions include implications for both theory and managerial applications such as findings that stakeholders punish CSR concerns to a greater extent than they reward CSR strengths, the effect of CSR strengths on CFP is dependent on the existence of CSR concerns, and a strategic management tool to aid firms in achieving superior financial performance.
This research study aims to interview supply chain professionals and identify best practices regarding resiliency planning and risk mitigation processes when companies face natural disasters. Natural disasters continue to be some of the most impactful events that supply chains face each year. Different types of natural disasters mean that companies must have a flexible and adaptable plan to mitigate the risk faced when an event occurs. Natural disasters can cost companies millions of dollars in equipment damages, lost inventory, and unplanned disruptions. Companies must utilize supply chain risk management and resiliency planning in order to reduce the upstream and downstream risk associated with these events and effectively continue operations despite facing disruptions from a natural disaster. The companies who perform best in natural disaster scenarios have a clearly-defined plan for multiple natural disasters, incorporating multiple levels and functions within the companies. These companies’ natural disaster plans include maximizing available production capacity before the event, expediting customer orders, securing WIP inventory and raw materials, and rerouting logistics through safer locations. No matter the industry or company that those interviewed worked for, each shared the idea that working with clear communication with upstream and downstream partners is the most important aspect of a natural disaster plan, and the best way to effectively continue business operations while minimizing risk and loss.
**Poster #94**  
**Student(s):** Isheeta Mistry  
**Faculty Mentor:** Tate, Wendy  
**Project Title:** Why haven't we ended World Hunger and why should you care?

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**Principle Investigator:** Isheeta Mistry  
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**Research Area:** Food Waste and Sustainability in Supply Chain

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**Why haven’t we ended World Hunger and why should you care?**

The world population today on Planet Earth is 7.7 Billion people. According to FAO, we produce enough food to feed every single person on planet yet there are still 821 Million people still hungry and undernourished. One out of every three people are affected by malnutrition. Why do we have so much food waste and still people going hungry? FOA claimed that every year around the globe, 1.3 Billion tons of food is lost and wasted. That is 1/3 of all produced for human consumptions. Not only food is wasted, but people are wasting energy, water, labor, and any other resources used to produce, store, and transport food to the consumer. The world population will increase by 10 Billion people by 2050. We must find a way to increase food growth by 70%, reduce the food waste, and minimize the use of water, land, energy, and labor and capital. This is one of the reasons why everyone who has food every meal should still care, because food might be scars in the future. In this paper we will be talking about how to reduce waste from agriculture to dinner plate.
Moda Nashville – Abstract

Modeled after a hybrid version of a business incubator, Moda Nashville is a creative space where up and coming fashion designers with a high level of established skill can bring their businesses to life. Through a six-month Designer in Residence program, these individuals will obtain the knowledge they need to run a self-sufficient, thriving business. With guidance provided by one on one mentoring sessions, access to fully equipped design studios, and unique networking opportunities provided by only our staff, designers will leave the program with a fully developed business plan, product line offering, and marketing strategy. It is our mission to provide these talented, creative minds with a place where they can grow and achieve success. For individuals who want to enter the industry but do not yet have the level of design skill needed to thrive, Moda Nashville will also provide monthly courses aimed to guide beginning designers and teach them basic business and design skills. Due to the nature of the services we provide, we could not achieve our mission without the help of our financial donors. Because of their generosity, Moda Nashville can succeed in providing the multi-faceted guidance that our business is centered around.
THE IMPLICATIONS OF BREXIT FOR U.K. DOMESTIC FINANCIAL MARKETS

Avery Morgan, the University of Tennessee, Haslam College of Business

This study analyzes the impact of economic policy uncertainty (EPU) on volatility within UK financial markets as a result of Brexit, sourcing daily data for the FTSE 100, FTSE 250, GBP/USD spot prices, and the UK economic policy uncertainty index. This research first utilizes event-study methodology applied to cumulative abnormal return/volatility (CAR/CAV) in the twenty days before and after the June 23, 2016 referendum and the March 29, 2017 release of Article 50. Second, to analyze statistical significance, this study conducted regression analyses across samples of data from 1,000 active market days on and before August 1, 2018, charting UK EPU as the independent variable and annualized daily percent standard deviation of daily high and low values for the FTSE 100, FTSE 250, and the GBP/USD spot prices as the dependent variables. Data revealed a spike in CAV across all three variables following June 2016 referendum and less significant spikes in CAV following the release of Article 50. The FTSE 250 typically exhibited higher levels of volatility than the FTSE 100. EPU CAR spiked both before and after key events.
Abstract

The purpose of this research was to understand the next generation’s involvement with Great Smoky Mountains National Park (GSMNP) by studying the motivations and perceptions surrounding engagement with GSMNP amongst undergraduate students enrolled for the 2018-2019 school year at the University of Tennessee, Knoxville. The project is in the format of a hybrid case study that aims to answer the following questions: What are the motivations behind those college age students who engage with GSMNP; What are the motivations behind those college age students who no longer engage with GSMNP; What are the motivations behind those college age students who have never engaged with GSMNP? The study was conducted first using quantitative research methods in the form of a survey and second using qualitative research methods in the form of focus groups. The triangulated data was then used to inform potential marketing applications for GSMNP to use in targeting “The Next Generation” in engagement and involvement.
Yes, We Can! Brewing Company is a grassroots effort that realized something was missing from the craft beer industry in both operation and consumption—diversity, particularly among the intersectional identity of women of color. We are living in a world of increasing diversity, with demographics shifting each day. Now is the time for the craft beer scene to diversify or face the repercussions of a market on the brink of saturation. The black female owned and operated microbrewery plans to revolutionize the industry by proving that women of color not only have a place among the greats but a place among the beer culture. From Mae Jemison, the first African American female astronaut to travel to space, to Bessie Coleman, the first African American woman to hold a pilot license, each beer can’s label will tell the story of female achievement. While a seeming small gesture, including stories of trailblazers will empower women of color to partake in an industry that has largely been homogenous since its inception.
This study seeks to replicate the results of a stock trading strategy that uses the returns prior to a company’s earnings announcement to predict the stock’s movement after the announcement. The theory that drives the strategy is that excessive movement prior to an announcement is an overreaction by traders, and that overreaction triggers a return reversal to follow.
Luke Andrew Norton

Close to Home

If a student lives close to a selection of colleges, would a merit-based scholarship be more likely to impact their decision to attend college? Previous research by Sjoquist and Winters (2012) found no direct effect of merit-based scholarships in enrollment decisions, but evidence does support a link between college proximity and enrollment (Turley 2009). My study measures the net impact to college enrollment when these two opposing factors collide, as well as the post-collegiate effect on income.
ABSTRACT

Biomimicry in Business

Before we ask a problem, we should wonder- has this already been solved by nature? Life has been on Earth for 3.8 billion years. It has adapted and survived and can perhaps be the greatest teacher to our society of all. This concept- biomimicry- is defined as innovation inspired by nature. Popularized in 1997 by biologist and author, Janine Benyus, biomimicry studies ecosystems and provides insight into today’s design and manufacturing processes. It has the potential to redefine how we grow food, make materials, harness energy, heal ourselves, store information, and conduct business. This research paper will focus on biomimicry’s impact on manufacturing in Corporate America. Fostering cooperation and embedding resilience in their products through sustainable design, businesses can take environmental responsibility from the start of their supply chain. The study will take five different industries: automotive, aerospace, consumer packaged goods, clothing, and cosmetics and study companies implementing biomimicry in their products. Through interviews with both the Biomimicry Institute and company insiders, the study will uncover how biomimicry has helped or hurt their product and the challenges they faced along the way. This research also draws on complex adaptive systems (CAS) to translate the biomimetic language to the language of business systems. The primary objective of this thesis is to uncover how natural systems can provide insight into business systems.
Ashley Roepke

Over the past several decades, digitization has rapidly transformed and disrupted every industry across the planet. As digital technology becomes integral to the success and survival of companies on a global scale, an executive role tasked with leading digital transformations has become increasingly implemented – that of the Chief Digital Officer (CDO). Emerging from relative nonexistence in recent years, the CDO is now a key figure at the helm of many large organizations in the digital age. While the growing relevance of the Chief Digital Officer is indisputable, there presently exists little empirical research on the impact this officer. In an effort to understand the Chief Digital Officer, I conduct an exploratory study into the position. I first define the role and investigate its associated duties, expectations, and challenges, as well as survey its prominence across industries. I then illustrate the officer’s potential impact on firm performance through real-life example. I conduct empirical research into the financial performance for firms with a Chief Digital Officer and firms without to prove the significance of the role, and conclude by acknowledging limitations to my research and further opportunities.
Abstract: The primary objective of this paper is to research the impact of specific economic factors on foreign direct investments (FDI) in the United Kingdom. I will first go through the literature on the relevance of individual economic indicators, looking through what previous analysis has returned on an array of different economic variables in what is a highly debated field. I will then analyze a time series study based on quarterly macroeconomic data, first created by researchers studying FDI attraction in the country of Albania. The dependent variable in the analysis is the value of FDI inflows in Albania, whereas I will change the variable to be FDI inflows in the United Kingdom. The independent variables will be: the value of gross domestic product (GDP), the value of investment with domestic capital, the level of economic openness, inflation rate, revenues from privatization, the number of employees, and the level of tax burden on businesses. The study I am basing my research on uses an elastic multiple regression analysis, and returned statistically significant results. I will compare the U.K. to the Albanian study for each of the indicators as I make suggestions for continuation of my research in the future.
Jack Shires

GLS Thesis Abstract

As e-commerce has grown in the past two decades, and consumers have begun to demand more and more in terms of delivery, companies like Amazon have had to creative in the last mile. One phenomenon that has been deployed in cities across the globe is Pick up Point Networks (PPN). PPN’s provide alternative delivery and pick up sites for e-commerce customers around the world, and can solve issues such as failed deliveries and package theft. Studies have been done on these networks in countries like France and Poland where the networks have been around for longer. In the U.S PPNs are less common, but in the last decade Amazon has built a network of Amazon Lockers that allow their customers to have alternative delivery locations. This research aims to be one of the first to analyze an American PPN by conducting a geospatial analysis of Amazon Lockers in the city of Chicago, Illinois. By analyzing this information, supply chain strategies for other companies searching for last mile solutions through PPN will be gained.
Finance theory has evolved rapidly over recent decades, as the growth of mass data sets have allowed researchers to apply theory and craft it to results seen in the real world. Financial policy has seen intense debate all across the world, but one of the more silent agents of advancement has been financial disclosure policy. Through the past few decades, we have seen the mutual growth between technology and policy, and how their interplay shapes the modern world we live in. Investor relations policy has never been at a greater point of allowing information dissemination than today, as with the de-regulation of social media disclosure, companies are able to, like never before, access a worldwide audience to deliver news, earnings, and press release statements to any average person. Although earnings releases, news, and press statements have started to become a main source of news for retail investors through mediums like Twitter, little research has been done on social media’s impact on price movement. Previous literature in social media’s impact on investors delves into accounting and psychologically focused material- no real research has been done into financial policy deregulation and its impact on how price moves when analyzed through the lens of the retail investor. In this paper, we look at the timeline of a year before and after the deregulation of social media as a hub of investor disclosure, from April 2012 to April 2014, and take the 300 top NYSE companies as a source for tweet releases, as well as high frequency TAQ (Trade and Quote) data parsed for data unique to average investors. Through our research, we attempt to discover if retail investor price movement is correlated with twitter company disclosures.
This study works to reverse engineer the Amazon Buy Box. The Amazon Buy Box is the button on items sold on Amazon.com that is labelled, “Add to Cart”. My study uses various data sets from a local third-party company, ReviewBox, involving a multitude of items from various clients they serve that has been attained via a custom web-scraping program they have built to observe multiple factors on Amazon.com to deconstruct said Buy Box. The reverse engineering uses the observed factors over various time frames, ranging from three months to a year, to follow trends and changes of the “owner” of the BuyBox. I have built various models in RStudio to use to attempt to accurately predict what factors are used the most in Amazon’s process of deciding the Buy Box owner. One would assume price is the primary factor, but it is not the only one. The main factors that I use in the models are a merchant/seller’s ratings, the price without shipping, the price with shipping, and Prime eligibility. While these factors are important, they are not the only ones and the models are used to more intricately define the workings of the Buy Box process.
Abstract

This thesis intends to dive into the differences between traditional supply chains with tangible products and non-traditional ones that use information as their key product. While traditional supply chains are incredibly common and well-studied, many people may not consider the inner workings of information-based supply chains like Facebook and Alphabet Inc. This can be an issue for companies who wish to enter the market of information-transfer and are primarily only knowledgeable on the operations of a traditional supply chain.

Information-based companies primarily rely on mobile carriers, browser providers, and software developers as avenues of content distribution while simultaneously serving as distributors for end consumers’ content. With this high frequency of knowledge exchange and the risks that may arise as a result, they are heavily regulated in terms of privacy by the government and can face serious consequences in the case of a breach. Companies in this market need to be prepared to create valuable relationships with potential online distributors and suppliers as well as invest in barriers to ensure privacy protection for end consumers.
Abstract

This study will analyze the relationship between knowledge of acronym meaning and group member’s socialization and identification. It will examine the understudied relationship between knowledge of acronym meaning by Cadets in ROTC programs and their socialization and identification in the group. Research has concluded that when assimilated into a group the group members contribute more, and overall have greater satisfaction (Riddle, Andersson, & Martin, 2000). This assimilation can be separated into two variables, socialization and identification of group members. Research on the relationship for knowledge of acronym meaning and assimilation has been understudied; therefore, this project is exploring how the terms we use in groups impacts our connection within the group.

This project will survey the two Reserve Officer Training Corps (ROTC) at The University of Tennessee, Knoxville. The study will be quantitative and will compare knowledge of acronyms to how participants feel they have assimilated into the group. The Small Group Socialization Scale developed by Anderson, Riddle, and Martin in 1999 (Riddle, Anderson, & Martin, 2000), and the Organizational Identification Questionnaire (OIQ) from Mael and Ashforth’s work in 1992 (Mael & Ashforth, 1992) will be used to examine the variables of acronym knowledge, socialization, and identification - dependent on the length of membership in the group. The data will be used to analyze the following:

RQ1: Does knowledge of acronym meanings relate to group members’ socialization?
RQ2: Does the knowledge of acronym meaning relate to group members’ identification?
H1: Length of membership in ROTC has a direct positive relationship to knowledge of acronym meaning.

Running Head: ACRONYM USAGE IN GROUPS

H2: Length of membership in ROTC has a direct positive relationship to group member’s socialization.

H3: Length of membership in ROTC has a direct positive relationship to group member’s identification.
Abstract

Advice Response Theory (ART) proposes that advice messages are evaluated for a number of factors that can affect the outcomes of advice. ART has been primarily studied in friend-to-friend advice scenarios, but this study will investigate parent-emerging adult child advice. This study seeks to show a relationship between family communication patterns (FCPs) of conversation orientation and conformity orientation and advice messages based on the framework of ART. FCPs may play a role in how parents offer advice and how children will then evaluate the advice. This study hypothesizes that conversation orientation will have a positive relationship with evaluations of message politeness, and conformity orientation will have a negative relationship to message politeness, which will then influence advice outcomes defined by ART. This study will analyze advice interactions regarding money, as financial independence is considered the marker of adulthood, but most young adults are still financially dependent on their parents. Understanding how advisor characteristics, previous relationship patterns, and the style of the advice message affects the advisee is important for parents of emerging adult children who want to offer support successfully as well as scholars seeking to better understand the ways that communication patterns affect message recipients and evaluations of support.
Abstract

Max Ray Davenport

Interprofessional collaboration functions as a necessary resource for project development and increased efficiency across professional domains. However, despite its importance, interprofessional collaboration can present momentous challenges for all parties involved. These additional barriers can be particularly difficult to overcome as working with individuals of differing backgrounds of knowledge and work practices can add to the daily challenges presented in the workplace. Hence, this area of organizational communication is worthy of further exploration in academic arenas. Thus, the purpose of this project is aimed at deciphering how professionals from various domains of expertise make sense of and form conclusions about collaborative efforts. More specifically, this project is aimed at analyzing and gaining an understanding about what key factors prompt professionals, in their reports about collaborative events, to convey appreciation and/or depreciation of the expertise of a collaborative partner. Therefore, using a series of 15 information interviews to process data and draw inferences, this project seeks to identify what factors promote the appreciation and/or depreciation of relative expertise during collaborative task.

Keyword(s): Interprofessional collaboration
Mary Klepzig

This project seeks to examine the role that pharmacists and pharmacy staffs' communication plays in patient’s medication compliance. Patient non-compliance or non-adherence has been a major topic of discussion among the medical community in recent years. Insurance companies and government agencies have recently made a push for pharmacists to take more responsibility in patient compliance. Though much research has been done on non-compliance statistics and reasons, little research has been done on how effective pharmacists can be in increasing compliance for patients since they have taken a greater role in the process. This study privileges the viewpoint of the pharmacy staff for what effective communication does and could look like in order to aid patient compliance. By using snowball sampling, 25 or more pharmacists, pharmacy technicians, and pharmacy interns will be interviewed. The participants will be from across the Southeast, and will be representing both community and clinical pharmacy practice. The interviews will be analyzed for themes of effective communication techniques and topics. We expect to find that pharmacists have an expectation of their role in communicating about compliance, as well as an expectation for other people involved such as doctors, insurance companies, caregivers, and staff members. However, these expectations of roles are violated making it difficult to fulfill their role. We also expect to find what inhibits pharmacists from communicating effectively, such as time restraints, unengaging conversations, misunderstandings, or technological problems. The data analysis will be used to guide directions for future research.
Multinational corporations have the added stress of mixing many cultures within a small space, and often the results of this involve tensions in the global workplace. Guided through a lens of co-cultural theory, particularly pertaining to the applications of both muted group theory and standpoint theory, this study seeks to examine intercultural relationships in the multinational workplace through the application of policy. When members of a dominant culture attempt to spread their culture to or even influence others, whether they be in different areas of the globe or in the same general area, workplace tensions can arise. This study will examine the written policies, documents, and statements made by companies relating to conflict and conflict management to examine the extent to which these companies have adopted policies which would mitigate cultural dominance, cultural power, and cultural conflict in the workplace. The presence of such policies would offer insight into how companies use policy to become successful worldwide as applicable to ensuring that co-cultural groups are valued in their workforce. Being as workplace policy has a larger role in the day to day communication than one would expect, studying the possibility to which this companies globalize is highly important.
A Profile of Physical Activity in Knoxville Parks

Margaret Rose Bailey

Student's Department: Kinesiology

Poster #114
Student(s): Margaret Bailey
Faculty Mentor: Fitzhugh, Eugene
Project Title: A Profile of Physical Activity in Knoxville Parks

Purpose: In the city of Knoxville only 48% of adults live within a 10-minute walk to a local neighborhood park. The purpose of this study is create a demographic profile of park users across Knoxville.

Methods: Out of the 95 local parks in Knoxville, 12 were randomly selected with an equal distribution by size (small to large). The System for Observing Play and Recreation in Communities approach was utilized for direct observations on 4 days of the week (Monday, Wednesday, Saturday and Sunday), 3 times each day (morning, lunch and evening) during one week in October. Park users were classified by age group, gender, race, and physical activity (PA) intensity level as reflected by mean metabolic equivalents values (METS).

Results: In total, 1700 people were observed using the selected parks. Park users were predominately adults (54.52%), males (54.0%), white (68.31%), and were sedentary (45.73%). The mean intensity of physical activity for users ranged between 2.1 to 4.0 METS.

Discussion: In general, park users did not reflect the census of Knoxville. Minorities were more likely to be observed using the local parks, with parks in lower-SES census tracts having a higher average intensity level of PA.
Inclusion or Exclusion? Playing together in an inclusive environment on a college campus

Dominique Bragg

The purpose of this study is to better understand the importance of including students with disabilities in physical education (PE) courses along with their able-bodied peers. This on-going qualitative study conducted interviews with students with and without disabilities who participated in an adaptive PE course on a large college campus in the southeast portion of the US. Interviews were conducted in-person or through a video medium (e.g. Zoom). Prior to interviewing participants, each participant signed an informed consent, which ensured their confidentiality and privacy. This study used Contact Theory as a grounded theoretical framework to guide the questions centered about the importance of inclusion and sense of community in a predominately able-bodied world. Preliminary results show that inclusion creates a sense of belonging, increase in self-efficacy, and better understanding of the importance of being physically active and having fun among students with disabilities. Students without disabilities discussed the importance of inclusion, an increased understanding of what inclusion means, and the challenges experienced in participating in adaptive PE.
Are We Pushing Kids Out of School by Trying to Keep Them In? Truancy Policies in The United States

Grace Carpenter

**Background:** Over a dozen Healthy People 2020 objectives focus on improving children’s educational outcomes, including chronic absenteeism. Poor attendance is strongly associated with school failure and poor health status in adulthood. Although few high-quality evaluations exist of efforts to reduce chronic absenteeism, we do know that punitive strategies do not work. We document the extent to which punitive attendance policies are implemented in U.S. school districts.

**Methods:** A random sample of 138 U.S. school districts with more than 5,000 students was drawn from the National Center for Education database, and the policies regarding chronic absenteeism were documented. This sample has adequate power to estimate proportions of 0.10 or greater.

**Results:** Most school districts use multiple strategies to improve attendance. Punitive programs are common: 43% of schools deny chronically absent students class credit, 54% require Saturday or after-school school sessions, and 22% fine parents. A quarter (24%) send truancy officers to homes. Court-based diversion strategies to keep students and families out court are almost universally implemented (85%). Most diversion programs have three steps: a letter to parents, meetings and an attendance contract, and referral to court. Just over half of school districts use positive social-emotional support programs (55%).

**Conclusions:** Although punitive programs have been shown not to prevent truancy, they are still commonly implemented. If schools want to reduce the numbers of students who are chronically absent, then there is a need to change truancy policies. In addition, rigorous evaluations of court-based diversion programs are needed.
Madilynn Caylor, Chris Crumbley

Type 2 diabetes mellitus is one of the most prevalent metabolic diseases that is characterized by hyperinsulinemia, insulin resistance, and defect(s) in islet secretory function. Pancreatic β-cells respond dynamically to fluctuations in blood glucose with the regulated secretion of insulin. Increased understanding of the molecular signaling mechanisms and proteins that underlie the function of these dynamic, insulin-producing cells will aid in the development of more effective therapies. Pyruvate kinase (PK), a rate-limiting enzyme during glycolysis, catalyzes the generation of pyruvate and ATP from phosphoenolpyruvate (PEP) and ADP. In mammals, four pyruvate kinase isoforms exist: the L and R isoforms, expressed in liver and blood cells; the M1 isoform, expressed in normal adult cells; and the M2 isoform, a splice variant of M1 expressed during embryonic development and in very specific adult tissues, such as pancreatic β-islets. The metabolic function of PKM2 in pancreatic β-islets, if any, remains to be determined. To dissect the metabolic functions of PKM2 we used islets from wild type and pancreas-specific PKM2 knockout (KO) mice and we examined the effects of PKM2 deletion on insulin secretion. Notably, PKM2 deficiency enhanced glucose-stimulated insulin secretion (GSIS) in panc-PKM2 KO mice. These preliminary data suggest that PKM2 is a regulator of insulin secretion and may potentially regulate systemic glucose homeostasis. In summary, our findings identify a novel role for pancreatic PKM2 and uncover it as a potential target for therapy of type 2 diabetes.
Sue Lim Choi

Background: Brown adipose tissue has emerged as a novel target for obesity prevention and treatment due to its responsibility for heat production. Soluble epoxide hydrolase (sEH) is a cytosolic enzyme that degrades epoxy fatty acids (EpFAs) (lipid signaling molecules) into inactive diols. Potent sEH inhibitors (sEHIs) are beneficial for many chronic diseases as they stabilize endogenous EpFAs by blocking the degradation. Our preliminary results have shown that trans-4-[4-(3-adamantan-1-yl-ureido)-cyclohexyloxy]-benzoic acid (t-AUCB), a potent sEH inhibitor, dose-dependently promotes brown adipogenesis.

Objectives: The objective of this study is to investigate the structure and activity relationship of various sEHIs with different sub-structures of t-AUCB to identify the structure properties that make t-AUCB a potent drug to promote brown adipogenesis.

Methods: Various doses of different sEHIs with modifications on the adamantane or benzoic acid groups of t-AUCB were added to the brown differentiation process. Brown adipogenesis was assessed by Oil Red O stained lipid accumulation and absorbance.

Results & Conclusion: There was a clear structure-activity relationship among the tested sEHIs. sEH 1471-core (t-AUCB without benzoic acid), but not other tested sEHIs, significantly increased lipid accumulation. Further study on gene expression of brown adipocyte markers is needed to confirm the results of the lipids accumulation.
Abstract:

**Purpose:** The purpose of this study was to examine the relationship between park features and park use in a large urban park. At 45.33 acres, West Hills Park has amenities such as athletic courts and fields, picnic areas, and a 1.9-mile paved trail.

**Methods:** Park usage was assessed using the System for Observing Play and Recreation in Communities tool that measures use by gender, age, ethnicity, and moderate to vigorous physical activity (MVPA). Data was collected in 18 zones over four days with three observations per day (morning, midday, and evening). Park features, amenities, and condition, were assessed using the Environmental Assessment of Public Recreation Spaces (EAPRS) tool.

**Results:** In total, 440 individuals were observed using the park. The EAPRS score was 31.78, a high rating. 68.3% of park users were at a MVPA level. Athletic courts had the highest percentage of MVPA users (46.8%) followed by open spaces (20.7%) and playgrounds (20.1%). Sedentary behaviors were observed near pavilions.

**Discussion:** MVPA levels are related to the type and condition of park amenities. Park directors may increase MVPA at the design phase of park development by selecting high-intensity amenities.
The goal of this study was to determine if there is a correlation between clinician measures of voice disorder severity and patients’ perceived impact of their voice disorders through a retrospective analysis of patients evaluated at the UTHSC Hearing and Speech Center from 2015 to 2019. The Consensus Auditory Perceptual Evaluation of Voice (CAPE-V), a clinician rating scale, and the Voice Handicap Index (VHI), a self-rating form, were reviewed for eighty-nine patients diagnosed with dysphonia and who met the criteria. Results of the Pearson Product Moment Correlation determined a significant correlation between the two measures (r-.558, p<0.0001). This demonstrates that patients’ perception of the impact of their voice disorders are generally consistent with clinicians’ ratings of severity. Furthermore, the effects of patient gender and employment status on the perception of voice disorder severity were analyzed. No significant correlation was observed between patient perception and clinician perception between different occupations and retired / unemployed individuals. In addition, there was no significant difference among gender, although the male sample size was significantly smaller than the female. This study suggests that clinicians should take patients’ perceptions into consideration when diagnosing and treating voice disorders.
Overuse and Acute Injury Risk: Early Warning Signs in Female Soccer Players

Lower extremity loading injuries are common in many sports. Early detection and prevention of injuries has gained popularity in research in recent years. In an effort to develop early warning signs, this study analyzed 27 female collegiate soccer athlete’s lower extremity loading distribution during a variety of agility tests. The athletes were instructed to complete a T-Drill, zigzag, and reactive agility test while wearing inertial measurement units (IMU) attached bilaterally just above medial malleoli.

From the data collected by the IMU sensors, intensity symmetry index (SI) as well as percentage of high intensity impacts were documented. A symmetry index of 19 or greater signified asymmetry to the right, while values of -19 or less signified an asymmetry to the left leg. Intensity percentage was categorized by 15% or higher signifying overloading and 9% or lower signifying underloading. Subjects were then categorized even further into four categories separated by intensity and symmetry index. Category 1 signified an asymmetry to the left with a large percentage of high intensity impacts sustained. Category 2 signified left asymmetry and a low percentage of high intensity impacts. Category 3 signified a right asymmetry with a low percentage of high intensity impacts. Category 4 demonstrates an asymmetry to the right leg with a large percentage of high intensity impacts sustained. Categories 1 and 4 indicate possible overloading of the left and right legs, respectively, and may suggest increased risk of injury. On the other hand, Categories 2 and 3 indicate possible under loading of the right and left legs, respectively.

Based on our categorization, results showed there were two athletes identified that may be at risk and several who appear to be avoiding one limb. For example, here are representative athletes from each category. Subject A exhibited a SI of -19.61 and an intensity of 15.9%, which placed them in category 1, and may indicate overloading of the left leg. Subject B was placed in category 2 with a SI of -116.28 and an intensity of 6.6%, suggesting that she was avoiding loading of the right leg. Subject C had a SI of 77.97 and an intensity of 6.9%, placing them in category 3 and indicating left leg avoidance. Finally, subject D was in category 4 with a SI of 28.6 and an intensity of 17.5%, indicating possible overloading of the right leg. Future prospective studies are needed to validate these thresholds and determine if athletes in categories 1 and 4 are truly at increased risk of injury. Likewise, the current data alone cannot fully explain why athletes are in categories 2 or 3. For example, subject B exhibited a SI of -116.28 showing a large asymmetry to the left leg, but only 6.6% of all impacts were high intensity. This indicates low usage of the right leg. There are many reasons, such as Kinesiophobia, undiagnosed injury, or recovering from injury that could lead to this asymmetry. Nevertheless, these data provide a starting point for identifying athletes at risk for injury (categories 1 and 4), as well as return to play criteria (categories 2 and 3).
Poster #122
Student(s): Alexandra Nussbaumer
Faculty Mentor: Colby, Sarah Elizabeth
Project Title: Successful Implementation and Elements of Healthy Food Retail Programs: Extension Professionals Perceptions

Abstract Title: Successful Implementation and Elements of Healthy Food Retail Programs: Extension Professionals Perceptions

Preferred Presentation Type: Indifferent

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Objective: The objective of this cross-sectional, exploratory study was to understand the perceptions of healthy food retail programs (HFRP) by Extension professionals in low-income communities to determine strategies for successful implementation of HFRP.

Methods: Thirty Extension agents and county directors from one state in the southeastern U.S. were recruited via emails, and 53.3% (n=16) completed a demographics questionnaire and a semi-structured interview. The interviews were conducted and recorded using online video conferencing software and took place in August and September 2018. Participants were asked about their definitions of HFRP, what challenges and benefits they had observed during HFRP implementation in their communities, and to identify strategies that would increase the success of HFRP programs. Recordings were transcribed verbatim and analyzed by two researchers independently using multiple coding mechanisms.

Results: Most participants were white (87.5%), female (93.7%), and had worked for Extension for 0-5 years (37.5%). Participants did not have any prior experience with HFRP; therefore, the qualitative data revolved around their interpretation of a HFRP, which varied. Participants noted the following as components needed for a successful HFRP implementation: working in both corporate supermarkets and local mom-and-pop stores; promoting healthy food retail options; and conducting food demonstrations. One emergent theme was that HFRP would bring immense benefits to their communities, including expanding the recognition of Extension and a higher consumption of healthier foods among community members. One barrier identified was current county-level evaluation practices for policy, systems, and environment (PSE) approaches, which Extension staff are evaluated upon, not currently fully capturing HFRP interventions. Adequate training of HFRP was another theme that was identified, with agents requesting in-person, hands-on techniques.

Conclusions: Extension staff perceive that HFRP implementation may provide benefits to low-income communities. However, one specific need that was identified is hands-on training prior to initiation of HFRP. Additionally, participants requested new approaches for evaluating PSE programs like HFRP.

Funding Sources: No funding sources.
Keywords: Food Environment, Extension Programs, Healthy Food Retail
Poster #123  
Student(s): Christina Paspalas  
Faculty Mentor: Anderson Steeves, Betsy  
Project Title: Impact of a Social Media Campaign on Student Athlete’s Nutrition Knowledge, Self-Efficacy and Behavioral Intentions

**Name:** Christina Paspalas

**Introduction.** Collegiate athletes can maximize sports performance through optimal nutrition. The purpose of this study is to enhance student athletes’ nutrition-related knowledge, self-efficacy, and behavioral intentions for healthy eating by providing a novel sport-nutrition social media intervention.

**Methods.** The @vol_nutrition Instagram account has been launched and sports nutrition-related content, approved by UT athletics, is being posted daily during the 3-month intervention (January-March 2019). Pre- and post-intervention online surveys will assess changes in student athletes’ nutrition knowledge, self-efficacy, and behavioral intentions.

**Results.** Currently there are 241 followers for the @vol_nutrition account. The baseline survey sample included 103 student athletes, representing 13 sports teams. The sample is 78.6% female, 94.2% white, with a mean age of 19.2 years. At baseline student athletes scored 7.6 out of 9.0 points on the nutrition-related knowledge scale, 25.5 out of 28.0 points on the self-efficacy scale, and 11.1 out of 16.0 points on the behavioral intentions scale. Post-intervention data collection will occur in March 2019.

**Discussion.** With a high number of followers, the Instagram platform is a successful way to provide an engaging nutrition sport-nutrition focused intervention. Forthcoming analyses of pre-to-post intervention changes will help determine impact of the intervention on student athletes'.
Increased stress may negatively impact health behaviors in college students. Therefore, stress management interventions are needed to combat this issue. One area that may inform interventions is personality theory. Different personality traits may do better with tailored intervention strategies, yet it is unknown which traits differ in perceived stress. The aim of this study was to understand if perceptions of stress differ by personality trait. First year college students (n=1115) from eight US universities were assessed on health behaviors including personality traits and perceptions of stress. Independent samples t-test was used to determine if gender was a possible confounder in the sample. Linear regression was used to understand differences in stress perception by levels of each personality trait. Most (53.5%) participants were Non-Hispanic White and most (66.5%) were female. Controlling for gender, conscientiousness, emotional stability, extraversion, and openness to experience were negatively associated with perceived stress (all p<.001), with emotional stability accounting for the greatest variance (35.7%). No differences were found in levels of agreeableness and stress perception (p=.500). Stress management interventions may fare best to focus on students who score low on emotional stability. More research is needed to examine differences in gender and personality traits in college students.
Behavioral tendencies in youth with intellectual and developmental disabilities during play activities

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Literature suggests that children with disabilities have a tendency to express themselves through non-verbal communication of body language or facial expression as opposed to verbal communication. These subtle communication styles can be a driving factor for negative interactions as their peers may not recognize the signs of communication. Engagement in physical activity may influence the interactions and communications that children have with one another.

**Purpose:** To identify behavioral tendencies during social interaction of youth with intellectual and physical disabilities while playing during a therapeutic recreation program.

**Methods:** The behavioral tendencies of elementary aged children (n=6) were coded using the Noldus Observer XT system during a single session for each participant (15 minutes) each during Therapeutic Recreation in Public Schools (TRiPS) program activities. The Play Observation Scale was used to identify the types of play (cognitive, functional, constructive, games, occupied) and the behaviors (anxious, hovering, curiosity, enjoyment, focused) seen during play. Positive and negative engagement in activity was also recorded. Descriptive statistics were analyzed for all variables. A paired-samples t-test was run to determine differences in types of play and behaviors during positive and negative engagement.

**Results:** Although there were no significant findings ($p>0.05$ for all variables), interesting trends were noted. When children were positively engaging in the activity, enjoyment was the most prevalent behavior (50.6%). In contrast, with negative engagement, frustration and hovering were the most prevalent behaviors (52.4% and 54.3%, respectively). Children participated mainly in functional play (29%), game play (23%), occupied play (23%), and constructive play (14%) during the TRiPS program.

**Conclusion:** The children portrayed both positive and negative social interactions through their body language and facial expressions. These positive and negative interactions may influence the type of play the children engage in as well as the behaviors they exhibit.
Pyruvate Kinase M2 Deficiency Promotes a Brown Fat-Like Phenotype in White Adipocytes

Jesse Rodriguez, Xinyun Xu, Presley Dowker

Abstract
Obesity is a growing epidemic that presents a major health problem worldwide. The past decade has seen advances in the identification of specific factors that contribute to this condition. However, despite these strides, there is still much to be learned about the underlying mechanisms. A better understanding of these biochemical mechanisms will enhance our ability to prevent and treat obesity. The conversion of white adipocytes that store fat into brown adipocytes, which burn fat, represents an anti-obesity therapeutic strategy. This study demonstrates that knockdown of pyruvate kinase M2 (PKM2) changes white adipocytes into behaving like brown adipocytes. PKM2 is an enzyme that functions in glycolysis to catalyze the transfer of a phosphate from phosphoenolpyruvate to ADP resulting in the formation of pyruvate and ATP. The role of PKM2 in adipocytes is unexplored. In the present study, we focused on investigating the impact of PKM2 on white adipocyte cell fate or differentiation. We demonstrate that PKM2 is indeed expressed in both brown and white adipocytes. shRNA-mediated depletion of PKM2 in white adipocytes promotes the development of a brown fat-like thermogenic program. These novel findings demonstrate that PKM2 suppression in white adipocytes could constitute a potential strategy to prevent obesity.
Abstract

While inverse associations between gross national income per capita (GNI) and under 5 mortality (U5MR) have been reported, little is known about the relationship between a country's mineral resource dependency (MRD) and U5MR. The current study examined the relationship between MRD and U5MR, with and without adjustment for GNI and other covariates. We additionally explored differences in this relationship between the Middle East and North Africa (MENA) region and non-MENA countries, as MENA countries have a higher prevalence of authoritarian regimes supported by mineral exports. Data were retrieved from multiple sources between 2004-2011 and Ordinary Least Squares (OLS) models estimated the relationship of MRD with U5MR (log transformed). Among all countries, the crude association between MRD and U5MR was -0.061 (95 CI -0.114, -0.007); the association was 0.06 (0.032, 0.088) adjusting for GNI. In MENA countries, the crude association was -0.118 (-0.229, -0.008); the association was 0.025 (-0.039, 0.089) adjusting for GNI. Among non-MENA countries, the crude association was -0.061 (-0.122, 0.000); the association was 0.05 (0.021, 0.080) adjusting for GNI. Although MRD appears to be associated with decreased U5MR, it is associated with a statistically significant increase in U5MR when holding GNI constant. Similar findings were observed among non-MENA countries. In the MENA countries, the crude association of MRD and U5MR was statistically significant but did not attain significance when controlling for GNI, suggesting that MRD may not be independently related to U5MR in the MENA region. A limitation of the current study is missing data on MRD and GNI, as well as a small sample size in the analyses stratified by MENA and non-MENA.
In 2012, nearly 2.6 million children and youth under the age of 18 had a parent in jail or prison (Sykes & Pettit, 2014). Research has shown that family contact with the criminal justice system is associated with a number of adverse emotional and behavioral outcomes for children and adolescents. However, little is known about whether these effects extend to dating and romantic relationships. Using data on predominantly African American and low-income youth from the Mobile Youth Study, we hypothesize that household member arrest will be negatively associated with dating relationship attitudes and behaviors. Preliminary data suggests mean differences between those who had a household member arrested compared to those who did not. Specifically, those who had a household member arrested in the past year reported less support and self-worth, as well as more negative attitudes about relationships. Results are discussed in terms of implications for future research and programming with adolescents who have experienced family member contact with the criminal justice system.
Abstract

**Problem statement and background:** Nursing turnover poses a significant problem to hospitals and patients alike. Higher patient-to-staff ratios are associated with worse patient outcomes. Staffing is only going to become more critical as the nursing workforce gets older and experiences attrition due to retirement. Now, more than ever, it is critical to mitigate nurse burnout and turnover. Nurse residency programs are one such mitigation strategy that is currently being implemented.

**Purpose and research questions:** The purpose of the study is to analyze the effectiveness that nurse residency programs have in decreasing burnout and turnover (or improving retention). The following question was asked; do nurse residency programs improve turnover?

**Review of literature:** The literature analyzed showed that residency programs are very effective at minimizing turnover. Both national and individual statistics were found, and while some studies reported better results than others, residency programs unanimously improved retention. Most of the literature was on retention and turnover - not burnout. But the literature did reveal that residency programs improved nurse enjoyment and satisfaction, skill, and it better transitioned nurses from school to the workforce.

**Conclusion-Recommendations for practice:** For the purpose of limiting turnover, nurse residency programs appear to be very effective. Because of this, these programs should be continued and refined to further improve their results. Hospitals that have yet to implement nurse residency programs should do so, and new graduate nurses should seek employment at organizations that offer these programs. More research is needed to determine which aspect of the residency programs are contributing to better outcomes and which aren’t.
Music Intervention to Reduce Pediatric Anxiety and Pain in Needle Related Procedures

Abstract

The problem being focused on in this review of literature is the negative reactions to needle procedures such as anxiety and pain and how these lead to adverse outcomes in pediatric patients. The purpose of this paper is to review published research articles to determine if music therapy can reduce the pain and anxiety that accompanies needle related procedures in children. The articles focused on pediatric patients undergoing some form of needle stick procedure such as blood draws and immunizations and their reactions. Twelve articles were reviewed that included interventions such as live music, recorded music, and music along with complementary mechanisms. Children from infancy through adolescence participated, and researchers obtained information such as children’s and parent’s perceptions of the situation, heart rate, and blood pressure to analyze if music during the procedures had positive effects or not. They also timed the length of crying to see if it was reduced with music intervention. There was too much variability and not enough standardization of therapies and measures for the results to be statistically or clinically significant. Although most of the findings were insignificant, music therapy is not harmful in anyway, only has positive effects on children in these situations, and could be a cost effective and easy to use therapy. The research suggests recommending further research to determine if music intervention is an effective way to decrease pain and anxiety during needle procedures in pediatric patients, and to determine if the results would be clinically and statistically significant in the future. In the future, more standardization of techniques and measurements should be implemented.
Problem Statement and Introduction: Electrocardiograms (ECGs) are the recommended diagnostic tool in cases of possible cardiac damage. In order to restore cardiac blood flow and prevent further myocardial damage, it is important that ECGs are completed in a timely manner. The American Heart Association recommends that ECGs are completed within ten-minutes of admission to Emergency Departments. However, data shows that this recommendation is at often times not met. Delayed ECGs can lead to a delayed diagnosis of cardiac damage and can secondarily delay the time it takes for reperfusion interventions to begin.

Purpose: The purpose of this evidence based project is to evaluate the question: In Patients presenting to the Emergency Department with Symptoms of Cardiac Ischemia: How Does a Larger Patient Volume Impact the Door-to-ECG time? After reviewing the question, we hope to find methods to decrease door-to-ECG timings in these departments.

Review of Literature: To evaluate methods to decrease door-to-ECG timings, we reviewed twelve research articles. There is encouraging research found to further decrease the door-to-ECG timings in high volume Emergency Departments. Additional interventions such as standardized ECG bundles, staff education programming, and interprofessional collaboration are shown to decrease the wait times of initial ECGs and can secondarily impact the quality of care.

Conclusions and Recommendations: Finding methods to decrease door-to-ECG times in Emergency Departments is important in order to prevent further myocardial damage in patients experiencing symptoms of cardiac ischemia. Interventions such as standardized ECG bundles, designated triage nurses and ECG technicians, additional staff education, and interprofessional collaborations can significantly decrease door-to-ECG timings.
Maternal action directly affects the life of the developing fetus in the womb. Since maternal action and compliance to healthcare recommendations is based off of maternal perceptions, understanding how women perceive their prenatal care is an important step in identifying ways to improve maternal care. A review of the literature utilizing Pubmed and CINAHL databases revealed that limited data exists regarding the perceptions of women regarding their prenatal care experiences. While some former research studies have identified women who believe their prenatal care from their health care provider did not meet their needs, women’s specific perceptions regarding were not asked. This research project will ask women 36 weeks gestation to 6 weeks postpartum receiving care in the Knox County Women, Infant, and Children clinic questions including, but not limited to: the amount of time the healthcare provider provided to the patient, whether or not the patient’s decisions were respected, and whether or not information about diet during pregnancy was given. The aim is to further understand gaps in maternal care in East Tennessee.
End of Life Care Disparities in the Hispanic Communities of East Tennessee: Exploration of Current Inequalities and Perceptions of Hospice and Palliative Care

Abstract

Hannah Anderson

Hispanic community members utilize end of life care services less frequently than their white counterparts. The purpose of this study is to determine the perceptions about end of life care of the Hispanic community; to assess disparities regarding palliative and hospice care; and to identify possible contributing factors to those disparities. A survey was given to eight Hispanic community members at the Centro Hispano, a local Knoxville community center for Hispanic people. Descriptive statistics and qualitative thematic analysis of the responses was conducted. Four themes were isolated from the data obtained: lack of basic knowledge and familiarity, the value of family, the value of religion, and professional help. It was found that the disparity in the utilization of end of life care services by Hispanic community members is due in part to a lack of knowledge of accessible services and a lack of comfort in discussing values surrounding death with loved ones, despite a desire to use professional end of life care services in addition to familial and religious support. It is recommended to conduct workshops in which Hispanic community members can become familiar with end of life care, discuss values with family members, and learn about the local resources available to them.
Lindsay Apedaile

Title
Effect of parental education on sleep quality of adolescent

Intro
Sleep is an essential part of everyday life especially for children in order to grow and develop. It has been demonstrated that sleeping the number of recommended hours each night is associated with better health outcomes such as improved attention, behavior, memory, learning, physical and mental health. Many children are not getting the minimum required hours of sleep each night and up to 25-62% of children depending on the development stage have some sleeping difficulty. Sleep hygiene are techniques that can improve the quality of sleep in an adolescent. A review of the literature revealed that parent’s knowledge about children’s sleep needs and sleep hygiene can influence the parent’s ability to promote healthy sleep habits. There is an association between the parent’s knowledge of sleep hygiene and the quality of child’s sleep. However, few studies have provided interventions of how to educate parents in techniques to improve compliance to a sleep hygiene regimen for their children. Given that knowledgeable parents are associated with use of sleep hygiene, it is important to identify effective strategies for educating parents.

Purpose
The purpose of this study will be to examine the effects of an educational session to parents on the sleep of the adolescent.

Design  Knowledge of sleep hygiene
A 2. Bed tiquasi-experiment single me group pre-test post-test. The variables to be measured will be

1. Sleep duration in minutes
2. Sleep quality

A convivence sampling plan of 30 adults with at least one child living with them between the ages of 6 and 17 years old.

Analysis: TBD

Recommendations and Conclusions :TBD
Problem Statement and Background: Animal assisted therapy (AAT) has been reported as an effective non-pharmacological intervention to improve a variety of issues in hospitalized patients. One example of the use AAT has been for pain management. However, in pediatric hospitalized patients, the effectiveness of AAT as an adjunct for pain management is unclear.

Purpose and Research Questions: The purpose of this literature review was to examine the evidence for AAT to alleviate pain in hospitalized pediatric patients. The research question was: Does animal assisted therapy have an impact on the alleviation of pain in pediatric hospitalized patients, and if so, are there confounding variables that contribute to this pain reduction (e.g. a decrease in anxiety and stress).

Review of Literature: Literature was searched through the UTK Library and the databases of PubMed and Google Scholar. Inclusion criteria were research article, last 10 years using the key words: “AAT”, “pediatric”, and “nurse”. Approximately 10 were obtained. After careful review, five articles, including a systematic review, were selected because of the focus on interventions of AAT and pain management in hospitalized pediatric patients.

Conclusions and Recommendations: AAT, while a popular therapeutic implementation, is still in the preliminary stages of study. Some interventions had significant improvements in pain management, while others did not demonstrate significant findings. These studies have pioneered the future of AAT and management of pediatric hospitalization issues such as pain management.
Abstract

Purpose and Research Question: In a recent study, approximately four of five nurses were found to be overweight, which contributes to poorer health and other negative outcomes. A number of factors have been proposed to contribute to nurse obesity rates including rotating shifts (days vs. night). The purpose of this evidence-based project was to examine the literature about rotating shifts and obesity among staff nurses.

Methods: A literature search was undertaken using PubMed and CINAHL databases for research articles not more than 10 years old. Using the keywords “rotating shift” and “nurse obesity”, a total of 12 were retrieved. After careful review, six articles were selected. Obesity was defined as a body mass index (BMI) greater than or equal to 30.

Conclusion and Recommendations for Practice: Preliminary findings indicate that rotating shift work alters circadian rhythms and negatively impacts metabolic rates and changes personal habits. Some of these habits include making unhealthier food choices and eating at irregular times—all of which contribute to a greater risk for obesity in nurses. Additional results and conclusions are forthcoming.
This evidence-based practice focuses on literature regarding skin-to-skin contact after a cesarean birth and the positive postpartum effects. Cesarean section births are linked to complications regarding slower breastfeeding rates, increased pain, and heightened levels of stress for the mother and newborn. The data in this evidence based practice was systematically reviewed. The review of literature was obtained with peer-reviewed journals and systematic reviews. The participants in the research were mothers undergoing a cesarean section. Newborns who received skin-to-skin contact directly after a cesarean section had an easier transition to breastfeeding, better latching, and a decreased breastfeeding initiation time. It was also found that it improved bonding between the mother and baby, as well as decreasing the mother’s pain and anxiety throughout the procedure. The implementation of skin-to-skin contact after cesarean sections provides health benefits for both the mother and newborn. A future recommendation would be to implement skin-to-skin contact immediately after a cesarean section if the mother and newborn are deemed stable. Breastfeeding should be encouraged during skin-to-skin contact to promote bonding and to increase successful breastfeeding rates.
ABSTRACT

“Personal Roadmap for Recovery”: Examining the Therapeutic Use of Blogs by Stroke Survivors with Aphasia

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Background: Strokes are a leading cause of disability and death in the United States. Approximately 25-40% of individuals who experience a stroke have aphasia, a language deficit secondary to damage to language centers in the brain. Aphasia contributes to difficulty with language expression or reception and generally does not affect intelligence. Recovery from aphasia after stroke varies by location and severity of damage. Individuals with aphasia experience many life changes and some have found writing activities, including blog postings, to be helpful.

Aims: The purpose of this study was to examine the therapeutic use of blogs for stroke survivors with aphasia.

Methods and Procedures: A qualitative content analysis of five blogs written by stroke survivors. All blogs were written by stroke survivors who expressed in the blogs they had language deficits resulting from the stroke.

Outcomes and Results: The findings revealed the overarching therapeutic purpose of blog writing was for healing. The three subcategories supporting this main category were 1) living with aphasia 2) accepting new identity 3) supporting peers.

Conclusion: Blog writing was found to be therapeutically beneficial for all five individuals affecting their psycho-social-emotional response to healing from stroke related aphasia. Nurses and other health care providers can implement these findings in clinical settings by suggesting writing, journaling, or blogging as activities that may be therapeutic for stroke survivors.
There is a known association between Sensory Processing Disorder (SPD) and preterm birth, born less than 37 weeks’ gestational age. SPD occurs when the central nervous system fails to efficiently process input from the senses resulting in deficits in learning, development, and emotional control. However, there remains a gap in the research between SPD and Intrauterine Drug Exposure (IUDE). IUDE occurs when a pregnant mother uses drugs that the unborn child is exposed to through the placenta. The purpose of this study is to determine if IUDE in preterm infants further increases the incidence of SPD. A retrospective chart review was completed at the East Tennessee Children’s Hospital’s physiatry clinic. Medical records were reviewed for 101 preterm infants without an IUDE diagnosis and compared to the medical charts of 102 preterm infants with a IUDE diagnosis. The data collected includes if there was a SPD diagnosis, the age at diagnosis, gestational age, birth weight, length of hospital stay, zip code, gender, and race. There was a higher portion of preterm infants with SPD who were exposed to intrauterine drugs (n = 59, 62%) compared to those who were not exposed (n = 36, 38%). A statistical significance was found between the number of preterm infants with and without IUDE diagnosed with SPD ($X^2 = 10.9$, df = 1, $p = .001$). Since a significant increase in the incidence of SPD was found in premature infants with IUDE compared to the control preterm infants, it suggests that there is a correlation between SPD and IUDE. Future research should investigate this potential relationship. An increased incidence in SPD with IUDE infants further indicates the need for developmental assessment to ensure early diagnosis and treatment.
Rural school nurses' perspectives on addressing adolescent mental health: A qualitative study

Caitlin Cartwright, BSN Candidate and Amanda Harper, MSN, CPNP

Little is known about the role school nurses have in addressing the mental health needs of rural adolescents. The purpose of this study is to learn the perceptions of rural school nurses in regard to addressing adolescent mental health. A non-experimental, qualitative descriptive study will be conducted. Rural school nurses in Monroe County, Tennessee will be asked to complete a self-developed ten-question survey online consisting of both closed and open-ended questions. Questions pertain to screening, resources, collaboration, and the level of comfort and confidence the nurse has when interacting with students with mental health illnesses. A focus analysis will be conducted on all answers to the survey questions. The findings will then be interpreted.
Abstract

Problem Statement and Background: The Society of Critical Care Medicine estimates that five million patients are admitted into the Intensive Care Unit (ICU) annually. Research suggests patient recovery from an ICU stay can be inhibited by cognitive, physical, and psychological impairments collectively termed Post-Intensive Care Syndrome (PICS). Limited early mobility has been proposed as a predisposing factor to the development of PICS.

Purpose and Research Questions: The purpose of this evidenced-based project was to determine whether a lack of early mobility contributes to patients experiencing PICS. The following research question was examined: Does implementing early mobility decrease the incidence of PICS in adult ICU patients?

Review of Literature/Methods: The findings of seven peer-reviewed research articles suggest a correlation between prolonged immobility in the ICU and complications in patient recovery. The inclusion of early ambulation in the PICS treatment protocol is associated with positive patient outcomes. Research methods utilized were databases such as CINAHL, PubMed, and Google Scholar. Searched words included: “PICS”, “ICU PTSD”, “ICU early mobility”, and “PICS mobility”.

Conclusions-Recommendations for Practice: To be determined.
Problem Statement and Background: Episiotomy is a surgical procedure widely used during labor to expedite delivery. However, routine episiotomy use is no longer recommended. Despite this fact, many women delivering vaginally are still undergoing this procedure and suffering long term consequences as a result. There are several factors throughout labor that affect the need for an episiotomy, specific birthing positions utilized by the mother is one such factor that can decrease the need for this procedure.

Purpose and Research Questions: The purpose of this evidence-based project was to analyze the current literature to determine which birthing positions yield a decreased rate of episiotomies. The following research question was considered: In laboring mothers, how does an upright compared to lithotomy birthing position affect episiotomy rates?

Methods: To evaluate the influence of maternal position, we analyzed 12 articles, all published within the last ten years and relevant to this topic. These studies were used if maternal position was an independent value and episiotomies were a dependent value. We include all variations of maternal positions but focused our findings on upright or supine positions. The results from these studies indicated that using an upright position during birth, rather than supine, was effective in reducing the incidence of episiotomies.

Conclusions: Episiotomies can cause long-term consequences for the birthing mother. It is important to find the best position to reduce episiotomy rates for women, nationwide. This review concludes that an upright maternal birthing position decreased episiotomy rates.

Recommendations: An upright position during labor should be encouraged as the preferred maternal birthing position.
Abstract

Background: Preterm infants have many physiological problems that require medical care assistance. An intervention that could improve the status of preterm infants is kangaroo care. Kangaroo care has increasing prevalence in hospitals globally. Kangaroo care involves bare skin-to-skin contact within five minutes of birth.

Problem: Mothers are the primary caregivers for initiating kangaroo care, consequently leaving fathers out of this intervention. Fathers often do not experience kangaroo care during the postpartum period. There are various positive effects resulting from kangaroo care with fathers and their infants.

Purpose: To explore the effects that kangaroo care has on fathers and their preterm infants. Data sources: PubMed and CINAHL

Methods: Studies included were: (1) Twelve studies: four systematic reviews, four randomized-controlled trials, one quasi-experimental study, two qualitative study and one cross over study; (2) published in English between October 1996 to June 2018; (3) focused on fathers providing kangaroo care with their preterm infants and the effects on infant and paternal outcomes.

Findings: Father infant skin-to-skin contact has positive effects on infant outcomes, including temperature control, increased heart rate, and decreased crying behavior. Kangaroo care develops more of a direct interaction that promotes bonding behavior and increased parental confidence with early interaction.

Conclusion/Recommendation: Fathers are just as beneficial as mothers for kangaroo care. More studies should be conducted on only the fathers providing kangaroo care. Fathers should be included as equally as mothers. Kangaroo care should be implemented within at least one hour after delivery. Ultimately, education should be provided to health care staff and parents on the importance and effects of skin-to-skin contact, and brochures should be provided during hospital admission for all fathers to become pre-educated about the effects found with kangaroo care.
Poster #145
Student(s): Hailey Cohen
Faculty Mentor: Thompson, Kathleen
Project Title: Drug Abuse in the Nurse Anesthesia Student Population

Abstract
Hailey Cohen

Intro
Substance abuse as an occupational hazard in physicians has long been a subject of interest. It began with studies of substance abuse in physicians in general, but as medical providers became more specialized however, the studies deviated from general physicians into more specific subcategories. One of the subcategories was the prevalence of substance abuse among Anesthesiologists. After years of research, it has been well researched and well documented that substance abuse in Anesthesiologists is statistically significant and yet substance abuse in Certified Registered Nurse Anesthetists(CRNAs) and Student Registered Nurse Anesthetists(SRNAs) has yet to be investigated to the same extent as these physicians. This is a problem due to the fact that Nurse Anesthesia is becoming an increasingly popular field of study and without the identification of the prevalence and patterns of substance abuse within this population, these individuals are ultimately at risk for developing a dependency on the same drugs they are exposed to within their day to day environment.

Purpose
The purpose of this study is to replicate similar studies done in years past with the intention to stress the prevalence of drug abuse within this population.

Design
The group that data is being collected from is Student Nurse Anesthesia students enrolled in a program within the AANA. The procedure is to have the students fill out an anonymous survey that identifies patterns and prevalence within this at risk population.
Purpose: To examine the relationship between knowledge of the harmful effects of using prescription stimulants and abuse among college students.

Design: A non-experiment that will use a survey to collect data from the sample.

Methods: A survey will be distributed using network sampling to get as many respondents as possible. The survey will contain questions that gauge the knowledge of the harmful effects of the stimulant Adderall may have on the human body. The survey will also question whether or not the subject has abused Adderall and if so how many times and how recent. I will also ask the reason for abusing Adderall whether it was for academics or for social reasons.

Analysis: The results will be compared with studies performed at other schools to determine if they are consistent with previous findings. I will also analyze the results to determine any correlation among the answer choices.

Results: TBA
Stigma in Persons with Mild Cognitive Impairment & their Family Caregivers

Brianna Fiala, Undergraduate Student, College of Nursing

Faculty advisor: K. Rose PhD, RN, FGSA, FAAN

Over 5 million Americans are living with Alzheimer's disease and related disorders (ADRD) today; 15 to 20% of people 65 years or older also have mild cognitive impairment (MCI), often a precursor to ADRD. One of the major issues that persons with ADRD and their family caregivers encounter is stigma. Stigma may influence their decisions to access care or make use of resources that are designed for support. However, it is unknown if stigma is experienced in persons with MCI and in their family caregivers. Thus, the purpose of this study is to describe stigma in persons with MCI and in their family caregivers. The design of this study is multiple methods. Quantitative data will be obtained using the stigma impact scale, CES-D to measure depressive symptoms, and the 18-item rating anxiety in dementia (RAID) scale to measure anxiety. Qualitative data will be obtained via individual study participant interviews to gain in-depth knowledge regarding perceptions of stigma in those persons with MCI and their family caregivers. Audio-recorded interviews will be transcribed and placed in NVivo software for analysis. Themes from the interviews will be identified. There are no study findings yet as this is an ongoing study. Results from this study will be target interventions to reduce stigma in persons with MCI and their caregivers.

Sources:

Abstract

The purpose of this review of literature is to evaluate studies conducted on maternal smoking and its relationship with sudden infant death syndrome (SIDs). The research problem is the magnitude of articles that suggest smoking increases the incidence of SIDs. All twelve articles reviewed were published within the last ten years and study the correlation between smoking and infant mortality. Studies analyzed included an ecological design, case-control study, retrospective cohort study, and meta-analysis among others. Overall, the findings revealed a positive correlation between smoking and an increased risk of SIDs. Therefore, future recommendations include more public health initiatives to educate mothers to not smoke during pregnancy or after birth and to increase prices of cigarettes to decrease SIDs cases. Also, further research should be implemented to distinguish why some infants who were exposed to secondhand smoke did not develop SIDs.
Problem statement and background: Cystic fibrosis (CF) is a genetic lung disease that leads to an abnormal buildup of mucus resulting in congestion of the lungs. Symptoms include shortness of breath and activity intolerance. These symptoms and the disease process can lead to a poor quality of life. A variety of therapies are individualized and utilized for these patients, including physical exercise and airway clearance therapies.

Purpose and research questions: The purpose of the paper is to explore the relationship between aerobic exercise and its reduction of CF symptoms versus other airway clearance therapies.

Review of Literature: Ten-studies between the years of 2005-2017 were analyzed. Results found that both exercise and airway clearance therapies increase maximal oxygen uptake and improves general symptoms, but both therapies should be used in conjunction.

Conclusions/Recommendations: Airway clearance therapies aid in the loosening of mucus in the lungs of CF patients, and physical exercise therapies can increase maximal oxygen uptake levels and slow the rate of decline of forced expiratory volume levels. Both of these therapies combined increase the overall quality of life in patients with cystic fibrosis. Recommendations include a holistic approach to patient-family care and implementing habitual activity with adjunctive airway clearance therapies.
The Effect of Patient-Nurse Ratio on Patient Safety in Bedside Nursing

Problem Statement and Background: There has been increasing debate amongst health care professionals regarding the impact of staff-to-patient ratios, particularly within the nursing profession. The most common complaint has been that there are not enough nurses to provide the safest and best quality of care. The problem is that high nurse-to-patient ratio results in time constraints, leading to nursing errors and directly impacting patient outcomes. As patient safety and positive health outcomes are the nurse’s main priority, determining a safe nurse-to-patient ratio may improve patient outcomes.

Purpose and Research Questions: The purpose of the following review was to systematically examine current literature regarding the relationship between unsafe nurse-to-patient ratios and adverse patient events affecting patient safety. Specifically, the objective was to identify adverse events, how often these events occur, and the resulting consequences of high nurse-to-patient ratios in bedside nursing. The population being studied was bedside nurses and hospital patients in the United States.

Review of Literature: Research methods used were databases such as CINAHL, PubMed and NCBI. Searched words included “patient safety”, “hospital nursing”, “adult patients”, “adverse patient events” and “nurse-to-patient ratio”. Articles were findings from research studies and written in the last 10 years. A total of eleven articles were reviewed.

Conclusion: The findings from this literature review suggests a relationship between unsafe nurse-to-patient ratios and adverse patient events at the bedside such as medication errors and lack of intervention on the patient’s behalf.

Recommendations for Practice: Preliminary findings suggest the need for federal legislation mandating safer nurse-to-patient ratios to optimize patient safety. Implementing a maximum nurse-to-patient ratio of one to five may prevent the incidence of adverse patient events. A final analysis will be available at a later date.
Effect of Provider Training on HPV Vaccination Rates in Southeastern Rural Communities

**Introduction:** The human papillomavirus (HPV) is the most common sexually transmitted infection in the United States, and is directly correlated with the incidences of cervical cancer, vaginal cancer, and oropharyngeal cancers. The vaccine, Gardasil® 9, has been approved to be used prophylactically to reduce incidences of HPV. However, vaccination rates, especially in rural communities, continue to be low. A significant barrier to adolescents receiving the HPV vaccine is a lack of provider recommendation.

**Purpose:** The purpose of this study is to educate providers about HPV, the vaccination process, and ways to discuss HPV vaccinations with vaccine-hesitant families in order to examine if provider education increases vaccination rates.

**Design:** This study is a quasi-experimental design using a pretest/posttest method. It is a convenience sampling plan of providers of adolescents from clinics in rural eastern counties in Tennessee who will view a training video targeting barriers to provider recommendation of the HPV vaccine. They will complete a baseline and posttest questionnaire assessing HPV and vaccine knowledge and attitudes, as well as comfort with vaccine recommendation. After implementation, the vaccination rates over a 6 month period will be analyzed to see if there is an increase in administration rates.

**Analysis:** To be determined.

**Conclusion:** To be determined.
Attitudes and beliefs of nursing students towards obese patients and patients with eating disorders before and after participating in a psychiatric mental health nursing course

Intro: The education of nurses includes courses focused on caring for psychiatric patients and obesity. However, there is a gap in research that demonstrates how practices and attitudes of these students exhibit toward nutritionally unhealthy patients and toward their own eating habits change after participating in a psychiatric mental health nursing course.

Purpose: The purpose of this study is to evaluate the effectiveness of teaching nursing students about eating disorders and obesity has in changing their practices and attitudes toward patients with disordered eating behaviors and how students’ personal eating behaviors and beliefs may influence their practices and attitudes.

Design: The design of this project will involve a pre-test/post-test survey that will be taken before the course information is introduced and after the information is covered.

Sample: The accessible population is third year nursing students at the University of Tennessee who will be taking a psychiatric mental health nursing course in the spring semester of 2020.

Variables: The independent variable is the information that is offered during the psychiatric mental health nursing course. The dependent variables include the comfort level of nursing students in screening for disordered eating and their attitudes towards disordered eating and obesity. Procedure/Measures: TBD
Around 163,000 Tennesseans are living without health insurance because of the state’s decision to opt-out of Medicaid expansion, an optional provision of the Affordable Care Act (ACA). These Tennesseans fall into what is referred to as the Medicaid Gap: the term used to describe the health insurance gap between people who qualify for traditional Medicaid and those who qualify for ACA Marketplace subsidies. A search of five databases was conducted to identify 19 relevant studies and articles pertaining to the Medicaid Gap in Tennessee. In the literature review, eight sources focused on the demographic data of the people who fall into the Medicaid Gap. In contrast, no sources focus on the human aspect of the Medicaid Gap. One of the gaps found in the literature was little information on the personal toll of being caught in the Medicaid Gap from an impacted individual’s perspective. Understanding this aspect could impact the direction of future healthcare policy. The purpose of this study is to identify the healthcare needs and concerns for individuals in Tennessee who fall into the Medicaid Gap. The study will gather and analyze qualitative data, which will be obtained from individual study participant interviews, in order to gain in-depth knowledge of the experiences of uninsured adult Tennesseans living in the Medicaid Gap. Hearing their stories is important because stories are more memorable to audiences than statistical data. Audio-recorded interviews will be transcribed and will be further analyzed through content and thematic analysis. Themes from the transcribed interviews will be identified.
Problem statement and background: It is common practice in the medical field for women to give birth in the lithotomy position. Majority of women assume the supine position during labor, however an upright position has proven to be physiologically more beneficial to the maternal-fetal unit. Women are often unaware of their birthing position options and the benefits associated with an upright birthing position.

Purpose and research question: The purpose of this evidence-based project was to use peer-reviewed research literature to discover the optimal birthing position for laboring women that decreased the duration of labor and pain perception. The following research question was considered: What effect does upright birthing positions have on labor pain and duration when compared to the supine position?

Review of Literature: The research was obtained from scholarly databases, such as PubMed, EBSCOhost, and NCBI. Selective search criteria was used. Articles older than ten years, research originating from other countries with culturally different practices, and articles discussing perineal outcomes were excluded. The findings supported that upright birthing positions had a multitude of benefits for both the mother and the fetus. It was discovered that upright birthing positions contributed to shorter duration of second stage labor and women reported lower pain scores when compared to the supine position.

Conclusions- Recommendations for practice: It is concluded that upright positions including standing, squatting, and water birth do, in fact, decrease pain and duration of labor. It is recommended that hospitals educate their staff and implement more accommodations for women that elect to labor using an alternative or upright position. These assistive devices would include birthing tubs, and squatting bars.
Effect of Animal Assisted Therapy in Nursing Home Residents with Dementia-Abstract
Hannah Harberts, Amanda Burk, Erin Harris, Abby Sanders

Problem Statement and Background: Dementia often presents with severe agitation, depression, and aggression and finding ways to alleviate these symptoms is a common problem for the nursing home patients living with dementia, their families, and nursing home staff. Animal-assisted therapy (AAT) is not currently widely used in healthcare, however, AAT is gaining popularity because of its low cost, simple application, and low risk.

Purpose and Research Questions: Though many methods of treating the behavioral symptoms of dementia exist, most that are non-pharmacological lack research or are simply underutilized by specialty-care-facilities despite their effectiveness in improving quality of life of the elderly. The purpose of this project is to review existing scientific literature on the topic of AAT of nursing home residents with dementia and address the question: Does AAT improve quality of life in nursing home residents with dementia?

Review of Literature: To determine the efficacy of AAT in treating the symptoms of dementia in nursing home residents, ten existing research studies were evaluated. The studies were each published within the last ten years and each examined the use of animals to improve the quality of life of dementia patients living in nursing homes. The findings of these studies largely support the use of AAT for short to medium term improvement of the residents’ quality of life.

Conclusions: These findings suggest that AAT is an effective tool for enhancing the quality of life in nursing home residents with dementia when used in conjunction with their other treatments and therapies. The findings are clinically significant to support the use of AAT as a cost-efficient, safe, and effective method for reducing the symptoms of dementia in nursing home residents.
Abstract

Interrupted sleep negatively impacts patients’ sleep quality and satisfaction. This paper examines 12 published articles that demonstrate the effect of implementing sleep bundles (ear plugs, enforcing quiet time on the floor, and dimming patients’ room lighting) to improve adult inpatient sleep quality. Online databases (CINAHL, NCBI, and PubMed) guided the search for resources containing key phrase such as “sleep quality,” “hospital enforced quiet times,” “adult inpatient units,” and “sleep bundles.” The resources’ studies mostly showed that implemented sleep bundles increased adult patients’ sleep quality. In addition to sleep quality, these sleep bundle interventions increased patient satisfaction, decreased healthcare costs, and promoted nurse-patient cooperation. It is recommended that hospitals implement a facility-specific protocol to enforce the implementation of these sleep bundles.
In recent years, sex trafficking has been recognized as a human rights concern, but there is little research on the topic, neither nationwide nor about the specific impact on regions and cities. This study is intended to fill a portion of this gap in research by focusing on the problem of sex trafficking in Knoxville, Tennessee. The purpose of this phenomenological study is to gain a general understanding of sex trafficking in Knoxville, Tennessee, from the perspective of local service providers who assist victims. This project is designed to answer the question, “What are the experiences of local service providers with sex trafficking in Knoxville, Tennessee?” Semi-structured interviews are being conducted with direct service providers that care for sex trafficking victims about their perceptions and experiences with sex trafficking in Knoxville, Tennessee. Audio recordings are being transcribed, analyzed, and organized into common themes with an emphasis on concepts that appear in multiple interviews. The project will synthesize and analyze the interviews as a resource for the general public to better understand the complexities of victims in this region in a pamphlet and research paper.
Background: Neonatal Abstinence Syndrome (NAS) is a collection of withdrawal symptoms following the abrupt discontinuation of a substance exposed to during pregnancy. Despite thorough research related to effective treatment, a consistent protocol has not been identified. It is unclear if a strict standardized treatment protocol can decrease the length of hospital stay for these infants. East Tennessee Children’s Hospital (ETCH) has altered their treatment protocol in attempt to decrease the length of stay (LOS) for their NAS patients.

Purpose: The purpose of this study is to compare the NICU LOS’s for NAS treated infants prior to and after implementation of a standardized treatment protocol that included Rescue Dosing.

Methods: ETCH introduced their current protocol in July 2014. A retrospective chart review was performed to collect data on the pharmacological treatment, LOS, and select demographic characteristics. Differences in LOS’s was analyzed using an independent t-Test to determine if there was a significant difference in LOS pre- and post-protocol.

Findings: A total of 1,022 neonatal charts were reviewed. The average LOS for 345 neonates prior to initiation of the Rescue Dosing protocol was 23.9 days. After the introduction of the new standardized treatment protocol the average LOS for 677 neonates decreased to 17.5 days. This was a difference of 6.4 days (t= 13.8, df= 526.1, p < .000).

Implications/Discussion: There was a significant decrease in NICU LOS after implementation of the new treatment protocol including Rescue Dosing. This validates the use of Rescue Dosing.
“I’ve Always Had to Fight”: A Phenomenological Study on Appalachian Men and Women Who Seek Care at Free Episodic Health Care Clinics

Malerie Lazar, BSN Candidate
The University of Tennessee, Knoxville

Abstract

Background: Low family income presents a wide variety of problems for men and women seeking access to health care. Health care disparities among persons with a low family income (PLFI) continues to be one of the most complex and prevalent problems, particularly for rural America. Many barriers exist for PLFI who seek access to adequate health care in the United States (U.S.).

Purpose: A precedent review of scientific literature revealed common barriers to accessing primary care are a lack of education, complications with health insurance, and personal distrust of health care providers. A critical gap in the literature indicates the voice of low-income persons who seek healthcare is unheard. The purpose of this project was to explore the meaning of access to care for low-income persons of Appalachia who seek healthcare services at free episodic health care clinics, which is a typical alternative source of care.

Methods: A phenomenological approach, based on existential philosophical tenets of Merleau-Ponty, was used to explore the meaning of access to care for those who seek healthcare services at non-profit medical organization clinics (such as Remote Area Medical Clinic).

Data Collection: Interview data, as well as investigator field notes, was the qualitative data for the study.

Data Analysis: An interdisciplinary phenomenology research group at the University of Tennessee provided insight and assistance with thematic analysis of interview transcripts.

Findings: Five overall themes capture the essence of what it means for PLFI who seek healthcare: provider behavior, difficulties with insurance/finances, isolation in rural area, consistency in care, and seeking solutions. Understanding the perceptions of low-income persons who seek healthcare and the meaning of their experiences is the first step in determining future sustainable solutions.
Abstract

The purpose of this evidence-based project was to examine the literature researching different interpretive aids utilized by healthcare facilities to address language barriers between healthcare providers and patients with limited English proficiency. Predictions concerning the probable increase of limited English proficient or non-English speaking United States residents make the issue of language barriers in healthcare interactions widely prevalent. Language barriers contribute to an overall diminished quality of care and can significantly decrease patient satisfaction. To find relevant literature, PubMed and CINAHL databases were utilized with the following search terms: “communication”, “communication barriers”, “language”, “telephone”, “translating”, “videoconferencing”, “patient satisfaction”, “professional-patient relations”, “physician-patient relations”, and “nurse-patient relations”. The inclusion criteria were qualitative or quantitative research studies or systematic reviews performed in inpatient and outpatient settings in the United States with limited English proficient or non-English speaking adult patients that measured patient satisfaction after implementing an interpretive aid. Exclusion criteria included studies performed outside of the United States and those involving pediatric patients. A total of four systematic or clinical reviews and eight research articles were utilized for this project. Researchers have found that interpretive aids positively impact patient satisfaction among populations with limited English proficiency. There is not sufficient evidence to recommend one aid over all others in terms of increasing patient satisfaction. “Ad hoc” refers to an “untrained person” such as a patient family member or bilingual staff (NCIHC, 2008). Research shows that ad hoc interpreter use decreases patient satisfaction rates compared to other aids. In conclusion, patients seemed to prefer the most efficient and comprehensive interpreting aids available, specifically professional interpreters and the telephone or video aids. Nurses and other hospital staff must advocate for the use of interpretive aids (technology and trained interpreters) over the use of ad hoc personnel in order to increase patient satisfaction, safety, and care.
Abstract

Problem statement and Background: The Center for Disease Control and Prevention report an increase in maternal mortality in the United States, by which an estimated 20% of the deaths are preventable. Preeclampsia is the leading cause of maternal illness and death and has increased in prevalence by 25% in the last twenty years. There is current evidence that supports the effectiveness of aspirin as a prophylactic intervention to reduce preeclampsia.

Purpose and Research Questions: Preeclampsia (PE) is a multisystemic disorder that involves hypertension, risk of pulmonary embolism, and risk for stroke, which is usually diagnosed by the 20th-week of gestation. This literature review addresses alarmingly high mortality rates in women associated with preeclampsia.

Review of Literature: Evidence supports that prophylactic use of aspirin decreases the risk of preeclampsia and in turn decreases maternal mortality. The results of two randomized control trials and a combination of three systematic reviews and meta-analyses publications demonstrate both supporting and opposing evidence regarding efficacy of aspirin as prophylactic therapy for preeclampsia. This opposing evidence exposes a potential gap in care (aspirin or lack of aspirin) with women at risk for preeclampsia and maternal mortality. Research articles were gleaned from CINAHL and PubMed. Articles older than ten years, research originating from other countries, and research focusing on fetal mortality were excluded.

Conclusions-Recommendations for Practice: Preliminary analysis suggests that high maternal mortality rates in the United States could be decreased with prophylactic use of aspirin for women at risk for preeclampsia. The time period that the female should be receiving the aspirin seems to be most effective at or before 16 weeks’ gestation at a dosage of 50-100mg.
References


Problem Statement and Background: Cardiopulmonary resuscitation (CPR) is a lifesaving measure that requires repeated chest compressions to restore circulation of blood. According to the American Heart Association over 200,000 cardiac arrests happen in United States hospitals annually (American Heart Association, 2017). CPR cannot be predicted, and therefore many times family is present when cardiac arrest occurs.

Purpose and Research Questions: This paper explores literature specific to family presence during resuscitation (FPDR). Research questions were based on evaluating nurses and family members attitudes towards having families present in the hospital room during a resuscitation event.

Review of Literature: Methods for gathering information included using the PubMed and the Cumulative Index of Nursing and Allied Health Literature (CINAHL) research databases. The keywords “CPR”, “resuscitation”, “cardiopulmonary resuscitation”, “family presence”, “nurses”, “effects on nurses”, “code team”, and “policy” to locate literature related to FPDR. Qualitative research done in North America in the last ten years (2008-2018) was analyzed. Results of these studies included positive and negative attitudes of FPDR from both the nurses and families perspectives.

Conclusion and Recommendations: Overall, most nurses and families supported family presence at the time of a code. Most of the research found that FPDR could be therapeutic for the families, and no concrete evidence has been found to show that FPDR negatively affects resuscitation outcomes. The recommendations made for future research include assessing the positive or negative effects family presence has on the resuscitation team and whether this affects patient outcomes during resuscitation. Another recommendation is the application of a policy specific to FPDR in more hospitals across North America.
Effects of participant-selected music versus researcher-selected music on chemotherapy-induced nausea and vomiting

Introduction: In the past year, 1,735,350 people in the United States were diagnosed with cancer. A common treatment of cancer is chemotherapy with approximately 650,000 patients receiving chemotherapy annually. Chemotherapy includes an array of highly caustic drugs that often cause numerous adverse reactions—the most noted or complained about is nausea and vomiting. Since 1985, researchers have been studying music therapy as an alternative therapy to reducing chemotherapy-induced nausea or vomiting (CINV). To date, there has been a lack of standardizing music as an intervention. While studies have shown music therapy to decrease nausea in CINV patients, one aspect not studied is the difference in patient-selected music versus researcher selected music in reduction of nausea and/or vomiting.

Purpose: The purpose of this study is to determine if participant-selected music is more effective than researcher-selected music in the reduction of chemotherapy-induced nausea and vomiting.

Design: This study will be a quasi-experimental design to evaluate the effect of researcher-selected music versus participant-selected music on chemotherapy-induced nausea and vomiting. The sample of participants will be those undergoing a chemotherapy session at a local hospital. The sample will be both genders and adults over the age of 18 who have consented to the study. The independent variable is the music therapy. The dependent variable is the amount of nausea/vomiting post-music intervention. The participants will be in either the participant-selected music group or the researcher-selected music group. Participant-selected music group will curate their own music playlist that will last the duration of their chemotherapy session (normally 30-90 minutes). Researcher-selected music group will have a pre-curated playlist of 30-90 minutes to listen to during the chemotherapy session. The levels of nausea/vomiting will be evaluated after the music-therapy and antiemetic drugs were administered during and before, respectively, the chemotherapy session.

Analysis: To be determined.

Recommendations/Conclusions: To be determined.
Stephen Nowell

Intro: 88 percent of people aged 18-25 engage in social media use; with Facebook, Instagram, and Twitter comprising the top three most used social media sites. The rise of social media use raises the question of how these applications affect sleep quality on these young adults. Multiple studies have linked high social media use and phone addiction to poor sleep quality, yet few studies have explored how specific application use and multiuse of how applications may influence sleep.

Purpose: The purpose of this study is to examine how different social media applications affect sleep quality in undergraduate nursing students.

Design: This non-experimental study will rely on a personalized questionnaire to assess social media use and the Pittsburg Sleep Quality Index to assess sleep quality. The sample for this study will include nursing students from several nursing schools in the East Tennessee region. The specific application use, overall time using social media, and multiuse of various social media platforms are key areas of interest for this study.

Analysis: TBD

Recommendations/Conclusion: TBD
Background: Findings from a recent literature review suggest that music is a promising intervention for older adults, without negative effects, and inexpensive. Understanding the usefulness of music as a leisure activity for older adults residing in the community who often lack social engagement and experience declines in well-being and other negative emotional states has been recommended.

Purpose: The purpose of this study was to determine the acceptability, satisfaction, and effect on mood of an innovative music game for community residing older adults. It was hypothesized that seniors who participated in Song Bingo would report it acceptable, want to play it again, and report improved mood afterwards.

Methods: After receiving institutional review board approval, study program flyers were distributed which was offered one time at a local senior center. A song list was created from popular and age-appropriate music, verified by a clinical expert. Measures included a demographic survey, a pre/post-game mood faces scale, and one-item acceptability and satisfaction scales. Descriptive statistical analyses were conducted. Thirteen older adults participated (Mean age = 74.4; 54% female, 40% black).

Findings: 46% reported satisfaction, 50% reported they would play again. One person reported their mood as “very happy” before the program while 5 people (39%) reported their mood as “very happy” after the program; corresponding to a mean mood rating increase of .7 (range 1-5).

Conclusion: Song Bingo improved mood in older adults residing in the community. Replicating this study in a larger sample and different settings is recommended.
Abstract

**Problem Statement and Background:** Hospital nurses often work in emotionally and physically demanding positions and may be vulnerable to emotional and professional burnout. Various self-care strategies, such as mindfulness, art, and yoga, have been demonstrated to reduce burnout; however, the research is unclear about whether these are indeed effective methods for reducing professional burnout.

**Purpose and Research Questions:** The purpose of this literature review was to examine the research literature about the effectiveness of self-care practices, such as mindfulness, art, and yoga, to reduce emotional and physical burnout among hospital nurses.

**Review of Literature:** Eleven research articles published within the last 10 years were chosen from PubMed and the University of Tennessee’s OneSEARCH using the terms “nurses,” “self-care,” “burnout,” compassion fatigue,” and “nurse burnout.”

**Conclusions-Recommendations for Practice:** Preliminary results suggest self-care practices may be effective at reducing nurse burnout. Additional findings to be determined.
Gina M. Cianciolo, Mollie M. Light, Jessica S. James-Schultz, Laurel S. West

Abstract

The primary treatments for cancer are chemotherapy, radiation, and surgery. Although these practices are beneficial in the treatment of cancer, they also can have systemic adverse effects. Common side effects reported by patients for chemotherapy specifically include nausea, vomiting, fatigue, insomnia, anxiety, and constipation. Traditionally these symptoms induced by chemotherapy have been treated using pharmaceuticals including antiemetics, sedatives, laxatives, and anesthetics. Although these aid in alleviating severe symptoms, complementary therapies like aromatherapy may be used in conjunction with traditional remedies.
Lauren Ingleston, Sabrina Casey, Sarah Gregory, Sarah Maye

Abstract

Problem Statement and Background: According to the Centers for Disease Control and Prevention (CDC), one out of every thirty-one patients obtain a hospital acquired infection (HAI) daily. Bacteria can be found on multiple sources in the hospital environment including blood pressure (BP) cuffs, pulse oximeters, telemetry leads, and bedside tables. A lack of disinfecting patient equipment may contribute to HAIs.

Purpose and Research Questions: The purpose of this evidenced-based project was to determine whether multi-use BP cuffs harbor bacteria due to a lack of appropriate disinfection between patient use, and the following research question was examined: Does cleaning BP cuffs between patients reduce the amount of bacteria present on the cuffs?

Review of Literature: The results from eleven articles indicated that BP cuffs are not properly disinfected between patient use. This leads to a correlation between disinfection of BP cuffs and the amount of bacterial growth present on the cuffs. Research methods utilized were databases such as CINAHL, Academic Search Complete, and Web of Science. Searched words included “infection”, “infection control”, “blood pressure cuff”, “contamination”, and “sphygmomanometer”.

Conclusions-Recommendations for Practice: Transmission of pathogens could be decreased with minimal expense when appropriately cleaned by healthcare professionals. A variety of organisms were identified on cultures of BP cuffs. The length of time a piece of medical equipment was cleaned could be correlated with the number of organisms present on the device. Recommendations for practice included a more in-depth study related to the length of time the devices are disinfected, the method of disinfection, and the use of disposable BP cuffs.
Poster Abstract
Stefanie Schumacher

Role of Healthcare Providers in Combating Sex Trafficking in Knoxville, Tennessee

Background: Sex trafficking is a public health issue recognized as a human rights violation occurring worldwide, including in the United States. Although Knoxville, Tennessee, has been identified as a hub for sex trafficking with the crossing of Interstate 40 and Interstate 75 downtown, there is very little literature that focuses on sex-trafficked victims specific to this region. Almost 90% of sex trafficking survivors report having come into contact with a healthcare provider at least once while being trafficked. However, there are several large gaps when it comes to the interaction between those who are being trafficked and the healthcare they receive. There is a need for more information about best methods for identification and care of sex trafficking victims and their immediate and long-term needs.

Purpose: The purposes of this project is to understand the confidence healthcare providers in local walk-in clinics have in identifying persons who are sex trafficked, and their knowledge of best next steps of action or connections to local resources available.

Methods: Surveying healthcare providers practicing in walk-in or urgent care settings in and around Knoxville about their experiences and knowledge of victims of sex trafficking, and knowledge of available resources in the community for the population.
In 2009, the Human Papillomavirus vaccine, commonly known as Gardasil, was approved by the CDC for use in the U.S. male population. This recommendation came three years after the approval of the vaccine in females. Vaccine rates among college-aged males remain lower than the rates of their female counterparts in 45 of the 50 US States. The state in which this study was conducted is unique in that it is the only state where male and female vaccine-initiation rates are equal (55.3%) (Walker et al., 2017). The objective of this quasi-experimental study was to assess the efficacy of a True-False Educational Intervention (TFEI) in increasing college-aged students’ willingness to receive the HPV vaccine (WTR) and their self-perceived knowledge level (SPKL) of information pertaining to the vaccine. A random sample of 5000 full-time students was solicited via e-mails obtained from an internal university data office. Each participant was given a Qualtrics® survey at week zero which included demographic items, HPV-attitude and perceived-knowledge items, and the TFEI. At week four, participants completed a follow-up Qualtrics® survey which contained the TFEI in the form of a Knowledge Quiz as well as HPV-attitude and perceived-knowledge items. The reliability of TFEI scores was assessed using Cronbach’s Alpha (a > 0.07). A Repeated Measures t-Test was used to analyze the difference in TFEI scores from week zero to week four. Cross-analyses were used to evaluate for positive correlations among the TFEI Scores and WTR and the TFEI Scores and SPKL. Consistent with Ajzen’s Theory of Planned Behavior and Rosenstock et al.’s Health Belief Model, increases in WTR and SPKL, respectively, would yield health behaviors—secondary to the TFEI—that result in increased HPV vaccination rates among southern college students.
The Effect of Nonpharmacologic Treatments on Infants diagnosed with Neonatal Abstinence Syndrome

Alexandria Tasket

Infants are a vulnerable population, especially those diagnosed and treated for neonatal abstinence syndrome (NAS). NAS is a group of withdrawal symptoms infants can experience after birth due to the abrupt discontinuation of a substance exposed to in utero. Many of the symptoms, including pain, nausea, irritability, vomiting, and tremors can be severe and require hospitalization. Because these infants experience extreme discomfort, the project will focus on the evaluation of techniques, specifically cuddling and music therapy, to reduce their discomfort without the use of medication. Due to the opiate epidemic and the especially high rates of NAS in Knoxville, ETCH treated 240 babies for opioid withdrawal last year. Furthermore, there has been a 15.4% increase in reported NAS cases in Tennessee from 2013-2017.

The research project will be conducted at ETCH’s NICU. Through collaboration, an interdisciplinary research team has formed including neonatologists, nurses, music therapists, and pain and palliative care specialists. The project involves analyzing the heart rate, respiratory rate, and oxygen saturation in newborns experiencing withdrawal symptoms. Each infants’ vital signs will be taken prior to and after each intervention. Analysis, recommendations, and conclusions are TBD.
Peyton Daigre, Anna Neglia, Ravina Patel, and Rachel Sherry

The Effects of Music Therapy on Cognition and Memory in Persons with Dementia

Dementia is a prevalent, progressive disease that leads to eventual cognitive impairment and memory loss. Declining cognition is often treated with pharmacologics, but it can also be improved with alternative therapies, such as music therapy. This review of literature examines the effects of music therapy on cognition and memory in persons with dementia (PWDs). Twelve articles were reviewed and synthesized from two electronic databases, PubMed and CINAHL. The inclusion criteria for these articles were populations with dementia, music therapy interventions, and measurements of the effects of music therapy on cognition and memory. The majority of the studies reviewed supported music therapy for PWDs. The benefits of music therapy appeared to outweigh the risks and costs. Music therapy programs should be developed into standardized practice and implemented in populations with mild to moderate dementia. Future research on music therapy with patients with dementia could reinforce the effects of music therapy on cognition and memory.
FALSE ALARMS IN RELATION TO NURSING PRACTICE IN CRITICAL CARE

Brooke Bischoff, Emily Clark, Tanzie Nguyen, Autumn Standiford

Abstract

Alarm fatigue in critical care units has been found to negatively affect both staff and patients. The purpose of this review of literature is to gain a better understanding of the effects of false alarms in critical care units on nurses’ behavior and patient quality of care. A total of 13 research articles, based in the intensive care unit, were critically reviewed, including systematic reviews and quantitative studies. Research showed that high false alarm rates were found to negatively affect the staff, which led to a mistrust of alarms and lack of response. In turn, false alarms were found to increase adverse patient outcomes, such as unnoticed cardiac dysrhythmias and decreasing oxygen saturation, which ultimately hinders patient rest and affects healing time. Conclusively, there were contradictory findings regarding the parameters of alarm settings and noticeable gaps related to different intensive care units, different monitor brands and vendors, and lack of research in other medical alarms other than monitors. Based on the research findings, recommendations for future nursing practice include proper preparation and placement of electrodes, providing patient education on alarm needs, better staff education on alarms and their functions, and designating alarm priorities based off severity.
Abstract

**Introduction:** Type 1 Diabetes Mellitus (T1D) is a common chronic illness. Patients diagnosed with T1D face challenges that affect their level of self-efficacy and, therefore, their health outcomes. Self-efficacy is one’s confidence in their self to execute a task. Self-efficacy impacts how adolescents manage their diabetes. The purpose is to review the literature to determine which mode of insulin delivery, either Continuous Subcutaneous Insulin Infusion (CSII) or Multiple Daily Injections (MDI), has higher levels of self-efficacy among adolescents with T1D. Adequate diabetes management is effective in preventing co-morbidities.

**Review of literature:** The databases utilized were PubMed and CINAHL. Eleven articles were found using the key terms “adolescents”, “T1D”, “self-efficacy”, “CSII”, “MDI”, and combinations of these words using AND/OR. Findings suggest that there is no significant difference in self-efficacy between CSII and MDI. External factors such as: parental involvement, diabetes knowledge, psychosocial factors, and situational factors have a greater effect on self-efficacy in diabetes self-management.

**Conclusions:** Recommendations for newly diagnosed adolescent patients and their families are that they should undergo a coping skills training session to address external factors. The government should provide readily available educational sessions in diabetes clinics nationwide. In addition, healthcare providers should rotate conducting the sessions to refresh their knowledge and to gain further insight. Sessions should be repeated yearly or as needed.
In the United States, satisfaction regarding quality of maternal healthcare is declining. To improve quality of care, women’s perceptions must be assessed. The aim of this non-experimental descriptive study is to evaluate a woman’s perception of the quality of care she received throughout her birthing experience. Child-bearing age women (n=30) who gave birth within the past month at University of Tennessee Medical Center will complete a Qualtrics survey containing the Pregnancy and Childbirth Questionnaire (PCQ) and demographics. A majority of women who complete the survey are expected to be dissatisfied with their prenatal and childbirth care in regard to involvement, communication, and information received. The results may provide insight into areas that healthcare providers could address. Recommendations for healthcare providers are to continually assess a woman’s perceptions of her quality of care. Through ongoing assessment, interventions can be identified and implemented.
Abstract

Predispositions of Homelessness for the Homeless Veteran Population

There were approximately 553,000 individuals experiencing homelessness on any given night in 2018. Of the 553,000 homeless individuals, close to 9% (38,000 individuals) were U.S. veterans. Cardiovascular disease, mental illness, substance use disorders, and exposure related conditions are prominent within the homeless population. The prevalence of these diseases poses the question, “Are these characteristics predispositions to homelessness or simply the result of it?” This non-experimental study will look at determining if there are health disparities associated and resulting in homelessness for the veteran population. Variables will include the health disparities of homeless veterans within the Knoxville area. Participants will be chosen via a convenience sampling approach. Data, in the form of subjective health histories, will be gathered by interviews with individuals of the homeless veteran population and analyzed to discern the prevalence of different health conditions. The results from this study will be applicable to the clinical setting in outlining health characteristics of veterans that are correlated to a status of homelessness. Clinicians could use the data collected to screen veterans and potentially provide interventions to prevent escalation into homelessness.
Primary care provider's knowledge of and attitude of probiotic supplementation during pregnancy

Introduction
Probiotic supplements are increasingly understood to support the maternal and fetal gut microbiomes and consequently a state of health and disease prevention through microbe-host interactions impact immune function, GI health; probiotic supplements can support the gut microbiota and can be implicated in maintaining both maternal health in pregnancy and subsequently fetal development and infant health. However, little is known about the health care providers attitudes towards probiotic supplementation during pregnancy and routine recommendations for women during pregnancy.

Purpose
The purpose of my research project is to employ a quasi-experimental research project to measure primary care providers knowledge of and attitudes of recommending probiotic supplementation during pregnancy, exploring the impact of educating providers.

Design
Sample will be determined by a convenience sampling plan of individuals from local health clinics/services in Knoxville who routinely provide care for pregnant women including FNP, obstetricians, WHNP, physician assistances. First, the knowledge level of providers regarding the micro biome and probiotic supplements will be measured. The participants will then be given informational materials to enhance understanding. Finally, a post-survey will re-evaluate their knowledge about probiotics and consequent likelihood to recommend probiotic supplements for pregnant women and attitude toward these interventions.

Analysis - TBD

Recommendations/Conclusions - TBD
Abstract

Kathryn Rack, Dylan Sutton, Rebekah Phillips, Kaitlyn Pawlak

**Problem statement and background:** Preterm birth and low birth weight are prevalent problems facing infants. Both pose threats to the infant as he/she transitions to extrauterine life and fights for survival. Preterm and low birth weight infants are susceptible for developing complications related to infection, thermoregulation, neurodevelopment, and nutrition. Skin-to-skin contact is an early and ongoing intervention that can be utilized in the hospital to promote the wellbeing of the vulnerable preterm and low birth weight infant.

**Purpose and research questions:** The purpose of this evidence-based project was to explore the effects that skin-to-skin contact have on the morbidity of the preterm and low birth weight infant. Morbidity was explored in four specific areas including: infection, thermoregulation, neurocognitive development, and breastfeeding.

**Review of Literature:** The studies revealed the benefits of skin-to-skin contact in caring for preterm and low birth weight infants and aided in reducing morbidities. These include a reduction in infection and sepsis, improvements in thermoregulation, positive results in neurocognitive development, and increased attainment of exclusive breastfeeding.

**Conclusions and recommendations for practice:** All the articles reviewed showed the benefits of skin-to-skin care in preterm and low birth weight infants and recommended its continued practice. No studies found negative outcomes of skin-to-skin contact. Therefore, skin-to-skin contact should be encouraged through patient teaching and nurse education to ensure its implementation. Future research to standardize care practices is also recommended.
Abstract

Problem statement and background: Intravenous complications of the pediatric population are physically, emotionally, and financially distressing to the patient and their family. Pediatric patients who are non-verbal are not able to fully express their pain or discomfort leading to potentially serious complications, such as extravasation. This is relevant for the pediatric patient as well as the healthcare professional initiating an intravenous access (IV), as a hospital-acquired infection or complication financially impacts the healthcare facility. Statistics reported regarding pediatric IV complications are shown to be decreased by appropriate nursing interventions.

Purpose and research question: The purpose of this evidence-based project was to compare the intravenous complications in pediatric and non-pediatric hospitals. In the pediatric population, which includes children between the ages 0-18 years-old, is there a difference in rates of pediatric IV complications between pediatric hospitals versus non-pediatric hospitals?

Review of Literature: The results found among various studies indicated that hospitals that provide nurses with increased specialized training for peripheral intravenous catheter insertion and education of management show a decreased number of complications compared to nurses that do not receive this training.

Conclusions & Recommendations for practice: Appropriate and timely nursing interventions are vital in prevention and early detection of intravenous complications in the pediatric population. The nursing interventions found through the research vary between pediatric and non-pediatric hospitals. Recommendations for practice include: expanding nurses’ knowledge on the management of pediatric IVs through in-service courses, having at least one pediatric nurse every shift in emergency departments that serve pediatric patients, and implementing a standardized IV complication prevention and detection program nationwide.
Parkinson’s Disease and Caregiver Strain

Over 10 million people worldwide have been diagnosed with Parkinson’s Disease. Often Parkinson’s disease patients remain in their own homes with family members or spouses as their primary caregivers. As a result, a lot of burden and strain is placed on the caregiver. The purpose of this study is to determine if caregiver strain can be decreased by providing an education program for them. The education program will provide the caregivers with more information on the pathology of the disease, ways to cope, and what to expect with disease progression. The sample for this study will be Parkinson’s disease caregivers in the Knoxville area. Caregiver strain will be measured prior to the education program and after the education program. The measurement tool for caregiver strain, results analysis, conclusion have yet to be determined.
Effects of Parent Educational Intervention on Nutrition and Physical Activity Behaviors for Children Enrolled in a School-Based Health Program

Mary M. Wilson

Obesity rates among children ages 2-19 in America have dramatically increased to include 1 in 5 children. Childhood obesity has been shown to increase certain health risks including high blood pressure, high cholesterol, Type 2 Diabetes, breathing problems, low self-esteem & issues such as bullying. Studies have shown that effective shaping of children’s behaviors depends on parent modeling and addressing the knowledge and beliefs of parents. A quasi-experimental design with a nonequivalent control group pretest-posttest design was used to determine the effectiveness of a 10-week after-school health program. Approval by the University of Tennessee’s IRB and county school district were obtained before proceeding with the study. Following the collection of informed consent, a parent educational session addressing nutrition and physical activity was employed at the intervention school, lasting approximately 20 minutes in length. There were eleven parent/child dyads in the intervention group and nine parent/child dyads in the control group. Physiological parameter outcome measures included weight, body mass index (BMI), BMI percentile, systolic blood pressure (SBP), and diastolic blood pressure (DBP). Reported outcomes measures included parental ratings of observed behavior change in their children and satisfaction of educational session content. Of the physiological parameters examined, a significant change in diastolic blood pressure was noted between the intervention and control groups post-program (p=.036). Using descriptive statistical analysis, 82% of parents reported a satisfaction rating of three or higher (0=not helpful, 3= somewhat helpful, and 5=very helpful). Additionally, 64% of parents reported a child behavior change rating of three or higher (0=no change in behaviors, 3=verbalized desire for healthier food choices, and 5=observed change in behaviors). No significant differences were seen post-program between the two groups for the remainder of the physiological parameters. Generalization of these results is limited to similar after-school child programs with parental involvement. Future studies should continue to analyze the effectiveness of parental educational interventions on child physical parameters and parent satisfaction to guide program revisions.
Researchers: Olivia Schapker, Marisa Hanlon, Chloe Allen

Abstract

Problem and Purpose

The use of electronic nicotine devices is rising in popularity, but very little is known about their potential health consequences. This evidence-based paper explores twelve articles that aim to discover what the health risks related to usage of these devices in college students are.

Methods Articles were discovered using research databases and filtering to only use articles written within ten years.

Findings Due to electronic cigarettes still being a relatively new, long term health consequences of these devices are unknown. The propylene glycol and vegetable glycerin in these devices can cause throat and mouth irritation, headache, as well as increased heart rate. The aerosolized ingredients that come out in the vapor can exacerbate respiratory disorders such as asthma in people within close proximity to users. Due to the large amount of nicotine present in the electronic devices, plasma nicotine concentration increases significantly with just one puff.

Conclusion and Recommendation There is still a lot of research to be done regarding the health consequences associated with using electronic nicotine delivery systems. All of the articles in this paper agree that there is a large amount of nicotine that impacts the user’s body, but long-term health effects have not been researched yet. Nurses will have to become more detailed when asking if a person smokes or not since many people don’t count electronic cigarettes. Education is key in helping people to better understand what is contained within these products.
Communication of DNR Orders Amongst Healthcare Providers

Ashley Darby, Talya Gassman, Lisa Russell, Laura Scruggs

Abstract

Despite improvements made nationwide regarding provider-provider communication, there is still room for improvement when it comes to conveying patient code status. Code status is an important piece of patient information as it tells the health care providers the wishes of the patient when he or she may not be able to relay this information. Not having proper communication of this information could result in lawsuits, wrongful resuscitations, and disregard for the patient’s wishes. Efforts have been made to improve the communication of this vital piece of information, but this research paper comes to explore how effective these efforts are in preventing DNR errors and ensuring patient safety. The efforts taken include but are not limited to standardization of color-coded wristbands denoting DNR status, code status reconciliation to ensure what the charts say match the wishes of the patient, and assigning code status upon arrival to the hospital. Although these efforts have decreased the number of wrongful resuscitations and increased patient safety and satisfaction, standardizing this vital piece of information would ensure this trend continues in this direction.
Abstract

The Human Papillomavirus (HPV) can cause those infected to develop cancers in multiple areas of the body, with 80% occurring in the cervix. The FDA has approved two prophylactic vaccines, Cervarix and Gardasil, but clients and their children have concerns about the efficacy, safety, and adverse events of the vaccine. The purpose of this EBP project was to review the current literature on the effects of the HPV vaccine and the risk of developing cervical cancer on women between the ages of nine to 35 years old. In order to find the relative literature for this project, we used two major databases PubMed and CINAHL. Twelve studies were selected, and the findings showed that in most cases the HPV vaccine was 100% effective in preventing cervical lesions related to the various genotypes of the human papillomavirus in females. This was further supported by comparing the pre-vaccine to post-vaccine data from the CDC and another long-term follow-up study on the effectiveness of the HPV vaccine. Various studies found that two treatments with the HPV vaccine was only 90-95% effective and to receive the full benefit the client should receive the full regiment of 3 vaccines within a year. Furthermore, it was found that the HPV vaccine was not only vital to prevent cervical cancer but also cancer in other areas of the body. Current literature shows that the HPV vaccine is a vital part in the prevention and spread of the human papillomavirus, which can lead to various forms of cancer, including cervical cancer. Patient education plays a critical role in informing adolescent females and/or their parents about the HPV vaccine and its role in preventing HPV associated cancer.
Problem Statement and Background: Premature infants lack the development of mechanisms to sustain extrauterine life, such as an ability to gain weight. Therefore, one of the main nursing goals is to perform interventions to assist premature infants in gaining weight. Typical neonatal intensive care units (NICU) consist of a large room with multiple beds in one space, which allows nurses to have quick access to constantly monitor the infants. This is a positive layout for the nurses, however, this model tends to produce negative outcomes for parents, and possibly babies. Due to the congestion of multiple infants and monitors all in one open area, the visiting hours for families are very strict. Typically, parents are limited to one hour of visitation per day, which can contribute to stress of the family and the infant.

Purpose and Research Question: This study specifically analyzes the impact of FIC on the weight gain of NICU infants.

Review of Literature: To evaluate the effectiveness of FIC, 11 studies conducted within the last ten years were reviewed. These studies consisted of randomized control, quasi-experimental, and qualitative trials. The studies evaluated integrating FIC from the nurses and parents’ point of view, which helped make the evidence stronger. The findings of these studies showed FIC had a positive impact on neonatal weight gain.

Conclusion: It can be concluded that FIC is more effective than other methods at improving the status of neonates, through an increase in the amount of weight gain. Therefore, FIC should be implemented into NICUs in the United States to improve the health of premature infants.
Abstract

Comparison of observation methods used to increase hand hygiene compliance

Selena Sрисourath

Problem statement and background: Hand hygiene performance is one of the most effective and economical methods of preventing hospital acquired infections. In the hospital setting, health care professionals such as doctors, nurses, and nursing assistants are often noncompliant with hand hygiene performance. This is a major problem because it has been clearly demonstrated in the literature that healthcare professionals non-compliance with hand hygiene performance increases the rate of hospital acquired infection.

Purpose and research questions: Many methods have been used in evaluating hand hygiene compliance among healthcare professionals for decades. With the variety of methods, their effectiveness, benefits, and limitations are often studied.

Review of Literature: In order to evaluate hand hygiene compliance and its effect on hospital acquired infections, 10 peer reviewed journal articles relevant to the topic were thoroughly analyzed. Different types of measurement tools, such as systems and direct observation, were implemented in simulated settings and actual acute care clinical settings to determine compliance rates of health care professionals. Both methods found that hand hygiene compliance was low, and the lack of hand hygiene compliance resulted in a higher rate of hospital acquired infections.

Conclusions—Recommendations for practice: After reviewing the literature, we concluded that hand hygiene is the most effective method of preventing hospital acquired infections. The use of hand hygiene is especially important because it keeps both the health care professional and the patient safe from pathogens. As Florence Nightingale once said, “the very first requirement in a hospital is that it should do the sick no harm.” A few recommendations for improving hand hygiene compliance rates and decreasing hospital acquired infections is to promote the performance of hand hygiene using flyers, improve the use of hand hygiene tools, measure the compliance of hand hygiene.


Kayla Starr, Sara Wiles, Clint Brasher, Eddie Small

Abstract

**Problem Statement and Background:** Pressure ulcers are a global epidemic that are causing longer hospital stays, higher risks for infection, and increased cost of patient care to the hospital that cannot be reimbursed through insurance.

**Purpose and Research Question:** The purpose of this project is to review the efficacy of skilled nursing assessment in decubitus ulcer prevention of hospitalized patients. The following research question was presented: does a timely skilled nursing skin assessment reduce the incidence of hospital acquired decubitus ulcers?

**Review of Literature:** An initial search revealed 10 salient articles suggesting the positive correlation between skilled nursing skin assessment and the prevention of hospital acquired decubitus ulcers. Databases used were PubMed and the Johanna Briggs Institute Database of Systematic Review. Searched words included “nursing documentation” AND “outcomes”, “accurate assessment”, and “skin assessment” AND “pressure ulcer”.

**Conclusions and Recommendations:** Preliminary review suggests that a combination of skilled nursing skin assessment, increased healthcare provider-nurse communication, skin moisture assessment and patient positioning will be the most effective approach to decrease the development of hospital acquired decubitus ulcers. Further recommendations are still to be determined.
Tube feeding is the standard of care in the neonatal intensive care unit (NICU) for preterm infants. The use of tube feeding can delay the development of vital reflexes like sucking and swallowing. The purpose of this Review of Literature is to determine the effects of non-nutritive sucking (NNS) on attainment to independent oral feeding and improved feeding tolerance. Twelve articles were acquired from the electronic databases, Pub Med and Web of Science using the keywords, “Non-nutritive sucking”, “NICU”, and “weight gain”. Articles were selected between the years 2013 and 2018 with NNS as the independent variable. Each of the sources manipulated NNS in their own way, all engaging babies in NNS pre-feeding for at least five minutes before or during tube feeding. Out of 12 articles, 10 found NNS to directly decrease the amount of time to independent oral feeding and feeding tolerance. All articles found that NNS was not harmful to preterm infants. NNS can improve feeding tolerance and have resulting positive effects on weight gain and sucking reflexes. Overall, the literature supports that hospitals should include NNS in their post labor education for new mothers.
Abstract

Problem Statement and Background: 1 in 25 people in the world undergo a surgical procedure every year. Of the 3-22% of negative inpatient outcomes, 36-54% of these are related to surgery (Haynes et al., 2009; Weiser et al., 2008). An estimated 50% of these have been recognized as preventable (Haugen et al., 2015; Haynes et al., 2009). The World Health Organization (WHO) launched the Surgical Safety Checklist (SSC) in June 2008 with the claim that it could prevent 500,000 deaths per year, as well as reduce surgical complications and errors (Urbach, Govindarajan, Saskin, Wilton, & Baxter, 2014).

Purpose and Research Questions: Surgical site infections (SSI) are one of the most dreaded and costly surgical complications. SSIs complicate healing and extend patient stay, which increases costs for the patient and the facility. This paper reviews the literature to analyze the impact the WHO SSC has on SSIs.

Review of Literature: We reviewed ten studies for inclusion in this paper. Seven of the ten studies found statistically significant reductions in SSIs with the use of the SSC. Of the three that did not find statistical significance, two found modest clinically significant decreases. We gave precedence to quantitative, experimental studies, but retrospective data analysis studies were included.

Conclusions and Recommendations: Statistically, the WHO SSC has not shown significant outcomes in every clinical setting, so further research needs to be done to evaluate its true impact in a variety of settings and patient populations. Since nine of ten studies showed at least some clinically significant decreases in SSIs, we conclude the checklist is a low-cost option that should be considered by all facilities to reduce mortality and morbidity, improve communication, and promulgate a culture of safety.
Abstract

McKenzie Ann Tanner, Annie Mikal Morgenroth, Jennifer Grace Hosenfeld

Problem Statement and Introduction: Neonatal abstinence syndrome (NAS) is a growing problem due to the increased use of opioids and illicit drugs during pregnancy. This has resulted in severe infant withdrawal symptoms and extended Neonatal Intensive Care Unit (NICU) stays.

Purpose: The purpose of this evidence based project was to evaluate the question: what are the effects of non-pharmacological interventions on infants diagnosed with NAS, specifically breastfeeding and rooming-in? The goal was to evaluate the effects of non-pharmacological interventions on the symptoms of infants with NAS.

Methods: This review of literature explored twelve published articles that reported results regarding non-pharmacological interventions on infants diagnosed with NAS. Non-pharmacological interventions, specifically breastfeeding and rooming-in, were examined by the maintenance of NAS symptoms. The results were measured by Finnegan score, length of stay, and need for pharmacological therapy if applicable. The methods reviewed included, but were not limited to: meta-analysis, retrospective cohort study, and experimental studies.

Conclusion and Recommendations: The results were inconclusive, but the implementation of breastfeeding and rooming-in correlated with a decreased length of stay, Finnegan score, and need for pharmacotherapy. Further research was recommended as NAS is growing in prevalence and the results were found to be inconclusive. Non-pharmacological interventions, such as breastfeeding and rooming-in, should be implemented on the unit in addition to pharmacotherapy as needed while further research is conducted.

Keywords: Neonatal abstinence syndrome, breastfeeding, rooming-in, Finnegan score
Abstract

**Problem statement and background:** Nausea and vomiting occurs in many postoperative patients who receive anesthesia. Typically, antiemetic medications such as Ondansetron and Promethazine are used in the recovery rooms to treat this issue. Alcohol prep pads have been used by recovery room nurses to treat postoperative nausea and vomiting (PONV), but evidence for the efficacy of this practice has remained unclear for some time.

**Purpose and research questions:** The purpose of this review of literature is to explore the effectiveness of inhaled vapors of isopropyl alcohol (IPA) on postoperative nausea and vomiting (PONV). The following research question was considered: In postoperative patients, what is the effectiveness of inhaled isopropyl alcohol or “basic alcohol prep pads” on nausea and vomiting?

**Review of literature:** After identifying and reviewing 10 research articles that completed both controlled clinical studies and randomized control trials, the evidence became more apparent.

**Conclusions--recommendations for Practice:** The results of this evidence-based project suggest that inhalation of isopropyl alcohol was just as effective or more effective than pharmacologic treatments and was also more cost effective than pharmacologic treatments for the patient and hospital.
Abstract

This review of literature evaluated 12 studies to examine if effective communication between nurses (RNs) and nursing assistants (NAs) improves patient quality of care. The articles chosen for this review were selected using PubMed and CINAHL. The topics included communication between RNs and NAs, patient care outcomes related to communication, and methods to improve communication to decrease adverse patient events. Through the use of effective communication, nurses were able to better prioritize nursing tasks, improve quality of patient care, and enhance overall patient satisfaction. A better method of communication between RNs and NAs should be implemented. The use of a flagging system would require RNs to double check NA’s documentation ensuring the delegated tasks were completed and documented appropriately and accurately. Thus, quality of patient care can be improved through effective communication among healthcare providers.
STRATEGIES TO REDUCE NURSE ALARM FATIGUE
Christa Wheeler, McKenzie Robinson, Emma Whatton, Sydni Vaughn

Abstract

Problem statement and background: A nurse’s job is incredibly stressful and demanding, even without the overwhelming amount of alarms in use today and the constant noise they generate. Excessive alarms can add stress and result in nurse alarm fatigue, leading to impaired patient care and negatively affecting the hospital unit as a whole. Available statistics depict the overuse of various alarm-generating devices that result in nurse alarm fatigue.

Purpose and research questions: The purpose of this evidenced-based project is to explore telemetry monitoring, a commonly overused alarm-generating device. Methods for implicating efficient telemetry monitoring and reducing excessive alarms will be evaluated to aid in reducing nurse alarm fatigue and improving patient care. Because a nurse’s ability to function at an optimal level with minimal distractions is crucial to patient care, it is important to continuously evaluate and review causative factors of nursing fatigue, as well as ways to reduce and prevent it.

Review of Literature: Findings from multiple studies suggest that interventions, such as implementing standardized criteria for telemetry monitoring, patient-specific monitor settings, and daily rounding to assess further need for continued monitoring of patients, can significantly reduce false alarms and nursing alarm fatigue.

Conclusions: Implementing new protocols for practice to reduce false alarms and unnecessary monitoring of patients are important tactics in reducing nurse alarm fatigue and improving patient satisfaction and care. The studies discussed conclude that new policies and discontinuation of unnecessary monitoring can greatly lower the risk of nurse alarm fatigue and patient harm. Due to these findings, these new policies and guidelines should be implemented in hospitals and other healthcare facilities nationwide to ensure appropriate nursing care and patient safety.
Abstract

**Problem Statement and Background**: Skin to skin contact (SSC) with mothers after a vaginal delivery is becoming common practice to improve neonatal outcomes: willingness to feed, crying times, and temperament. In situations where the mother is unavailable to provide immediate SSC to the newborn (cesarean sections) fathers are not being utilized to provide SSC. This is problematic because 31.9% of births in 2016 were delivered via cesarean section which places a large population of infants at a disadvantage.

**Purpose and Research Questions**: The purpose of this evidenced-based project was to evaluate current literature regarding the practice of SSC between the newborn and father, and how this may positively affect newborn outcomes related to thermoregulation, glucose control, and other factors.

**Review of Literature**: In order to evaluate the effectiveness of SSC, 15 articles were reviewed and 10 were selected to be included in the literature review. The research articles were from PubMed and CINAHL databases and were published between 2007-2018. Overall, the articles found a positive association between newborn health related to immediate SSC with the mother or father versus no SSC after delivery. Paternal SSC benefits neonatal temperature stabilization, pain, bonding, crying and breastfeeding time. There is little research on the topic so no conclusions can be drawn from the articles reviewed regarding SSC with the father.

**Conclusions**: It can be reasonably concluded that a positive correlation between SSC with the newborn and the resulting positive impact on newborn health outcomes exists. While this topic has been researched regarding SSC with mother and newborn, there is room for future research about SSC between father and newborn. Many articles reviewed have shown improved outcomes in this scenario. Additional research needs to be performed to be able to draw firm conclusions about effects of SSC on the father and neonate.
Abstract

**Problem statement and background:** Many mothers choose not to partake in SSC postpartum, despite the extensive amount of research that promotes SSC. This affects both the physiological and emotional health outcomes of both the mother and the newborn. Research shows a significant benefit to both mothers and their healthy, full-term newborns that receive SSC directly after birth.

**Purpose and research questions:** To review literature that studies the effects of immediate SSC on healthy, full-term newborns. The factors analyzed include pain, thermoregulation, breastfeeding, and neurobiological stability. The following research question was considered: In the hospital setting, does immediate skin-to-skin contact between newborn and mother improve the health outcome versus no skin-to-skin contact?

**Methods:** Peer-reviewed articles from various databases such as, Cochrane, CINAHL, and PubMed was used. The articles were published within the past ten years, except for one, and convey the most recent research conducted on SSC.

**Review of Literature:** The results indicated that SSC improved newborn’s procedural pain and thermoregulation, lower neurosteroid levels, and increase breastfeeding duration. Newborns achieve higher increases in temperature following delivery through their maternal natural body heat. SSC for 15 minutes provides benefits in reducing procedural pain with newborns. SSC has shown to increase the duration of breastfeeding three months postpartum, and decrease the stress associated with the laboring process.

**Conclusion – Recommendations for practice:** SSC is beneficial to newborns regarding pain, thermoregulation, breastfeeding, and neurologic stability. SSC should be implemented as a universal standard in all hospitals. In addition, education to nurses and mothers on the benefits of SSC needs to be done. Key search terms include: “skin-to-skin”, “breastfeeding”, “pain”, “thermoregulation”, “neurological effects”, “neuroprotective”, “newborns” and “kangaroo care”.
This study examines the relationship between language and knowledge by focusing on the extent to which intentional body language (i.e. hand gestures and symbols) is understood universally on a modern-day American college campus. I hypothesize that as a result of both globalization and the highly-Americanized culture of these universities, the hand gestures that I am studying will be nearly universally-interpreted. This study aims to discover any common discrepancies between intended meanings and interpreted meanings of body language and signals in order to address the extent of cultural divisions in a place immersed in American culture. To do so, I gathered information through a survey with 211 members of the general public — specifically with students from ages 17-28 — in and around the university. The data shows that most gestures are comprehended in the same ways by many demographics. Survey results suggest that participants from families with cultures different than typical American culture interpret intentional hand gestures similarly to the way that families completely immersed in American culture do; however, while different cultures understand common American gestures, these people additionally have other interpretations of gestures. By addressing these slight cultural differences, I was able to emphasize the importance of being sensitive to others through non-verbal language and to further analyze social barriers caused by possibly misunderstood body language. Additionally, I was able to study the effects of globalization throughout American colleges and the degree to which being immersed in multiple cultures affects individual interpretations of intentional gestures.

*Keywords*: gestures, interpretations, cultural division, sensitivity, universality
Schools in the state of Tennessee are now required to address chronic absenteeism and behavioral concerns for their students. If schools were able to address these problems early on, students would have a better chance of academic success. If high risk kindergarten students were to receive twenty minutes of added support each week, attendance and behavior would improve. An elementary school in East Tennessee recently started a program where they identified at risk kindergarteners, and implemented twenty minute small groups for the children each week. The kindergarteners were part of a program that the school ran over the summer, and only about half of the students kept participating once school started. Data will be collected from the school that details student absences, and major and minor behavior referrals for all the students attending the summer program. Once collected, comparisons will be made between the children who continued with small group participation, and the children who only attended the summer program. Results are expected to reflect that the children participating in small groups throughout the school year were present more often and had fewer behavioral referrals.
Abstract

Individuals with a dual diagnosis of mental health and intellectual/developmental disability are often stigmatized in our society. Some have a difficult time communicating with others because they are non-verbal, and a percentage of them engage in disruptive behaviors. There have been few studies done on this specific population of individuals. This study examined the relationship between these individuals’ ability to communicate, with ability to communicate categorized as verbal or non-verbal, and the frequency and severity of their engagement in disruptive behaviors. It was hypothesized that dually diagnosed individuals that are non-verbal will engage in more frequent and severe disruptive behaviors than individuals who are verbal.

This study analyzed data on disruptive behaviors collected from intake forms, comprehensive assessments, and case notes at an agency that only works with this population. A disruptive behavior scale was created and individual’s disruptive behaviors were scored on this scale. Analyses were then conducted relating ability to communicate and the scores on the disruptive behaviors scale.

The results are expected to give a better understanding of which group engages in more disruptive behaviors and the relationship between their communication ability and their disruptive behaviors.
Abstract

Juvenile recidivism is a complicated and significant social problem. Gender and race are important variables for investigating re-offense among juveniles because there is a known overrepresentation of males and people of color arrested or cited. This study investigated the relationship between race, gender, and recidivism of juvenile delinquents in a sample of juvenile offenders. This study used data collected the years of 2017 to 2018 by a juvenile court in a Southeastern state. Binary and ordinal logistic regression analyses were used to evaluate whether gender and race were associated with re-offense, and with severity of re-offense. The severity of an offender’s re-offense was measured using an ordinal scale created by the investigator, with scores ranging from zero (no re-offense), to one (any minor property offense), to two (property offense that included a threat of violence), and to three (any violent offense). It was hypothesized that males and young adults of color would have higher rates of re-offense and would have more severe re-offenses. The finders are expected to add knowledge concerning the relationship between race, gender, and re-offense and severity of re-offense. The results are also expected to help inform the juvenile court about possible intervention for reducing juvenile re-offense.
Forming a mentoring relationship between an adult and child is a common intervention and type of program used in social service agencies. Extensive research has been done on mentoring relationships, but there is little consensus on what factors should be considered when creating a mentoring pair. One factor that has been studied is race in mentoring, but there have been varied results. Some studies find that people of color feel more supported and understood when their mentor is a person of color, but others find benefits to matches that are cross-racial. This study investigated the following research question: is there a difference in the longevity of same race versus cross-race mentoring relationships. It was hypothesized that matches who participants identify as the same race will last longer on average than those who do not.

This study involved a secondary data analysis of a stratified random sample of matches from a local social service agency. The data were analyzed by survival analysis that compared the duration of mixed and same race matches.

The findings add to the understanding of what criteria should be considered when creating matches in this local agency.
Mackenzie Hunter

The Department of Children’s Services conducts research yearly that is included in their annual reports on the number of children entering custody in all counties of Tennessee. This data divides the children into age groups of 0-4, 5-12, and 13-18. I utilized this data to get more specific and study the trends in numbers of children entering custody in Knox County for the years 2012-2018, due to my field placement and the direct work I do with children in Knox County. I compiled the data and constructed three graphs that display the trends over time in the number of children entering custody in Knox County. When analyzing the graphs, it was clear that there was a significant change in the trends between the year 2015-2016. I then conducted a discontinuity-regression analysis and found the change in trends during 2015-2016 was statistically significant for all three age groups. More research should be conducted on what factors caused this apparent increasing trend in the numbers of kids entering custody in Knox County so that changes can be made to improve the well-being of children and decrease the numbers of children entering custody in Knox County.
Abstract

Cal L. Lane

Quality of life (QoL) looks at a person holistically to determine if they have adequate living, social, and environmental conditions. The primary factor in determining QoL is the ability to afford or access resources to meet all of an individual’s needs. The objective of this study is to determine if there is a difference between the QoL of different workers and their families. The study evaluates three populations: migrant and seasonal agriculture workers; non-migrant and seasonal agriculture workers; and a group of all other workers. It is hypothesized that migrant workers will have the lowest QoL, seasonal workers slightly above them, and non-migrant, non-seasonal workers having the highest QoL.

The sample of existing data in the study is from Telamon program participants’ records. Using QoL categories from existing surveys, a QoL measure was developed to obtain data from Telamon’s application, eligibility criteria, and family strengths assessment. The QoL measure is used to record QoL data for each family. Average scores were calculated for each group described above, with staff surveys collected to clarify certain data. The results of this study may help improve services and support outside activism around labor and the living conditions of these populations.
Rebecca Liana Nicholson

Adverse Childhood Experiences (ACE) are traumatic events such as abuse and neglect. ACE scores, ranging from 0 to 10, are a tally of different types of adverse childhood experiences. Studies show that higher ACE scores increase the odds for poor health later in life, risky behavior, and increased mental health needs. However, research indicates positive outcomes for individuals with high ACE scores who receive support from others and are able to develop resiliency skills. Accurate ACE scores are crucial for practitioners to provide preventative treatment and early interventions to minimize lifelong negative impacts of high ACE scores.

This study, a secondary data analysis, compared ACE score validity based on two methods of scale administration, paper-pencil and verbal. It was hypothesized that there would be higher psychometric properties of ACE scores associated with verbal administration as compared with a written questionnaire. The data analyzed came from ACE scale questionnaires administered in written and verbal formats to therapeutic clients, grades K through 12, from an interprofessional pediatric clinic providing mental health services over a period of one school year. The findings are expected to suggest the most psychometrically sound method of ACE scale administration in terms of reliability and validity.
Social anxiety disorder is manifested by intense anxiety or fear of being negatively evaluated or rejected in a social situation. This may cause sufferers of social anxiety to avoid anxiety provoking social situations and if they cannot, cause them significant anguish. This study investigated the relationship between participation in a social skills training group and reductions in social anxiety. The research hypothesis was that female adolescent participants’ post-test scores on the Social Interaction Anxiety Scale will have decreased relative to their pre-test scores after participating in a social skills training group. Social Interaction Anxiety Scale scores were obtained prior to, and after completing, the social skills training group. The group was held for an hour and a half once a week for six weeks. The results of this study will offer tentative evidence concerning the potential effectiveness of this social skills training group for reducing social anxiety and providing information on the possible further use of this treatment option for this population.
Abstract
Scott Sloan

In order for programs that target at-risk youth to best engage with students, they need to understand which types of students are at risk for dropping out of the program. If a program can identify which students are more likely to attend based on certain demographics or identifiers, they can use this information to strengthen the program. This study examines the retention patterns of students at a community law office in a southeastern state and looks at the relationship between key demographics of participants, such as their age, grade, sex, and race, and their attendance history. This study investigated the following research question: are a student’s demographics related to their attendance pattern at the? It was hypothesized that older students who also have siblings who participate are more likely to attend.

This study involved secondary data analyses of participant information and attendance records over a five-year period at the a social service agency in the south. The hypotheses were tested using a survival analysis. The findings are expected to add to the understanding of the agency of the relationship between a student’s basic demographics and their likelihood to attend the program, and the agency will be able to use them to adjust their program.
When looking at reasons for low academic performance, understanding environmental factors that could be impeding a child’s ability to succeed is crucial. One factor that affects a child’s development is homelessness. Research suggested that homeless children may have more behavior problems and school failure than children who were poor but in stable housing. Researchers have also discovered that children experiencing homelessness have high rates of developmental delay. Since the 1990’s, little research has been performed to further examine the impact of homelessness on children.

This study investigated if there was a relationship between homelessness and academic performance in elementary school students. The researcher performed a secondary data analysis by reviewing the TNReady scores of 3rd-5th graders, some of whom were flagged as having a McKinney-Vento homelessness referral form on their file. The population contained students in 3rd, 4th, and 5th grade. A partial regression analysis was used to analyze the data while controlling for grade level. The findings are expected to raise awareness about the need for more interventions for students who are homeless and to prompt more research on this topic.
Chelsea Stephens and Rachael Davis

Loneliness and depression are widespread problems in the aging community, with contributing factors like declining health, loss of loved-ones, and loss of purpose. These risk factors are more prevalent in seniors receiving mobile meals. There is substantial evidence that mobile meal delivery buffers symptoms of loneliness and depression. However, there is less focus on research concerning seniors who eat in congregate settings, with even fewer studies comparing groups of congregate and isolated diners. This study explores the relationship between loneliness and depression against the two levels of the independent variable, meal setting. It is hypothesized that seniors who dine together in congregate settings will report fewer symptoms of depression and loneliness.

The study will analyze data from a survey distributed to approximately 30 seniors who live in high-rise, low-income towers with Knox County CAC case managers on staff. The survey will be comprised of the Center for Epidemiological Studies Depression Scale and the UCLA Loneliness scale, and an independent samples t-test analysis will be run on the data.

The findings are expected to show a higher likelihood of depression in isolated seniors, and the goal is to direct more outreach efforts and funding into CAC programs which promote socialization.
Neonatal Abstinence Syndrome (NAS), a constellation of withdrawal symptoms experienced by newborns after exposure to opioids in utero, has increased five-fold from 2000 to 2012 (Patrick et al., 2012). Though mothers play a crucial role mediating withdrawal symptoms in the NICU through non-pharmacological care (e.g., kangaroo care, breastfeeding) (Wallen, 2017), maternal visiting varies. To understand factors affecting maternal visiting, we conducted a retrospective review of 200 family, social work, and discharge summary reports from East Tennessee Children’s Hospital. I hypothesized factors affecting visits include mother being in treatment (MAT or mental health), infant’s father’s involvement, children at home, distance from ETCH, grandparent involvement, and maternal mental health or pain condition.

Guided by the NASW Code of Ethics’ principles, dignity and worth of a person, and importance and centrality of human relationships (NASW, 2017), a better understanding of factors that impact visitation will help social workers propose mezzo policies providing evidence-based support to families, and facilitate a stronger mother-infant bond.
African American women die at three times the rate that white women do due to childbirth-related complications (CDC, 2011). This statistic calls into question other areas of healthcare where racial disparities are present; the gap persists in regard to breast cancer-related screening (McCarthy et al., 2016). Researchers found that, even upon accounting for risk levels exhibited by the women, approximately 50% of white women were recommended preventative screening, while only 25% of women of color received recommendations. Circling back to maternal health, data from Centers for Disease Control between the years of 2007 and 2013 reveals that black mothers with a professional degree are just as likely to lose their infant within the first year of life as a white mother with less than an eighth-grade education. The current study aims to determine the extent to which this disparity effects women of color on the University of Tennessee, Knoxville’s campus as well as evaluate their awareness of and feelings towards the topic. Four young black women were interviewed in an attempt to answer this question. The results of this study can be used to work towards a greater understanding of the issue with genuine insight from the women who it most prominently affects.
Negative Political Advertising: Effective or Annoying?

Political scientists have long debated whether or not negative political advertisements are effective ways of campaigning. Academic studies suggest that negative campaign advertisements do not actually sway voters against the targeted candidate but, rather, they sway voters away from the candidate who released the negative ad. In this research, I address this remark by surveying people of voting ages on their likelihood of researching and voting for a candidate after watching a positive advertisement about him and then again after watching a negative advertisement about him. I also ask what the likelihood is that they will research or vote for the opposing candidate who released the negative advertisement. Party affiliation was not at play in this research because neither of the ads addressed the party of either candidate. The findings of this study shows that watching a negative advertisement about a candidate lessens voters’ support for that candidate while not necessarily making it likely that they will instead vote for the opposing candidate. However, respondents reported they would have high likelihoods of conducting further research on the candidates at hand, making the voters more involved in the political process as a whole.
Bilingualism and Biculturalism: The Interdependence Between Non-English Language Proficiency and Ethnic Cultural Involvement in College Students

Alawi, Aniza A

A Classroom Project for English 298 Faculty Mentor: Kristina McCue

Despite a lack of academic research about the interaction between bilingualism and biculturalism, the two concepts are arguably interwoven. As newer sociolinguistic research about the relationships between language and perception of culture emerges, the argument that language and culture positively influence each other is further reinforced. This study, consisting of a survey and voluntary interviews, was conducted to evaluate the impact non-English language proficiency has on ethnic cultural involvement in a targeted population of American college students of immigrant descent. Select participants were interviewed further about their own experiences and views of their ethnic culture and the possible role of language could have had. The survey and interviews presented a positive correlation in language proficiency and cultural involvement: language proficiency and cultural involvement increased proportionally to one another. These results suggest an interdependence between bilingualism and biculturalism. As this area of research is still in its fledgling state, there is ample opportunity to further explore this relationship as well as the social and intergenerational causes and effects.
This study compares texting with that of oral communication to discover how texting affects emotions among users. Any data gathered can be a useful tool to better understand the reasons for using either platform and decide whether a texting design feature is necessary to improve emotional connection. In order to come to a conclusion regarding the usage and emotional connection of either platform, three key variables were analyzed: (1) context, (2) relationship, and (3) emotional reactions. Data for each variable allows for insight into the reasons for using each platform and a greater understanding of the emotional connection between two individuals when either texting or talking. In order to gather information on each variable, participants must take a survey answering questions regarding each variable as well as their general usage of either platform. The data gathered shows that each platform has a specific purpose in regard to each of the variables mentioned. Texting is viewed as more convenient and simple with minimal usage in serious situations or long conversations and has no bearing on emotions for this reason. Oral communication is the preferred platform for better understanding emotions and delivering greater amounts of information but is viewed as less convenient compared to texting.
Emily Allegra

A classroom project for English 298

Despite growing concerns about the potential negative impacts of childhood sports (injury, high delinquency rates, etc.), many parents still encourage their children to participate in sports. The study attempts to answer this question, by asking “what skills or knowledge do parents hope their children will gain by participating in sports?” Hypothetically, parents believe the benefit of the skills their children learn will outweigh any possible risks from playing sports. Two parents were interviewed to explore their intentions in encouraging their children to play sports and to learn what skills they hope their children will learn. Additionally, two students who played sports throughout high school were interviewed to determine what skills they learned from sports and why they believe their parents encouraged them to play. The results show that parents want their children to learn teamwork, confidence, discipline, commitment, and healthy habits, all of which are skills that children actually develop from playing sports. Additionally, parents that encourage their children to play sports believe that supporting their child in their sport will alleviate potentially negative effects that are more prevalent in children whose parents do not support their participation.
Artificial intelligences seems to be the future of human innovation. While most AI’s are used optionally to assist their users with minor tasks, more companies are starting to see the value in artificial intelligences and are attempting to implement them into different aspects of our everyday lives. These functions could range from offering financial advice to helping medical professionals diagnose patients. But how comfortable is the average citizen around these AI’s and how can we make sure these systems work on an ethical blueprint? To better understand, I conducted a survey with participants answering questions regarding how comfortable they were with AI’s in a variety of different situations and how AI’s could be made ethical, with a majority of the volunteers being students enrolled at the University of Tennessee - Knoxville. These college students will inevitably be the ones who will enforce, introduce, and engage with these AI’s the most in the upcoming years, so their opinions carry substantial weight. The results of the survey suggest that while people are comfortable with AI’s to some degree, implementing AI’s in every aspect of our lives would not be favorable to the majority. Most significantly, people aren’t accustomed to AI’s interfering with their health and as a whole answered very negatively to these types of questions. Ethically, the responses erred on the side of caution, choosing more conservative options in regards to handling threats to national security. This study concludes that while artificial intelligences are accepted as an everyday part of our lives on the small scale, they won’t be assisting us on a much larger scale for years to come due to issues with their ethical framework causing a general lack of trust in AI’s.
Controversial Comedy on College Campuses

Standup comedy is an artistic form of free speech, but what extent of free speech do audiences deem socially acceptable? In the modern era there has been an increased importance placed on political correctness, something rarely found in standup comedy. For this reason, many prominent standup comedians refuse to perform their acts at places that focus heavily on political correctness, such as college campuses because of the ridicule and heckling the comic often receives from the current generation's students. To further understand the current situation of the issue, I read articles and watched videos to understand different comics' and critics' views on political correctness in general and on college campuses specifically. I created a survey designed to further understand the opinions of college students on standup comedy, political correctness and their relationship. The survey asks what the student deems acceptable or unacceptable to joke about to find the most sensitive or controversial topics. The results to find a solution to alleviate the tensions between the college populace and comedians by utilizing the students' preferences of humor from an observer's perspective as a viewer rather than a comic's as a performer. Though the survey did find the top five most distasteful comedy topics, it was less successful in finding correlations between groups of people and shared views on comedy and comedy topics. This study concludes that views vary person to person, and other characteristics have little to no impact on ideals about comedy and political correctness with the result being that students are more accepting of standup comedians joking about controversial subjects when they believe that comedians are humorously expressing their first amendment right through idiosyncrasies opinions rather than systematic criticisms of society.
As genome editing advances, society is questioning its use in the human genome. Genetic editing takes the original DNA of the organism and modifies it in some way, leaving a permanent change in the genome. The technology behind editing the human genome is outpacing the understanding of the American population, leaving scientists, the government, and citizens confused as to where the future of genetic editing is headed, and what laws should be set in place to regulate its use. To determine how Americans feel about this new biotechnology, specifically younger generations that will have this tool at their disposal in the future, a survey was conducted with 30 students from the University of Tennessee-Knoxville. This survey evaluates the extent to which the participants find genetic modification in humans appropriate and if any demographic factors influence their responses. The results reveal an overall positive attitude towards genetic editing, especially when used to treat diseases or disabilities, but produced mainly negative responses regarding its use for enhancement purposes. This research can be used to open conversations surrounding human genetic modification and encourage lawmakers to create constructive public policy to ensure both ethicality and scientific advancement.
The Effect of Being Bicultural and Bilingual on the Sense of Patriotism

This research compares the perspectives of second generation bilingual and bicultural college students on how being a part of two cultures, both in language and tradition, affects their feelings of patriotism towards America and American values. While acknowledging that most scientific research on bilingualism focuses on the neurological benefits of knowing two languages, a cognitive discussion of bilingualism is incomplete without a discussion of how being bilingual affects the mental and social identity of bilingual individuals. Some of the most important factors which affect the challenges a bilingual person faces in America are how fluent one is in English compared to one’s native language, which language is preferred in certain situations, and how strongly one associates each language with a sense of citizenship. Interviews with seven, second-generation college students were conducted in order to obtain personal accounts of the effects of bilingualism. The results of this research were divided almost evenly between those students who felt an equal but heightened sense of patriotism towards both of their shared cultures and the students who felt more pride towards their culture of origin. This study concludes that the role of family in the students’ lives is what affected their pride to sway one way or the other, largely because parents possess the foresight to understand that in order for bilingualism to truly become an asset, it must be introduced from an early age and maintained through cultural traditions.
Caroline Virginia Ayers

This is a classroom project for English 298. The Enneagram personality model has recently become popular. This model outlines 9 personality types and was designed to serve as a path for growth. It describes the personality types in terms of explaining behavior rather than identifying it. The recent popularization of this model leads to people using it with little understanding and possibly mislabeling themselves or putting themselves and others into boxes based on these types. This can be increasingly problematic, as the age group that seems to be popularizing the Enneagram is adolescents. These individuals are at a particularly vulnerable time in their lives, trying to find out who they are. This paper examines how the Enneagram impacts the way college students view themselves and others as they enter adulthood. I interviewed five college freshmen to see how they related to the Enneagram and found that students have both negative and positive points attitudes regarding the Enneagram and its uses. There also is be a correlation between students with low levels of Enneagram knowledge and a tendency to have more negative views surrounding the Enneagram as a whole. This most often came from a place of misunderstanding.
Silence’s role in human communication has been a somewhat ambiguous topic, deriving different meanings depending on circumstance and culture. In this qualitative study, I attempted to determine whether three factors; culture, religion, and gender, significantly impacted people’s perception of silence in different social settings. I hypothesized that those from non-American cultures would perceive silence more favorably than Americans, due to the negative connotations typically associated with lack of talking in American culture. I also hypothesized that those who identified as religious would perceive silence more favorably than those who did not identify as religious, with the assumption that those who were religious placed additional importance on silence as an element of religious ceremonies. I conducted a qualitative survey through the website QuestionPro in order to assess the general public’s comfort level with silence in various scenarios, attempting to gain as diverse of a sample population as possible. My findings revealed that 84% of those who identified as religious considered a shared silence with a person that they do not know very well to be peaceful, rather than stressful, compared to only 73% of non-religious participants choosing this option. Additionally, 81% of religious-identifying people viewed silence when they are alone as a method of thought and reflection, rather than signifying too much time alone with their own thoughts, compared to only 77% of non-religious participants choosing this answer. These results suggested a correlation between culture and communication, indicating that religion and cultural practices influence the way people perceive silences, and furthermore, influence their social interactions.
Abstract

Much of the current research in the field of translation revolves around the evolution of it and the historical context in which it was conducted. However, the existing body of knowledge does not address how those factors impact the way in which modern translations are read and received in contemporary society. Therefore, this research sought to determine whether specific populations showed preference for Biblical translations based on their demographic groups and if so, whether those preferences could be attributed to social and cultural characteristics. The study was conducted with the use of surveys distributed electronically through several media which were made available to all demographics. General trends were then extracted from the data collected. The most significant of those being that older populations prefer translations that are perceived to be more accurate while younger populations prefer translations that are easier to read. Specifically, 33.33% of those between 18 and 24 years old prefer translations that are easier to read and only 16.67% of them prefer those that are more accurate while 16.67% of individuals between 35 and 54 years of age prefer translations that are easier to read and 83.33% of them prefer more accurate ones. Another correlation drawn from the survey results holds that more educated populations prefer translations that are perceived as more accurate. This relationship showed a distribution similar to the that for age. However, variance within other demographic sets suggest that the social context of translation does not contribute as much to translation preference as supposed by other research.

Keywords: translation, dynamic equivalence, formal equivalence, public preference
Attending college is a huge decision that can change lives and potentially lead to exceptional financial success. It provides students with a pathway to continue their education and broaden their knowledge, which is an invaluable experience. To attend college undoubtedly should come with respect and success, but are there no other pathways students can achieve these same results? Why are more and more students choosing to attend college? In this project, I will argue that students feel that their only means to be successful is through attending college. In addition, I will also argue that college is for those who seek purely the opportunity to expand their minds; college should not be attended because outside pressures. This project will analyze how societal and parental pressures on post high school students to attend college and the stigma around not attending college is affecting students’ decisions to attend. Lastly, it will discuss how students should be led by their own self-interest, personality traits, and skills despite the pressure to attend college. Overall, it is concluded that not attending college should be seen as a viable and acceptable option for post high school students.
Name: Garett Ball

A classroom project for English 298.

In this study I am attempting to study the effect language has on our perception of the world and creation of thought through the alteration of syntax in English sentences. I believe that by shifting the subject of the sentence towards the end of the sentence I can alter the perception of the sentence to the reader. My secondary hypothesis is to study whether the constraints and effects of languages are consciously recognized. I am trying to support the Sapir-Whorf hypothesis that states the languages we speak have a great impact on our perception of thought, how we intake information, and our behavior. There is a gap in the scientific knowledge surrounding how the structure of language may alter the perception of the speaker’s world. Basic comparative studies of languages and syntax have been conducted and been shown to support a weaker form of the Sapir-Whorf Hypothesis. The results of this study were inconclusive. The effects of syntax on language seem to be so minute that smaller studies, such as this one, are not able to find conclusive evidence to support the hypothesis. However, the data suggested that almost half of the participants were able to consciously pinpoint recent moments in which they were not able to express an idea in their language. This may be because of gaps in vocabulary or shortcomings in the speaker’s language. Further inquiry in the survey yielded data that suggest a majority of the participants did not feel limited by language. Overall, this study is significant because it points out further gaps in knowledge that needs to be researched. This study can be used as a guide to future researchers deciding on a research question.
The Role of Companies in Employee’s Job Satisfaction and Happiness

In our current culture, the well-being of workers and organizational practices are continually thrown into the spotlight. If companies are not persistently and purposefully striving for a better work culture, their product and community will not thrive. Thus, the process to make their employees’ experience more desirable is not a mere choice but a necessity. Secondary research suggests the worker’s well-being and happiness directly affect their performance and the company’s overall attribution to the community. To better understand why happiness affects job performance, I explore how companies can make their employees satisfied with their job through interviews with employees and CEOs. I interviewed three people who have held different job titles and a multitude of experience in different fields of work. Also, to provide relevant results, I interviewed people of different age, gender, background, and career goals. I asked questions concerning their work environment, leadership, natural elements, and job orientation to illustrate the efforts current organizations make to aid the employee. The results were not shocking, but rather provided tangible evidence showcasing what methods work the best and why. This study concludes that the most important factor in job satisfaction is a solid management team. Many components of job satisfaction stem from solid leadership, such as positive job orientation and a feeling of encouragement. A sensible leadership team fosters growth and productivity in the office while not sacrificing work ethic.
This study examined how we look at the recruitment and retention of women in computer science. The goal of this study is to analyze current methods and propose different methodology to increase female participation in computer science. Two undergraduate students at the University of Tennessee who initially declared their majors as computer science before redeclaring their majors into other fields were interviewed. In addition, the faculty advisor for a program supporting women in computer science was also interviewed. It was predicted that the current methods for recruiting and retaining women are not effective and that an increase in knowledge of the history of women in computer science as well as more popular references to women in computer science could help encourage more women to join the field. It was found that in order to increase the number of women in computer science we need to have more present role models for women as well as shifting the way we talk about women in computer science.
Emotion: The Language of Memory

Gavin Belfry, a classroom project for English 298.

English 298

Abstract

Emotion tends to alter memory. Witnesses can be doubted if evidence seems to show they have suffered shock and memory repression due to a crime. Elderly people often view the past through rose-tinted nostalgia and perceive things as much better than they were. The purpose of this study was to determine if there were reliable linguistic markers that may indicate such interference. Utilizing the data generated from a survey asking about two specific memories, the coded responses and self-reported scoring of the emotion of the memory were compared to see if the relative age of a memory had any relation to the emotional connotation of the memory. Based on the correlation between high emotion connotation and the relative age of recent memories found in this study, it seems that emotion does interact with memory to enhance or possibly suppress recall, but the linguistic emotional markers seem to degrade over time as shown by the relative lack of emotional description of early childhood memories.
We Are One: Twin Individuality and the College Experience

Belt, Faith

A Classroom Project for English 298 Faculty Mentor: Nicks, Robin

Though twins are often the perfect participants for research, rarely is the development of identical twins’ individuality studied or even addressed. Society makes assumptions about identical twins, frequently categorizing them as a single unit rather than two different individuals. This study explores the ways in which identical twins attending college establish their own identities while still maintaining their unique twin relationship. Two sets of identical twins are interviewed to obtain each twin’s personal experience, to discover how the twin feels society may prevent being viewed as an individual, and to analyze each twin’s perceived relationship to the co-twin. The study suggests that though society’s attitudes create obstacles for twins to establish their own individualities, twins find a special identity through their relationship with the co-twin. The validity of twin stereotypes, such as twin telepathy, is challenged, and further twin studies are encouraged to explore if the patterns found in the research apply to a larger sample size.
Drama Within Drama: How Power Ranks affect the Relationships of a Theater Crew

This article looks at the power rankings of a theater, and how the relationships between power levels affect the people within the production, as well as the production itself. Results from this study display how the use of rank can influence the people within a theater crew negatively and provide insight into how groups feel about these interactions, and how they can be altered to become healthier and more effective. People of varying positions, professionalism, and power rank were interviewed to determine how they felt about relationships between different power dynamics within theater companies. The overall consensus is that power dynamics are necessary in theater to allow for a smooth production; however, the relationships between the levels of power need to be seen more as a collaboration of ideas, rather than a boss-employee dynamic.
This is a classroom project for English 298. Pornography is a large industry with a huge consumer base, yet it is not commonly talked about in normal conversation. Pornography use is sometimes hidden in relationships and has the potential to impact and even end a relationship if one partner’s pornography habits are revealed. This study answers questions about how pornography can affect undergraduates’ intimate relationships and the mindset undergraduates have about watching pornography. The data comes from survey responses from twenty-five anonymous undergraduates at the University of Tennessee that asked them about their opinions on porn, the effects it has had on their relationships, and their pornography habits. My results show that pornography use does not consciously affect relationships in undergraduates and that many undergraduates somewhat approve of pornography use. This research concludes that males are more approving of pornography in relationships and more likely to view it.
A classroom project for English 298.

Abstract

This paper examines the issues within the Security Council of the United Nations as well as the reforms that should be made to counteract these problems. The UNSC is responsible for maintaining peace and security internationally as well as amending the charter of the United Nations, accepting new members, and organizing peacekeeping operations. Since the United Nations Security Council has such a large role in the United Nations, there have been many criticisms of the UNSC and suggested reforms to create a more effective or fair council overall. The problems that were specifically inspected in this paper were the veto and the lack of representation in the Council of the demographics of today. Three professors of international relations were interviewed and gave new insight into the workings of the UNSC. The original hypothesis was that taking away the veto from the permanent members and giving more permanent seats would be the best way to maintain the Security Council’s main goals. However, the professors provided information that led to the conclusion of the veto being useful, but only if it were given to the future permanent members of the UN Security Council, which would potentially consist of Brazil, India, Japan, and South Africa, which could potentially cause the issue of the department having to slow down decision making to include the new permanent members’ opinions.
The world is becoming more and more dependent on devices and machines to help carry out daily tasks and functions. As a result, the technological world is accelerating towards further innovation requiring new processes and techniques. However, while this technology is pushing the boundaries, it is leaving its consumers behind. A common theme is being recognized: As smart phones are getting smarter, people are getting dumber. Thus, the question arises: should people have basic computer science knowledge? If so, should computer science education be implemented into educational settings? If efforts are already being made, what are stopping these efforts? In this study we look at the various benefits of implementing computer science education into educational settings. I interviewed a computer science professor, an engineering professor, and a senior level computer science major to explore their opinions on this subject. The results show that not only does computer science educational lead to individual improvement of critical thinking and problem-solving skills, but it additionally improves the national economy by filling the computer science workforce. Additionally, the earlier this education is introduced to students, the more beneficial it will be to them in the future.
Abstract

The research presented investigated the differences in emotional responses and views concerning terrorism among generations. Members of Generation Z, Millennials, Generation X, and the Silent Generation participated in a web-based survey in which they answered questions about their feelings when seeing terrorism in the media, their education and exposure concerning terrorism, and their opinions on the matter. Furthermore, select individuals ages fifteen, eighteen, forty-eight, forty-nine, and seventy-eight participated in an interview where they discussed terrorism jokes, their fears surrounding attacks, and their personal experiences. It was predicted that younger generations have become desensitized to terror and therefore would show lesser emotional responses compared to older generations. However, results indicate that younger generations use jokes as a coping mechanism to deal with their stresses about attacks and they tend to feel indifferent about attacks in the media unless they feel local to the individual. All generations showed empathy towards the victims, however Generation Z exhibited higher levels of stress, which correlates with early exposure to terrorism.
Abstract

In the United States, people are often left in the dark when it comes to their medical treatment because of their lack of health literacy. When it comes to the topic of health capacity, past research focuses more on how it could be fixed or how it affects specific demographics of people. Because of the lack of research on the overall effect of health literacy on patient care, I decided to look into this gap. In order to do this, I decided to conduct a survey to get the patient’s perspective. The survey gave a variety of answers, but these answers did lead to the inference that as educational levels increase, people become more susceptible to ignorance. Along with the survey, I interviewed a physician and a nurse with the intent of gaining an insight to their view of health literacy. The two interviews gave similar information which allowed for a concrete view from the physician’s perspective. Physicians believe that health literacy does affect their patient care which is why they strive to not talk down to their patients, but instead speak on their level and make sure they fully understand what is being said. Overall, the survey and interviews allowed for me to conclude that the health capacity of patients is affected not only by how a physician speaks to them, but also by their academic level due to the fear of seeming incompetent.
Abstract

This is a classroom project for English 298. Music plays a major role in shaping language. My research is aimed at determining how hip-hop influences modern language. This research is important because music is a large part of popular culture and has plenty of real-world applications such as utilization in education and preservation of culture. To determine correlations, I created a survey that asked participants if they could choose the correct meaning for slang that is commonly used by hip-hop artists. I found that people who actively listened to the genre could correctly define the terms at a higher rate compared to listeners of other genres. Listeners of other genres could correctly answer the questions somewhat well, but nowhere near as accurately as listeners of hip-hop. I have concluded from my research that music plays a role in shaping slang and also modern language.
Regional accents and nonstandard English speakers have been found to have lower employability depending on thickness of accent and as documented in Baratta’s (2008) study, it’s not uncommon for them to be asked to change the way they speak despite the important role that accent plays in one’s identity. In a study done specifically on Southern speakers, it was found that people judge those with Southern accents as less competent, even when there are no grammatical errors in the speech (Cheryl Boucher, Georgina Hammock, Selina McLaughlin, and Kelsey Henry, 2013). Through a series of interviews with three Southern and Appalachian speakers from the University of Tennessee at Knoxville, the personal, professional, and perceptual experience of those with accents has been documented and analyzed in order to further understand the effects these biases have on nonstandard English speakers and their lifestyles. The research indicates that while speakers in less prestigious positions, such as students, feel less of a need to adjust their accent, those in higher positions, such as professors, do adjust their accent in the workplace. Given the importance accent can have on one’s identity, reducing, even removing, these biases as much as possible is imperative for improving quality of life.

References


There is currently a significant gap between the number of men and women in the STEM field, women being vastly outnumbered. One aspect of this gender gap that has not previously been researched thoroughly was what differences occurred prior to an individual’s active pursuit of a career in STEM. That is, whether there are gender differences among students with STEM majors or individuals with a career in STEM regarding influences on choosing their major or career path. In order to obtain information about current perceptions of the gender gap, a survey was sent to STEM majors at the University of Tennessee, Knoxville, Lipscomb University, and Texas A&M University. Two interviews were conducted with Post-Doctorate STEM majors in order to gain insight on their perception of the gender gap in STEM when looking back through their experiences and academic career. Thus, the participants in this study were either STEM majors or working in STEM fields and were enrolled in, or had graduated from, a university. Overall, the results led to the conclusion that an increased amount of both support and engagement in the sciences in primary education led to engagement in STEM for both genders, and a deficiency of either support or engagement significantly decreased the likelihood that an individual will pursue STEM; this effect was especially significant in females. Furthermore, this finding agrees with previous research that has indicated a major reason women do not participate in STEM is that they were not encouraged from an early age and did not see their gender thoroughly or equally represented in the field. It is reasonable to conclude that as more young females are encouraged to engage in the sciences, their participation in the STEM field will increase.
This paper examines why reality television shows, specifically *The Bachelor* and *The Bachelorette*, have become popular and how they are affecting viewers’ opinions of their own relationships. Research was conducted through the analysis of qualitative survey results collected from college students at UTK. In order to understand how popular the shows are, respondents were asked about their viewing habits for the two shows, as well as various questions about participation in viewing the two shows’ content outside of watching the series. To understand the effect that the two shows have on the viewers, respondents were asked questions about their current relationships and how they relate to the relationships seen on the series. The results from this research, combined with secondary literature on similar topics, illustrate the reasonings behind the two series and similar television shows’ increased popularity and determine how these shows influence viewers’ relationships. This paper concludes that the popularity of reality television among college students is because they enjoy the contradicting combination of fantasy that they can get lost in and the reality of the uncut drama. Also, students enjoy the community that is created as they watch the show with their friends. Lastly it concludes that watching the shows does not have a large effect on students’ views on their own personal relationships.
More students than ever before are taking Advanced Placement (AP) tests in high school, and research has been done to determine common academic benefits of these courses once a student is in college—such as a higher GPA and increased college retention. However, research fails to note student misconceptions about the extent of their AP course’s college payoff. Students load their high school schedules with AP courses that they are told will increase their chances of college acceptance, dramatically increase freshman year GPA, decrease graduation time, and give them a leg-up on their college classes. In my classroom project I will acknowledge that yes, there are advantages to AP courses, but are these advantages as drastic as advertised? I will attempt to find out the scale of these student misconceptions and determine the general consensus of the extent of AP’s usefulness. My project interviews several college seniors to compare their AP payoff in college and interviews a University staff member to gain insight into the way Universities evaluate AP credits. I hope my project will provide a different perspective on how we view and sell Advanced Placement courses.
It has been found that there are significantly fewer female engineers than male engineers in the workforce and at the university level. STEM has always been a predominantly male field and lately has seen several efforts to increase the number of female engineers. Researchers ponder why there has been little progress in increasing the number of women in STEM, even with these new initiatives. Engineers are responsible for creating the future of technology, and without female influence, technology is generally more suitable for men. While there has been some progress, in comparison to other math and science-based fields, engineering has fallen behind the curve of gender equality. To better understand this problem, I will examine the reasons why females choose engineering in a classroom project for English 298. Some studies suggest that there are more males than females that study engineering because females are less confident in STEM-based skills. To test this theory, I will also be investigating what skills females are the most confident in as compared to males. To complete this project, I will compare my collected data to current research and interviews.
Abstract

Modern autoimmune disease treatments widely vary in their effectiveness depending on the disease and there is little hard evidence of what the future of these treatments will look like. This study discusses different perspectives on the current efficacy and future outlook of such treatments. Two knowledgeable participants were interviewed on the topic; one interview was conducted via telephone, and the other via email. The views on the present effectiveness have moderate variation, however both perspectives were in agreement on what the future of these treatments may look like.
Is Voicemail on Its Way Out?

Voicemail has been a prominent method of communication since the late twentieth century and was one of the only ways to leave a message for someone via phone prior to the invention of text messaging. Early in the twenty-first century, as cell phones became widely owned, text messaging became a formidable competitor to voicemail as a method of communication. Several studies and articles on the subject suggest that younger generations tend to prefer text-based communication over voice-based communication. However, many businesses still tend to communicate through voicemail. Consequently, it is unclear whether voicemail is still a valid method of communication in this new age of text. To examine this uncertainty, twenty-seven people of various ages were surveyed about their views regarding the use of voicemail versus text, as well as their opinions on voice-based and text-based communications in general. Interviews were also conducted with two individuals, one each from Generations Z and X, regarding the same subjects as the survey. Most of the respondents preferred text messaging over voicemail, and many cited the speed and comfort of texting, along with the social anxiety felt when recording voicemail, as the reasons driving this preference. Upon reviewing these results, it is clear that voicemail is viewed mostly negatively by people of both generations surveyed; therefore, I conclude that our society, along with the businesses of today’s world, should let go of this construct of the past and embrace the modern era of text-based communication.
As the world population grows and non-renewable resources decrease, alternative energy is a viable option to combat climate change and increase the planet’s sustainability; however, its support is not uniform and lacking thus requiring change. Instead of focusing research on a particular country, this essay evaluates multiple countries and the differences between developed and developing countries’ alternative energy implementation. Using scholarly articles, the paper (a) examines the weaknesses of current alternative energy support methods that lead to inadequate gain in alternative energy use, (b) determines the potential improvements based on what has been successful recently, (c) and finds applicable solutions for both developing and developed countries. It concludes that switching to these new methods will take years to implement and increased cooperation between developed and developing countries is needed for a more sustainable world. The acknowledgement of different countries’ implementation of alternative energy and various methods to increase alternative energy support will facilitate international collaboration between economic, governmental, environmental, scientific, and psychological groups.
Studying abroad is not required at most universities, and therefore, a relatively low number of students have studied abroad. However, the number of students studying abroad is increasing as universities have begun to emphasize the importance of studying abroad in recent years. This paper focuses on the effect studying abroad has on a college student’s education. More specifically, it will explore whether students gain knowledge from studying abroad that can’t be learned inside a classroom by identifying study abroad benefits. In the end, this will help determine if studying abroad is a necessary component of a college education. University of Tennessee faculty and students who have experience participating in or leading a study abroad program were interviewed. The practical skills students have reported gaining, in conjunction with those that faculty have reported noticing in students who have studied abroad, help determine if studying abroad is worth the time and money invested. It was common for students to speak highly of their experience abroad. Likewise, study abroad faculty emphasized the potential benefits, as well as giving advice for students considering studying abroad. Overall experience studying abroad provides valuable lessons from the experience.
A Qualitative Analysis of Recycling Perceptions on a College Campus: Current Concepts and Future Outlooks

Abstract:

The current popular conceptualization of sustainable lifestyles is somewhat bleak in US media. As it stands, the practice of recycling has been in the public eye for nearly 20 years; recently however, it seems to be lumped in with other, often demonized environmental actions. In the academic community the literature regarding recycling perceptions, as well as new models, has waned, with ever-fewer scholars discussing what the future of recycling looks like. This analysis, through a general, qualitative survey of US college students on the UT Knoxville Campus, seeks to elucidate contemporary, college-aged perceptions on recycling and how it would be received under a reward-based model. Considering the younger generations will determine how sustainable the world will be in the future, it is very important from a policy perspective to measure outlooks on recycling and discover effective ways to bolster recycling rates. The results showed widespread consistency with much established research, highlighting that students recycle frequently, are highly aware of environmental issues, and would fully support a reward-based recycling system. Though not many are environmentally active, almost all displayed a desire to be. Established research, holding true despite the gap in time, exhibits that the next step is to further educate young people, and motivate activism wherever possible.
A classroom project for English 298

To what extents do Living Learning Communities enhance the college experience at the University of Tennessee?

Over the years, universities have begun creating Living Learning Communities within dormitories in hopes residing students will gain a sense of community with peers who share common interests, majors, or career goals. But to what extent do these living learning community truly enhance the college experience for those who participate? To collect data, I created a survey that asked open response questions regarding the students academic success, social experience, and overall satisfaction with the University of Tennessee. These free response questions were then followed by questions asking if they believe their experiences were due to, or could have been improved, by living in a LLC. The results I collected followed most of the previous literature on the topic. Students who lived in a Living Learning Community reported, on average, a higher rate of satisfaction with their dorm experience. Furthermore, almost all of the students in my survey stated they have been academically successful. But, the students who were a member of an LLC believed it was an important aspect to their success. The majority of students also felt insecure about the community within their major, but students in Living Learning Communities stated that LLC’s have been beneficial even if the major communities are minimal. Although all of the aforementioned benefits of LLCs correlates with previous research, my study found that individuals living in these LLCs are not receiving the desired social benefits. Therefore, we can conclude that living learning communities at the University of Tennessee do not foster as much social benefit as those on other campuses.
Despite several systems already in place to provide medical care to disadvantaged and underserved populations in the United States, there is still a significant disparity between level of need and level of care received by these populations, especially homeless populations. A 2009 study conducted by researchers B. Nickasch and S. Marnocha explored the healthcare experiences of homeless individuals and concluded that “all those [homeless individuals] interviewed felt that healthcare providers lack compassion for the homeless,” and similar studies concluded that healthcare providers should do more to help homeless populations. However, not much research has been conducted concerning the experiences and perceptions of healthcare providers when caring for homeless populations. Three healthcare providers were interviewed for this study. Interviewees were asked about their feelings, thoughts and observations concerning the provision of healthcare to homeless populations as well as the obstacles they face in doing so. Interview subjects also offered ideas regarding what can be done to address the healthcare gap present between homeless populations and healthcare providers in the United States. The results of the study offer insight into the obstacles health care providers face in trying to meet the needs of this unique and underserved group.

If the Glove Doesn’t Fit: An Analysis of College Students’ Viewpoints on the OJ Simpson Murder Trial

Bush, Katie

A Classroom Project for English 298

Despite the attention devoted to the OJ Simpson case in recent years, there has been little research done on the ways this attention has affected the viewpoints of today’s young adults. These people did not live through the trial; rather, they gained their knowledge of the case through documentaries such as ESPN’s *OJ: Made in America*, limited series such as FX’s *The People vs. OJ Simpson*, or through the stories of people who did live through the trial. Closing this gap could allow for better understanding of the way young adults view the criminal justice system, as well as the way that media consumption and parental opinion affect modern young adults. This study aims to understand the way college students view the OJ Simpson murder investigation and trial through a series of qualitative interviews. In order to find this information, two white men and one black woman will be interviewed to see if demographics affect opinions the same as they did at the time of the trial. Research has found that the participants mostly believed in Simpson’s guilt, do not know much about specifics of the trial, and formulated their opinion through mainstream media and their parents’ knowledge.
Let’s Talk About Sex: Benefits of a Comprehensive Sex Education in United States Schools

One substantial “elephant in the room” topic in modern society is sex, a stigma which carries over into the public education of young adults in the United States, with the primary options under scrutiny being comprehensive versus abstinence-only sex education. The former advocates for teaching students in an informative manner about the details of sex, including how it works, how to practice it safely, and the consequences that not being safe can have. The latter chooses to approach the topic by emphasizing the necessity of abstaining from sex in an effort to prevent teen sex altogether. However, this discussion leaves many parents and students in the dark about which method is most effective and beneficial. This project presents a collection of information to prove that comprehensive sex education is more effective and beneficial than abstinence-only, using analysis of statistics, opinions, and legislative influence. It focuses on an effort to better inform parents on the methods of education they should utilize and prioritize in consideration of their children’s health and knowledge. Comprehensive sex education holds benefits in social, medical, political, and educational areas of adolescent lives and helps to correct stigmas and miscommunications construed by lack of proper, informative sex education.
A Classroom Project for English 298
Abstract
Author: Brian Timothy Byerly
Project Title: The Distributist Property: Evaluating the Relationship between Catholicism and Distributism in Early-Twentieth-Century England

In the twentieth century, Europe served as a battleground for the war between socialism and capitalism. Early in the century, a group of Catholic writers in England found themselves deeply dissatisfied with both systems, seeing the same problem at the root of both: property ownership concentrated into the hands of the few, whether capitalists or government. These thinkers formulated a political philosophy, called Distributism, that sought to reinstate a class of small, self-sufficient property owners. Yet, the question remains as to whether Distributism’s association with Catholicism was incidental, owing to a happenstance alignment of writers’ religious and political views, or whether Distributism itself was intrinsically Catholic, inseparable from the Faith of its founders. Drawing from primary Distributist texts as well as secondary analyses, I concede that one may divorce the bare concept of Distributism, an effort to spread control of the means of production among the many, from Catholicism. However, I argue that the political views of the movement’s founders grew out of their Catholic Faith and reflected a desire for a reconquest of Catholic values in a secular world. For the early Distributists, faith and politics were not separable spheres, for both concern the ultimate good of humanity.
ABSTRACT

John Cage’s 4’33” is a modern piece which consists of four minutes and thirty-three seconds of composed silence. Whether the piece should be considered music has been debated since its composition. The intention of this research is to understand the perspective of a contemporary population on the topic. Furthermore, this research aims to determine if the subject population tends to share a single opinion. One faculty member and one undergraduate student of the University of Tennessee School of Music were interviewed, as well as one undergraduate student who is not in the UT School of Music. Musical backgrounds were discussed, and questions developed into the ultimate question, “Is John Cage’s 4’33” music?”

Both members of the School of Music ultimately stated that they did not believe the piece should be considered music. Their reasons included opinions that since the piece lacks any scored instrumentation or vocals, it not musical. The other undergraduate student expressed that he/she does not consider the piece music. These results do not indicate any type of concrete conclusion on the matter. However, the entire sample indicated against the piece being considered a piece of music. The data provides insight into the greater population of UT students.
For decades, the amount of plastic waste accumulated in the world has only increased, and this amount will only keep growing without intervention. This essay argues for the replacement of traditional petroleum-based plastics for those made of eco-friendly materials. Environmental chemists, engineers, and regular activists have pondered and proposed multiple alternatives to plastics that are both environmentally friendly and made of biodegradable material so that, when disposed of, they will decompose back into their original natural constituents. However, these eco-friendly alternatives are currently much costlier to produce than the that of traditional plastics, which was determined when the materials and equipment needed to produce the plastics were being compared with their alternatives, and with this problem of cost comes the problem of affordability, both by the producer and the consumer. If the popularity of using these eco-friendly materials comes up to par with the use of traditional synthetic plastics, then the cost of production of these new materials should be far cheaper than they are in the present; therefore, buying these alternatives should be as cheap as or even cheaper than buying the plastics used today that are filling up our oceans and causing an overall negative environmental impact.
Rachael Cail  
A Classroom Project for English 298

In order to get ahead in the financial arena, some businesses engage in fraudulent activity. The field of forensic accounting focuses on detecting and preventing fraudulent affairs. In this way, both forensic accountants and businesses possess substantial power. With these facts in mind, this study analyzes the duties of forensic accountants and auditors. Furthermore, the study explores how those in the finance field view fraud. This study consists of interviews with various individuals in both the finance and accounting fields. Interviewees respond to questions about their occupation, experiences in the finance field, and their knowledge of fraudulent affairs. The interviews revealed that those who worked closely with fraud, such as auditors and forensic accountants, had a more negative perception of fraud. Their extensive experience with the subject allowed them to express the severe consequences of engaging in such activity. When asked what they thought motivated businesses to engage in fraud, most of the interviewees determined that it was a lack of financial security. Interviewees suggested that businesses tend to falsify numbers to make them look more desirable to stockholders. Therefore, this study suggests that businesses abuse their power to manipulate the public into investing in them.
Voter Demographics and Voter Interest: Why We Vote How We Do

One of the greatest concerns that has arisen in the wake of the global predominance of the Western democratic as the ideal form of governance is a seeming weakness in the electorates ability to act as a check on the government, as demonstrated by fraught election cycles and poor turnouts throughout the Western world. One theory for this occurrence is a lack of accountability for members of government who act in a manner that the electorate would not approve due to the latter not behaving based on straightforward policy analysis. This paper finds that while party level trends of support from certain groups do develop, the same does not significantly extend down to the level of individual candidates and their platforms. Further, an analysis of both conceptual and actual voter behaviors demonstrates that despite individuals’ claims that their political affiliations are based on their beliefs, it seems more common that politics themselves inform and shape beliefs. The paper concludes that factors including blind partisanship, identity politics, and generally poor levels of political information are contributing factors to the faltering of the ‘ballot box’ check, although there may be other contributing factors.
Psychologists, most famously Adler and Freud, have researched the impact of birth order on personality since the early twentieth century. Over time, stereotypes have developed based on common acceptance of how people expect the personalities to maintain the stereotypes of their birth orders. Some common assumptions about birth order are that older children are generally more responsible than their younger siblings, middle children are generally more diplomatic than their other siblings, and younger children are generally more sociable than their older siblings. The current study focused on whether college students believe that their personalities correlate with the personalities expected because of their birth order. Eighteen undergraduate students from universities in Tennessee and Mississippi participated in a survey, and two of the participants were then interviewed to provide further insights of the results from the study. The study confirmed that the majority of college students believe that their personalities align with the stereotypes of their birth order.
The Correlation Between Geography and Nutrition: How Living in a Food Deserts Contributes to Obesity and Poor Diet, and Why Policy Change Is Needed

Food insecurity is a prominent issue within the United States, but some research asserts that the issue has disproportionate effects based on location. This article analyzes and draws upon the studied effects of geographical factors on food security and obesity through the examination of food desert urban obesity levels, supermarket proximity within food deserts, and other barriers to access of affordable produce and non-processed goods. The article contends that residents of food deserts record higher obesity levels than non-residents due to the lack of access to cheap and healthy foods in a food desert that results from residential distance from supermarkets and inadequate nutritional diversity in local convenience stores and small grocery markets, and it attests to that contention with obesity and food insecurity date measured across the United States. The article concludes that the measured effects of food deserts should be counteracted with public policy action and supermarket implementation in order to stem the growing urban obesity epidemic.
Similarities between traditional gambling and stock market investments have been explored in recent years, with studies concluding that both traditional gambling and stock market investing in excess can lead to addiction, as well as psychological disorders with severe consequences. The following study explores college students’ perspectives on the stock market and gambling, with an aim to formulate a comparison of the two perspectives. The question that this study aims to answer is: what differences exist in the perceptions of the stock market and gambling, and why do these differences exist? To answer this question, four college students from public Tennessee universities were interviewed about their views on the stock market, gambling, and factors that may influence these views. It was found that, though the participants willingly identified similarities between the trading stocks and gambling, they still felt that traditional gambling carries a negative stigma and that trading stocks is either a positive or indifferent behavior. When asked about the reasons for this conception, multiple participants noted that the media portrayal of gambling primarily contributed to its negative perception. Based on these findings, disorders related to trading stocks are under-publicized due to multiple factors, including societal praise of stock traders and general protection of stock market image by those within its community.
This is a classroom project for English 298. Physical activity has been associated with benefits to physical and mental health; however, despite known benefits, research shows a significant decline in physical activity in college years. College is also associated with an increase in stress, as students are faced with new responsibilities. The purposes of this study were to: (a) examine the effects of academic stress on physical activity levels in college freshmen; and (b) examine the current physical activity levels in college to previous high school levels. Freshman from four colleges took a survey to assess their current activity level, past activity level, barriers to physical activity, and hypothetical situations to measure the impact of academic stress on exercise. In conclusion, physical activity significantly declined during the transition from high school to college. Academics was the most reported barrier to physical activity. The hypothetical situations regarding different levels of academic stress had most of the responses reporting that the individual would decrease exercise during that instance to prepare academically. Intervention to increase physical activity and improve time management in college freshman should be considered not only for their health benefits, but also for the psychological benefits.
YMCA Camp Fuller has many traditions. One of those is the tradition of devotions. Every night, before the campers go to sleep, the lights go off, a candle gets lit, and the counselors ask a question. The questions come in varying depth. Everybody takes their turn answering. Nobody speaks when someone else is talking. Answers are treated with respect, without judgment, and don't leave the cabin. Devotions are a key part of life and cabin bonding at Fuller.

Children don’t really have the same opportunity to learn about emotional wellbeing as they do about physical wellbeing growing up. This is a huge problem because not being emotionally aware can lead to just as severe problems as lack of physical health. A widespread form of devotions could be a way to provide an education in emotional health.

To understand how childhood opportunities to share, emotional regulatory ability, and overall happiness are related, a survey was conducted. Through the survey, it was found that the majority of children don’t have an opportunity to share and that childhood opportunity to share is positively related to emotional regulatory ability, which, in turn, is positively related to overall happiness. To understand how to improve and support healthy devotions, some of the best counselors from Fuller were asked how they prepared for and maintained a respectful devotions environment. The interviewees generally agreed that devotions has positive effects on children, and that to get children ready it’s important that counselors set the tone of what is expected of the campers and understand what the campers are ready for.

A large portion of children don’t have an opportunity to share their emotions, and as a result, are generally less able to regulate their emotions. This results in them being generally less happy. A solution proposed to this lack of opportunities is to enact policy constituting a mentorship role from high-schoolers to middle and elementary schoolers. Having more regular guidance interactions could also serve to provide a similar benefit.
Assistive technology is, simply, any technology made to help make life easier for people. In this research project, I will focus on assistive technology made for the disabled, such as canes, wheelchairs, hearing aids, etc. The way assistive technology is designed can change the way disabled users interact with people and feel about themselves. Most research on how the intended users feel about their assistive technology focuses on whether the users like the way it looks and functions, rather than the way it makes them feel about themselves, and the way it affects how they’re seen by others. I have interviewed three people who use assistive technology to help in day to day life with a disability. I investigated the way their assistive technology affects their public and self image, as well as whether that affects the way they interact with other people. In this study, I’ve found that the experiences of assistive technology users vary from person to person, and by the types of assistive technology they use. Since assistive technology helps with daily life, it becomes a part of day-to-day routines and interactions. With this in mind, the individual tastes and experiences of disabled users should be reflected in the assistive technology they use.
Solution and Method Management in Terms of the Engineering Failure

Solution failure in engineering is a common among all of its many branches, but the ways engineers react to, accept, or are affected by such failures can be varyingly dependent on many factors, including, but not limited to, the magnitude of human harm caused by the failure, their level of involvement in and responsibility for its causation, and even their own personality traits and qualifications. While it has been observed through previous research that bouts of failure due to engineering design or malpractice are typically corrected and used to improve further design of the same solutions into successful states, failures are also often used to rework the standard of practice for the better as well. This study employs interviews with Y-12 National Security Complex electrical engineer Stephen Charles, and Professor of Introductory Engineering Physics for the University of Tennessee and Materials Science Engineer Dr. Kevin Kit, in order to examine the specifics of their experiences with solution failure as well as how those experiences changed their personal methodologies throughout their careers. Surveys of undergraduate students in the University of Tennessee’s Tickle College of Engineering were also conducted to determine the effect of classroom project failure in engineering departmental classes/extracurriculars on the development of students’ perception of their practice and its implementation through an academic lens. Both standpoints suggest that engineers’ drive for methodology improvement is piqued when failure is linked to large impacts upon the function of fundamental processes within the practice.
Why is the average college student sleeping less than the recommended 8 hours of sleep? Sleep deprivation is an epidemic among college campuses not limited to the University of Tennessee. Experts and peers attribute sleep debt to poor time management, but the real question is “Why do people not worry more about sleep deprivation?” Students comfort and chant “sleep is for the weak” but in actuality, behind the constricted schedule and limited hours in a day, young adults hold the “fear of missing out” on college experiences. This classroom project will address the different factors contributing to college students’ lack of sleep and their different attitudes toward students exhibiting sleep deprived behaviors in comparison to intoxicated behaviors.
The Effects of Music on Emotion, and Emotion on Music

Christoph, Eli

A Classroom Project for English 298

Music has a tendency to impact the listener in more ways than one. Looking deeper into the idea of simply liking a song, music often resonates with listeners because of the emotional impact that it has on the person's mind. In turn, the highlighted themes and emotional influence of the song can cause the listener to think or act in a certain way. Tsay (2013) discusses impact of music with positive messages, by analyzing the physical signs the body gives off when listening to upbeat music that the person is feeling more positive. However, what still remains is whether the music more so impacts how the listener feels, or if the listener's emotions will impact what music they are attracted to. In this study, three undergraduate college students of different majors at the University of Tennessee: Knoxville were interviewed. They were asked questions of how and why certain music is attractive to them, and whether or not visual elements accompanying songs, which were created by the artist, caused a profound impact in their perceptions of the songs.

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In popular culture, superheroes bear a more dominant spotlight than ever before, largely due to the increased exposure and lucrative nature that the superhero genre has garnered. Critics and casual viewers of the genre’s films often believe that they are simply action-packed blockbusters based around comic book characters that have taken Hollywood by storm. However, they are an integral to our society, as these films represent the closest thing to a mythological pantheon America has: comic books. Comic books – specifically of the superhero genre - are deeply rooted in American culture, dating back to the 1930s. What holds true of all comic books past and present is that they mirror the views and beliefs of American citizens within them, and often present themselves as an allegory for various communities. This so-called American mythology has built characters that reflect and impact various parts of American society, such as the LGBTQ+ community, multicultural people and disenfranchised communities, political climates, youth culture, and numerous others. This impact is representative of comic book culture’s significance in modern American pop culture and it proves that the genre is an integral part of our society.
A classroom project for English 298

Post-secondary curriculum has evolved over the last decade, and in modern education, many institutions have observed a drastic shift in the presentation and recording of academic media in the classroom. Depending on the faculty member, classroom material is offered either verbally, physically, or digitally. For example, teachers can start a conversation about a subject, give a guided notes packet, or display a presentation. The students have no choice regarding how information is presented, but they do have a choice on how they can retain the information outside of class. Students study by writing handwritten notes, typing digital notes, reading from physical textbooks, and skimming digital articles. Studies from around the world have sought to determine whether physical information or digital information has a greater impact on a student’s academic success, and this project examines and analyzes several sources from varying fields to determine whether a student can be more successful with studying one type of media compared to another. Studies have shown that student’s prefer physical forms of information, like textbooks and hand-written notes, and this analysis will analyze the dynamic relationship between college students and their studying preferences to determine if their predilections influence their academic success.
John Codevilla

A classroom project for English 298

How Robots Can Work More Effectively in Nuclear Power Plants: The Need for a More Adaptable or Modular Design

Abstract

This paper investigates ways to upgrade robot performance in nuclear power plants by interviewing experts. Two people, one an expert on nuclear power plant maintenance and robots used in nuclear power plants and the other an expert on robot construction and electrical design, provide insight into constraints and potential solutions surrounding robotics in nuclear plants. The merits of a modular robot in particular are evaluated. The paper finds that a modular robot could be appropriate for certain situations were a group of similar functions need to be performed, but more research needs to be conducted towards specific design and implementation of such a machine.
Lottery Advertising: How Unregulated Tactics Can Affect People’s Lives

Lottery Advertising is an exception when it comes to the “Truth in Advertising” regulations of the Federal Trade Commission. Even though playing the lottery is a form of gambling, advertisers have free reign to say, show, and do whatever they’d like with their advertisements. This article argues that the lottery is exploitive and shows that through how it is underhanded as well as how it affects people’s lives. My solution to this problem is a simple policy change to make lottery advertisements follow the same guidelines that private lottery and sweepstakes companies do. Even though the lottery does help a government increase its’ revenue, the revenue gained is a small percentage of the total profit. The lottery is a voluntary tax that targets low income individuals through advertisements meant to draw out the worst habits in people.
Abstract

This is a classroom project for English 298. Inspired from work of previous researchers, this project will shed further light upon differences and similarities between the comprehension and perception of sarcasm and sarcastic statements in a population of males and females. I hypothesized that the opposite gender will see the other as more sarcastic. I also predicted there will be more negative connotations of the sarcasm placed on the opposite gender of the surveyee, however it is not predicted there will be a difference in the ability of either gender to detect sarcasm. A survey was the most effective way to gather responses from people, and still be able to compare the data easily. Participants consisted of people online through group chats, social media, online message boards, and survey taking websites. Over the course of twenty days and 142 responses, the data was analyzed for trends and correlation. Males were shown to be perceived as more sarcastic and their sarcasm was considered friendlier than females by both genders.
Conner Michael Cornachione

Instant Replay in Baseball and its Effects on the Fan

This is a classroom project for English 298. In 2014, Major League Baseball introduced an expanded instant replay system. Previous to this implementation, replay had been heavily used in other sports to improve their ability to correctly officiate games, but baseball had only used it to review home runs and fan interference. With the new system, coaches are able to challenge a call on the field, making it be reviewed by the replay center at an off-field facility where an umpire decides what call should have been made. In this project I will be examining the effect that the new replay system has had on the fan’s experience of the game. In terms of improving the fan’s experience, one major point of discussion was the length of games, so making a large change, especially one that affected a part of the game that was already under scrutiny like instant replay, could be a problem. I will use the data I gathered in my research to show that even though replay does add to the length of games, its benefits outweigh its drawbacks.
Melodic Healing: Why Music Should be Used as Medicine

Music effects many different chemicals that relate to stress, anxiety, symptom management, and overall mood. While only a small percent of people know these actual benefits to listening to music, almost everyone benefits from it. Whether we listen by choice, or if that-one-catchy-pop-song forces its way into our heads at the super market, music effects us all. Through various studies, it has been proved that music has a measurable, beneficial, physical and mental effect on the human body. In this paper, I hope to prove why music can and should be employed, in addition to the already existing treatments, in order to improve a patient’s overall well-being.
Artificial Intelligence: Safely Developing the Future of Computation

Abstract: The use of AI technologies has showcased impressive potential in guiding our society towards achieving a greater understanding of the world and making our lives easier and safer. The possession of such powerful capabilities and potential raises concerns about possible consequences or dangers. This research paper analyzes the contention between the benefits and disadvantages of our continued development of machines and programs with artificial intelligence. While the future of computation and automation relies on the powerful capabilities of intelligent machines, we must also consider, predict, and address any potential unexpected or unwanted outcomes in our continued development of intelligent programs which have access to large amounts of data as well as connection to the internet. For these reasons, we must continue researching the ways in which to establish standards and regulations in order to develop safe AI practices. With these regulations, we can safely utilize the capabilities of AI to our benefit.
Eliminating aliens: common factors of effective invasive species control methods

In every ecosystem there is a fragile balance between the organisms that are a part of it. Invasive species are a major threat to biodiversity across the world because they are able to survive in non-native environments, damaging ecosystems by outcompeting native species for resources. In order to preserve biodiversity and reduce the effect they have on an ecosystem, it is essential to control alien species by removing or confining them. Controlling invasive species presents financial and physical challenges because most are adept at survival and reproduction, traits that make them successful invaders in the first place. The goal of this research is to combine discoveries made in several case studies of invasive species control methods including both plant and animal species in order to suggest strategies to make these control methods more cost-effective, efficient, and successful. These tactics include taking early action to control invasive species in order to quickly eradicate the population, working continuously in order to ensure the population does not have a chance to recuperate, and combining multiple control methods in order to maximize the effects of control on an invasive population.
Many studies have investigated the correlation between various demographics among college students and the level of stress that they experience in their collegiate career. However, few studies examine the links between sources of stress within a student’s life and their major of choice at their university. This study seeks to clarify the correlation by examining the choice of major by various students across multiple disciplines and then examining the stress in their life. To do this, the study primarily relies upon a survey of a large number of students across multiple colleges within the university. Students were grouped by their college and then asked to rank the top sources of stress within their lives. Additionally, students are optionally asked to elaborate in order to provide qualitative logic behind possible patterns. Ultimately, several trends were identified that connected various majors to various types of stress. STEM majors expressed much more stress from academic sources than students from non-STEM majors. However, the same students in STEM fields reported a much lower impact of stress on their academics than students in other majors reported. This study concluded that certain trends exist that make the stress experience different between students based on their major of choice. Additionally, this study argues that as a result, more needs to be done to better tailor stress relief programs for different majors in order to address these differences.
Leah Crowley
The Extent of the Universality of Intended Gestures on Today's College Campuses: a Classroom Project for English 298

This study examines the relationship between language and knowledge by focusing on the extent to which intentional body language (i.e. hand gestures and symbols) is understood universally on a modern-day American college campus. I hypothesize that as a result of both globalization and the highly-Americanized culture of these universities, the hand gestures that I am studying will be nearly universally-interpreted. This study aims to discover any common discrepancies between intended meanings and interpreted meanings of body language and signals in order to address the extent of cultural divisions in a place immersed in American culture. To do so, I gathered information through a survey with 211 members of the general public — specifically with students from ages 17-28 — in and around the university. The data shows that most gestures are comprehended in the same ways by many demographics. Survey results suggest that participants from families with cultures different than typical American culture interpret intentional hand gestures similarly to the way that families completely immersed in American culture do; however, while different cultures understand common American gestures, these people additionally have other interpretations of gestures. By addressing these slight cultural differences, I was able to emphasize the importance of being sensitive to others through non-verbal language and to further analyze social barriers caused by possibly misunderstood body language. Additionally, I was able to study the effects of globalization throughout American colleges and the degree to which being immersed in multiple cultures affects individual interpretations of intentional gestures.
Despite the overwhelming research made by corporations and government officials regarding the use and abuse of opioids in the United States, legislators and officials fail to go directly to the source, healthcare professionals. These individuals are the ones directly prescribing and providing such medications. They, more than anyone else, see the overwhelmingly negative impacts of opioid use and can provide personal experiences which would then help others to better understand how this problem has grown into a national epidemic. This study will eliminate many communication barriers and go directly to the most powerful individuals in the situation, healthcare providers, including nurses, doctors, and pharmacists. In-depth interviews will provide their feelings toward and experiences with opioid addiction in their respective professional environments. The results of this study will then allow legislators and government officials to consider the feelings and experiences of healthcare providers when trying to implement the most effective laws, policies, and programs regarding opioid use in America.
Abstract

The overall purpose of this study was to investigate the difference between the perception that professors and students have about anxiety and the impact it has on people. This was done by conducting interviews with two students with anxiety and two professors, one that teaches psychology and one who does not, to see how anxiety had personally impacted each, as well as to see if the professors are aware of how the students feel and if there is a discrepancy between what students and professors feel about the effects anxiety has on performance. Major findings include: that all the interview subjects were aware that many people have anxiety; that college students tend to be more anxious; that each knew someone that has or had anxiety that negatively impacted them. They are aware that it can manifest in physical symptoms and affect performance. The two students both claimed that anxiety had prevented them from completing assignments in the past. The conclusion reached is that many underestimate the number of college students that have anxiety as well as the impact that it can have on a person. While each had a story of what anxiety can do, they downplayed the effects and how severe it can be with regard to other people. The professors were, however, willing to help the students and did seem to care about their wellbeing, despite what one student claimed.
The purpose of this study is to investigate the potential impacts of quantum computing as part of a classroom project for English 298. It is designed to investigate what it is as well as how it might change the power dynamic between companies and the public. Multiple individuals who had experience in the field were contacted and asked questions on the possibilities of quantum computing as well as how they thought the quantum computers could affect the computing industry and the world at large. A major finding of this study is that quantum computers are more powerful than regular computers by a large margin. They can be used to expand multiple fields including cryptography. This presents a problem though that they can be used to easily hack technologies that aren’t as powerful easily. The changes in the power dynamic are not favorable to the public which quantum computers would likely not be widely available for. In conclusion, quantum computers are definitely a game changer for the computing world.
Marketing towards targeted audiences has always been a goal by companies in order to make profit. In the cosmetic industry, there are many audiences that products could be developed and marketed for. One of these groups is college women. Studies have shown that women feel more confident and attractive while wearing makeup. In order to explain these claims and learn why college women wear makeup so that brands can target them as an audience, I conducted a survey with 39 responses from women attending various colleges. Questions about their reasons for wearing makeup, how they feel when wearing makeup, and the type of advertisements they respond to were asked. From my study, I conclude that college women are more confident when wearing makeup, and that they want makeup that is natural and evens their skin tone while enhancing their given features. Although knowing what the consumer wants from their products is important, it is also important to know how to market towards them. In light of this, companies should use advertising that is known to grab college women’s attention. Using trusted people that the women look up to and models of all races and sizes will allow them to feel confident that the product they are buying will work for them and is approved by people like them. In conclusion, college women are an underdeveloped market that should be expanded by many companies.
A classroom project for 298 study observes the issue relating to Earth’s natural resource, water. Water is an essential resource for life on Earth and has been widely known as a renewable resource with water all around us. However, recent studies and observations have observed that there is an issue regarding our water here on Earth noting the term, “water crisis”. Two university professors were interviewed to further examine the issue. These professors specialize in environmental science, natural resource conservation and their main focus revolves around water resource. Research and conducted interviews from these university professors suggest there are calls for concern with Earth’s water and it needs to be addressed.
Title: An Analysis of the Financial Censorship of Art.

Censorship of art has existed as long as art itself. The objection to art varies across all mediums, yet all methods used stifle creativity and limit expression. Art censorship has constantly changed form. From the doctrines dictating the usage of harmonic intervals in liturgical pieces to the banning of books in the school system, the objection to art remains prevalent in society even today. However, today’s form of art censorship differs from the past because of its focus on money. With artists becoming more reliant on funding from organizations and donors, they are often subject to regulations of those patrons which determines the art they produce. While a consensual agreement between a patron and artist about a piece of work should be the norm, it unfortunately isn’t always the case. The problem happens when organizations deny financial support to artists as a way of censorship that functions without the specific attack on a piece. This essay looks at the modern day examples of art censorship and its use of restricting funding as a means of censoring art. It will show the importance of protecting artists financially, and how any form of art censorship stifles creativity, and must be fought against.

Word Count: 200
In recent years, there has been a push to increase security measures across college campuses. Many have conducted research into possible solutions, with bystander intervention being at the forefront. More safety measures have been put into place, and some orientation safety courses have been made mandatory. Also, students are encouraged to carry their own self-defense devices and undergo training. However, there is no answer as to whether or not these safety features actually make students feel more secure. I surveyed students at the University of Tennessee on their sense of safety on campus. I inquired into the types of self-defense devices they employed as well as their personal feelings and experiences on campus. Most students report that while they do carry and have access to self-defense mechanisms, they have experienced uneasiness, especially walking alone at night. They also admit that concern for their safety limits when and where they are willing to go. Despite this, the majority describe an increased sense of security while carrying said devices. Therefore, through qualitative research and analysis, this study concludes that carrying self-defense and having self-defense training does make students feel safer on college campuses, but there is still much to be done to make this perceived safety a reality.
Cassidy Davenport

Abstract

This study demonstrates and further researches the large gender gap between males and females in the engineering STEM field. It collects information from three participants, all of which are at different levels in their degree path or career, in order to investigate the social and emotional effects of being a woman in a male-dominated STEM field, specifically engineering. Along with the social side of engineering that affects individual females, this study will also look into possible explanations to provide a reason as to why there is such a large male to female ratio and how, or even if, universities are attempting to close this gap and be more open and inclusive. The research shows that women can feel like they are at a numerical disadvantage and that there are many stereotypes for women to overcome in order to be at the same level, if not surpass, their male counterparts. However, universities are attempting to close or lessen this gender gap by adding more programs and clubs in order to make women feel more included and involved within the engineering community.
Different genders can often be treated differently within society based on appearance and adherence to gender roles. Thus, self-confidence likely varies among these different genders based on lived experience. For example, Heather Sarsons's study of male and female economists finds a large gap in confidence with men typically having a higher level of confidence. Unfortunately, there is a lack of research involving transgender individuals. It can, therefore, be asked how confidence ranks among college-aged individuals of other genders that are not cisgender or strictly in the male-female binary. In this study, research conducted through surveys assesses the attitudes of UT students towards themselves and how they believe others perceive them after designating their gender. Subsequently, interviews conducted with those who provided lengthy, interesting, and detailed responses provide insight into the different nuances among different genders. These individuals discuss hardship and discrimination faced for their genders, which can imply that by undergoing exploration of gender while experiencing discrimination, some people who are not cisgender learn to value their lives and experiences less than their cisgender counterparts value their own lives. This research concludes that the transgender participants—including the non-binary ones—seem to have lower self-esteem levels and higher levels of empathy for other people at the expense of their own mental well-being.
Many researchers debate over whether or not human evolution has stopped due to a lack of change in human bodies throughout recent history. If they agree over its continuation, they then debate how it is changing—whether through continued changes biologically or new cultural changes. If they agree over its stopping, there is still no one reason why. Due to the many definitions of evolution people have this can be a complicated debate to follow, but the final answer would be a resounding no on whether or not human evolution has stopped. Discrepancies like above are because there are so many different ways a species can evolve. While evolution is typically thought of as Darwin’s Theory of Natural Selection, there are also other forms like cultural evolution and genetic mutation. While in most countries natural selection is no longer a problem due to our ability to keep most children alive till adulthood, our large population size causes genetic variability to be a huge factor of our ongoing evolution due to the amount of mutations possible. Likewise, is our cultural evolution, in which humans are constantly thinking of new ways to preserve and advance our population. While many people think since natural selection has almost been eliminated our evolution has stopped— the answer is quite the opposite. Humans will never stop evolving.
Abstract

This study focuses on the differences between learning disabilities such as Dyslexia and Attention Deficit Hyperactivity Disorder (ADHD) and intellectual disabilities such as Autism and Down Syndrome. Learning disabilities effect the process of receiving information, while intellectual disabilities results in difficulties interpreting information. This study intends to reveal the level of knowledge of the public pertaining to each disability. Learning and intellectual disabilities are being increasingly diagnosed, and it is necessary for these individuals to receive a positive response from their surroundings. It is easy for those that do not fit into a typical ‘mold’ to be neglected in many areas of life, such as education and external interaction. By identifying the misinformation in the public, specific areas can be targeted to better inform the public. Results showed that learning disabilities were viewed more favorably than intellectual disabilities. Within the intellectual disabilities, it was observed that there are misconceptions about the differences between the two, specifically the intelligence levels associated with each. This showed that although members of the general public are knowledgeable, there is still work to be done informing them about the variations of each type of disability as well as the general intelligence level of each type.
In the last three decades video games have become much more accessible to the public with the release of consoles that can play a variety of games. Following the advent of smartphones, the mobile phone game industry exploded, and there is now a game for everyone. Recently, many have speculated that playing video games have a significant mental effect, specifically on behavior. This prompted a new field of study into the psychological effects of playing video games on behavior and brain functions. Published research has supported both positive and negative behavior changes due to playing video games. However, no single study has obtained enough evidence to support a generalized conclusion. Therefore, it is necessary to examine a variety of research studies to effectively evaluate the behavioral changes caused by playing video games. The following paper cross examines results from many different types of studies on video gaming’s effect on behavior with the goal of first determining the validity of video gaming effecting behavior and then determining how video games are most likely effect behavior. This could indicate useful new directions for further research into the vast field of video game psychology.
An Analysis of the Interaction Between the Internet and Modern Slang: Abstract

Slang has been a prevalent part of adolescent culture for generations; however, today’s slang is affected by a new variable: the internet. I believe that it is important to identify how greatly modern slang is affected by internet use in order to maintain sovereignty over the internet’s effect on everyday life. When beginning my research, I hypothesized that the internet was the source of the majority of current slang, and I also believed that frequent social media users would know more slang in general. Additionally, I suspected that similar slang was used nationwide due to the internet nationalizing slang.

I conducted a survey on internet and slang usage, which I administered with my personal social media and one poster hanging in my university’s library. I received 112 survey responses, and I used Microsoft Excel and JMP to visualize and analyze the data. My results confirmed my hypothesis. I discovered that survey takers knew significantly more slang words from the internet than in-person conversation; 38 respondents reported knowing 0 slang words from in-person communication while only 6 respondents reported knowing 0 slang words from online communication. This supports my thesis, because I anticipated that internet use directly affects slang usage.
Quen Deckbar

A Classroom Project for English 298

Project Title: In Support of Marijuana Legalization: The Comparison of Behavioral and Physical Consequences of Alcohol and Marijuana

As one of the most impassioned debates on today’s docket, the argument over the legalization of marijuana is built on many misunderstandings about the drug. With sixteen pro-cannabis states and the District of Columbia feuding with the federal government about the weight of the drug’s adverse consequences, the two sides of the argument have grown polarized and misconstrued, resulting in a great deal of falsified information taken as fact. With more and more cannabis related studies being released, the effects of marijuana on behavior and health are becoming better understood. When compared to other legalized recreational substances such as alcohol, marijuana proves to have far fewer negative effects on both health and behavior. The only justified reasoning for a government to intervene and prohibit a drug is if the prohibited drug is a direct danger to the user and those around the user; otherwise, it is not the government’s place to get involved. The comparison of the behavioral and physical consequences of alcohol and marijuana demonstrates that marijuana poses no greater threat than alcohol, providing no reason for its prohibition in the United States.
Linguistic Purism and Anti-Immigration: A Dangerous Combination

In the current political climate of the United States, anti-immigration movements and linguistic purism—the idea that one’s language is better than others—are on the rise. In fact, anti-immigration movements to end the Deferred Action for Childhood Arrivals program, eliminate temporary protection status, and limit birth right citizenship have all gained traction in 2018. Additionally, while English is not the national language of the United States, many native citizens have recently come to fear the loss of purity within the English language. While both of these phenomena have increased, the possible correlation between the two concepts has been relatively unexplored. This study, relying on results drawn from surveys and interviews of both native and non-native speakers, seeks to examine the relationship between linguistic purism and anti-immigration sentiments. In order to study this relationship, the surveys and interviews inquired about the constitution of one’s national identity, the emphasis one places on English, and general feelings towards immigration. The data suggests that there is a strong correlation between believing all United States citizens should speak English and having negative opinions about immigration—and vice versa. The temporal precedence of the correlation will require more extensive research in order to understand which concept causes the other; however, recognizing this correlation is an excellent launching point for targeting anti-immigration propaganda and hatred.
Emotions play a key role in distinguishing living beings from manmade machines, specifically today, when technology is becoming increasingly complex and humanoid robots are becoming more life-like with each new model. With every advancement, the dividing line between humans and artificial intelligence (AI) also seems to be disappearing, even to the extent to where human brains are commonly tricked into acting differently towards AIs that seem to display emotions. As scientists get closer and closer to perfecting facial and bodily movements in AI that mimic human emotion, what seems like science fiction today may become the reality of the future with the possibility of AIs portraying emotions commonly thought to be unique to humans. Despite the efforts of countless scientists, human and animal emotions emerge from chemical reactions, mixtures of hormones, and stem from brains that have evolved over generations in order to protect and drive their hosts, and therefore these emotions cannot, today or in the foreseeable future, be replicated by manmade machines.
The dependence on fossil fuels poses a global threat to humanity. Nonrenewable energy sources such as coal, petroleum, and natural gas release CO2 to the atmosphere, contributing to the global crisis we have entered. Not only does this dependence lead to an accelerated rate of climate change, but it also forces energy sectors of countries to remain economically stagnant. This essay analyzes the benefits of developing and transitioning to a renewable energy system, the obstacles that we still face in relying on renewable energy (such as public policy and infrastructure), and how the United States can make this transition. By addressing the energy needs of a specific country, using secular heating and heat pumps, improving electric grid regulation, and demand management, any country is capable of becoming renewable energy dependent. These methods are supported by multiple professionals who believe the methods would allow the United States to become almost completely independent from fossil fuels. The energy transition will not only improve the economy of the U.S., but also protect humanity as we know it from the devastating consequences of climate change that have been looming over us for the last century.
Forensic evidence has been used in the United States since the 1980s in criminal investigations to find and prosecute criminals responsible for rape, assault and murder among other crimes. Fingerprint and ballistic analysis, DNA testing and testimony by forensic experts have been used in criminal cases to prosecute perpetrators of these horrible crimes. However, in recent years many cases have been reevaluated and overturned because the conclusions from forensic evidence used in the original cases were not correct. Many people have spent years in jail for crimes they did not commit due to forensic evidence that was not trustworthy. Forensic evidence is not as reliable as it is thought to be and while forensic evidence should be used in criminal investigations and to overturn previous convictions, its use should be limited in prosecutions. Forensic evidence is problematic in prosecutions because the scientific methods used in forensic evidence haven’t been well established or researched, there is bias in expert analysis and testimony and there is a lack of understanding of the limits of forensic evidence by jurors. A limited use of forensic evidence in prosecutions will help prevent false convictions and strengthen a weakness in the United States judicial system.
ABSTRACT

People respond differently to different fonts. This study supports the idea that italicized and serifed fonts are typically seen as more luxurious and complex, while blockier and bolder fonts are seen are less formal but easier to read and more dependable. Font was cross examined with gender, education, and age to determine which style of font was most effective at appealing to a certain demographic. Younger people tended to lean toward more simplistic fonts and older people toward more elaborate fonts. Those in medical majors responded the most predictably when asked which fonts display quality and user friendliness. There was no meaningful distribution between gender or highest degree of education and font.
Sophia DiOrio

Abstract

This is a classroom project for English 298 that aims to find out if higher mental health literacy causes an increase in the well-being and happiness of UTK students. Mental illness is a very prevalent issue on modern college campuses as one in five college students has anxiety or depression (Rosenberg, D., 2018). Moreover, mental health literacy is critical to the understanding of people with mental illnesses and a person’s understanding of his or her own well-being. In order to help those with mental illnesses, many college campuses offer mental health resources for students; specifically, the University of Tennessee, Knoxville offers several resources for students struggling with mental health including counseling services, mental health screenings, and a 24-hour helpline. This paper also reviews literature in the area of mental health on college campuses and the benefits of mental health literacy. For this project, I surveyed twenty-two UTK undergraduate students to gain a better understanding of UTK students’ mental health literacy and their knowledge of the resources offered at UTK. Increased knowledge of UTK’s mental health resources and increased mental health literacy may be beneficial for UTK students’ well-being.
Abstract

The intent of this study is to explore the reasoning behind MMR vaccine hesitancy. In order to determine why people continue to refuse to vaccinate, despite the proven safety and success of vaccines, secondary research was conducted by rhetorically examining peer-reviewed journal studies to derive conclusions over the topic, as well as establish a foundation for the conversation on vaccine hesitancy. The history of vaccines was explored to conclude whether or not previous opinions and actions have affected opinions today. Moreover, primary research was carried out through interviews with a medical doctor, a supporter of the anti-vaccine movement, and a routine vaccinator to establish first-hand accounts of opinions and beliefs. News stories were additionally utilized to demonstrate the effects of events in the community. The research concluded that the previous bias of studies and the current bias of works available to the public has deemed the MMR vaccine unsafe, causing appalling consequences like the current measles outbreak in Washington.
This study theorized the effects of modern conceptions, methods, and restrictions of biohacking subcultures on the future of biological augmentation and the medical field itself. Undergraduate students (N-51) were surveyed in order to gauge familiarity and comfortability with common biohacking procedures and implantable devices that that may be popular in the near future. Familiarity was based solely on whether or not they had heard of any procedures before taking the survey, and comfortability was based on the likelihood that responders would ever implant an augmentative device in their own body. Although familiarity was extremely low, comfortability levels were surprisingly high in undergraduate students. This shows that the acceptance of ideals characteristic of modern biohacking trends in younger generations is likely to increase in the years to come and speaks to an importance of biohacking to humanity itself.
Abstract

Some may think about the time of people in America being able to trust a stranger in times of need and having the good Samaritan mentality of being the person to help a stranger, and how these ideas molded together to form what was once the American psyche. They may also wonder how those times disappeared, and those that never witnessed them may wonder why that reason is. The spectacle that was Ted Bundy’s public trial in the late 1970’s, in which the media through its hyperbolic representation of this case created nothing but panic and fear, can be seen as a large cause for the last glimpse of the healthy American psyche to cease. Since this event, the media has only continued the cycle of mistrust through the availability bias it creates increasing the perceived risk of that anybody can be a possible killer, leading to the idea that the American psyche may never be whole again. However, this idea is not a concrete one; but if America is to ever be truly unified again this fear will need a long and grueling amount of time in order to dissipate and to allow the American psyche to heal.
A Review of Civil War Statues in Modern Society

Primarily over the past five years, statues commemorating Civil War figures have created controversy. Many have been criticized and protested for being offensive, with requests for the statues to be torn down coming to fruition in some cases. In response to this, many others have stood in support of the statues, not wanting them to be removed or altered in any way. Literary sources explain that the issue has grown to be massive in importance, affecting colleges, communities, and the nation as a whole; protests over the fate of a Robert E. Lee statue started the events of Charlottesville, which killed three. In this study, I surveyed University of Tennessee college students through a multiple-choice Qualtrics examination accessed by QR code and email, asking questions related to the statues and the south to gain a better understanding of their feelings towards these statues and the ongoing debate pertaining to the monuments. Respondents validated points of emphasis for both sides of the argument and when asked to pick between quotes clearly supporting one side, responses were extremely close to even in either direction. Through a review of external sources and my survey data, I conclude that rather than agreeing solely with one viewpoint or another, respondents wanted to both cast down racism and respect history, and were torn when they had to ultimately choose a singular ideal to align with.

[ABSTRACT FROM AUTHOR]
According to research by RAIIN, from 1995-2013, 11.2% of all students experience rape or sexual violence on a university campus in the United States. Despite this, discussions on the topics of sexual violence and rape are still seemingly infrequently addressed with high school students who will be potentially entering the college field soon. Past research into this topic area has focused on what is appropriate to teach students in the moment rather than the impact that teaching such has on the students understanding of the material moving forward in their lives. This study interviews two high school English teachers and two first year college students about their experiences discussing sexual violence and rape in a classroom setting. In doing so, this study captures the differences in the experience moving between the two educational levels and if such impacts the students understanding of sexual violence and rape. This study will provide inside insight into how we teach our students sensitive content and if those methods are effective in preparing them for an adult climate at the university level.
Joshua Dreussi, a classroom project for English 298.

This study examined both student and faculty opinions regarding the importance of ethics in the business profession and its emphasis in education. Haslam College of Business Faculty in the Accounting and Management Departments were interviewed regarding the value they place on ethics in business, how ethics was emphasized in their education, and if they have encountered any unethical behavior. Haslam College of Business Students were interviewed regarding how ethics was emphasized in their education and why they believe ethics is important in their future profession. Haslam College of Business faculty and students found to have different experiences with ethics during their education and experiencing unethical behavior, the reason why ethics is important in the business profession, and the cause of unethical behavior in the business profession.
The importance of standardized test scores has been consistently stressed in the educational community. Many older bodies of research claim that these scores are the most accurate predictors of postsecondary success, arguing that admissions offices should place a heavy weight upon students’ performance on tests such as the Scholastic Aptitude Test (SAT) or the American College Test (ACT) to ensure that their student body is most designed for success. However, recent literature has rejected this traditional approach to predicting collegiate success, championing the concept of student satisfaction as predictive of success. Despite scholars’ rejection of standardized testing, colleges still place undue weight on scores in their admissions processes. This project explores a more comprehensive and broad examination of student competence and compares its benefits and detriments to those of the traditional approach in hopes that college admissions offices will begin to listen to the recent research performed on student retention and satisfaction. It chooses to define student success as both academic achievement as well as retention and satisfaction of the student. This report concludes that a more universal approach to student evaluation—involving high school grades, standardized testing scores, as well as psychosocial and emotional intelligence factors—is better suited to determining aptitude and success across student groups.
Chris Duncan

A Classroom Project for English 298

How Are You Doing: The Meaning of Ritual Exchanges

A common way to greet someone is to say “Hi” or “Hello,” followed up with the question of “How are you?” This question has become such a common greeting that it has lost its original intention. While it seems to show general care for how the other person is doing on an emotional level, it has mostly become another way of just saying hello. We are asked this question and expected to respond the same way every time by just saying that we are fine or good. We have become so numb to this question that we are programmed to respond without even thinking about our own well being. This study examined, through the use of voluntary anonymous surveys, why college students at the University of Tennessee respond to this question of “How are you?” the way that they do and what function this sometimes seemingly empty exchange plays in our culture. This study concludes that while the common exchange of “How are you?” is in fact most of the times empty, it is not an empty exchange due to a lack of care for the other person, but rather, as college students, we are often too busy to stop and have drawn out conversations with people about how they are actually doing.
This is a classroom project for English 298. In recent years, doctors and politicians alike have started taking steps to mitigate prescription painkillers’ contribution to the Opioid Epidemic. The Opioid Epidemic is a complex issue, but it is likely that factors such as obesity and depression are contributing to the high demand for pain relief. In the pursuit of less addictive treatments, doctors have started relying more on targeted pain therapies, physical therapy, cognitive behavioral training, and Traditional Chinese Medicine practices. After interviewing four doctors with questions on how treatments have changed since the Opioid Epidemic became a national problem and how they view alternative TCM treatments, it was evident that although there is a lack of sufficient evidence supporting TCM’s validity, they are more than willing to use them if patient’s report less pain. In other words, they prefer potentially less effective practices over the addictive opioids for dealing with chronic pain. There was a consensus that if more research came out supporting these TCM practices, the medical community would likely support making these practices more mainstream.
Abstract

Traditional ecological knowledge—the understanding and use of natural plants—is integrated into the daily lives of indigenous groups around the world. However, this knowledge is being lost at an unprecedented rate, likely due to an increasingly unstable environment. This essay uses the loss of traditional ecological knowledge in indigenous peoples to understand the impact of climate change on culture. Indigenous cultures may change in several ways in response to climate change, including increasing exchange of ideas between cultures, changing cultural practices to integrate new resources, and a loss of cultural unity. This essay concludes with a call for comprehensive climate change policies that include the protection of indigenous cultures. With enough support, indigenous voices can become a valuable position in climate change discourse, as they have already begun to feel the effects of a changing world. A greater understanding of the challenges that indigenous peoples face will allow the global community to better comprehend the looming threat of climate change.
In recent years, the topic of birth order has made its way into popular culture. Theories regarding the effect of birth order on individual traits, such as independence and preparedness for adulthood, are often accepted as a means of predicting the extent to which a person will express these traits. However, scientific studies have not yet yielded any conclusive results on whether birth order can accurately be used to predict a person’s character traits. Some say it has a strong effect on the development of certain traits, while others say the effect is little to none. This study used interviews and an online survey to gain insight into the perceptions of undergraduate college students into their independence and preparedness for adulthood, with a focus on the possible effects of birth order on these aspects of their personality. The results found that the majority of undergraduate students surveyed felt that older children in a multi-child family are given more responsibilities, and that this leads to them being more independent and prepared for adulthood. Interestingly, the study also found that many undergraduates surveyed had the same difficulties upon reaching adulthood, regardless of their birth order. These discrepancies could help explain the conflicting results from previous studies, and might prompt one to wonder why theories on birth order are so accepted if they may not be true.
The Native America Occupation of Alcatraz: Radio and Rhetoric

Megan Engle
Dr. Barrow
English 298

This is a classroom project for English 298. From November 1969 to June 1971, Native American protesters occupied Alcatraz Island, drawing attention to the unjust treatment of indigenous populations and the hardships they faced. Throughout the nineteen months of occupation, protesters received much attention from the media. While in theory this attention may have been beneficial, the media presented the story in a largely negative and inaccurate light. Upon review of the literature, it becomes evident that the media used racist and poor journalistic practices to diminish the protest. To counter this biased view, the occupiers released their own news via radio. A comparative analysis of selected Radio Free Alcatraz broadcasts and selected releases from the mainstream media sources of the time demonstrates a dichotomy in the presentation of the situation and reveals a series of discriminatory tendencies in the journalistic portrayal of Native Americans. Understanding this divide and these journalistic tendencies in the presentation of minorities may allow for a greater understanding of contemporary race and media relations.
A Classroom Project for English 298
Charles Evans
Patriarchal Language & Christian Faith Abstract

The main topic of my research is how the presence of patriarchal language within the Bible influences the modern Christian’s faith and relationship with Scripture. I expected the issue to be a much more pressing one within the female population as compared to the male one. Though there is much recent scholarship on the topic, I predicted that the issue wouldn’t be a wholly urgent issue with the data evaluated in general since the issue itself is something that is only recently making its way to the world stage. I explored this issue by distribution of a survey through Question Pro.

The survey itself was 29 questions, including four demographic questions. With the exception of one participant from the UK, participants were all from the United States. More specifically, the concentration of the participants was in the United States South, with some input from the western United States. There was a total of 164 participants.

The results of the survey confirmed my hypothesis that the population of female participants regarded presence of patriarchal language in the Bible as a concerning issue, but I was surprised by only marginally lesser rates among male populations. As a whole, however, I was right in predicting the population at large didn’t regard the issue of this language as a particularly immediately relevant one. A surprising portion of the participants who regarded this language as a pressing issue aligned with the way in which they interpreted the Bible: The majority of those who regarded the Bible as a literal text thought this issue was a very relevant one.

As such, it is clear that though the issue is not the most important problem for the modern Christian and his or her faith, the percentage of those concentrated groups who did identify it as a problem certainly makes it one worthy of discussion.
Olivia Fairweather

This is a classroom project for English 298. Tennessee’s abortion laws have drastically changed since Amendment 1 was added to the Tennessee constitution. The state requires a mandatory 48-hour waiting period after an initial meeting with a physician before an abortion, and as of 2017, the state only has 8 abortion facilities. Furthermore, only 37 percent of women live in the counties where the abortion facilities are located (Ely, Rouland-Polmanteer, Caron, 2018). This causes some organizations to label Tennessee as a state with “extremely restrictive reproductive rights” (“State government: Tennessee, n.d.). In addition to these restrictive policies, Amendment 1 allows the possibility for more restrictive policies to pass, which poses an even greater threat to reproductive rights in the state (Reynolds, 2015). However, it is unclear if the public is aware of the struggle for reproductive rights in the state. My project’s goal is to understand how knowledgeable students of the University of Tennessee-Knoxville are about Tennessee’s abortion practices, laws, and policies. I hope that my research will help spread awareness of voters’ lack of knowledge of abortion policies and add to the ongoing conversation of how the university can offer better abortion-related educational services to students.
Jesse Farr
A Classroom Project for English 298

The purpose of this study is to investigate and analyze how and why different individuals in various fields of study view the relevance and importance of physics to the scientific community as well as to the advancement of mankind. Using surveys of different age groups and areas of study, the responses given were studied using the narrative analysis method, and recurring themes were reported. It was found that common responses were that scientists need to always keep advancing to promote the human race as well as for the wonder that unknown science sparks in individuals. Regardless of who was being interviewed, the main idea was that physics is important and relevant. It was not dependent on if it was part of the interviewees’ work. This shows that many understand the field of science and scientific advancement, even if it is not involved in their everyday life.
Women are significantly less prominent in the field of engineering, and there are currently many explanations offered for their underrepresentation. There is a widespread belief that gender stereotypes and male intimidation discourage women from entering or staying in the field. However, the magnitude of the impact of stereotypes on this phenomenon is not known, and other factors also contribute to discouraging women from studying engineering. Other arguments include that women and men have inherent differences that result in differing skill sets and/or interests. In this study, students from the University of Tennessee, Knoxville were surveyed to determine how different factors influenced their choosing of their major, their competency in subjects, as well as their attitudes towards different situations. Female engineers were also interviewed about struggles they face studying and working in the engineering field. This study concludes that the primary reasons for the underrepresentation of women in STEM fields are feelings of inadequacy due to stereotypes or anxiety, differences in interest between genders, and intimidation caused by being outnumbered by males.
Can Men and Women be Friends?

Relationships between men and women can often be tricky to define. Frequently, if a man and a woman are together, it is assumed there is some level of romantic interest from one or both of them, even if both claim to have no romantic intentions. However, with the changing understanding of gender roles today, it is becoming more and more acceptable for men and women to be platonic friends, but is it really possible for neither to feel attraction or desire companionship in a more affectionate way with the other? Research suggests that men and women can be friends until they become intimate and inseparable, after which they may be so only in name. This study, having conducted surveys and interviews, asked men and women to evaluate their platonic relationships to examine whether men and women can truly be just friends. By asking questions that are theoretical (e.g. can men and women be friends?) and practical (e.g. have you ever had a best friend of the opposite sex?) this study explores both what people hold to be true and how this manifests in their lives. This study notes that often people believe it possible for men and women to have entirely platonic relationships, but they rarely materialise in that way. The study concludes that theoretical answers outpace practical answers, and the intentions of those in a serious, intimate friendship with someone of the opposite sex will often have feelings that will lead the friendship away from its platonic origins.
Each year, millions of college freshmen begin a new chapter of their life as they embark on their journey to various universities in the United States. A very small percentage, however, come to college in the efforts to both earn a degree and play their respective sport for the university. This study looks into the effects that sport has on a freshman student-athlete’s transition into college with the intention of identifying factors that complicate or relieve the common stressors of a freshman’s transition. Freshman student-athletes of various sports, seasons, and hometowns were interviewed during the spring of their freshman year to reflect on the transformation that has occurred since coming to college in the fall. While a common finding was that the beginning of the year was an adjustment, these athletes found that their sport generally aided in their transition for a variety of reasons. Even those who faced pressure or injury during their first season outweigh the positives of being a part of a team from the moment they walk onto campus. From this information, I can conclude that having an instant support group and activity during a time of uncertainty and newness can help all college freshman transition into their first year.
The Disconnect Between Perceptions of Feminists and Self-Identification as a Feminist

For decades, feminism has been interpreted to mean a variety of widely different ideals: from man-hating to equality of all sexes. Consequently, the image of what a feminist is, such as their looks, beliefs, and actions, also widely varies from person to person. This study examines how modern-day college students perceive feminism and, more specifically, feminists. Knowledge of how college students today view feminism and feminists can accurately measure how modern feminism, as it exists today, is defined. Older generations might have biases or preconceived notions when perceiving modern day feminism due to lingering opinions of previous waves of feminism. The majority of the college students surveyed, however, have said they are only moderately or slightly familiar with the history of feminism. Therefore, their perceptions of modern-day feminism are purely based on how feminism exists today and not affected by notions of previous waves of feminism. In previous research, results have shown that people are less likely to identify themselves as feminists when they have negative views of feminists. This occurs even when people have positive views of feminism. However, the research conducted for this study shows that this is still true for men, but not for women. The negative views that female participants held towards feminists had no effect on their self-identification as feminists. This study concludes that there is a disconnect between the perceptions of feminism and the perceptions of those who follow feminism.
Fake News, Real Consequences:
A look into how fake news is impacting science, and what we can do to fix it

With recent advancements in online news, political tensions, and social media, the communications world has practically created a breeding ground where fake news can flourish. The scientific community, in particular, is becoming more and more overrun with false reports with no reliability that may influence the public to dismiss the credibility of many legitimate scientific pieces. However, few attempts have been made to prevent the detrimental impacts of fake news from advancing. This paper argues that educating young students on the ideas of fake news, implementing self-regulatory laws, and other possible solutions might make for a safer, more trustworthy news community within the world of science writing.
Ever since its origin in the summer of 1946, the National Basketball Association has continually risen in popularity. Almost fifty years later, the Women’s National Basketball Association was formed under the wing of the NBA. To this day, there has been much controversy over the known salary gap between pro women players and pro men players. As of 2018, the largest NBA contract was worth up to $34 million. While most of the largest WNBA contracts barely reach past $110,000. Since both leagues have received backing from large corporations, including Nike, General Motors, Coca-Cola, American Express. People then wonder why there is such a large gap in salaries between the two leagues. Most people identify sexism as a reason for the salary gap. However, this is not the case. The salary gap between NBA and WNBA players is justified due to the NBA’s tax model, Title IX involvement, the difference in attendance and attention levels, and the fact that the NBA has been around longer.
What About Tinder? A Qualitative Research Project Investigating What People Think About Dating Apps

Dating apps have become popular and made mainstream through current technology and a decreased stigma around their usage (Smith and Anderson), and a number of studies show how people view these apps and some general data trends (Sumter, Vega, Mitchell). But, what do people think of these apps? This premise is what this study aims to understand, specifically within the “college age” demographic of people ages 18 to 24. The information for this study was gathered from a survey that was distributed throughout my social groups on Facebook, Snapchat, Instagram, and iFunny, as well as an additional link that was attached to a chain email. Other information for this study was derived from both other studies on or relating to this topic and from electronic news coverage of dating apps. The study, derived from 35 voluntary participants mostly within the goal age range (7 were not), suggests that, while a majority of this population uses or has used dating apps, most of the population views it as a hookup app, with less than 10% of the population stating that dating apps such as Tinder could be a “serious” dating app. The study also finds a generally positive or ambivalent attitude towards using these apps themselves and a mostly positive, if cautious, attitude towards their friends’ usage. These results indicate a less stigmatized viewpoint of dating apps and of using these apps for hooking up than perhaps older demographics, which opens the door to future analysis.
Methods of what practiced in the field of management differ by situation, team, and individual and have different effects on employee input, company output, and the overall workplace environment. To analyze the most common of these methods and determine their most significant effects, four subjects with experience from various work settings reveal employee attitudes towards management styles and actions and the impact of those managerial attitudes through a series of interview questions. This study aims to explore manager types and techniques in corporate and local, family-owned companies, and therefore, environments and their success are compared. Employees’ willingness to come to work and perform their best is largely impacted by how they felt about and view the management and managers that are more focused on creating an enjoyable environment and good relationships were typically viewed better. Further, the type of management that works best for a company can be predicted by its nature and motives of the company. The project distinguishes the management methods with the most benefits in the most situations and offers lists of characteristics that should be used to determine which type of manager will succeed.
The idea that materialism and clothing affect self-esteem and clothing choice is common knowledge to this generation of college students. Students might not feel that they are influenced by these factors today, but a majority of people can say that they were at some point in their lifetime. “Name brand clothing” is typically made famous by a manufacturer and marketed towards a certain demographic, often times an age group. Possessing brand names or lack thereof can affect self-esteem rates, causing people to feel insecure if they are not wearing their definition of these popular clothing brands. Research shows that tweens are most affected by this need to fit in, and they look to material goods to boost their self-esteem. In this paper, I examine how self-esteem is influenced by people’s personal view of materialism and name brand clothing based on research done and survey results. In my survey, I asked college students how they define name brand clothing and how they think it affects their self-esteem both today and in earlier adolescence. The results of the survey support previous researchers’ conclusions, but many respondents suggested that brand name influences people’s clothing choices more in high school, but it affects self-esteem more in middle school. Results also suggested some practical explanations as to why people are less brand-sensitive as they grow older, such as parents not paying for clothing and valuing comfort over style. Name brands continue to have an impact on clothing choice because of the materialistic nature of today’s society, but its influence on people’s self-esteem remains most prominent in early adolescence.
This essay addresses the widespread and unsettled issue of the consequences of nationwide marijuana legalization on the youth population. If such legislation were to be made to nationally legalize marijuana, there would undoubtedly be large changes. The question lies within how devastating or how beneficial is the legalization of marijuana. Some people believe that marijuana has very little effect on even children’s wellbeing, while others firmly vouch for the toxicity within the plant's chemical makeup. Within this essay, I explain how marijuana legalization would have negative consequences on the nation’s youth population because of the youth’s tame view of marijuana, mental repercussions (educationally and psychologically) linked to marijuana, and the dangers it poses to the youths’ futures. This essay also addresses the downfalls of potential medically legalizing policies for marijuana due to the elasticity of the laws surrounding those policies, and the widespread accessibility it provides to the general population, and therefore the youth.
The purpose for conducting this project was to grow the understanding of how grammatically gendered languages can influence one’s perception of the world around them. The specific area that my project focuses on is the correlation between grammatically gendered language and international marketing/advertising. The application of this research would be for companies and service providers looking to expand into a market with a differing language. The problem surrounding the current understandings of language and worldly perception is the overall lack in application to the marketing/advertising world. To conduct this study, a survey was performed in which participants were asked to choose adjectives that best describe a given word. Each word was chosen based on its differing grammatical gender in several languages and its overall ability to be perceived in various ways. The results for this study showed slight trends, but they proved to be insignificant upon further statistical analysis. A larger sample size, however, a study with a larger sample size may provide significant results.
Frannie Gallegos  
A classroom project for English 298

Foreign language acquisition has a wide variety of benefits. From a practical standpoint, foreign language ability allows students to communicate with more individuals. However, in addition to simply enabling communication, foreign language competency can give individuals a greater cultural awareness. Therefore, foreign language education is an important resource for students in school. However, despite these benefits, the foreign language programs in American schools is relatively underdeveloped. This project explores American foreign language education programs in public school systems. Through interviews with a high school Spanish teacher, a second grade teacher, a college professor, and a college-aged foreign language student, this project ascertains how foreign language education is implemented on various levels and whether individuals believe the American education system values foreign language education. Additionally, individuals share why they personally value foreign language education. All four interviewees reported that they do not believe foreign language education is valued by the American school system for varying reasons. Additional research as well as interview responses demonstrate the importance of foreign language education in teaching individuals to have cultural competency and exposing students to ideas and practices common outside of and even within their own communities. Because of the unique experience and perspective foreign language competency gives individuals, the American education system should implement foreign language education earlier and more consistently in school. By doing so, students will benefit more greatly on individual bases, but also general perceptions of what constitutes “American” culture will become less closely tied to use of the English language.
As society becomes more connected through technology, it is important to look at the languages used by different peoples. Throughout most of the world, the majority of people speak at least two languages, and most school systems require a second language to be learned. In America, that has not been the case. However, it is important to see if Americans are becoming more accepting. Therefore, I am studying the American opinion on foreign languages and bilingualism to see if our culture is changing from a monolingual country to be more bilingual. My hypothesis is that more Americans are becoming open to using languages other than English throughout our country. I also hypothesize that the younger American generations and more liberal leaning people are open to having the next generations learn more than one language. In order to gauge the American opinion, I made a survey that ran from February 12 to March 8 that yielded 255 results, and all of the participants in this study either live in the United States or are American Citizens that live abroad. My key result indicated that the American opinion is becoming more open, as the younger generations seem to be open to the use of more languages and multilingualism.
With sports gambling being legalized in the United States, it is receiving more attention than ever before in the media. College students are seeing more exposure to sports gambling and this has caused a rise in its participants. Gambling is a game that is not in the player’s favor; and, more often than not, the player loses both more bets than they win and also more money than they make. These results from gambling often carry negative consequences for gamblers. I have conducted research and attempted to breakdown the characteristics that link individuals’ backgrounds to their depth of gambling participation. My work aims to find out what situations, if any, can result in a positive experience for college students gambling. With this knowledge, the question of whether or not intervention should be used to prevent students from gambling can be answered.
What Behavior Leads to a Good College Experience?

A college campus today looks very different than it did 10 or 20 years ago. Higher education has evolved over time and, as a result, so have colleges and college students. Today’s students carry a heavier financial burden, deal with a different dating scene, and use social media. In the midst of a new college environment, I examined what behaviors can lead to a good and memorable college experience. In this study, I asked students in an anonymous survey to rate their college experience so far. The students are from a variety of different grades, majors, and genders. This study noting that some demographic characteristics play a role in a college experience while some have no influence at all, concludes that having a strong social outlet or being a part of an organization that offers a social aspect directly correlates to a positive college experience.
This is a classroom project for English 298. Language is one of the most important staples of everyday communication and culture. No matter the medium, it drives most interactions between people. One difference between many languages is the syntax and word order that they are built around. This can cause difficulties when communicating in writing, which can affect the reading comprehension of English speakers who are used to subject-verb-object word order. Syntax and Word Order will affect comprehension of sentences by English speakers. To test this, I created and distributed a survey with 10 sample sentences, 5 of which were in the common subject-verb-object word order used in English, and 5 of which were in the Subject-Object-Verb form which is the most common word order used worldwide. I received 114 complete responses, in which all answers were filled out and the participant gave me permission to use their results for data analysis. I analyzed these results by using t-tests to determine if there was a significant statistical difference between the accuracy of answers that were in Subject-Verb-Object form that is common in English compared to the Subject-Object-Verb form that is common worldwide. After performing this statistical analysis, I found that the word order of a simple sentence has no significant effect on the comprehension of that sentence by survey participants. This is important, as it shows that English speakers can parse information properly, even if it is given to them in a form that they are not educated in. The lack of demographic diversity present in the results may be prominent enough to warrant similar studies with a broader scope.
Jill Grant - a classroom project for English 298

Texting has a bad reputation and many believe that texting hurts literacy skills. This paper presents the results from a study of 138 survey responses regarding the relationship of certain texting habits and reading comprehension skills. Participants were asked to indicate how often they text and how many abbreviated words or phrases they typically use as well as other factors in their texting and their confidence in performing various tasks associated with reading comprehension such as identifying the main idea of a passage and explaining the main idea to someone else in their own words. The answers to the questions assessing texting habits were cross-tabulated with the questions assessing reading comprehension and it was found that those who use 5 or more abbreviations per text are significantly more confident in their reading comprehension skills than those who use 0-3 abbreviations in their texts. Further a neutral correlation was found between frequency of texts per day and amount of time it takes to compose a text message and confidence in reading comprehension. This suggests that as one’s abbreviations per text increase, so does their confidence in reading comprehension abilities. These findings are discussed as well as directions for future research.
This study analyzes the link between proper grammar, educated vocabulary, and formal language and professionalism. A survey which recreated an interview like setting was released to the educated public and was taken by 64 participants. Two candidates with the same qualifications presented elevator pitches. Candidate A used proper sentence structure, formal language, and scholarly vocabulary while Candidate B lacked professional language, sentence structure, and used informal pause words. When asked to determine which was the most qualified, well prepared, and passionate Candidate A took the majority, resulting in 98% choosing Candidate A to book a followup interview with in the survey. These results were compared with the leadership qualities the participants ranked to be the most important, qualification and charisma, suggesting that professionalism is directly tied to presentation of oneself. This proposition can be further studied to determine which specific words and phrases a speaker can use to be perceived as the most qualified, in order to ensure success in interview settings. The majority of this study’s demographic, collegiate students that are the bulk of the upcoming work force, can use this data to be more aware of how others perceive them in professional settings.
Poster #328
Student(s): Bailey Graves
Faculty Mentor: Barrow, Robin
Project Title: The Effects of Generational Differences on Opinions of Socialized Medicine and Healthcare

Bailey Graves

“The Effects of Generational Differences on Opinions of Socialized Medicine and Healthcare”

Abstract for a Classroom Project for English 298

In today’s world, healthcare is a highly debated and controversial topic, with many asking one important question: is healthcare a right or a privilege? Supporters of socialized medicine, a form of healthcare that gives all citizens medical care through public funds, see healthcare as a right. Issues arise with socialized medicine because there are such varying opinions as to whether or not it is truly effective. This classroom project for English 298 looks at opinions on socialized medicine held by current medical professionals and compares them to those held by current nursing students at The University of Tennessee Knoxville. After conducting a survey and interviews with a group of nursing students, it was found that 89.3% of them believe healthcare to be a right. But, 71.4% responded that they think having socialized medicine would make their future jobs as nurses hard. This suggests that a new form of healthcare could emerge in the future that grants people more equal opportunity in healthcare but also differs from socialized medicine. Until then, it seems more important to educate all people on healthcare and global policies so that one day there will be an efficient healthcare system that benefits everyone.
While watching a film, audiences commonly form connections with characters that manipulate their emotions. Psychology and philosophy experts are divided over why exactly audience members experience these character-directed emotions. The three primary reasonings for character-directed emotion are that audiences are either making a sympathetic connection, an empathetic connection, or a vicarious connection. While some experts assert that just one of these explanations is evidence enough to justify these audience-character connections, many provide their own joint-explanations that cherry-pick aspects from each rationalization. To answer the question of how audiences experience character-directed emotion, this paper presents a unique argument that synthesizes the most persuasive aspects of all three arguments and then provides a way in which they work together to explain character-directed emotions. Effectively, this paper asserts that audiences don’t exclusively experience one form of character-directed emotion when watching a film. Rather, aspects of each reasoning can work simultaneously to manipulate the audience into feeling a certain way.
Abstract for EURECA Presentation: A Classroom Project for English 298

This research looked to address the ways in which most caffeine-affect studies are faulty, specifically in regards to their failing to account for the influence of withdrawal reversal, as correlated to how college students perceive caffeine’s effects on themselves. A literature review was conducted, then the results were compared to the responses of three female undergraduate students from the University of Tennessee, Knoxville. It was hypothesized that the responses from the interviewed participants would follow the results and trends of the inaccurate caffeine studies. Interviews were conducted in relaxed environments and participants were encouraged to elaborate as much as they wished. The results of the study indicated that the participant’s knowledge followed the inaccurate conclusions from the faulty caffeine-affect studies. Consequently, caffeine studies need to be performed in more accurate ways in order to prevent the spread of false information to vulnerable groups such as college students.
Will Greenberger

Gambling as a Drug: What Gambling’s Addictive Properties Mean in the Technological Era

A classroom project for English 298

The rise of the internet has provided new opportunities for gambling, and online gambling websites have capitalized on this opportunity. This essay, written in response to the increasing deregulation of gambling within the United States and the increasing availability of online gambling, demonstrates the severity of gambling addictions and need for increased focus on treating these addictions. The essay argues for the necessity of increased regulations on gambling and more effective treatment methods by drawing similarities between drug use, gambling, and appropriate treatments for addictions of the two. The evidence provides reason for a change within gambling prevention programs in the United States and highlights its importance given the growing presence of online gambling and its correlation with youth gamblers. Considering the shift in treatment for gambling addiction in countries like Brazil and Switzerland, this essay supports the argument for the United States to develop methods useful for treating gambling addictions.
Statisticians have often tracked the enrollment rates for college universities; however, in recent years, studies have found that the percentage of students who attend an out-of-state post-secondary institution is fairly low. Although expected, these statistics have led to increased research into the factors that influence the college decision-making process. Yet, these studies have focused primarily on common influences not specific to out-of-state students. This study researches the personal factors which lead students to choose an out-of-state university in an effort to aid post-secondary recruitment offices in the advancement of campus diversity, along with simply granting insight to prospective students investigating college options. In this study, two interviews were conducted along with a survey that was distributed to out-of-state students, predominantly at the University of Tennessee, Knoxville. In addition, previous peer-reviewed research was utilized to explore the common and the uncommon underlying elements in the decision process. This study concludes that personal elements such as intuition and opportunities for maturity greatly influence students’ college decisions, along with common factors like housing, extracurricular activities, and job availability. This study finds that students experience several unanticipated obstacles caused by their out-of-state status and also recommends that recruitment offices appeal to out-of-state students in ways unique to them to increase the enrollment percentages. In addition, it is recommended that prospective students engage in active research in order to fully consider every factor that could influence their college decision.
Abstract

Alyssa Grissom

A Classroom Project for English 298

Marketers attempt to increase positive product perception through advertising, but many studies focus on only one or two forms of language manipulation. My study combined multiple manipulations, and I hypothesized that metaphoric, complimentary, pictorial, and effective semiotic (first group) advertisements would influence positive product perception greater than literal, noncomplimentary, linguistic, and ineffective semiotic (second group) advertisements. I surveyed 203 people who viewed three ads of a Chevy Camaro and rated product perception. Contrary to my hypothesis, I found that the first group of elements was less effective than the second group of elements. People were not interested, did not feel important, and did not want the product after viewing the first group of elements in action. I concluded that complimentary language works well when presented alone, but its persuasive power is weakened when paired with metaphoric language. Pictorial-based and stimulating semiotics are also ineffective when not enough information is provided for the consumer to identify themselves in the message. A metaphoric, complimentary, and pictorial advertisement is too ambiguous, so people believe literal ads are more credible. Functional language allows the consumer to actually envision the benefits of a product. Although my hypothesis was not supported, this study provides an understanding of how particular elements can work well when presented alone (e.g. complimentary language) but not when paired among other elements (e.g. metaphoric language). More importantly, the results suggest that marketers should seek a balance when emphasizing the psychological and functional benefits of a product in order to create a dreamlike yet realistic message.
The primary objective of this research was to gain a better understanding of youngest children’s perception of how birth order ties into their independence in comparison to their siblings. Although previous researchers and the general public do believe birth order stereotypes hold true, the survey data and interview as well as the research of Harris (1995) suggested there is more to one’s personality development than birth order. Fifteen individuals who were the youngest children in multi-child families were solicited in a survey; fifteen responded to the survey and two responded for follow-up interviews. The responses from the survey and the follow-up interviews conveyed the pool of seventeen to twenty-year old’s perceptions on family dynamic and personality development in terms of birth order. These results, as well as the results from the interviews, correlated strongly with Harris’ (1995) research as all participants disagreed with at least one aspect of their birth order stereotype. However, this data contrasted with Herrera’s (2003) research over the effectiveness of birth order as a definite personality determinate. Although these results only convey the perceptions of the participants in this specific case, the results combined with the work of Harris (1995) have the potential to reflect a generalized disagreement with youngest child birth order stereotypes. With a larger pool of participants and the opportunity to delve deeper into the psychology of personality, perhaps a future study can provide a conclusive consensus.
Abstract

This study examines the effects of nutrition education on the overall diet quality of university students. It also explores specialized forms of nutrition education that may be effective in promoting good diets. Interviews were conducted with a student and two nutrition professors at the University of Tennessee. The student answered questions that asked about his general diet. The professors answered questions about the effectiveness of education as a form of intervention for bad diet choices. I predicted that general nutrition education would be effective in promoting healthy diet. However, a general nutrition course appears to not be effective. Instead, the participants argued that students generally know the basics of nutrition. They contended that it may be more effective to teach students skills in order to make eating healthy easier to increase diet quality. Moreover, this type of intervention should be individualized to the need and schedule of the student. Thus, it may be best for students to experience practical education of nutrition in order for them to have a healthy diet.
The American Southern accent has been shown to influence perceptions of individuals and even job acceptances and placement of speakers with the accent (Markley, 2000). While these biases based on accent are not necessarily accurate, they do exist and have been shown to be significant in perceptions of individuals with Southern accents when considering various personal qualities. Based on knowledge of various Southern accent stereotypes, I anticipated that a Southern speaker would be perceived as less intelligent and less likely to be accepted in a simulated university acceptance situation. To test the perceptions of the Southern accent, I posted a survey open to anyone, which contained audio recordings of a Southern and non-Southern speaker of the same gender and relative age. This survey allowed me to gather data about perceptions of the Southern accent in the scope of the university setting and obtain fairly widespread demographic results. The results suggested that having the Southern accent did not lessen the acceptance into university; in fact, the Southern speaker was more likely to be accepted into university, as 71.19% of participants chose the Southern speaker to be accepted into the university. In contrast, 28.81% of participants chose the non-Southern speaker. This could be due to a difference in enthusiasm between the speakers, however. The Southern accent did, however, impact the perceptions of the speakers based on the other categories tested, including kindness, wealth, and multicultural awareness. The Southern accent does not necessarily have a negative impact on the perceptions of the speakers in the simulated university setting, however, even though it was shown that there is a bias present in some categories when considering the accent.
A Study of the Influence of Religiosity on One’s opinion on the Mind-Body Problem:

The categorization of things mental and physical, impelled by scientific synthesis and countered by longstanding belief in the unexplainable complexity of human mental states has led to the polarization of philosophical thought into two distinct camps, substance dualism and physicalism. The Knowledge Argument proposed by Frank Jackson in the early 1980s strikes at the heart of an ongoing battle between those struggling with the mind-body problem. As scientific discovery progresses and knowledge of physical states of being expand, they push the “line of scrimmage,” so to speak, more firmly into physicalist areas. To evaluate the degree to which societal views on this fundamental conflict have changed, individuals were surveyed regarding the popularized “Mary’s Room” thought experiment, sampling level of spirituality and religiosity as a main marker to see the extent to which physicalist ideas have pervaded social and intellectual norm. The results indicate that this is a small extent, with even a large percentage of irreligious people concluding that Mary learns something as a result of being exposed to color despite knowing the all of the physical facts about it. This points to a continuation of dualist ideas despite the heavy emphasis modern society places upon the scientific.
Service animals and emotional support animals are increasingly common forms of treatment for a number of physical and mental disabilities. As the use of these animals becomes more common, colleges must find ways to accommodate these animals in a legal and non-discriminatory way. However, the laws surrounding these animals and their uses consist of contradictory and overlapping definitions as well as intertwined legislation that is difficult to manage when forming policy. As a result, colleges are at risk of being sued if they misinterpret these laws. The goal of this project is to review the policy at the University of Tennessee Knoxville on these animals and seek ways to minimize legal risk while maximizing student accommodation. This analysis also covers the broader implications of service and emotional support animals on campus through a comprehensive analysis of their current legal definitions and proven medical benefits. This project concludes that the vague case-by-case policies of the University of Tennessee and other universities is insufficient given the legal confusion surrounding service animals. The University of Tennessee Knoxville should be completely knowledgeable of the current laws and have an explicit, complete policy surrounding these animals in order to avoid unfortunate lawsuits.
The recently developed ability to genetically modify embryos, both for therapeutic and cosmetic purposes, has brought up various ethical issues regarding societal changes that medical professionals and intellectuals alike must consider when evaluating this new technology, specifically CRISPR-Cas9. This paper will suggest that from an ethical standpoint, it is absolutely necessary that the already present inequalities be taken into account when deciding how to introduce this technology to the world, and optimize its medical advantages. The synthesis of research works to caution society against allowing genetic modification technology to further inequality through economic inequities, differences in religious beliefs, and disparities in governmental regulation. By examining various viewpoints on how this medical technology would benefit global societies, this paper will examine to what extent societies would be improved or worsened, and use these viewpoints to stress the global issues that must be monitored most closely in order to utilize the technology in a manner that would improve the overall human condition without worsening global inequality and altering society in negative ways.
Race is often a subject of concern when assessing healthcare outcomes, including reproductive healthcare such as abortions. As an initial step towards understanding how, or even if, race affects an individual’s experience with abortion services, the author conducted interviews with individuals from the state of Tennessee who had received an abortion as well as abortion care providers in order to determine if race was a significant factor in the discussion, and even willingness to discuss, an individual’s own abortion. Abortion is highly individualized, where no person has the exact same experience. A variety of emotions, both negative and positive, are felt by those of different racial backgrounds. Abortion is influenced by, and thus experienced through, a variety of intersectional factors, including race, gender, religion, socioeconomic status, and geographic location.
The Rise of Electric Cars and the Effects on Knoxville Mechanics

Harris, Duncan

A Classroom Project for English 298
Faculty Mentor: Nicks, Robin

From 2008-2012 Tesla Motors produced the first all-electric production car to use lithium-ion battery cells and to get more than 200 miles per charge. Known as the Tesla Roadster, this car was one of the first well selling all electric cars to be introduced in the American market. Since the production of the Roadster, Tesla and many other manufacturers have produced countless all electric vehicles, many of which have outsold the Roadster. This study interviewed electric and hybrid car owners in Knoxville about their opinions on electric cars and how they dealt with maintenance. This study showed that the mechanic shops had already begun being affected by the rise of electric cars, and they expected that the effects would continue to worsen unless they changed their business. Understanding how small businesses could be affected by the rise of electric cars is critical in understanding the next steps to take in the development of infrastructure for electric vehicles in the United States.
My name is Caroline Harrison, and this is a classroom project for English 298 with Dr. Robin Barrow. Choosing a major is one of the most daunting tasks college students face, as it more or less determines their everyday life in the future. With new options available every year, one must wonder how students make their choice and why one field of study stands out among the rest. With technology and research on the cutting edge, neuroscience is becoming a popular major for students. My project involved interviewing three college neuroscience students and, with their consent, analyzing their responses along with peer-reviewed journals to uncover the reason that they chose neuroscience. I examined the pros and cons of the education, job opportunities, and life after graduation for these students and asked them about their expectations about what they can do with their major later on in life. With this project, I aim to help students get a better idea of what majoring in neuroscience is really like, both the good and the bad, as well as explain some of the options that studying neuroscience provides, in order to make their choice of major easier.
Mary Katherine Hartman

A Classroom Project for English 298

Abstract

Political influence from social media has become an increased area of interest in recent years. As social media outlets have gained prominence and popularity among a wide range of age groups internationally, they have simultaneously begun to have an increased influence on politics. The large influx in social media use is important to study, as it helps to understand the impact of social media on the political world. This impact occurs because the way social media impacts politics has the potential to directly influence those who are able to vote. This specific study provides insight into how the way the language that is used in social media platforms has an effect on the way that those who use social media perceive the information regarding political issues. A survey was completed for an IRB approved study by a CITI certified individual through the University of Tennessee. The results of the survey showed that 95% of participants believe there is bias in political posts found on social media, and survey results indicated that close to 90% individuals are prone to disregarding information from these posts when forming political opinions, as they are not deemed to be trustworthy. Based on these conclusions, it can be stated that language used in social media does not influence political perception, as results do not indicate an alteration of personal views based on politics in social media.
With robotics and artificial intelligence development progressing at a rapid rate, the question of how to make them behave in ethical manners is becoming increasingly important. Sections of this debate focus on existential questions and philosophical contemplations about the rights or possible sentience etc. of robots; however, while these discussions may be important, they do not provide a practical solution for how to program robots to behave ethically. Furthermore, many of those who do address solutions provide systems that can be too focused, perhaps concentrating on only one or two aspects of ethical decision making, or too broad, giving only a loose solution. Therefore, this article presents a 5-step framework to aid in the programing of robots and artificial intelligences in the hope that it will be able to give a more comprehensive solution to programing robots to behave ethically.
Since the turn of the 21st century, the use of email in professional, academic, and social settings has drastically changed non-verbal communication, making it faster and relatively easier. In many professions and nearly all universities, email has become a necessity; however, recent research has called into question how this changed mode of communication can affect intersocial relationships, particularly in “professional” dialogues, e.g. employee-to-manager or student-to-instructor. These dialogues are noteworthy specifically due to their power imbalances; moreover, these hierarchies use consequence and reinforcement through “social etiquette” as a tool to compel people to act by a set of norms. In this study, I narrow the focus to the academic setting -- primarily at the college level -- to analyze student-instructor relationships. Following a review of the body of research, qualitative data was obtained from student surveys, as well as two interviews with a student and a college professor, in order to provide a further understanding of email and its relation to the power differential between students and instructors. This study concludes that the power imbalance between students and instructors, primarily at the college level, manifests and reinforces itself through email communication; however, most students still view email positively.
Garrett Henniger

A Classroom Project for English 298

Abstract

This study identified the effect that personal music had on how people perceive themselves. The object of this study was to create a platform for more detailed research to delve into this topic further. Four undergraduate students were asked to take the Myers-Brigg and record their results prior to being interviewed. They then were interviewed and instructed to listen either sad or happy for 10 minutes based on their responses. From there they retook the Myers-Brigg and were debriefed after. The hypothesis was that after listening to sad music there would be an increase in introversion and happy music would cause an increase in extraversion. The specific types of music, happy and sad, had these effects, however, it was not anticipated the change in thinking and feeling that resulted from the music. There were also significant differences between how the two genders interviewed reacted to the music. These findings were backed up by previous research done by several people established in the field. This study needs to be further repeated and explored as the sample size of this study is ideal for preliminary research.
In recent years, Alfred Russel Wallace has regained some notoriety in the scientific community as a cofounder of the theory of natural selection, which is typically reserved for great Charles Darwin. This is an injustice to his memory as Wallace was more than a simple “cofounder”. Wallace devised his own theory for natural selection completely independent of Darwin, and, over time, Wallace’s theory has been proven more scientifically accurate than Darwin’s. However, the scientific community wrongly accepts Darwin’s theory over Wallace’s because of deviant actions later in Wallace’s life such as supporting women’s suffrage, civil rights, and environmental conservation. In an age that is striving to overcome bias, the scientific community has an obligation to Wallace to recognize that Wallace’s theory is superior to Darwin’s, and that his contributions to science are not impacted or diminished by his divergence from stereotypical norms.
Business analytics has been expanding as an industry for years, and people are only recently noticing it. By utilizing large piles of data that companies have compiled over the years, big data analysts have the capability to revolutionize the processes people use and even make ordinary life easier. In a rapidly globalizing world, it is becoming a necessity to communicate these business ideas and model them effectively so that anyone can understand them, and analytics is the way to do it. When looking for more information, I set out for interviews with business professionals at the university to see exactly how analytics is serving the university and how it can improve the students’ lives. This project will explore how big data analytics can bring more students to Rocky Top, prevent students from dropping out, and what impact it makes on the faculty. I hope to be able to apply the principles of business analytics outside of a business setting and bring to light how important this major is.
Nina Hethmon

A classroom project for English 298

Project Title: Putting Stiches in a Papercut: Why a Border Wall is an Ineffective Solution to the Minor Issue of Illegal Immigrants Crossing the Mexican-United States Border

The media holds great power in shaping the public’s opinions about any topic. Recently, illegal immigration has been a topic of great concern for the public. President Trump’s attempts to fund a border wall on the Mexican-United States border the past few months has been a source of countless news stories. Despite research on illegal immigration many people believe that a border wall will solve the majority of problems with illegal immigration. Many of the perceived problems with illegal immigrants are perpetuated by stereotypes of their violence, laziness, and lack of education. Despite these stereotypes being rooted in falsehood, they are a driving force against illegal immigrants, and a driving force to fund a border wall. The facts are that these stereotypes are unfounded, and that a border wall will do little to prevent illegal immigration. The stereotypes are perpetuated by confirmation bias and most illegal immigrants overstay their visas instead of crossing the border illegally. A border wall would be an unrealistic solution to the vast minority of illegal immigration as well as overly expensive for what control it does offer the border.
College Freshmen’s Perceptions of Social Issues

Hicks, Douglas

A Classroom Project for English 298

Political divide in America is higher than ever. The future of America will be decided by the voters of today. College students are the youngest demographic able to vote. As such, their beliefs will greatly impact the future of the United States. Gaining a better understanding of their beliefs may give some insight into what political paths the future of America is likely to take. The researcher sought to determine the stance college students tend to take regarding social issues. The researcher conducted an anonymous survey distributed to Lee University and the University of Tennessee in Knoxville. The distribution of students’ political identities was even, yet students responded with liberal views of social issues more often than not. Roughly twice as many students viewed issues liberally rather than conservatively. It is likely, therefore, that students will vote liberally regarding social issues, therefore leading America in a socially liberal direction. The researcher also conducted two interviews with two participants of the survey to gain a more in depth understanding of why the students voted the way they did. Future studies should include a larger sample size from a wider variety of colleges, resulting in more conclusive results.
Ryker D. Hill

A classroom project for English 298

The cost of college has skyrocketed in recent years, so more students are taking out loans to make up for the lack of school financial aid. The national student debt is now in the trillions and is still increasing with every passing second. Currently, U.S. congressmen are debating how to handle this debt. What Congress doesn’t know is that the current federal aid system discourages students from getting a higher education in fear of taking out loans. This study aimed to find out who bears the most burden of student debt, why they do, and how student debt affects their educational goals and decisions. Five UT students were asked about their student loan debt, family income, and their decision to go to college. The FAFSA algorithm assumes having more parental money and assets denotes an ability and willingness to pay, when the reality for many of these students is quite different. Most of the interview subjects’ parents cannot afford to help their child pay for college, or they just flat-out refuse to help regardless of affordability. Despite this, the indebted students do not consider the possibility of debt to be an important factor in their decision to go to college. However, they are quite worried about paying off their debt in the future.
A classroom project for English 298

Qualitative Research Abstract

In recent years the issue of women leaving STEM graduate programs has grown to an international problem. Many have argued that a gender filter exists discouraging women from joining STEM graduate programs at many points along their academic career, leading to an overall lack of women in graduate programs. In order to learn more as to why this is the case, interviews were conducted of a select group of women, all of whom either earned their PhD in a STEM graduate program or dropped out of their STEM graduate program. In the interviews the women were asked a series of questions regarding their time during both undergraduate and graduate studies. In specific, many of the questions were tailored to see if their gender had affected their experience and if so in what ways. The findings show that there is indeed discrimination in many STEM graduate programs and there are larger systemic issues which cause many women to drop out. These issues include societal expectation of the woman to follow the man, having children, sexual harassment, and the inability for many men to have normal platonic interactions with women. While these issues aren’t specific to STEM, less women leads to a less diverse research environment which drastically decreases the quality of research and stunts the growth of knowledge and innovation.
Ageism has been a problem in healthcare for many years. Given the rapidly increasing percentage of the population that is classified as “aging” or “elderly”, claims of ageism are more prevalent than ever. This study explores the reality of ageism, the effects of ageism, and the viewpoints of victims on ageism. Interviews of subjects that have encountered ageism were utilized. Results obtained showed that nearly everyone considered “senior” has encountered an instance of ageism while seeking healthcare at least once in their life. Subjects felt that in most cases, ageism did lower the quality of care in which they received; however, in some cases, subjects felt that ageism had a positive impact on their treatment. This led to the conclusion that while ageism is prevalent in healthcare, it is not something that should be viewed in a purely negative light. Ageism can be useful in order to properly treat and diagnose patients. Ageism also does not have to be poor treatment of someone older but can rather be strengthened protocols in order to handle patients in their advanced years.
Regarding language research and the evolution of language, profane language research is often under covered and under discussed. Additionally, within the field of profane language research, profanity and its involvement in education is an even more overlooked field, despite research by Timothy Jay and Kristin Janschewitz showing the possible benefits of cursing in human communication. (Jay and Janschewitz) The following study and research seeks to attain students’ opinions on the use of profanity in the classroom by their professors and wishes to see the effect that professors using profanity has on students’ attentiveness and understanding of the material. After collecting sources and researching why we curse, the positive and negative effects of profanity, and profanity in schools, a 15-question survey, including two demographic questions concerning gender and religious identity, was created and setup for one week using QuestionPro to attain these opinions of the student participants. The survey was distributed on various social media platforms and taken by 91 students at the University of Tennessee and Pellissippi State. The survey mainly found that while there is evidence from the results of the survey that show that use of profanity by an instructor is not offensive to 96.70% of the respondents and that 16.48% of the participants found that it distracts from class material and find themselves less likely to pay attention, a majority of the respondents found that whether the professor uses profanity or not does not directly affect their willingness to pay more attention or affect the professor’s ability to relay class material.
While most statistics on addiction in the United States are slowly declining, there is one category that has made a steady increase over the last decade. This category is opioids, specifically prescription painkillers. The goal for this study was to investigate students’ and professionals’ perceptions about the opioid crisis and a newly approved drug, DSUVIA. Interviews with two groups, students and professionals, were conducted. Participants were asked to describe a range of information regarding the subject, spanning from personal experience to common knowledge of the topic. From these interviews, similarities in initial opinions about the opioid crisis within the two groups interviewed were found, but beyond basic knowledge and into major opinions, disparities across the two groups on their opinions and answers were noted. There were also disparities within the groups, specifically in reference to methods of treatment or further prevention of opioid abuse. The answers given by both groups is helpful in establishing the differences in knowledge between the common citizens and professionals with an experienced outlook. This study also provides greater context in the understanding of misuse and abuse of opioids, through the perceptions of these individuals. This context helps explain how the opioid crisis has become so out of hand and why there has been no dramatic resolution to the current situation.
A classroom project for English 298
KiAnna Holder
Professor Gentry
English 298, section 007
8 March 2019

Extensive Social Media Use: Negative Effects on the Psychological Well-Being of Young Adults

Does the extensive use of social media impose negative effects on the psychological well-being of young adults and adolescents? Numerous psychologists and researchers have conducted studies over the last ten years which have: (a) assessed the effects social media users experience as a direct result of social media use and (b) asserted that increased use of social media positively correlates to decreased psychological well-being, such as increased depression, anxiety, and decreased self-esteem, among young adults and adolescents. This essay asserts that, while social media use may benefit adolescents and young adults in certain aspects of their social lives, the existence of negative influences is far more prevalent among these young adult populations. This argument relies upon the analysis of numerous psychological studies that have assessed the overall effects of social media use on the young adult and adolescent psyche. This essay also collectively compares the results of these studies to evaluate the positive and negative impacts of extensive social media use. This analyzation and evaluation support the conclusion that when used for specific reasons and purposes social media directly and negatively impacts the mental health of young adults and adolescents.
CRISPR-Cas9: An Analysis of Ethics and Dangers in its Use as a Medical Tool

Alexander Horton

A classroom project for English 298

Germline genetic modification, or the modification of a human’s DNA before birth, has become a talking point in the field of bioethics after He Jiankui, a Chinese researcher, successfully performed germline genetic modification using CRIPR-Cas9 technology. Philosophers and genetic researchers who warn against the practice argue that the use of CRISPR-Cas9 could trigger a slippery slope that ends in unforeseen medical consequences and “designer babies,” or children with chosen traits. This could cause a severe social and economic gap between those who have access to the technology and those who do not. In this paper, the validity of the slippery slope argument is analyzed along with multiple other ethical perspectives including the use of CRISPR-Cas9 for medical practice. Research conducted by both philosophers and genetic researchers suggest that the slippery slope argument is invalid due to legislative and procedural clear lines put in place by developed nations, therefore making CRISPR-Cas9 a viable and effective tool in the medical field without worry of an ethical dilemma.
The Victorian-era, defined as the reign of Queen Victoria from 1837 to 1901, is marked by advancements in education, industrialization, and urban expansion. Scholars have extensively studied England for cases of superstitious beliefs, including spells, witchcraft, divination fortune-telling, apparitions, and other occult beliefs. While it might seem logical to assume that these magical beliefs ceased to be relevant as society became more rational and urbanized, that is not the case. As this project proves, magic was still a relevant belief in the Victorian-era. Drawing from modern folklorists and print media from the nineteenth century, my research reveals the adaptability of occult beliefs in spite of advancements in society. Groups and individuals representing multiple socio-economic classes still relied on those beliefs to cope with basic aspects of life, such as health, marriage, and wealth. Secret societies formed to seriously discuss and teach practices. The documentation of folklorists, people interested in recording and preserving supernatural beliefs and practices, started officially during this era. Newspapers continued to sensationalize stories of occult practices and practitioners in their communities. Aided by folklorists and print media, magical beliefs survived through the Victorian-era, ultimately adapting to accommodate the lives of the people.
Author: Matthew Hubbard

Project Title: Food Deserts: The Impact of Food Insecurity on Modern American Households

This is a classroom project for English 298. Food insecurity has been present in society for hundreds of years. However, while most long-lasting problems have been solved by modern technology, food insecurity has become more and more widespread in the United States in recent years. This has occurred because of food deserts, or areas wherein the residents do not have access to a grocery store where they can buy affordable, healthy food. This traps residents into settling for cheaper fast food that often leads to widespread obesity and health issues. Throughout this project, I argue that food deserts have a lasting impact on the health and socioeconomic status of their residents. Then, I analyze the data and research done by different American organizations, such as the CDC and FDA. Finally, I explain exactly what causes a food desert to emerge, as well as some possible solutions for those who are trapped within them. Food deserts are creating a modern, humanitarian crisis across the country, and if no action is taken to help the individuals who are stuck within them, then food deserts will sentence millions of Americans to a lifetime of chronic health issues for themselves and their families.
All Night: The Drawbacks of Studying from Dusk to Dawn

College involves so much work that it almost seems as if pulling an all-nighter every once in a while is inevitable for many students. However, while avoiding sleep might seem like the best way to finish homework or studying, staying up from dusk to dawn has several drawbacks. Recent studies indicate that pulling an all-nighter can be damaging to both the mental and physical health of students. Also, abundant evidence emphasizes this study tactic is not improving grades, and in some cases even making them worse. This paper argues pulling an all-nighter is more harmful than beneficial to college students. In order to support this hypothesis, data and information from several past studies will be analyzed to see just what scientists say about the effects of staying up all night to study.
Camryn Hurley: A classroom project for English 298.

Non Traditional Lectures: The benefits and disadvantages of implementing adaptive flipped learning in engineering college courses

The typical engineering lecture course can be outdated, unadaptive, and ineffective to certain types of learners, but not for much longer. Since the peak of the digital age, more universities are testing a new and innovative type of teaching called flipped learning that more actively involves students in and outside of the classroom. Evidence has shown that flipped learning has improved students’ overall comprehension of engineering courses. Hands on and adaptive flipped learning increases the personal motivation, understanding of material, and overall performance in the classroom for STEM students, but it comes with some demanding requirements. With lots of extra needed time, effort, and materials, the class can be difficult for teachers and students alike to balance the workload in other courses and activities. However with better performances on exams and tighter grasps on the subjects in the course overall, the benefits to the students education outweigh the negatives. Adaptive flipped learning shows the strongest results of improvement in the current learning experiences for college engineering.
Cameron Hutt

This is a classroom project for English 298. Public speaking is a huge fear for many Americans. Failure to participate in the practice has led to a lack of awareness of the benefits it can provide and its overall relevance in everyday life. Public speaking not only aids in its participants’ communicative abilities, but also their perceptions of themselves. My research was conducted to determine how this seemingly surface level skill is able to change the way we see and feel about ourselves. Seeing that public speaking is, in fact, a skill, once one is able to overcome their fear, practice, and master it, they are left with a feeling of accomplishment. Throughout this process, they are able to learn more about themselves and what they are capable of, leaving them feeling much more comfortable in who they are. Furthermore, overcoming their fear involves not only developing the ability to speak in front of audience, but also overcoming their fears of being judged by those around them. All of these things combined ultimately lead those regularly exposed to public speaking to feel greater levels of self-confidence.
Abstract

Though many researchers debate the merits of investing in passenger rail for greater
intercity connection, few explore the causes of rail’s decline and the reasons for its resurgence
into the political conversation on a macro scale. This paper examines the relationship between
passenger rail and the urban landscape in order to understand how it contributes to the
development of the modern American identity. This research studies historical trends of urban
density and distribution in the post-war economy and connects them to recent urban development
movements and theories such as New Urbanism, transit-oriented development, and Smart
Growth. This article concludes that this renewed interest in transportation reform is inevitable
based on current paths of urban growth, including passenger rail policies that often reflect
increasing class inequalities amidst ideological conflicts.
In light of Russian meddling in the 2016 United States presidential election, scholars have examined the relationship between social media and politics with renewed vigor. Experts have cautioned against social media, suggesting its influence on voter activity does not outweigh the threat of narrowcasting and fake news. This paper, however, shifts the research focus beyond the United States to foreign case studies and surveys, finding that social media has become a crucial platform for free speech and protest efforts in authoritarian countries and minority communities. Additionally, this paper contradicts previous research by illustrating the large-scale effects of social media on political participation. The paper ultimately argues that social media should be perceived as a tool for fostering engagement and empowering citizens rather than as an obstacle to democracy.
This is a classroom project for English 298. According to recent statistics, a large portion of alcohol-related injuries and fatalities among college students occur within the Greek community. Past studies have shown that Greek members consume significantly more alcohol than the average college student, even more if they hold leadership positions within their chapters. Colleges across the nation have become active in sharing tactics to lessen the severity of the issue. A handful of universities have resorted to eliminating Greek life activities altogether while others have declared themselves “dry” campuses. Most colleges, however, have started requiring chapters to participate in alcohol education courses. However, it is often debated whether they are beneficial. In order to investigate this issue further, I conducted an online survey to assess the amount of Greek college students that were required to attend an alcohol safety class and whether or not their drinking habits changed after attending. Based on the results of the study, the students’ drinking habits did not change, and most responded that they did not feel that there was a problem regarding alcohol consumption within the Greek community. Based on the gathered information, future research should be done on alternative preventative methods.
As environmental issues and policy proposals continue to become more prevalent, it is important to understand their political importance amongst college students—a growing segment of the voting population. In the general public at large, the views surrounding environmental issues experience significant fluctuations from overwhelming belief in climate change one year to tepid support just a couple years later, yet little research has been done to explore the perceptions amongst college students specifically. The intensifying effects of climate change present great threats to our way of life, and my generation’s opinions on environmental politics will prove formative to the future of our planet. Through surveying and interviewing college students, I work to comprehend the political perceptions of 33 college students on environmental issues. Beyond simply gauging their support relative to other political issues, I aimed to understand potential trends in their beliefs and to gain information on how people may develop these ideals. This study concludes that college students have mixed views on environmental issues; while the relative importance in comparison to other issues is similar to the general public, they readily embrace climate action. This information may be used to advance the environmental movement in creating more relevant promotional efforts that address young people’s concerns in order to increase its importance relative to other issues.
Cloning in Science: The Reason it is Ethical and Should be Practiced

The idea of cloning has long fascinated humanity. The thought of being able to make an exact copy of a person or an animal has sparked people’s imaginations. Unfortunately, cloning has also triggered many debates such as “Is Cloning Safe?” and “Is Cloning Ethical?” Cloning is an ethical practice because it could lead to major breakthroughs in medicine, which could improve human health, and major breakthroughs in reproduction. Like everything, cloning has its critiques too, critiques such as it is not safe and that it is not natural. Cloning also provides many benefits such as major medical advances or even keeping animals from going extinct.
Stay-at-home dads experience a unique, cultural paradigm that encourages the abandonment of stereotypically gendered actions while also restricting the role of a primary caregiver to women, which can be offensive and detrimental to American society. The existence of stay-at-home dads offers a particularly insightful view of gender stereotypes, microaggressions, gendered language, and many of underlying assumptions that individuals may unknowingly hold. These offenses against non-conforming parental structures are relevant to American culture as a whole as they are a direct contradiction to progressive thought and equality in and outside of the workforce. The personal testimony of numerous stay-at-home dads culminate to reinforce the startling narrative of both inclusion and ostracization around working, educational, and domestic environments in America. The investigation of the underlying assumptions, stereotypes, microaggressions, and gendered language pertaining to stay-at-home dads sheds light on the darker areas of human interaction and how these grievances can be addressed, amended, and altered so as to establish a richer, healthier American culture.
Abstract

There are many fewer women than men working in STEM fields. While this disparity is improving, women in STEM fields still face considerable bias and discrimination daily. This study consisted of three interviews with women working in STEM fields and aimed to focus on their individual experiences of to further understand the discrimination they face on a daily basis, find out what they think is the basis of any discrimination they may face, and gain insight on potential avenues for improvement. This study found that all three of the women interviewed have experienced or seen gender-based discrimination while working in STEM fields. They experienced feelings of isolation due to a lack of female colleagues in their workplace and reported being held to different standards than men. They attributed these forms of discrimination to unconscious bias. Additionally, this study explored two possible means of decreasing the negative effects from the bias women in STEM fields face: focusing on changing the beliefs of society so that women in STEM fields are seen as equals, and empowering women to be able to succeed in spite of any bias they encounter.
How much knowledge is too much knowledge? This question is at the root of the ethical controversy surrounding the use of epigenetic therapy to treat cancer. The goal of epigenetic therapy is to reverse harmful epigenetic changes, as epigenetics is the study of heritable changes in gene expression caused by environmental or cultural factors. Illnesses such as cancer can be traced to an exact epigenetic change and therefore treated with epigenetic therapy. This essay contends that epigenetics is separate from genetics and with continued research, epigenetic therapy should be the primary option for cancer treatment, as it is the most specific, personalized approach to medicine. Classifying epigenetics as its own field allows for justification to amend several ethical and legal policies that currently hinder the process of sharing and implicating epigenetic information as common practice. An assessment of a person’s epigenetic genome will provide them with an array of invaluable information, and it is their right and responsibility to take action based on the information, whether as preventable or treatable measures. Integrating epigenetic therapy as common practice will create a healthier and better informed society.
Career and Technical Education (CTE) is a curriculum that is present in most high schools across the United States. This curriculum, previously coined as “vocational education,” provides students with course work that does not follow the standard curriculum presented in core subject areas. Such curriculum includes coursework ranging from health science to construction education. In these courses, students are taught skills such as taking vital signs in health science and arch welding in welding courses. However, little is known about how students use these courses and skills after high school. This project examines discuss how students use CTE skills after high school and whether or not the skills influence what they do after high school and how government funding supports this curriculum and directs student paths to increase the skilled labor division of the national workforce. I argue that encouraging CTE courses during high school provides students with a passion and direction that they will pursue in post-secondary education and experiences such as technical schools or the workforce. Government support of this curriculum also helps to guide students to a career using skills taught during CTE courses at the secondary level.
Zoe Kendall

This is a classroom project for English 298. There are often stereotypes that are associated with organizations and groups of like people, some of which can be impactful, even detrimental, to member’s image and relationships. A frequently discussed aspect of these stereotypes is the perception of Greek Life on college campuses. This project will use qualitative research methods to investigate the perception of students on college campuses compared to those who are unaffiliated. It analyzes how people, whether in greek life or not, perceive the difference in lifestyle of a greek member. From interviews I conducted, I discovered that the opinion of those directly involved in Greek Life (or those who have some connection to it or knowledge of it) is that Greek Life is not entirely about drinking alcohol and partying. The purpose of Greek Life is to make friends and get involved in the community. Although underage drinking, drug abuse, and over stigmatization of gender is present in Greek Life, it is not the entirety of Greek Life. These aspects should not be the only elements of Greek Life extensively researched, but the benefits and values of these organizations should be researched as well.
Personal bias as a perspective has become increasingly pervasive in American society as political tensions have continued to escalate. Many individuals have made claims of an overwhelming bias specifically in places of secondary education. Instructing with more independence than lower level teachers, college professors have a relatively unrestricted forum into which they can put forth their personal beliefs. In this study, I examined the extent to which college-level instructors insert their political views into the classroom and how this experience altered the students’ perception of free discourse relative to the student’s own political ideas. I conducted interviews and analyzed survey responses from self-described liberals, conservatives, and independents to determine how their perception of bias changed with their political affiliation. This study concludes that there is, in fact, a correlation between the political disparity of the student-teacher pair and the frequency and severity with which that student perceived bias. Given that the majority of teachers are liberal, similarly liberal students recorded little to no bias and showed a sense of openness in their beliefs that few others shared. Independent and conservative students reported high levels of bias and withheld their beliefs out of fear of academic or disciplinary repercussion. For this reason, the extent to which political bias inhibits free discourse in the classroom is dependent on the affiliation of the student in relation to the beliefs of their professors.
Abstract

Online retail is a growing piece of the retail industry that appears to be taking over everyday shopping. Online shopping’s accessibility is pushing physical retailers across the world out of the industry and forcing those that remain to adapt accordingly using various developing strategies and hybrid business models. This has created a more volatile industry that the business research community is attempting to understand as it evolves. In this research article secondary research is compiled as a foundation for primary research to add detail and specifics to the vague and evolving industry. The primary research was conducted in the form of interviews with field experts and professionals. The findings of this primary research yielded both support for existing findings and a unique aspect of varying advice for business owners plagued with the shift towards online retail.
A Classroom Project for English 298

Abstract

This study seeks to rebut the controversial finance theory, The Efficient Market Hypothesis (E.M.H.). E.M.H., in short, posits the Stock Market is always accurate and follows a random walk. Hence, all prices are valued ideally; alpha generation, profits relative to a benchmark index, and forecasting stocks are impossible (Stanley and Kinsman, 2011). E.M.H. is a flawed premise though, leading to irrational exuberance and inflated confidence in investing (Nocera, 2008). Its advocates are lead astray by its tenets, blinded by market inaccuracies (Nocera 2008). Additionally, through empirical literature and interviews with financiers, this study postulates asset bubbles and econometrics are evident contradictions to the theory’s creed. Bubbles emerge based on false expectations and emotions; stocks are priced without the insight of their intrinsic values, leading to speculation (Blumen 2004). Econometrics, another E.M.H. confutation in the study, extrapolates data, allowing investors to forecast stocks with tremendous accuracy and beat the market on a risk-adjusted basis. Ultimately, the market is seemingly inefficient, muddled with irrationality, and predictable, teeter-tottering on a linear track. The debate continues, however. All three participants in the study did not reach full consensus.
Risk-taking is crucial to expand the scope of a modern-day American corporation. A vast amount of research exists about the impact of loss-aversion upon risk-taking, but it largely focuses upon the psychological lens of American investment. However, it is necessary to explore the possible correlation between finance-based accounting—which typically provides an insight into a company’s risk-taking ability—and an American company’s risk-management. How heavily do companies rely upon finance-based accounting to inform their high-risk decisions?

This study focuses upon Tesla, Inc. as an example of a high-risk company due to its prevalence in the public eye within the past year. A cross-sectional analysis of interview data was used to conclude that Chief Executive Officer Elon Musk’s high-risk decision-making greatly impacted the well-being of his company. Risk-taking is an indicator of a company’s future performance, and American companies have started to recognize the key insights provided by finance-based accounting upon their risk-taking ability. In sum, finance-based accounting greatly impacts risk-management in American corporations, a finding promoted by current risk-management theory.
This paper first considers the extent to which food insecurity exists amongst university students, then proposes and discusses potential solutions to this problem. Three total interviews were conducted, all from varying points of view on student food insecurity but all asking how it can be remedied. I speculated a few solutions universities could enact based on publications discussing food insecurity, and the interviewees’ suggestions generally lined up with my own speculation. Education, destigmatization, and food pantries were all mentioned as being important solutions. More specifically, the interviewees said universities should better educate students how to combat food insecurity and students should actively try to remove the stigma attached to getting supplemental help from food pantries.
Are Barbies to Blame? The Impact of Gender-Stereotyped Toys on Female Motivation in STEM Careers

This project investigates the correlation between gender-stereotyped children’s toys and a minority of women, as compared to men, that pursue careers in science, technology, engineering, and mathematics (STEM) fields. Numerous studies suggest that children’s toys and characters in children’s media often depict common gender stereotypes, and children are impacted by these social cues in their development of skills, interests, and perception of gender. Furthermore, toys that are typically marketed towards boys, such as construction toys, have been found to aid in the development of spatial skills, which are integral for success in STEM fields. Researchers agree that multiple factors influence a woman’s choice against entering STEM fields, including low self-efficacy in mathematics and spatial awareness, as well as stereotype-induced anxiety. While more research should be conducted on the direct impact of gender-stereotyped toys on female motivation in STEM, the current body of research delineates gender-stereotyped toys as both a byproduct and perpetuator of cultural gender stereotypes, and those same stereotypes dissuade women against entering STEM fields. This leads to the conclusion that women who were not exposed to toys that promote STEM-learning as a child may develop less interest in entering STEM fields as an adult.
Abstract

I hypothesize that there is a prevailing issue concerning certain perceptions of unintelligence and work competence against people who speak with a southern accent, which are commonly acknowledged by both southerners and non-southerners. This study focuses on defining various perceptions associated with people who speak with a southern accent and the effects these perceptions have on people’s academic and career experiences. The goal of this study was to get feedback from both southerners and non-southerners concerning their opinions of people who speak with a southern accent, not just people from a particular area or age group, which is how my study has filled the previous gaps in research. I chose to study this as a result of my personal experience with accentual discrimination in my past and present academic settings. The study was conducted through an online survey distributed to all willing and able participants. Through this study, the results to the survey conducted suggest that although people may not define or admit to believing these stereotypes and negative perceptions, when given the chance to speak freely, these perceptions are evident. These results mean that southern accentual discrimination is a common issue, even if it is not always interpreted as acts of discrimination.
Understanding Political Tribalism: The Internet and American Partisanship in the Age of Post-Truth

The United States has undergone many radical political transformations throughout its history. These transformations have been well documented by scholars and are often characterized by periods of political unrest, increased partisanship, and division between voters. In recent years, political division has been exacerbated by the diffusion of false information across the internet. As a consequence, many have argued that American politics have entered an era of “post-truth” marked by increased political tribalism and weakened social cohesion. Although researchers recognize the danger the internet poses to American democracy, it has been difficult for scholars to determine why Americans propagate fake news media to achieve partisan goals. In order to understand the rise in political tribalism across the United States, it is essential to recognize not only the importance of the internet in revolutionizing American politics, but also to recognize the deep-seated appeal of political polarization in human beings. This project explains this appeal from a psychological perspective, consolidating the work of scholars concerned with bias, flawed reasoning, cognitive dissonance, and the need for a desirable self-image. Understanding political tribalism not only reveals truths about human nature but is crucial in predicting trends in American politics for years to come.
A Family Ordeal: The Experience of Caring for Children Affected by the Opioid Crisis

Kingsley, Joseph

Rates of opioid addiction in the United States have increased so dramatically in recent years that the issue has been labelled the “Opioid Epidemic” and the “Opioid Crisis”. In many areas, the increase in addiction rates has correlated to increasing rates of foster care entries, as parents struggling with addiction cannot adequately care for children (Radel, Baldwin, Crouse, Ghertner, Waters, 2018). Sometimes, family members will care for the children to keep them from foster care, and while many aspects of the epidemic have been studied in detail, there has been little to no research in these situations. This study seeks to address this lack of information through the analysis of three separate interviews conducted with people caring for children of family members. The purpose is to gain an insight into the unique experiences, challenges and rewards of caring for these children, in addition to understanding the effects on the children themselves. This study sheds light on an often under-represented population and, hopefully, will lead to future research benefitting this population.

Internships have, by many accounts, been degrading, wasted experiences characterized by coffee preparation and minimal actual engagement in the internship’s field of study. In the field of engineering in particular, despite the bounty of jobs available, it is very difficult to obtain a full-time job without having had some previous experience in the engineering field. Given the strict necessity of engineering internships and co-ops, this paper seeks to examine the experience of participants to characterize the intrinsic value of these experiences outside of their existence as “résumé items.” Past and current engineering interns were interviewed about their employer interactions and their responsibilities in their positions, and there seemed to be a consensus about one thing: employers want to give interns as much responsibility as they can handle. The actual amount of responsibility varied from person to person from almost immediate, overwhelming responsibility to an extremely manageable progression of duties. The value of the experience was also agreed upon and no one felt that his/her time at the internship was wasted. From the data, the main suggestion that emerges for employers in charge of interns is to give plenty of feedback to their interns and make sure the interns feel able to speak and inquire about their responsibilities at the firm.
Ethics Behind CRISPR Technology: Differing Viewpoints
John M Klett

Student’s Department: A Classroom Project for English 298 Faculty Mentor: Nicks, Robin Jean Gray

Advances in biotechnologies are allowing scientists to alter genomes easier than ever, offering potential to transform fatal disease research on human embryos (Albitar, Rohani, Will, Yan, & Gallicano, 2017). However, regulations on new technologies, clustered regularly interspaced short palindromic repeats (CRISPR) for example, are minimal. The current lack of oversight of CRISPR technology resulted in the public’s resistance after CRISPR was successfully used on human embryos in China (Braun & Meacham 2019). Previous research concerning the ethics of CRISPR technology agree on potential issues of the technology including biological safety and off target effects but fail to address the differences in opinions of various age groups (Pineda, Lear, Collins, & Kiani 8; Zhang, Quan, & Wang, 2018). After conducting interviews with two undergraduates at the University of Tennessee majoring in scientific fields and two adults aged 50-60 working in scientific fields in Knoxville, differing opinions based on thoughts, beliefs, and experiences relating to the ethics behind CRISPR technology will be analyzed. Results suggest college students are less concerned with the regulation of CRISPR technology than adults aged 50-60. In addition, college students are more likely to classify a specific use of the technology as “ethical” than their adult counterparts. However, religion rather than age was the best indication of an individual’s beliefs. Future studies will enhance these findings by investigating a wider range of age groups to increase validity. This study helps increase our understanding of how specific experiences and beliefs interact in order to shape one’s opinions.

References


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Is it possible that a gender bias exists in medical practice and research which specifically targets women? Based on research compiled over the last five decades, evidence indicates there is a standing issue of medical discrimination against women as both patients and research subjects. This essay asserts that the existence and practice of such biases negatively impact the overall medical care, treatment, and diagnosis, as well as research-based knowledge of women. Furthermore, this essay supports and extends the current scholarly conversation regarding gender bias by declaring: (a) that physicians and medical researchers still hold and actively practice gender bias today and (b) that it is still a relevant issue due to the harmful effects it imposes on women. Research indicates that medical biases arise from assumed health similarities or differences between sexes that do not exist, which in turn influence how women are perceived and treated by physicians and researchers. Overall, methods such as stricter education guidelines, more policies requiring gender inclusion, and fewer restrictions on research subjects could potentially contribute to a permanent solution.
Abstract – Emma Kruse

The issue this research intends to address is the prevalence and acceptance of gender neutral pronoun use in modern society, with a focus on college campuses as well as general attitudes of the public. I predicted that there would be a strong correlation between various demographic groups and willingness to accept gender neutral pronouns, namely that younger people and more liberal people will be more open to use gender neutral pronouns. This prediction was true in regards to the effect of political leaning on openness, but there were too few participants from older age groups to compare to. This data was collected in the form of a survey, which was created on the software “QuestionPro” and distributed via GroupMe and Reddit. The survey was open for approximately two weeks in February and collected 200 responses from various countries and demographic groups. It asked various demographic questions, along with questions about the respondents’ preferred pronouns, opinions about pronouns on official college documents, and general pronoun usage among strangers and friends alike. The survey found that there was generally a positive attitude towards gender neutral pronouns (although there was a higher opinion of the typical pronoun they/them as opposed to more unusual variants such as ze, hir, ae, or others).
A classroom project for English 298

Internalizing Racial Stereotypes as Asian American Students

Stereotypes, as defined for the purposes of this study, are fabricated labels with racial undertones applied to a group of individuals based on generalized perceptions of that group; these labels can place an intangible yet forceful pressure on the peoples being categorized and instill a persistent need to meet societal expectations. Previous research has documented that minority groups feel an inherent and almost automatic need to match a certain label given to them by society. As such, under several racially motivated stereotypes, Asian American students experience similar feelings and situations, ultimately affecting their own perceptions of themselves. Through a 10-question survey administered to Asian American undergraduate college students, I explore how racial stereotypes have impacted their lives. Furthermore, through one-on-one interviews sharing anecdotal experiences, I document the personal narratives of individuals and the ways in which stereotypes have pervaded their views of themselves and fellow Asian Americans. While the findings acknowledge stereotypes’ negative effect among the minority group, the study also reveals how some individuals may interpret stereotypes as academic motivators or rationalize the existence of stereotypes through a historical lens. Thus, this study concludes that while there is undeniable evidence that stereotypes garner negative sentiments, individuals may employ explanatory devices to better navigate these labels and their place in society.
How Age-Discordant Relationships Affect Mental Health

There has been a long-standing social stigma surrounding the idea of relationships between individuals with an age gap of three years or more, especially when the younger individual is an adolescent. In recent research, these relationships, otherwise known as age discordant, have been found to be detrimental to mental health in the younger individual. In this study, I ask whether the participation in age discordant relationships for young adolescent females causes mental health issues into early adulthood. I conducted interviews to explore how female college students who had previously been in relationships with men three or more years older than them now were affected by the previous relationship. Then, I conducted surveys to examine the social stigma surrounding these relationships and how the stigma changes as the individuals age. I concluded from my interviews that age discordant relationships for young adolescent females are correlated with mental health and may have a correlation with dysfunctional relationships with the participants’ fathers in childhood and early teenage years. Additionally, I concluded through my surveys that there is a significant difference between the perceived appropriateness of age discordant relationships involving young adolescents and age discordant relationships involving older adolescents. Overall, the social stigma seems to be justified due to the mental health risks associated with these relationships for young adolescent females because the mental health issues are carried into early adulthood.
Abstract

Daniel Jon Lamphere II a classroom project for English 298.

This research was conducted to better understand how internet usage can benefit or detriment an average college student’s ability to manage stress. To do this, several sources were compiled in order to build a basis for which to interview two college students and Jesse Williams, M.S., a therapist, about internet usage and stress management. In short, while many studies found that using the internet for stress management proved to be ineffective, many failed to identify what exact types of internet usage was the most detrimental, or in some cases beneficial. Williams provided thorough insight into the research of the secondary sources, often agreeing with the findings, but also explaining that he has found some significant benefit if internet usage is channeled correctly. Similarly, both college students spent large amounts of time on the internet, but neither seemed affected adversely or beneficially by such usage.
Jenna Laughlin

A Classroom Project for English 298

Volunteerism and How People are Motivated to Help Others

Tennessee has been referred to as the “volunteer state” since the war of 1812. More than two centuries later, some are left wondering: is the nickname still reflective of Tennessee’s current residents, and what motivates people to volunteer? Many academic sources categorize people’s motivations to volunteer. While many of the categories cited overlapped, none of the sources grouped them the same way. In order to find out what these motivations are, I have designed a qualitative survey to question people in East Tennessee about this topic. The survey asked surveyees to sort their motivations into one of four categories created following the sources: altruism, experience, personal fulfillment, and requirement. The most popular category was personal fulfillment, closely followed by altruism. This study, acknowledging that there are a number of other factors that could influence why people volunteer, concludes that people are primarily driven by the personal fulfillment they experience when volunteering.
Abstract

Through various research, texting language and shorthand language have been shown to provide and increase the use of incorrect grammar among students and young adults as well as how the use of texting jargon negatively affects grammar scores and professionalism. In my research I tested to see if a frequency of use in texting along with gender and age have a correlation to the use of informal language in a formal setting along with the way individuals are viewed when using informal language. I developed a survey that was made accessible to anyone with internet access and or social media. The majority of my participants were college (74.03%) and high school students (18.18%). Through my data I found a trend that showed how high school girls under the age of 18 used texting jargon and shorthand language while texting and using social media more frequently than other individuals surveyed. Along with this, high school girls also felt that the use of informal language in formal writing and verbal communication affected their school work and the way others perceived them when using it. My results showed that while majority of those surveyed use texting jargon and shorthand language, different demographics of the population feel as if it affects them in a negative way. This might account for the generation of high school and college students surveyed being more relaxed when communicating with others and feel as if it is not necessary to be using formal language at all time. Overall my research helped develop a link between informal language and texting habits to that of individuals under 18 and more specifically females under the age of 18.
Abstract

Despite the mass amount of research completed on both bilingualism and dreams separately, there exists a lack of research completed on both that could help to confirm where both dreams and bilingualism are derived within the brain and where the connection between the two occur. Within this paper, the specific emotions felt while dreaming were studied using a survey to observe which language is spoken during the dream. More specifically, I studied the effects of fear, anger, happiness, and sadness within dreams to determine whether the first language, the second language, or a combination of both were used in dreams with certain emotions. This survey was available to all internet users, which allowed for responses from a diverse population including individuals from seventeen different countries. Dreams with more serious emotions, such as anger or fear were expected to have more of the first language spoken during them; on the other hand, less emotionally stressful dreams, those that conveyed happiness and sadness, were expected to be spoken in a combination of both or the second language. The results from the survey displayed that the only difference in language spoken depending on language was the increase in the second language spoken during dreams that involved anxiety and fear. In lucid dreams however, the majority of people used a combination of both languages as opposed to just the first language, which was the most popular in the dreams involving emotion.
A classroom project for English 298.

John Leland

Professor Gentry

The Future of World Energy: The Costs and Benefits of Nonrenewable, Renewable, and Nuclear Energy Sources

Stanford scientists and many other experts in energy agree that the current use of nonrenewable energy sources must eventually be replaced by renewable or possibly nuclear energy sources to meet ever growing energy demands while eliminating environmental health and safety concerns. This essay focuses on nuclear energy, renewable energies, and nonrenewable energies and argues that, while each energy source provides their respective advantages and disadvantages some of the costs are not worth the benefits. To address this argument a categorical analysis of the costs and benefits of different types of energy sources based on their economic viability, environmental impact, and fuel and area efficiencies is created. Through this analysis it is determined that a combination of renewable energies and nuclear or nonrenewable energies is needed to best fulfills current and possibly future environmental safety and economic needs. The advantages of one source cannot offset its respective disadvantages and in order to compensate for their shortcomings, a combination of two or more different energy sources is needed.
The Effects of Childhood Access to Books on Adult Attitudes Towards Reading

Many habits and attitudes that adults possess start formation in childhood and remain relatively stable throughout life. Thus, an individual’s habits and attitudes concerning reading may affect the life of the individual in many ways. Recent research has shown that access to types of reading material may play a major role in the formation of these habits and attitudes. In this study, I rely on surveys and interviews of college students attending the University of Tennessee to examine the relationship between early access to reading materials and attitudes and habits concerning reading. The results of this survey were compared with existing literature on this issue to examine the impact that childhood access to reading materials has on adulthood habits and attitudes concerning reading. This study suggests that, while childhood access to reading materials does have an impact on adulthood habits and attitudes concerning reading, other factors, such as assigned reading in school and amount of free time, have just as much, or more, of an effect as childhood access to reading materials on adulthood habits and attitudes concerning reading. I recommend that further study is done on the seemingly negative effects of required reading on the formation of reading habits and attitudes would be beneficial for better understanding the factors that affect the formation of long-term reading habits and attitudes.
Simone Li

A classroom project for English 298

Female Beauty Standards: The Impact of Instagram Fitness Accounts on Self-Esteem

Abstract

Social media has a greater impact on our ideas of self the more technology becomes more prevalent. Watching people on Instagram or Facebook and seeing a snapshot of other people’s lives on Snapchat allows us to see how they live, providing a fake standard by which to live. However, in comparing ourselves with other people, we can develop an unhealthy relationship with how we view ourselves, most pressingly in how we view our bodies. Fitness accounts on Instagram are one of the most prominent examples that come up when talking about this topic. Many people say these accounts are an inspiration for them to follow for a healthier lifestyle. Others see the accounts and feel hopeless; they feel as though they will never be able to attain the lifestyle or the body these people have. A fine line exists between a healthy goal and an obsession. This project investigates the effects of these fitness accounts on Instagram and how they ultimately lead to a culture of comparison and low self-esteem in the United States.
Women in Art: Nudity, Sexuality, and the Patriarchy

Women in art have historically been misrepresented, especially during the Renaissance, due to the patriarchal views that have typically controlled society. These views are that women should either be objects for male sexual fulfilment and childbearers. Frequently, especially during the Renaissance, there has been little to no representation of female sexuality in art being created or commissioned by men without the women being seen as sexual objects or merely childbearers. Currently, in what is being considered the fourth wave of feminism, there has been an increase of female-identifying artists, and therefore there has been an increase in more accurate representation of female sexuality in modern works of art. Art history scholars provide evidence that the current representation of female sexuality and nudity in art is less dictated by the patriarchy. Also, the representation of women of color in art will be analyzed and compared to the representation of white women in art. Again, it will be shown that women of color are currently being represented out of the views of racism and the patriarchy.
Gender inequality in work fields is an ongoing issue throughout America starting as early as the undergraduate level for students. Specifically, women pursuing the medical field face gender discrimination from their undergraduate science classes to finding mentors in medical school to achieving high positions in their career. Many times, people focus on the gender inequality in medical school and in hospitals, but this inequality can start as early as collegiate science classes. Interviews were conducted to get the perspective of gender inequality from undergraduate students at different levels of education, including four females and two males. While most interview subjects all agreed that the rate of acceptance for males and females into medical school is the same, the females mostly agreed that they have felt underlying gender discrimination in their science classes, whether that was a snide comment in an engineering course or pressure to prove their class answers. Both genders agreed that social expectations for women makes it harder for women to be successful in the medical field, because of the sacrifices they make. Overall, while gender inequality in undergraduate levels for women pursuing medicine is present, most women do not feel as though their path to medicine is hindered by such inequality at this level.
This is a classroom project for English 298. Social media’s popularity has soared among recent years, and current college students’ heavy online usage is a main contributor to its success. This digital socialization has had a large impact on many lives for better and for worse. Based on interviews I conducted with current college students, for many, social media is a great tool to cope with negative emotions and build a social support system. For others, it aggravates their mental well being. With the additional help of studies, I have discovered that mindless screen time takes away time from real life connection and constantly scrolling through the highlights of others’ lives can lead to self comparison and personal dissatisfaction. This depended, however, on how one used social media. College students are especially vulnerable to depression and anxiety, and my project aimed to discover if social media worsens this vulnerability. If college students use social media in ways that evoke self comparison, lessen connection, and reduce life satisfaction, students are becoming even more susceptible to the effects of depression and anxiety. However, further research should be done to pinpoint aspects of specific platforms that contribute to this mental detriment.
The Fallout of Adventures: How Adventure Stories Influenced Victorian Ideas of Domination

Were the views of dominance proliferated in Victorian adventure fiction a product of or an influence on the societal views and norms of the time? While literature as a whole both reflects and challenges society, the depiction of dominance in Victorian adventure stories impacted society more than they reflected it. In order to navigate the question, this paper will analyze the relationship between dominance as portrayed in Victorian adventure stories and its part in British and international society. The influence of adventure stories on Victorian views of dominance will be analyzed in terms of masculinity, colonial literature, the promotion of imperialism, and social hierarchies. The analysis of Victorian adventure stories concludes that this specific type of writing had a significant impact on contemporary Victorian society’s views of dominance.
Abstract

Biopharmaceuticals is a relatively new and emerging field of medicine that uses macromolecules produced in living cells to target specific illnesses in the body. Because of numerous reasons including high production costs, an absence of competition in the marketplace, and a lack of regulation, biologics cost patients a considerable amount of money. In this paper, I review the manufacturing processes and the pathway to the market of biologics in order to identify areas in which improvements can and should be made in order to allow biopharmaceuticals to become more affordable to patients. This research was supplemented with interviews from experts in their fields to address various issues concerning the costs of biologics. From a production standpoint, I found that switching to transgenic animal cell expression systems and incorporating various new methods may provide a solution to high production costs. In conjunction with lowering manufacturing costs, regulations must be implemented on the patent process in order to allow biosimilars to enter the market in a more rapid manner. The added competition that the introduction of biosimilars yields will drive the prices of biologics down. Once the costs of biologics are decreased, not only will patients be able to afford their medication, but the field of biologics will be able to expand exponentially to fight and vaccinate against other diseases.
Why do People Follow the University of Tennessee Seal Superstition?

Superstitions have been around for centuries, and Thomas Kramer and Lauren Block in “Nonconscious effects of peculiar beliefs on consumer psychology and choice” define them as “peculiar beliefs—socially shared or idiosyncratic—that actions or objects can be invoked to control both good luck and bad luck” (101). A superstition at The University of Tennessee holds that walking over the seal on Pedestrian Walkway will cause students to graduate late. As a result, many students go out of their way to walk around the seal. This research investigates why students go out of their way to follow the seal superstition in order to understand why people may follow a variety of superstitions. In order to achieve this goal, I surveyed students at the University of Tennessee, asking about their actions in relation to avoiding the seal, as well as knocking on wood, and fearing Friday the 13th. This study concludes that there is a discrepancy between students’ decision to walk around the seal and their portrayed belief in the superstition, as well as other superstitions like knocking on wood. This phenomenon may be explained by the redefining of modern superstitions as a social tradition and ritual and less so a real threat of bad luck; however, the following of superstitions can still be influenced by personal evidence, anxiety, and the actual belief in superstitions.
An Analysis of UTK Students’ Opinions on Campus Dining

As has been made clear by decades of medical research, proper nutrition is essential to the health of young people. College campuses, housing thousands of young people, have implemented several systems in attempt to meet this need. However, many of these systems, such as expensive mandatory meal plans, easily fall under scrutiny. In order to gauge college student feelings on campus dining options, I conducted a survey in which 32 students attending the University of Tennessee in Knoxville, ranging from first-years to seniors, answered a variety of questions regarding the school’s meal plan and food availability. While several students were satisfied with the status quo, a majority of them indicated that there were significant problems with the dining options on campus and that the system could benefit from adjustment. A common grievance was that the meal plan required for first-years is much too expensive for students with greater financial needs. These results indicate that there are a variety of ways in which dining on campus at the University of Tennessee can be improved. Looking into the parts of the UT budget made publicly available, this study concludes that more funds could certainly be allocated to either make the meal plan cheaper or more worthwhile, and the UTK SGA also must be made more representative of the current student body in order to begin making these changes.
Facing Modification Fears: The Importance of Continuing Genome Modification Research

This paper examines the conflict of stopping human genome editing research, which is the modification of human fetuses in order to change a particular gene that could be beneficial to the wellbeing of the future child, due to various beliefs and fears versus the devastating outcome of unlawful and unethically researched genetic editing that may occur if human genome editing research is completely illegalized. This essay will examine the detrimental effects that completely stopping genome modification research, because of those who condemn the continuation of research out of fear for things unknown, can have on the future generations. To avoid unregulated genome modification, public officials and international authorities should strive to continue researching gene editing in humans. If this halting of genome editing research prevails, the future generations will be doomed with illegal and unmoral research being done. Ultimately, for the benefit of our upcoming society by avoiding scandalous and unregulated research, genome modification must be supported by legislators and public officials to avoid unethical research.
Abstract:

As technology continues to advance, the reliance on cell phones as a means to communicate, gain information, and even order food at the touch of a button has become a pervasive reality. While cell phones have paved the way in connecting the world through instant communication, a recent concern has emerged regarding increased dependence on cell phones and how that dependence is influencing face-to-face communication skills. With cell phones allowing individuals to electronically exchange words and information, the need for engaging in face-to-face conversations has diminished. This study examines if increased time spent on cell phones has decreased the frequency of face-to-face interactions or influenced comfort levels associated with differing modes of communication. In addition, this study also explores how people perceive cell phones being used in social settings. Correlations were examined from a survey of 216 participants who ranged in age from 18-50+. Based on the assumption that individuals would report higher comfort levels in communication through cell phones as opposed to direct conversations, I hypothesized that the more time an individual spent or his or her cell phone, the less often he or she would engage in face-to-face conversations. Significant correlations within the data suggested that younger participants were more likely to use their cell phones among others unfamiliar to them and in order to escape uncomfortable social interactions. However, no distinct correlation was determined between the amount of time spent on a cell phone and the frequency of face-to-face interactions.
This study investigates mental health in undergraduate students and the various factors that impact it. Seventy-two anonymous undergraduate students participated in a survey which questioned their mental health issues since coming to college. Three men were also interviewed in order to examine these problems at a much deeper level than the survey was able to provide. I predicted that stress or work load would be the number one stressor amongst college students, and that there would be a strong correlation between stress and depressive behaviors or suicidal thoughts. Almost all students surveyed had experienced stress during their time in undergraduate school, and a very high percentage of these students had also experienced depression. Though the survey had a very small sample size in relation to the school’s overall population, the data collected here is parallel to studies carried out in the past.
Anna Beth Malone

A Classroom Project for English 298

The Importance of Sleep Schedule

Benjamin Franklin is quoted stating, “Early to bed and early to rise, makes a man healthy, wealthy, and wise.” In secondary research, a majority of studies focus on determining an ideal quantity of sleep for peak performance, but little research has been conducted over the importance of one’s sleep schedule. This research examines the value of when individuals go to sleep, instead of the more widely considered quantity of sleep. In this study, I surveyed 30 college students to determine the correlation between perceived wakefulness, focus, and productivity and the times at which subjects fall asleep and wake up. To more simply compare, I categorized students by quantity of sleep to compare their sleep schedules with fatigue, perceived productivity, and average caffeine intake. From survey results, I found students who reported feeling as though they did not get enough sleep the prior night, even individuals who slept up to ten hours, had gone to bed later than individuals who felt they did get enough. Furthermore, those students who went to bed later were twice as likely to feel tired and three times as likely to feel like they didn't get enough sleep compared to students with earlier bedtimes, and 100% of students with a later bedtime answered that they felt unfocused if not also unproductive, even if they got over nine hours of sleep. While sleep schedule as a whole was not found to have major consequences, this study concludes that there is an overwhelmingly-positive effect of an early bedtime.
Genetic Engineering and the CRISPR-Cas System: The Dangers of Genetic Enhancement

A recent advancement in genetic manipulation known as the CRISPR-Cas system is leading a medical revolution, treating disorders or diseases such as Down syndrome, cancer, or cystic fibrosis. This essay argues that the CRISPR-Cas system, an innovative new approach to genetic engineering, will have serious consequences on society and the evolution of human life if it is used to if it is used not only to eliminate previously incurable genetic mutations, but also exploited for the enhancement of physical and mental characteristics. Government policies must be established to prevent this new technology from being used in ways that could adversely affect humankind. CRISPR provides a method to eliminate genetic mutations while also offering a less invasive and deteriorating therapy then prior approaches. Genetic enhancement, however, is an exploitation of this technology. Using CRISPR to select for desirable traits is too dangerous because it (a) will widen already present class gaps (and gaps between developed and undeveloped countries) due to the cost and accessibility and (b) will have unpredictable effects on the evolutionary movements of the human race. The CRISPR-Cas technology will allow millions of people to live happier and healthier lives; however, if it is not regulated, all of humanity will suffer.
Tristan Maryanski

The Prevalence of Loneliness Among College Students

This is a classroom project for English 298. College is supposed to be an exciting time, filled with new friends and memories. If this is the image that most people have about college, why are over half of college students still reporting feelings of loneliness? There have been countless studies regarding loneliness, but few have looked specifically at first-year college students. This project aims to look at the prevalence of loneliness among first-year college students and ask why they are feeling this way. 21 first-year college students were surveyed for this project. Each student was given a survey regarding their personal experiences in adapting to a new place, finding friends, and getting involved on campus. Results showed that extremely involved students and students who felt secure in their friendships were still feeling lonely. It also showed that the feeling of loneliness follows the student whether they are alone or with other people. The goal of this project is to help bring awareness to the issue of loneliness in college and show that it is a relevant issue that is applicable to thousands of students.
This Paper delves into the recent history of CTE in football as well as the steps being taken to prevent long-term injury by the various leagues. A parent and former player were interviewed in order to determine whether the sport is doing enough to keep its players safe. The initial determination was that the football was too violent a sport for its changes to make a positive impact on parents while players largely overlook the prospect of injury because of the general environment the sport creates. These suspicions are largely confirmed by the interviews, but there is also the discovery that injuries are also just ignored, being chalked up to the violent nature of the sport. The conclusion drawn is that while leagues are taking steps to make the sport safer, it is not making these changes apparent to the masses and these changes are merely tape on a leak. Football, in its current state, is not safe to play.
Despite the efforts to professionalize nursing, it is still seen by some as inferior career in comparison to doctors. A look into the history of nursing confirms that there has been an evolution of conflict between the doctoral and nursing professions. This study aimed to analyze experiences of unprofessionalism by doctors and power differentials in the healthcare field by interviewing four separate nurses from two major Tennessee cities: Memphis and Knoxville. There were several questions fueling this investigation. How does the traditional power imbalance between nurses and physicians affect the relationship between these healthcare professionals? Is it realistic to expect doctors to consider nurses to be their partners? How do nurses feel about doctors? These questions, which are answered throughout this study, are important to address because while nurses are becoming increasingly open in their contribution to decisions about care, doctors still possess considerable advantages over them. With the statements from the four interviews and further research, it has been concluded that the relationship between doctors and nurses appears to have evolved into a collaborative partnership. Many nurses felt that their current relationship with their doctors was extremely professional and healthy. It appears that there is a slow, but steady growth of educated intelligence about nursing working to further develop and demonstrate the capabilities of professional nurses in the health fields.
This is a classroom project for English 298. American society today focuses on two political parties: the Democratic Party and the Republican Party. Trends in characteristics of candidates for each of these parties could influence voting. Political stereotypes regarding race, gender, and religion have been identified by Castle et al., among others. The present study focuses on further exploration of these stereotypes, as well as geographic stereotypes, and how they affect the support of candidates. It primarily focuses on the effect that partisan stereotypes of a candidate have on whether voters will vote true to their ideological values. In order to study this, a survey is conducted to establish general stereotypes of each political party and to establish the trends in voting through a hypothetical election scenario. In this scenario, the voters are presented with a candidate whose stereotypes and ideals are from opposing parties. The survey results indicate that there are stereotypes that are considered to be more dominantly reflective of the candidates from one party over another. They also indicate that the majority of participants’ votes are not influenced by stereotypes. Meaning, participants choose to vote based on their ideological values over the stereotypes of the candidates.
Stroke is the fourth leading cause of death and number one cause of disability in the United States according to recent statistics released by the American Heart Association (Ganapathy, V. et al, 2015). The disabilities that strokes can leave its survivors with are lifelong obstacles that the victim must constantly fight to overcome. As an outside observer, one may neglect to consider the effects that the stroke has on the caretakers of the stroke victim as well as the family dynamic as a whole. These issues often get overlooked because they seem less severe or important than taking care of the primary victim of the stroke (Haley, W. E., Roth, D. L., Hovater, M., & Clay, O. J., 2015). Four qualitative interviews will be conducted in regard to this topic: two with stroke victims, and two with stroke caretakers. These interviews will provide insight into the difficulties these families have faced as well as advice to other families who may be beginning their journey on the road to recovery. The information gained from these interviews will help with future treatments and methods that will ease the hardships that are associated with post-stroke recovery.


Increasing patient demands for life ending options have led some states to legalize Physician Assisted Death (PAD). Since then, legal and illegal states have been evaluating the practice to determine not only if it is beneficial, but how it should be utilized in medical institutions. As an initial step in determining if PAD is medically ethical and safe, and how PAD should be managed, I interviewed four medical professionals to explore: how medical ethics and a terminally ill patient are defined, what safety regulations surround the practice, and what options PAD offers to terminally ill patients. Overall these professionals described medical ethics as acting in the best interest of the patient, and most agreed that PAD should be offered as a death option for terminally ill patients. Additionally, all but one of these professionals viewed PAD with a positive perspective, and everyone heavily emphasized the importance of patient autonomy. These professionals worry about promoting death sooner for patients but think supportive environments and counseling would help insure the patient was making the right decision. Ultimately, they want their patients to have the best options when nearing the end of their lives.
The Role of Fat in Diet: How Fat can Improve Overall Health

Within the past thirty years, there have been a wide range of opinions regarding the dietary purpose of fat. This essay highlights the current use of dietary fat in diet and how it affects overall health when consumed from the right sources. This essay contends that, while consumption of certain saturated fats can contribute to obesity and heart disease, not all types of fat (saturated fats, polyunsaturated fatty acids) should be associated with these health risks. Many health factors affect body weight such as activity level and body type, which can mask the effects of fat, both saturated and unsaturated. Certain fats can improve overall well being when consumed on a regulated basis. This article highlights the current uses and health benefits of fats in food, such as how nursing mothers can ensure their newborns receive proper nutrients. This article concludes that one should consume a controlled mix of saturated fatty acids, containing few carbon molecules in their chemical makeup, and polyunsaturated fatty acids in order to lower the risk of excessive weight gain and heart disease.
The Evolution of Complex Language: A New Way to Define Hominins

Until relatively recently, the question of the origin of language has been almost untouched by linguists and anthropologists alike. Since *homo sapiens* is the only living species of hominin (a human or something very closely related to humans), the challenge of investigating the evolution of language seemed nearly impossible. How, after all, can you analyze something’s ability to speak without ever hearing it talk? The difficulty of this endeavour led many anthropologists to conclude that *homo sapiens* was the only species of hominin with language capabilities. However, new evidence suggests that this is not necessarily the case. From the early hominid ancestor *Ardipithecus ramidus* to our close relative *homo neanderthalensis*, the idea of a deep prehistory of language is becoming more and more likely. This project discusses some of the ways language capabilities can be studied through fossil anatomies, neurological morphologies, and cultural analyses, and concludes that our species was almost certainly not the only hominin to speak. While complex language was likely limited to our genus, the genus *homo*, the evolution of language was one of the fundamental characteristics of hominin evolution as a whole, defining the family almost more than their trademark bipedalism.
Poster #416
Student(s): Natalie Meade
Faculty Mentor: Dean, Lance M
Project Title: The Impact of the Quality of Nursing Compassion and Education on Patients’ Overall Satisfaction and Pain Management

Natalie Meade

A Classroom Project for English 298

The Impact of the Quality of Nursing Compassion and Education on
Patients’ Overall Satisfaction and Pain Management

Many aspects of nursing have been studied, but one quality that is unique is the patient/caregiver relationship, which is even considered a defining characteristic of nursing. The connection between the nurse and patient arguably has much to do with the nurse’s attitude and care. This paper seeks draw a parallel between the quality of nursing care (i.e. the nurse’s education and personality traits) and the overall satisfaction and pain management of a patient. In order to determine this, I researched outside sources and interviewed participants. Two nurses and two patients with ample interaction with nurses were chosen. This study finds that it is hard to draw conclusions on the effect of a nurse’s education because there may in fact be no relationship linking it to patient satisfaction and/or pain management; however, there does appear to be a relationship between compassion/empathy in nurses and positive patient satisfaction and better pain management.
This research consisted of a series of six interviews intended to reveal the nature of the effects of language bias present in the United States with a specific focus on college campuses. The data were analyzed by using keywords, themes, and topics to compare and contrast the content of each interview and to find common occurrences throughout. I hypothesized that the five students and one faculty member would all share firsthand stories of language bias and that the students would express feelings of discomfort towards speaking their language in public. The findings supported the hypothesis such that many people are concerned about speaking their non-English language in public because of the fear of the language division causing tension in predominantly English-speaking group settings. The findings also demonstrated that one of the most significant factors in attitudes towards speaking a non-English language in a predominantly English-speaking public is personal background, which, despite varying greatly among the subjects, almost always consisted of the participant’s perception of a strong cultural connection to their native language.
Rural Appalachian areas have seen rampant poverty over the last few decades. While the situation has improved in some areas since the Appalachian Regional Development Act of 1965, many areas are still in distress, particularly in the Central Appalachian region encompassing Kentucky and West Virginia. Many people dismiss the root of the problem as the people being merely uneducated or ignorant, which misrepresents the region and undermines potential solutions. Many factors influence the economic situation of the area either positively or negatively, including the prominent industries in the area. The economy has historically focused on natural resources, with the most recent and prominent example being coal and a potential future one being natural gas. While industry brings jobs and is thus a short-term blessing for the area, certain types of industry can have negative long-term consequences. A number of causes could explain these consequences, such as the inability to adapt to rapid changes in industry and the high demand for low-skill labor that suppresses the perceived need for education or diversification.
Channing Mercer

A Classroom Project for English 298

Today, women fill magazines and go on talk show to talk about how they consistently have to work ten times harder than a man just to get the same number of acknowledgements. To investigate these claims, interviews with two women lawyers and two male lawyers explored how these lawyers’ personal opinions on the matter and to get some first-hand experiences about gender impacts the legal profession. Findings support the claim that gender impacted levels of success in the legal profession. Women truly do have to work harder in the legal field to have success that men. This can be seen by the number of women partners compared to men, despite qualifications, as well as the general pay salary compared by the two genders. With all these in mind, it is easy to see why people complain about such unfair treatment between the two genders.

Keywords: [words others would use to search], gender, law, sexism
Family Matters: The Implication of Family Influence on the Political Ideologies of Young Adults

Understanding how ideas are formed and how they can be influenced is crucial, especially in a troubled political climate. The notion that young adults do not make independent, informed decisions prompted the research. As they will soon make up the majority of the voting pool, it is important that these individuals are able to understand how their ideas are initially formed. The research sought to gain an understanding of how college aged individuals form their political ideologies and shed light on whether or not family members have the largest influence on the ideologies of young adults. Through surveys, interviews, and secondary source research, the results showed that many other factors could potentially weigh more heavily on the individual’s ideology than a family member’s influence. In the survey, many individuals noted the vast differences between their family’s ideologies and their own. Survey respondents also named other factors that they believed influenced their political ideologies. Some of these factors included: religion, social media, peer influence, scientific worldviews, and their own research into politics. The majority of those surveyed believed that it is important to participate in elections. The interest in politics and the listing of other influences show that young adults perceive that they are forming their own ideologies and not blindly following the lead of previous generations. Interview responses led to the same conclusion: the participants hold different beliefs than their family members on a variety of issues and did not list their families as a main influence.
Garrett Mesmer

A Classroom Project for English 298

Evaluating the Effectiveness of Engineering Curriculum in Workforce Preparation

In engineering, there is a widely accepted idea that new engineers are not prepared for the workforce having gone through school alone. Why is it that engineers often are unprepared for the jobs that they have spent their last four or more years studying for? Sources suggest that academia only teaches students the basics leaving it up to them to gain experience. This research reviews the general college undergraduate engineering curriculum to find out what students have been taught and interviews employers and employees out in the field to determine what is expected of those students. The research investigates potential gaps in the engineering curriculum and recommends possible solutions to help students fill those gaps. In determining potential gaps, I ask employers and professors what they believe are the most important qualities in a well-prepared engineer with the goal of assisting students in their pursuits for excellence. This research finds that the main discrepancies between what is taught in school and what is expected at work are experience, training, and real-life skills. Professors agree that students aren’t prepared fully out of college alone and recommend taking internships as a supplement. Universities are taking strides to include new education methods, but those changes won’t come soon enough for the current generation of students. In the end, I determined that academia is largely out of sync with the expectations of employers.
No other measured aspect of schools is nearly as important in determining student achievement as teacher quality. Moreover, it has not been possible to identify any specific characteristics of teachers that are reliably related to student outcomes. It is pertinent to define qualities that make a good teacher as broadly as possible. This project is meant to put forth a constructive analysis of teacher characteristics derived from observed behaviors, attitudes, and interactions that enhance students’ success regardless the teaching environment. We will analyze multiple peer-reviewed journals and discuss three interviews with college freshman who have experience with several different teachers. The following classroom project examines the interviewees opinions on what contributed to and hindered their learning, focusing on specific actions instead of general personality traits.
Logan Miller

A classroom project for English 298

Hidden Histories Revealed: Genetic Ancestry Testing and Familial Identity

In recent years, genetic ancestry testing (GAT) has rapidly become more accessible to the general public and with such popularity come concerns about the effects of the tests on subjects’ familial relationships and ethnic identities. Secondary source literature suggests that some who take GAT have made reflections on their experiences, discussing how the results of the testing have made them more aware of the discrepancies in the definition of race in public opinion when compared to their genetic history. This study, through the means of a publicly distributed survey of UT college students, examines the experiences of those who have taken GAT, have relatives who have and those who have not taken GAT in regards to ethnic identity. Results were inconclusive for discussions on the effects of GAT on participants’ familial relationships and ethnic identities. Indeed, this study finds that college students are unlikely to have taken genetic ancestry tests but do have informed and thoughtful opinions about the future of genetics and genetic testing.
With the ever inexorable proliferation of machine learning into more numerous facets of our lives, one may ask whether AI has been permitted to overstep its bounds. In recent years, AI has been employed as judicial and policing tools, yet the emergence of egregious racial bias in these AI threaten the basic rights of convicts and marginalized communities across the nation. Moreover, this machine bias may even naturalize institutional prejudices, undermining the justice system and the country’s endeavor for equality and justice. Therefore, this paper contends that artificial intelligence use in judicial and policing applications must cease until developers can combat this prejudice. We examine specific contexts of machine bias, namely in recidivism prediction noted by Angwin et al. and in predictive policing algorithms described by Lum, Isaac, and Chammah. African Americans were greatly mislabelled by recidivism prediction software and algorithmic predictive policing disproportionately targeted minority neighborhoods. Despite this demonstrable bias, many argue its utility in these applications justifies its continued use. While AI assists police and judicial departments with data parsing and organization, its prejudice in recidivism prediction and predictive policing are too pernicious and the benefits too few for AI use in this context to continue.

Poster #424
Student(s): Joshua Miller
Faculty Mentor: Gentry, Elizabeth Leigh
Project Title: The Ghost in the Shell: How Subtle Biases in AI Perpetuate Racial Profiling in Policing and Judicial Contexts

Joshua Miller - a classroom project for English 298

The Ghost in the Shell: How Subtle Biases in AI Perpetuate Racial Profiling in Policing and Judicial Contexts
Public Concern of Autonomous Technologies

Milligan, Ivy Kate

A Classroom Project for English 298 Faculty Mentor: Addicott, Randi Marie

This paper discusses public trust in autonomous technology and its ethical applications. Since the recent advancement in autonomous technology, the population has questioned the ethics of self-governing machinery. While some believe these technologies can improve everyday life and reduce human error, others argue such technologies can limit independency and lead to possible dangers caused by lack of human control. The purpose of this study is to analyze whether or not researchers should continue developing autonomous technologies. I specifically examined public opinion on current applications, including motor vehicles, surgical tools, and military weaponry, as well as potential applications of artificial intelligence. By interviewing varied people, I was able to compare viewpoints for cultural impacts. Trends showed that general approval of autonomous technologies correlated with younger age, liberal ideology, and atheistic beliefs. Additionally, my population sample would feel much safer if given the ability to monitor and override technologies. A general consensus exists that this technology should not be applied militarily due to its lethality, and that artificial intelligence is problematic but still out-of-reach. Interview subjects differed over whether this type of technology should be utilized in vehicles and surgery as well as how moral algorithms should be imposed globally. Ultimately, human surveillance is essential to address universal algorithms and legal implications. Moreover, researchers should increase public awareness in order to gain acceptance before they move forward with new applications.
Existing research surrounding the effects of philanthropy involvement on college campuses is limited to information on service-learning courses provided by the university. This research study centers around the outcomes and effects of being involved in student-led philanthropic organizations outside of a classroom requirement. These two philanthropic categories differ by their driving force: school or passion. This research’s goals were to discover what students learn and how they benefit from being involved in not only a student-led, but also a philanthropy-based college organization. To conduct this research, four interview subjects were selected based on involvement in a student-led philanthropy, career/career path, and age. All four subjects were asked generally the same questions. The findings showed that their respective philanthropic organizations are a large part of who they are as people now, and their future career or the career they are currently pursuing will be or was heavily influenced by their involvement in an undergraduate philanthropy. The results also indicated that these people are very likely to give back to their community now and in the future as alumni. These subjects also had an overall positive view on their undergraduate years, which they attribute to the organization that they were so involved in. The scope of this research was very limited, but the data gathered does show how beneficial this category of philanthropy is to many young adults; therefore, further research should be conducted on how to best utilize these programs and the benefits gained from them.
Stephen David Monroe

This is a classroom project for English 298. Baseball cards are becoming more and more popular to collect and sell. This is due to the generally stable market of the cards and the potential value that can be earned from them. This value can be disputed from person to person though. Each person has their own beliefs on what makes something valuable and this is also true in baseball card collecting. I will try to determine the factors that affect the value of baseball cards in today’s world. My investigation will use responses from card shop owners and collectors from across the United States to determine what they see as factors that determine a card’s price. These responses were collected through email and in-person interviews. My aim in completing this investigation is to see if racial biases still exist in people, specifically in the collecting of baseball cards. I hope that this investigation causes people to think more about their choices and the reasons for why they make certain decisions.
Sloane Montgomery
This is a classroom project for English 298.

In my experience as a distance runner on many different teams, I have both been injured and have had many teammates who have been injured. Through these experiences, I noticed that there always seemed to be more than just physical damage to the body. I noticed a correlation between physical injury and a negative shift in mental health including increased feelings of depression, anxiety, and loneliness. This project investigates that observation. A sample of collegiate cross country runners (n=22) at Creighton, Emory, and University of Tennessee, Knoxville responded to an online survey about if and how their most recent injury impacted their attitude toward the sport as well as their overall frame of mind. The results showed that more than 4 out of 5 athletes developed a more negative attitude toward the sport. Additionally, over two-thirds of athletes reported a negative impact on their mood. Future research could look into how a more holistic approach to recovering from injury—such as employing a sports psychologists in addition to athletic trainers—could help these athletes with the unseen side of injury.
Leah Montgomery

A classroom project for English 298

*Overcoming Barriers to Help-Seeking: Analyzing the Impact of Campus Culture and Stigma on Student Utilization of Mental Health Treatment*

While the prevalence of mental illness amongst college students is growing, the number of students utilizing campus resources for mental health treatment is not increasing at a proportional rate. This issue has recently gained attention as researchers explore the possible factors impacting student-willingness to seek necessary treatment for mental illness. Although there has been some inquiry concerning public stigma as a barrier to help-seeking behavior, little research exists exploring the influence of campus culture and stigma on student-willingness to seek treatment. This project provides an analysis of the role of campus attitudes, norms, and stigma on student help-seeking behavior and perception of self-stigma. My investigation reveals that student-perceptions of their campus environments can have a significant influence on self-stigma and help-seeking behavior. I also offer methods for increasing student willingness to seek treatment. Crucially, these methods must be initiated campus-wide in order to reflect campus attitudes of greater acceptance of mental illness and provide more opportunities for students to receive help. Through altering student perceptions of campus culture, these approaches reveal the opportunity for college campuses to influence student-perceptions of stigma in order to increase help-seeking behavior.
Binary thinking, especially in terms of gender, has been the focus of media controversy in recent years. The stigmatization of gender preferences in music is a great example of binary thinking, as some genres are typically seen as either “masculine” or “feminine.” To gain more insight, research was conducted among undergraduate college students, specifically to understand the viewpoint on this subject among young adults, who are known for challenging the status quo. Research participants drawn from public undergraduate universities in the southeastern United States were invited to participate in a survey and some voluntarily shared further information in anonymous interviews. Results showed that only about 50% of students perceived there to be a distinct difference in music preferences between men and women. While the results were somewhat consistent with previous research in that some students distinguished between “masculine” and “feminine” music genres, other students felt that there was no distinction between music preferences. There was an even distribution in terms of music genres participants associated with men and women, showing they felt there was no correlation between their own gender identity and personal music preferences. The most interesting finding of this study is that gender stereotypes in music preferences are not felt by an individual, but an individual may have this binary perception of others, which may be due to the fact that the stereotypes themselves are no longer valid but are still present in ideology.
Abstract

No One is Tone Deaf: How Tone Affects One’s Perception of Others

In analyzing tone, it is important to understand how people interpret different tones and how they use tone to express emotion. In a modern world, misunderstandings are common when speaking as various tones carry different meanings, such as louder tones seeming to convey anger. In this study, different phrases are analyzed to determine how different tones affect the interpretation by the listeners on meaning and how people utilize tone to express emotion. For this, a survey was put out on a public surveying website, Question Pro, where 375 willing participants answered questions relating to how using different tones to convey the same information affected the interpreted meaning and emotion behind the statement. This survey was open to participants from around the world, although most of the results came from people in the United States. In the end, it was found that people tend to interpret different tones in the same manner, such as many people interpreting louder tones as conveying anger. However, it was also found that different people utilize tone drastically different, such as participants using either a fast, quiet, loud, or normal tone when defending their actions. Altogether, this shows that people tend to interpret variations in tone similarly, while they also use them differently. Such differences in use without differences in understanding is what leads to miscommunication between parties and thus prevents mannered and collaborative speaking. Overall, these results suggest that differences in tone interpretation and use are what cause misinterpretations when two people are speaking.
In the current political climate, it seems the world’s political discourse is becoming increasingly polarized. This political science study investigated undergraduate students’ opinions and beliefs about the political climate on the University of Tennessee, Knoxville (UTK) campus. Getting a broad scope of the campus political climate was a challenge due to a plethora of unique, varying opinions, but maintaining diversity and depth in answers and respondents was helpful in getting unbiased results. The fluidity and volatility of the political climate was also taken into account. Using a survey and several interviews, the study found that participants generally believe UTK is neither too liberal or too conservative. However, the majority of students sampled believe the UTK administration does not do enough to make sure all students’ voices are heard.
This research study examines if the benefits of a plant-based diet outweigh the potential negative aspects, specifically in college students. The results of the secondary research show that cutting out meat from your diet can lead to significant health improvement such as lower BMI and lower risk for cardiovascular disease. After interviewing two college students who follow a plant-based diet, and doing ample secondary research, it was predicted that having a plant-based diet can lead to a healthier lifestyle with a lower risk for different health issues in college aged students. Also, the interviewed students claim they feel much healthier and active since changing their diet. While there is still much research that needs to be conducted on this debate, this research presents findings that support vegetarianism being overall healthier and can lead to a better lifestyle among college students.
For many centuries, prostheses have been helping amputees restore their lives after the loss of a limb. As technology has advanced, different methods and materials are used to manufacture these devices, leading the innovation of various types of prostheses including body-powered, myoelectric, and 3D printed. Body-powered prostheses involve mechanical systems attached to the body that move the device, whereas myoelectric prostheses use electrical signals within the nervous system to power the prosthetic. While most research discusses the advantages and disadvantages of each type of prosthesis, there are limited analyses about the specific ways that 3D printing prostheses is advantageous, or disadvantageous, over standard prosthesis manufacturing. This project examines the different advantages and disadvantages of standard versus 3D printed prostheses in order to showcase the various devices, provide a background knowledge of the different types, and evaluate various methods and designs to provide the reader with a complete analysis of each prosthesis. Users may require either body-powered, myoelectric, or 3D prosthesis for different reasonings including aesthetic, economic, and technological reasons.
GM-Whoa: A Look into the Impact of Genetically Modified Crops on Soil Quality

Today, nearly all crops are genetically modified (GM) in some way, either through selective breeding or more recently, gene editing. The purpose of this paper is to discover the impact if any, that GM crops have on soil quality. In some cases, researchers have found evidence that GM crops change the soil microbial communities, but others found no evidence. Possible reasons for the discrepancy in their research include location and type of crop used. Even slight changes in soil microbial communities can have a potentially disastrous impact on the overall health of the soil. Plants need soil to live and humans need plants to live. However, the further development of GM crops will continue and they do have significant benefits to people all over the world. This essay contends that the benefits of GM crops are too great to hinder the use or stop the production of GM crops, but a cautionary approach needs to be adopted with regards to the release and use of GM crops due to the inability to predict their long term impact on soil microbial communities. The policy suggestions made in this paper are based purely on research done regarding the impact of GM crops on soil quality.
From a young age, children are encouraged to participate in sports. As people mature, their experiences change. After high school many people stop participating in sports, especially team sports. For those who continue to participate in sports in college, they experience a wide variety of benefits and drawbacks. This study determines whether the experiences and outcomes of participating in team sports in college are the same as participating in team sports after college and throughout adulthood. To gather the necessary data, I surveyed 28 college students (ages 18-22) of all genders who participate in a wide variety of sports. I asked them about the benefits, drawbacks, and general experiences they have had while participating in a team sport while in college. Then I interviewed 3 adults who currently participate in different team sports. I asked them about their current experience and compared that to the responses I got from college students. This study concludes that while there are similarities in the fundamental experiences and outcomes of involvement in team sports, there are some distinctions that make overall participation in a team sports as a college student different than participation in a team sport as an adult. For college students, involvement in a team sport is more integral in their lives and college experiences, whereas for adult athletes, participation in a team sport is more supplemental to their lives and work.
The hierarchies within power structures are complex and dependent on many factors including knowledge and leadership. This study examines the way these factors are involved in the hierarchies. The way they are involved is important since hierarchies are present in almost every aspect of life from friend groups to businesses to the branches of government. Therefore, power structures relate to a variety of people and situations. While hierarchy most commonly can be seen through political systems, this research examines the power structures in a college dorm starting from the student to the Hall Director. The questions asked to each reveal the way each person in the hierarchy views themselves, those above and below them, and how they handle the power they’re given. The results conclude whether the relationship between those in the dorm structure aligns with structures on a larger, political level. By taking this into account, a better understanding can be achieved in how different leadership styles and how knowledge is handled affects the rest of the hierarchy on both a small and larger scale.
Although the United States government, in their 2018 International Narcotics Control Strategy Report, largely applauds the Colombian officials in their efforts on the War on Drugs, overall levels of cocaine production and supply have grown after years of implementing harsh eradication methods. This essay explains the numerous shortcomings of drug eradication policy (focusing specifically on Plan Colombia) and the terrible consequences the war has had on local economies, environments, and citizens. Citing experts from the fields of politics, economics, statistical analysis, and social issues, this paper concludes that the War on Drugs has been largely ineffective and counterproductive. Plan Colombia did not reduce cocaine production; it only dispersed it to poor and rural areas of ecological importance. As a result, many policy changes and adaptations are needed in order to successfully reduce cocaine supply, such as increased rural development, decriminalization of possession, education and health programs, and crop substitution incentives.
RHYTHM AND THE HARD PROBLEM
Coleman Numbers: a classroom project for English 298

Abstract

The hard problem of consciousness, or the causal link between the neural structures underlying consciousness and the subjective experience associated with these structures, captivates many within the cognitive, computational, and phenomenological discourses who seek to understand the substrate and nature of being. The paradigm of musicology promises insight into this problem by examining temporal concepts which underlie both music and consciousness; this modality utilizes the neural correlate framework set forth by David Chalmers, linking qualitative phenomena to respective cognitive representations. One such phenomenon—rhythm—pervades music and subjectivity, and its analysis adds the characteristic of periodicity to our profile of subjective experience. Controlled studies demonstrate that rhythmic stimuli provoke autonomic and conscious neural responses, attuning the body to a perceived or explicit beat frequency. Definite brain regions coordinate this process, and their presence suggests a specific experience underlying a more fundamental lived phenomenon: that of the mind’s tendency to attune to patterns extended over microscopic and macroscopic scales. Identifying the rhythmic nature of experience further develops a musical portrait of consciousness, which holds implications for cognition, psychology, medicine, and any field which involves the mind as a dynamic element.

Keywords: entrainment, hard problem of consciousness, music, neural correlates, neurophenomenology, rhythm, subjectivity
Abstract

Physical activity is beneficial in many ways. The purpose of this research was to learn the ways that exercise empowers students. This research included a look at its effects on academic performance, mental health, and energy. In order to complete this research, physically active students at the University of Tennessee Knoxville were interviewed about potential outcomes that they could experience from exercising. The interviews included questions regarding how the students feel after exercising and what effects they believe that exercise has on their lives. Students reported that exercise seems to result in more proficient academic performance, better mental health, and increased energy. Overall, all of the answers reflected a positive outcome resulting from physical activity. These results helped to prove that physical activity does have an effect on college students and their daily lives.
Wesley O'Donald
A classroom project for English 298

The healthcare system is constantly evolving both for patients and for physicians. Positively, physicians are becoming more collaborative, and better technology is accessible. However, with these comes the ever-lingering issue of patient discrimination. Those who are of a different race can face changes in care, unfair treatment, differences in treatment depth, and are susceptible to mistreatment by medical staff. Age discrimination is also running rampant in healthcare systems. The elderly population is a constantly growing population that is not receiving adequate care. The purpose of this study is to investigate the prominence of discrimination that has been perceived in healthcare settings by patients both personally and indirectly. Through interviews of subjects of different ages and races, the idea of age discrimination, specifically in nursing homes was present and discussed. Patients also felt as though time with physicians was limited and could be linked to age and race. While the interview subjects themselves may not have personally experienced discrimination, each was able to provide an instance of a relative or coworker that has been racially profiled or treated differently because of age.
Why Traveling Abroad is so Beneficial for College Students: A Qualitative Study

Traveling abroad has long been considered an enriching experience, and much research has been dedicated to examining the overall effects and benefits of international travel. Previous research reveals that such effects and benefits range from language development to increased global knowledge and cultural awareness. While also furthering the examination of benefits discussed in previous research, this study examines traveling abroad from a more focused approach and a more defined subject population. Specifically, this study reviews if a travel abroad experience affects the personal growth and world perceptions of college students. In order to explore the impact of traveling abroad on personal development and worldviews, I conducted a series of interviews and distributed a qualitative survey among college students in the United States. Finding positive evidence for both areas of change, this study concludes that traveling abroad not only enables individuals to grow personally in multiple areas, such as communication, religion, and independence, but also that travel affects the way individuals view and understand their home country and the world as a whole. Thus, considering the multitude of benefits of international travel, this study argues that the percentage of U.S. students who study abroad is too low and recommends that colleges work to increase the number of students that study abroad and consider establishing study abroad requirements.
Allison Padovani

Abstract

Politically correct (PC) language has been championed as a means of improving social perception and treatment of historically marginalized groups. While linguists have long-conjectured that word choice has the power to shape perceptive reality (Sapir, 162), very little research exists to test whether this holds true for PC language. The goal of the project was to determine if general attitudes toward marginalized groups improve when these groups are assigned PC labels, as compared to traditional derogatory labels. To test this hypothesis, the researcher distributed two surveys asking participants to express general perceptions of each marginalized group; the surveys were identical, save for the terms used to refer to the groups. All responses were anonymous, with most participants being from the US. The results indicate a positive correlation between the use of PC language and improvement in participant perception of the marginalized groups. Although research with larger sample sizes must be conducted before conclusions can be drawn on the effectiveness of the aforementioned hypothesis, findings suggest there is a cultural imperative to include PC language in American vernacular to promote continual social progress.
Chae-Yeon Park

A Classroom Project for English 298

Cultural Xenophobia of Foreign Musical Influences: How Emotional Arousal, Personality, Cultural Identity, and Social Belonging Influence Differences in Musical Preferences

Over time, a wide range of musical genres have evolved along with people’s musical taste. Musical taste is an individual’s preference to listen to certain musical genres which are generally characterized by their unique uses of tempo, musicality, styles, rhythm, and other musical elements. People tend to have various musical preferences that can differ from those around them. However, extreme differences in musical taste can become a problem especially when individuals show cultural xenophobia for foreign musical genres. This rejection of external influences in music results in spiteful attitudes toward these cultures. Exclusion of foreign cultures is detrimental to the globalization and interaction between countries. In order to combat cultural xenophobia of foreign musical influences, this project explains various factors that can affect individuals’ musical preferences. This project also analyzes observations and experiments of prior research studies that focus on the influences of different elements on musical tastes. Although factors such as emotional arousal and personality influence musical tastes, cultural identity and social belonging determine whether differences in musical preferences portray cultural xenophobia. It is necessary to understand these factors in order to bring down hateful attitudes, cultural stereotypes, and barriers that people have of foreign musical genres.
Physician Assisted Suicide: Assessing the Moral Implications of “Die with Dignity” Legislation

In the late nineties, the trial of Dr. Jack Kevorkian for the practice of physician assisted suicide ushered in the debate of the practice and its moral implications. This essay analyzes statistical data as well as personal testimonies from both advocates and opponents of physician assisted suicide to assess that with concise legislation, the practice is both moral and justified. It also addresses the overarching reasons why some oppose the legalization of physician assisted suicide such as the belief that the practice devalues human life and creates a “slippery slope” of medical ethics. To confront the concerns of those against the issue, this essay examines evidence from studies conducted in the State of Oregon, where the “Die with Dignity” legislation has now been active for over twenty years. These studies are important to this argument as they provide information on the long-term effects of the legalization of physician assisted suicide. After investigation, the research supports that it is moral to allow physician assisted suicide for terminally ill patients and that physician assisted suicide legislation will promote the concept of choice in the United States healthcare system.
Abstract

This research examined how well people determine if words are fake relative to computers, as well as the methods people use to determine if words are fake. The data for this research was collected from a survey advertised and hosted online. Participants answered a series of questions and were asked to provide how confident they were as to whether a word was real from a list of twenty words. They also answered how they came to their conclusions. Two computer programs were made to perform a letter juxtaposition analysis on the words. The comparison between the computer’s results and the participants’ results was done with a t-test and F-test. The comparisons between the methods for determining if words were fake were done using t-tests. It was hypothesized that people would be better than computers at determining if words were fake and that they would generally favor using phonetics to determine if words were fake. It was also hypothesized that determining if words were fake phonetically would be the most accurate. The results for all of the t-tests and the F-test indicated that there were no significant differences between all of the data. However, generally, the first part of the hypothesis was supported. People generally did better than computers, but they tended to favor comparing fake words to real words they knew. People also tended to be more accurate with this method than with phonetics. The lack of a significant difference in the results indicated that a computer program could in theory be made to use letter juxtaposition and be better at determining if words are fake relative to humans, possibly allowing for word processing programs to adapt better to new words and to not need a large dictionary to function.
New legislation in the medical field often poses new, unforeseen issues for patients and doctors alike. In recent years the opioid epidemic has evolved rapidly, significantly impacting the Eastern United States and putting pressure on legislators to pass new regulation in order to find a solution to the issue. Previous research, however, documents how this crisis cannot be solved with a simple change in regulation, and if not enforced appropriately, this new legislation has the potential to only cause more harm. This study examines interview responses from three current prescribers in the East Tennessee region in order to assess the effects of increased opioid regulation on both doctors and their patients. Results of this study demonstrate a need for a multifaceted biopsychosocial approach to treatment in order to successfully mitigate the effects of the opioid epidemic in East Tennessee.
“Selfie” Image: Analyzing Social Media’s Effects on College Students’ Self-Perception

As social media continues to gain popularity, many questions have been raised concerning how and if it affects the mental health of its users. This study utilizes data from a survey taken by 25 college students as well as follow-up interviews with three of those participants to learn what effects, if any, students’ participation on social media has on their self-image. Specific questions include reference to which social media platforms students favor, how much time per day they spend on these platforms, and the discussion of strong emotional experiences students have been involved in while on social media to determine if social media has positively or negatively skewed their self-perception. The results of this study show that the effects social media has on college students is largely determined by the individual themselves; some participants felt that social media had a negative impact, while others stated the opposite. While the results are varied, this study concludes that social media’s influence on college students is mainly connected to an individual’s attitude as well as pre-existing self-perception.
This research examines the importance of standardized test scores when going through the college admissions process. Specifically, it looks at the emphasis placed on these scores when students are in high school and how they view these test scores from a personal perspective. Interview subjects have recently experienced standardized tests and have just applied to college within the last year. Findings indicate that many students felt extreme pressure from their peers and from their instructors to perform well on standardized tests. They also felt like there was a heavy emphasis placed on such testing with regard to college admissions. Thus, a large presence of nationally standardized tests exists in the United States and they are often unavoidable. This causes negative issues for students, but these tests do not appear to be losing their impact any time soon.
A Demonstrable Link: A Comparison of Psychological Profiles, Motives, and Brain Patterns of Human and Animal Abusers

The statistical link found in crime rates between animal abuse, defined as socially unacceptable behavior that intentionally causes unnecessary pain, suffering, distress, or death towards an animal, and intimate partner violence, defined as engaging in or characterized by habitual violence and cruelty, whether physical, sexual, or emotional has long been recognized. However, much of the body of research already accepted does not address the psychological similarities between the two types of abusers. This project examines the brain functions, psychological profiles, and character traits of both intimate partner violence perpetrators and animal abusers. Both animal abusers and intimate partner violence perpetrators, male and female, have similar prefrontal cortex activities and identical character traits of being impulsive, neurotic, extraverted, and often have antisocial personality disorders; in addition, many have experienced trauma in their childhood such as sexual or physical abuse. The drawing of this connection is imperative because a perpetrator’s aggression used against animals often very closely mirrors that expressed against other humans, specifically intimate partners. In addition, better understanding the brain functions and patterns of abusers could, in turn, create ways of rehabilitating abusers effectively.
In 1998, Dr. Andrew Wakefield and his colleagues published a study saying that the measles, mumps, and rubella (MMR) vaccine can cause autism. Since the study, many scientists and doctors have proven that Wakefield’s claim is false. Despite the provable falseness of the study’s conclusion, many parents still believe in the study and refuse to vaccinate their children. As a result, we have seen an emergence of previously eradicated diseases such as the measles and polio. While the study has proven to have lowered vaccination rates, there is not as much attention on why this is the case. This project focuses on how people, who generally pride themselves as being logical, could still believe in a claim that has been disproven countless times. Despite the overwhelming evidence that the MMR vaccine does not cause autism, people continuously believe in Dr. Wakefield’s study and its findings for a variety of reasons. By framing the issue in the vaccine autism myth, there is proof that largely due to fear, confirmation bias, and non-credible sources, people cannot tell the difference between truth and unreliable information, which can have devastating consequences such as those from the autism-vaccine link myth.
Within the last couple of decades, a growing concern has existed regarding the advancement of human enhancement technologies. These technologies are able to improve human capabilities above normal and include several biomedical fields such as genetic engineering and nanotechnology. Many questions have been asked about the ethics of such technologies and the debate is increasingly relevant today. This study sought to expand upon previous research by focusing on the perceived power balance of human enhancement technologies. To accomplish this task, interviews were conducted with engineering faculty at the University of Tennessee whose research could be considered in the realm of human enhancement technology. The results from these interviews indicate that power imbalances will exist between the government and researchers, parents and their children, and the wealthy and the poor where human enhancement technologies are concerned. Therefore, dialogues about these power imbalances should be added to the human enhancement technologies debate and more research needs to be done on how to minimize these disparities.
The Variance in Methods of How Multiracial People Define Their Ethnic Culture:
A Qualitative Study
Powers, Celeste

This study researched the variety of different ways that multiracial people define their culture. Previous studies concluded that multiracial individuals preferred to identify with multiple ethnicities instead of being constricted to one. There are many outside factors like genetics, ancestry, and where the person grew up that affect how multiracial people come to define their ethnic culture. The main point of this paper is to identify which of these factors affect how these people define their culture. In order to gain qualitative data on this subject, a survey was sent to multiracial undergraduate students who attend the University of Tennessee, Knoxville. The survey covered topics such as ethnicity, interracial couples, and perceptions about present ethnic traditions are in the home. Interviews were also conducted to help provide supplemental information on the survey questions, ask deeper questions about how these students grew up and how they perceived their ethnic culture, and whether based on familial heritage or their ethnicity. The results of this investigation showed that multiracial students at UTK use different aspects of their identity, such as their genes, ancestry, and traditions, to define their ethnic culture. Identifying how multiracial people define their ethnic culture can help other people understand that culture is not defined to an individual culture but can be a mix of them too.
An Evaluation of Special Education in Public Schools

Price, Elizabeth

A Classroom Project for English 298 Faculty Mentor: Nicks, Robin

Special education can be found in nearly every public school across the United States. At this point, Individualized Education Programs (IEPs) are the only form of individualized learning for these students. IEPs are helpful, but the specific environment a special needs student learns in is important to the receptiveness of the student. This study analyzed the data gathered from interviews conducted with professors at the University of Tennessee that teach Special Education. Researchers such as Chu and Garcia (2018) have studied the effectiveness of teaching techniques in special education classrooms; however, there is little research on the effectiveness of special education according to university professors. Likewise, there is little research conducted that studies the goals of special education professors when teaching prospective teachers. This study will allow a better understanding of what the current special education teachers want for their programs, as well as what is being taught to the future teachers. By doing so, it will allow the teachers and policy makers to work together in order to positively change special education based on the proposed ideas found in this study. This could result in the increased effectiveness of special education lessons on the special needs students taking the classes, which could, in turn, drastically improve their quality of life going forward.

References
In an age where the internet has penetrated nearly every aspect of life, online data privacy has now become a topic of high concern for many individuals. Institutions such as governments and corporations utilize more sophisticated data collection techniques than ever before, and these technologies can expose any aspect of life that an individual might desire to be hidden. With this in mind, how do Millennials and Generation Z – those who are most acquainted and familiar with technology – view the use of their online data by these institutions? These generations are often grouped together but have distinct differences, so how do these differences, particularly exposure to the internet, shape their views on collection and use of their data by these corporations? Interviews were conducted with members of each generation, and the results show a strong possibility that age correlates to concern about data privacy, even at younger ages. Findings also show that there is a distinct disparity between how respondents view their data privacy and the behaviors they take to protect this privacy; views on such matters do not necessarily correlate to actions taken to preserve privacy and anonymity on the internet. Understanding these behaviors and differences among Millennials and Generation Z will help lead to understanding of internet behavior as well as the prime areas where these individuals value their security and privacy online.
A Classroom Project for English 298

The Degree of Weekly Exercise’s Effect on College Students

Exercise wears one out and causes soreness, but at the same time it heals one’s mind. The main benefit from exercise is maintaining good physical health, but people often fail to value the positive effects of exercise on mental health. This study examines the degree to which weekly exercise affects college students’ mental health since college campuses often include depressed or overly stressed students caused by a heavy homework load, busy schedule, or new lifestyles. The research was performed through a survey and multiple interviews to see the degree that college students suffer from mental wellbeing issues and how exercise affects them. Based on the results, most students claimed to suffer from stress at times and occasionally depression or mental illness and felt a relief from those after exercise. Overall, most college students use exercise to stay healthy, mentally and physically, but there were no trends that showed evidence of a noticeable percent of college students having mental issues from not exercising. A reason for this could be that they might have other methods of stress relief since some people never played sports or had a regular exercise plan. The recommendation for people who struggle with stress, depression, and mental illness in college would be to plan to exercise thirty to forty-five minutes and to run for the best result. The study supports the idea that most college students have some mental issues at times and the degree that exercise helps depends on the diversity of one’s lifestyle.
Language Comprehension with Three Languages: English, French, and Kannada

Abstract:
This research project focuses on language comprehension of three languages- English, French, and Kannada (a language spoken in southern India). I wanted to see if a non native speaker of Kannada and/or French could discern words using cognates. While researching my problem, I saw a massive hole in comparisons of a Dravidian, Romance, and Germanic language. In an increasingly diverse world, it is important to see if these language families are as different as some believe they are. I hypothesized that some people would be able to discern the definition of a word in Kannada, but more people would be able to do so with the assistance of having the French word. This was found to be true in my study. I conducted a survey of one hundred and forty one individuals around the world. The survey first asked the participant to chose the English translation of a Kannada word. The next question gave the same word, but in French. The comprehension of a Kannada word increased once the French word was also given, in all questions that I asked. However, with most questions, the majority of people got the correct answer with just the Kannada word. This suggests, that although French is a more familiar and discernable language in comparison to English, some Kannada words can be understood by people that don’t speak the language.
A Classroom Project for English 298: Working Harder versus Working Smarter: Personal Trainers, Training Styles, and Your Results

Abstract

When considering hiring a personal trainer, hiring the trainer that will let a person achieve their fitness goals is paramount. This study looks at two different personal training styles. Style one focuses on motivating the client to work harder, promoting overall output (Motivational Style, MS). Style two focuses on coaching the client to execute a movement in a way that biomechanically isolates the muscle, promoting time under tension (Execution Style, ES). The goal of the study was to see which style participants preferred or felt they derived the most benefit from. One personal trainer was used as a control to test multiple population samples of people with (Trained) and without (Untrained) previous weightlifting experience. Participants were asked to complete two training sessions with the personal trainer. During the MS training session, the personal trainer demonstrated the movement for one set, then asked the participant to complete the movement for the prescribed routine. Meanwhile, the trainer told the client motivational phrases from a script the participant was unaware of. The ES training sessions consisted of the trainer demonstrating the movement for one set, then asked the participant to complete the movement for the prescribed routine. Meanwhile, the trainer told the client verbal cues to guide the participant into the biomechanical pattern that would result in maximum isolation of the pectoralis major. This study concludes that participants preferred the ES training style because of qualitative increases in perceived effort, fitness progress, and delayed onset muscle soreness.
For millennia people have been attempting to illuminate the secret behind perfecting the human being; the relatively recent discovery of CRISPR, a genetic editing technique, may hold the answer. However, this trailblazing technology, which essentially works by cutting genes and either introducing or removing part of the DNA sequence before mending them, has been plagued with concerns regarding the moral limitations and ethical dilemmas that require redress before research and implementation can begin. CRISPR’s adherents argue that unrestricted access to it will allow doctors and researchers to devise cures to debilitating and deadly diseases while pushing people to achieve higher standards in life through human enhancement. Opponents question the untested technology’s ability to edit the human germline, claiming that permanently altering human DNA could lead to a form of pseudo-eugenics by eliminating those born with genetic diseases or disabilities as well as by reinforcing beauty and body stereotypes through so-called “designer babies.” While CRISPR research should be permitted in order to find cures to the genetic abnormalities that plague a large minority of the population, regulations should be set in place to keep the technology from testing the bounds of healing and from drifting into the unethical realm of genetic enhancement.
The Abuse of Power in Long-Term Care Facilities: Abstract

Today, most Americans know someone in a long-term care geriatric facility. These facilities are known for poor living conditions, and elderly individuals often express anxiety and distaste towards residing there. Many studies have found that poor staffing, education, and expectations often lead to a decrease in care quality. This study gives voice to the staff of these long-term care facilities, regarding their opinions and experiences with seeing abuse, poor staffing, and overall negative working conditions. The primary goal of this study was to explore what work environments lead to staff abusing or neglecting patients within long-term care facilities. Four individuals who work or have worked in a long-term care facility for an extended period of time (3+ years) were interviewed separately. All participants reported having personal experiences with understaffing and expectations within facilities that were too high to reach. Each participant then tied this inability to meet expectations to quality of care suffering and patients being neglected. Unreasonable expectations of staff by administration lead to a decrease in quality of care and an increase in staff burnout. When burnout occurs, it is likely that the individual experiencing it will lash out at those around them who are vulnerable, leading to abuse and neglect of residents within facilities.
Linguistic studies apply to nearly every aspect of sociology, including gender studies. Past research has focused on mixed gender interactions in spoken language and gender connotations of particular language. In this study, I apply linguistic knowledge to formal written language and increase the depth of research on gender connotations of individual words, finding demographic patterns in these connotations and assumptions. In order to determine these patterns, I released a survey to the general public and analyzed the results using observation and simple statistical tests to find significant differences between demographic groups. I found that adjectives focusing more on emotions garnered feminine connotations while those focusing more on direct interaction between people have masculine connotations. There are also gender-based connotations tied syntactic and topical patterns, with shorter sentence structure and abstract topics correlating to assuming female authors. Therefore, fiction passages were generally identified as having female authors while nonfiction passages were identified as having male authors. Surprisingly, there were no significant differences between demographic groups, except for those still in high school in comparison with those who have received more education, implying that age, gender, and level of education have minimal impact on a respondent’s institutionalized gender-based biases, but that these biases do exist in individual words, topic of material, and syntactical structure when analyzing written work.
To Work or Not to Work

This study analyzes the factors that influence a woman’s decision to either continue working or stay home once she has children. Young women often wonder why they would go through the hard work of earning a difficult college degree if they are only going to use it to support themselves for a few years before settling down and starting a family. This study examines whether women considered when they were students whether they intended to start a family, and if so, did they have intentions of leaving the workforce. Though the main influence upon this decision is a family’s financial situation, there are other considerations that affect it, such as a woman’s personal preference and potential social stigmas that exist among middle class communities. Through a survey distributed to women with children via Facebook, and after consultation of various secondary sources, this study concludes that women who earned a college degree that allows them to begin a rewarding career are more likely to continue working through motherhood than their counterparts who held a less desirable job before having children.
Religion’s Role on Political Opinions within the United States

With the mass expansion and use of social media, almost anybody has the means of expressing their political beliefs. Many celebrities, politicians, corporations, and anyone who has access to the internet can announce their opinions for the world to see, and the many who view these tweets or posts agree with or even derive their beliefs from this form of political influence. The opinions from all forms of influence must come from some past event or belief, with many of these beliefs tracing back to our teaching of good moral through religion. We have seen teachings from religion influencing our societies for millennia, but with mass social media and the growth of atheism our influence of religion could be diminishing. I will attempt to analyse how much modern political beliefs are influenced by the teachings of religions within America. My work aims to compare the morals taught through religion to the political opinion itself, and how many are for or against such political opinion. My hopes are that the data collected through my analysis will shed light onto our current political climate, and where our modern society tends to derive their political opinions from, no matter what an individual's religious beliefs are.
Virtual Emotions

Tyler Senter, a classroom project for English 298.

Abstract
Non-verbal communication plays a major role in how humans communicate. In the current study, I examined the reasons behind why people use emojis and emoticons. Specifically, I compared self-reported emoji and emoticon usage across two mediums (text messages and email) between two groups of people (family and friends). I also examined these indicators according to age and gender. In general, women were more likely to use emojis and emoticons in text messages, and far more likely to use them to express emotions that would otherwise be lost, whereas men are more likely to use them to provide clarity to their overall message. These findings add to the ever-expanding library of literature on emoji usage, and the reasoning behind it, which seems to support to the notion that women are, in general, more emotionally active than men.

Keywords: emoji, emoticon, emotion, non-verbal communication, affect
In group interactions it is very important to increase group efficiency and avoid any hostile environments. Therefore, it is important to investigate certain conditions that may impede overall group productivity. Many possible obstacles arise from the ways in which language and communication are used in group settings however this research focuses on ambiguity in language and its specific effects. This idea of ambiguity effecting group interactions was analyzed through a series of observational studies. Small groups of four to five college students were given ten basic sentences, five of which were considered ambiguous and five of which were considered non-ambiguous or straightforward. Groups were asked to work together to represent these sentences visually with the provided materials. Data was collected through observation, audio recording, and exit surveys given to participants. While the negative connotations associated with ambiguity would predict increases in hostility and decreases in efficiency, this was not indicated by the final results. However, another interesting conclusion arose from these observation studies. It appears that in groups where members were less familiar with one another, they interacted in a more serious way, analyzed the sentences more in depth, and therefore were able to identify more of the possible representations of the ambiguous statements. This is a significant conclusion because it may indicate that groups will be more effective at ambiguity resolution if they are less familiar with one another.
Abstract
Madeline Seymour

A classroom project for English 298

This study explores the relationship between students and teachers who have differing regional and or international accents in regards to how well those students understand those professors. After reviewing previous studies done on differing populations, I created my own survey for college students specifically. In this, demographic data was collected in addition to information about teachers, the ability to understand them, and their accents or lack of. Following the closing of this survey, I analyzed my results and found that they were not entirely consistent with each other. I found that although having a different accent from a professor may influence the ability to understand them, it is not always the case. In fact, there were many cases where the student and professor had the same accent/dialect, yet the student thought that professor was the most difficult to understand. There was a slight pattern indicating that this was because of the professors ability to communicate in general, not that their accent made it difficult to comprehend what they were saying.
At birth, before we know a single language, we in the United States are given a name that most of us are referred to for the rest of our days. However, there are some cases where people will adopt or be given a pseudonym that for all informal communication takes the place of the legal name. Even rarer still are those who will change their legal name with some effort. To examine what situations cause people to look into going by a different names, I did a survey of thirty people mostly in college. If given the option, would those currently developing their identity decide to change their name to something more fitting? The survey asked several questions about how they felt about their current names then subsequently if they currently went by a nickname or would go by a different name if given a chance. Surprisingly, although over eighty percent of participants polled indicated they thought names contributed to identity, only eight stated they would go through with a name change. Furthermore, there was little correlation between their view of their current name and the prospects of an alteration. This study concludes that people generally have a high view of the process of giving/receiving a name, and, moreover people get use to their name over time and changing would remove a part of identity instead of enhancing it.
Multi-disciplinary design teams consist of a range of people: from those versed in all disciplines to a degree to those who are experts in one specific discipline. Additionally, a range exists in the amount of experience one member may have. These facts evoke the question “how does a person’s experience affect their power on a design team?” This study focuses on this question by analyzing the structure of a high school robotics team. A high school team provides an interesting angle into the topic because the students progressively become more experienced and then leave. This cycle may not provide a clear image of what teams are like in the adult workforce, but it may show a unique perspective on what these teams should be like. This study was conducted by interviewing high school team members and mentors. The study found that experience plays an important role in a member’s leadership and power on the team, but it is not the sole factor. Additional factors that determine a person’s social power on teams like this are their dedication, availability, and ability to convey their ideas. These factors, including experience, show what makes leaders successful on a high school team, and applying these to the workforce can illustrate the underlying relationship between knowledge and power. Understanding this information is vital to maximizing success.
Herbicides: The Effect of Chemical Exposure on Human Health

Herbicides contain many harmful chemicals that have the potential to contaminate the environment, and, in extreme cases, poison the people living in affected areas. This essay will examine the effects of herbicide use on human health through an evaluation of Operation Ranch Hand, the U.S. military operation involving the aerial spraying of millions of gallons of agent orange over Vietnamese jungle. Research both on veterans who served in the war and residents of affected areas has given inconclusive evidence as to whether dioxin contamination from herbicides cause health issues. Since herbicide usage in the war, Vietnam has seen a large increase in the number of children with birth defects, leading many to believe that it is linked to herbicide toxicity. Though no definitive proof exists to show that herbicides are directly causing health issues in Vietnam, scientists are continually studying the chemicals and supposed agent orange victims in hopes of finding a link. More recently, the herbicide glyphosate, found in many weed killers around the world, has also come under fire for concerns that it may also cause health problems. Research on this will also be examined for a more in-depth look at the effects of herbicides on humans.
Samantha Shoffner

A Classroom Project for English 298

Mind Over Matter? Try Music Over Mind

Music spans across all cultures and geographies and is a key part of the human experience. While much research has been done on the impact music has on a person’s mood or emotion, relatively little has focused on how someone’s current activity influences their preferred listening music or whether people seek to use various styles of music to match their activity. This research examines whether depending on a person’s current activity, one might prefer varying genres of music. For example, while a person could proclaim metal to be the best music, that person may still prefer hip hop when exercising and instrumental music when focused on an English essay. In addition, people may use high energy music to boost their mood or to synchronize their mood to their actions. To evaluate this question, the researcher surveyed students attending the University of Tennessee in Knoxville to collect information about the opinions and behaviors of the target population. This study argues that people do indeed listen to different types of music during different contexts.
How Do Students Perceive Respect from Professors?

College professors and students do not always see eye-to-eye on what respect is in the classroom. This leads to poor learning experiences for the students. Through a survey, undergraduate students at the University of Tennessee in Knoxville, Tennessee and Liberty University in Lynchburg, Virginia expressed their views on what comprises a respectful professor. Both an ideally respectful professor and an ideally disrespectful professor are described according to the views of the students. This determination reveals how respect is related to improving learning experiences. I review the responses of the students about both respectful and disrespectful professors in order to find which variables are opposites or nearly opposite of each other in each scenario. These special variables define the line of respect between student and professor. Results suggest that the behavior and initiative that the professor takes to know students personally is one of the biggest contributing factors to maintaining a level of respect. Another finding is that students prefer professors who are both clear with directions and kind yet blunt in their lectures. Students perceive these professors as respectful because they appear to clearly meet the students at their current level of understanding. This study concludes that professors need to be clear, kind, and sophisticated when working with students.
The purpose of this study is to examine the ethics of selective breeding practices of domesticated species, as well as to investigate whether the current practices commonly exhibited today on an international scale are an abuse of power by humans. A major focus of this study is to establish a differentiation between animal welfare and animal rights, and how humans, as stewards of animals, can use their power over other species in a way that is both humane for the sake of the animal and efficient for the sake of production. The investigation specifically examines how breeding practices can be carried out both responsibly and irresponsibly in food production, companion animal breeding, and exotic species importation. The basic design of this study was to conduct a series of four interviews and use them in conjunction with the information gathered through credible and relevant literature to identify common links in data and establish potential themes that justify these links. The results suggest that practices such as pure breeding, inbreeding in moderation, utility breeding, mass production of food animals, and importing of exotic species are all inherently ethical and—on the whole—can be used for extremely beneficial purposes for both animal populations and the human race, including food production, preservation of endangered species, and research advancement.
Poster #473
Student(s): Winnie Sisk
Faculty Mentor: Murphy, Samantha Ann
Project Title: Safety Measures for Intravenous Drug Users: Needle Exchanges and Bleach Distribution

Winnie Sisk
A classroom project for 298

Project Title: Safety Measures for Intravenous Drug Users: Needle Exchanges and Bleach Distribution

The opioid epidemic began in the late 1990s, where the use of prescription and non-prescription opioid use skyrocketed; this includes the illegal injection of intravenous heroin, which is used by nearly 500,000 people in the U.S. The majority of these IV drug users do not have access to clean needles and supplies, because the drug addiction is criminalized and not seen as something that people need real help with. Needle Exchanges serve to replace dirty needles with clean needles for IV drug users in order to prevent spread of disease through sharing needles. Bleach distribution is along the same lines, because it is giving out bleach in order for needle sterilization. The lack of these resources results in various diseases spread through dirty needles such as MRSA, Hepatitis B, Hepatitis C, and HIV/AIDS. These diseases will continue to spread within the IV drug user community until there is governmental aid to help solve the issue, because not only does it affect the user, but these diseases can be spread through sexual contact and mother-to-child through birth.
Foreign and regional accents are discriminated against in job interviews and workplaces. Linguistic characteristics are often associated with certain stereotypes that employers consider when making decisions on filling job positions. In my classroom project I will attempt to discover how often discrimination against linguistic characteristics occurs. I will use information from previous studies conducted on this topic, and interview subjects who possess foreign and regional accents to obtain information on how they were discriminated against in the workplace, and their view on discrimination against accents. Although it is illegal to discriminate against linguistic characteristics, this continues to occur because employers justify these actions through requiring strong communication skills as a component for working with them. This allows discrimination because employers claim that interviewees who possess foreign or regional accents lack communication skills for the job. People who possess foreign and regional accents often find themselves trying to change the way that they speak in order to sound more standard so that they can increase their chances of being hired. This requires more work in order to receive a job. In my classroom project I will also discover how often interviewees change their accents to seem more qualified for the job.
Religious participation on college campuses is something very closely examined by the religious and nonreligious populations. On college campuses today, many alternatives to participating in religious activities exist. It is also important to examine religious participation of college students before they arrive and determine if it has increased or decreased. With the rise of extreme political cultures, college campuses are ground zero for the exposure of many viewpoints and identities that could easily deviate from previous held beliefs. In this study I am analyzing whether or not religious participation among college students increases or decreases and why. I am examining the root causes of the increase or decrease in participation and how students see religion on a college campus. In this study, I conducted a multi-question survey to analyze the religious participation trend the University of Tennessee, Knoxville campus. This survey included many targeted questions that asked for their participation in high school vs. college now, and the main factors that have caused a positive or negative reaction now. I also analyzed if course load and social norms had any effect on students’ religious participation. This study concludes that religious participation among college students is declining and that it is mainly due to the increase in coursework and lack of adequate time to participate.
The Practicality of the Royal Family of Britain: The Positive Economic, Political, and Psychological Effects in a Modern Society

The Royal Family of Britain simultaneously fascinates and unsettles many worldwide due to their unique position with little political power as one of the last remaining monarchies; therefore, this paper extends upon previous research to examine the Royal Family’s practicality in a modern society that has shifted towards democracy. The intention is to support the credibility and authority of the Royal Family wholly as a modern entity. This paper reviews the history of the modern British monarchy as well as the overall historical and current economic, political, and psychological effects. Two opposing viewpoints are identified from the claims of numerous prior researchers that the Royal Family is either: a) a drain of resources economically and politically for Britain and should move towards a democracy or b) essential to the identity of Britain, promotes tourism and a stable economy, and influential in British and global politics. This paper maintains that the Royal Family of Britain is not a drain of resources, but is in fact, essential to and influential in Britain and subsequently, the world in the 21st century.
A classroom project for English 298

Noah Smith

Prof. Gentry

20 February 2019

Poster #477
Student(s): Noah Smith
Faculty Mentor: Gentry, Elizabeth Leigh
Project Title: The Thorium Fuel Cycle; How to Improve the Image of Nuclear Power

The first major nuclear disaster of Chernobyl in 1986 that made roughly one thousand square miles uninhabitable, effecting the lives of millions, and even killing 31 sparked an abrasive feeling towards nuclear power from the general public. However, nuclear power is one of the only ways to meet the increasing energy demands of the present and future. This article aims to prove the benefits of utilizing the thorium fuel cycle through two major ideas: (a) switching to thorium would provide a much higher level of safety and cheaper energy, and (b) thorium could provide a gateway that could flip the public image of nuclear power opening a wide array of possibilities of industrialization. These points are accomplished through analysis of thorium’s atomic properties; the three major points made is the need for Pu-239 as a catalyst for Th-232 to react, the much higher presence of the element in the earth’s crust, and that the raw element does not emit radiation, making it much safer to mine. Through these points, an argument is made that making the switch to thorium will increase the safety of those working directly and indirectly with it while also helping in removing the negative associations with nuclear power.
A gender gap in the participation of STEM majors has been well documented and analyzed over the past decades. The goal of this research was not to measure the extent of this phenomena, but rather to gauge how encouraged UTK undergraduates feel to pursue STEM majors and perceptions of representation within their respective fields. Surveys were sent to undergraduates majoring in STEM and interviews conducted with one male and two female participants in order to gather data on the differences in how men and women perceive their own gender representation/treatment and how encouraged they have been to pursue their major by those around them. The results indicate that the majority of women participating in this survey feel underrepresented to some extent and at a disadvantage in comparison to their male peers. Data gathered from the interviews provide anecdotal testimony support the theories that negative gender-stereotyping and, to a lesser extent, ‘imposter syndrome’ are major contributing factors to women’s lower enthusiasm to pursue STEM fields. The results of this study also reveal a smaller, opposing trend of both males and females who think that men are at a disadvantage in STEM fields when it comes to applications for scholarships/jobs due to quotas and affirmative action. The scope of this research was not large enough to make any conclusive claims about the overall population of STEM majors at UTK; however, it has provided interesting insight into varying perspectives from inside this population that can contribute to broader research on the topic of gender in STEM.
Caitlyn Smith

A Classroom Project for English 198

Abstract: Marijuana Consumption Methods: Safety and Effectiveness

Marijuana is a widespread, controversial drug. There has been extensive research done to discover if marijuana is safe and if it should be used. Scientific evidence has supported that marijuana is a safe drug. However, despite its attention across the country, there are still individuals that do not know much about the drug. Specifically, when it comes to college students, the lack of knowledge about marijuana is too great. This includes consumption methods and safe use. This project answers which consumption methods are safest and most effective. It also discusses different chemicals specifically associated with the methods of consumption. These chemicals can affect the effectiveness and safety of each method. Of course, just as there are methods that are healthy and effective, there are also methods that users should be wary of. Users should have knowledge to decide which method is right for them. In terms of effectiveness, users may search for a method that best fits their motives, such as providing feelings of being high or treating anxiety. Altogether, this project will convince users or potential users of which methods are best to use. Despite marijuana’s inconsistent legality across the nation, everyone should know how to use it safely.
Reengineering Gender Reassignment Therapy: Potential Research Pathways in Core Surgical Procedures

Gender reassignment therapies alter one’s gender presentation and are used as a treatment for gender dysphoria (feelings of distress arising from a disconnect in one’s gender identity and gender presentation); however, many of these procedures are under-researched. Much of our information comes from individual case studies or small case series in which data can be easily skewed by differences between individuals. This means that, compared to other similar surgical procedures, they have disproportionately high rates of necrosis, infection, and other complications. This project investigates possible avenues for research that could reduce these rates and improve the functionality of the surgically-altered genitalia. While there are numerous types of gender reassignment therapies including gender-affirming hormone treatment, psychotherapy, and facial bone reduction, this paper will mostly focus on surgeries that alter primary sex characteristics, also known as core surgical procedures. These, along with gender-affirming hormone treatments are the most common and significant of gender reassignment therapies and are often the most prone to complications. By making these procedures safer and more successful, the quality of life and the mental health of the transgender population should improve.
Ethics of Gene Editing: Is it Worth the Risk? - Abstract

Recently, new methods of genetic modification, such as CRISPR, have become so incredibly precise and affordable that the dawn of widespread commercial genetic editing seems like an inevitability. This paper answers the question of whether gene editing is an ethical next step for humanity, given both the potential social and physical hazards of CRISPR. The conclusion is that the potential gains that genome modification could herald—such as the eradication of genetic diseases and defects—should make the technology’s development a priority for researchers. To accomplish this, the stances taken by several bioethicists and researchers are analyzed, breaking their arguments into matters of safety and social ethics. From this analysis, the assertion is made that despite the differing ethics of using CRISPR in adult body cells (which would only effect one person) and in human embryos (which could potentially alter the human genome permanently), gene editing on all levels is a fundamental step in humanity’s advancement. Currently, the majority of progress in gene editing technology has come to a halt due to major discussion around the recent use of gene editing techniques; this paper’s goal is to extend the dialogue in order to move the stagnant conversation forward.
The Effect of Locus of Control and Subsequent Religiosity on Mental Well-Being of College Freshmen

Mental health has many influencing factors and is impacted by complex psychological, biological, and social systems, one of which is locus of control (LOC). Classified into internal and external loci, where one’s perception of control lies can have broad-reaching impacts on various facets of life. Research shows that an internal or self-centered LOC can contribute to a more stable psychological state and relatively improved mental health, whereas an external LOC (contributing outcomes of behaviors and life to a Powerful Other or factors such as chance or fate) correlates with poorer coping behaviors and more psychological symptoms. Of course, there are exceptions; too much perceived control can result in increased stress and contributing phenomena to outside factors can provide a sense of comfort and stability. In order to better understand the relationship between LOC and mental health, I surveyed freshmen at the University of Tennessee about their perceptions of control, religious beliefs and practices, and experiences and history with mental health issues. I chose to sample only freshmen because although any year of college can present its own changes and struggles, the transition is greatest in the first year. The findings of this study provide supporting evidence for the correlation between an external LOC and aspects of religiosity, as well as show a relationship between strongly-internal LOC and reports of psychological symptoms; these results support the more recent understandings of LOC theory more than the simpler approach in that the correlation between an internal LOC and decreased mental well-being are in contrast with the classically held belief that personal perceptions of power increase well-being regardless of its extent.
Brea Sorrells

Nature on Campus: How College Students Can Improve use of Green Areas

A classroom project for English 298

Abstract

This research investigated the current uses, effects, and eventual improvements that could be made to green spaces and parks near or around college campuses. Two college undergraduate students from the University of Tennessee in Knoxville were interviewed about their use of natural areas on campus, the amount of time spent outdoors, and the improvements they believe this campus could make in order to bring students outdoors more often. Initial predictions agreed with findings from the research, showing that being outside for some period of time helps students become less stressed and ultimately become more productive.
Abstract:

Throughout the history of epistemology, or the study of the theory of knowledge, there have been debates over what should be considered a valid method of proving and producing knowledge. Epistemic circularity, proving a conclusion by implying or explicitly using the conclusion within the argument, has been particularly contentious. Skeptics and relativists argue that epistemic circularity contravenes causality and is potentially dangerous. Supporters of the usage of epistemic circularity point out that without its use the foundations of many fields and branches of science become invalid, along with one’s own subjective ability to understand reality. Due to the flaws in both of their arguments, which shows epistemic circularity to be both discrediting and fundamentally necessary for many fields, I argue that epistemic circularity should not be considered strictly invalidating in arguments. I assert that there should be criteria in which the use of epistemic circularity is accepted. These criteria permit two situations for its usage: when justifying sensory perception in everyday life, when the consequences of its usage are minimal, and when justifying mathematics.
Technology is a great aid for education and facilitates an efficient, engaging environment. Despite this, recent literature shows a concern for using technology as a crutch and portrays how often students become distracted by technological devices. This paper seeks to find the extent at which technology becomes a hinderance in the classroom for college students. I did a study through surveys and interviews and found that technology plays a strong role in student distractions. The extent to which technology serves as an aid before becoming a hinderance, however, is hard to define due to the high variation between class sizes and styles of teaching. Therefore, the study suggests that technology should be determined on a case by case basis and teachers should determine the extent to which technology should be used in their classroom to reduce distractions.
Individual cultures have long devised different ways of explaining and improving their people’s health. Due to historical dominance and increased globalization, the Western medicinal knowledge system, “biomedicine,” has become the de facto system, and all others are regarded as an alternative. Recently, information from Indigenous medicinal knowledge has been incorporated into biomedicine, such as isolating bioactive chemicals from medicinal plants used by Indigenous groups. This research has been beneficial, such as creating new pharmaceuticals, but this paper will argue that over simplifying parts of Indigenous knowledge in order to superimpose the Western model does not give an accurate representation of Indigenous medicine as a whole. Studying Indigenous medicinal knowledge from its unique epistemological perspective will yield a greater understanding of medicine in general. In this sense, Indigenous knowledge research should be conducted in an effort to expand our understanding of health, not serve as a means to an end for the Western model. This paradigm shift would give rise to a more holistic, worldwide medicinal knowledge system which synthesizes aspects of many knowledge and value systems.
Despite the recent push for diversity in the workplace, there are still more CEOs named “David” than female CEOs. Women have slowly started to gain more respect as leaders, however, through secondary source research, it is clear that women approach a so-called “glass ceiling”. This study will shed light on the differences in leadership styles of men and women and how women feel in a position of leadership. Through a series of qualitative interviews with women of various leadership roles, I was able to discover that going through a challenge or hurdle gave the participants clarity on what they wanted to achieve. With two older participants and one younger participant, I was able to gather a variety of perspectives on the workforce and how women leadership is perceived. An analysis of the conversations showed that women are starting to be encouraged to pursue jobs in STEM, as opposed to nursing and education. One common theme throughout the interviews was the acknowledgement of a glass ceiling. While the older participants made it clear that a glass ceiling prevents women from reaching leadership positions, the younger participant, while still acknowledging it’s existence, generally remained more optimistic about it not affecting her career goals. Future research can focus on why men feel uncomfortable with women leadership. In order to shatter the glass ceiling, we must first understand why it’s there in the first place.
Agricultural Chemicals: Necessary Action in American Public Policy

The average American relies on agricultural products countless times a day, but remains unaware of the biological effects these herbicides/pesticides, i.e dicamba or glyphosate, have on the health of themselves and their surroundings. This article argues that new public policy is necessary in the United States to ensure the balance between biological safety and agricultural efficiency caused by these products. By analyzing the effects these products have on plant and animal life, and reviewing implemented policy in other countries, conclusions can be drawn about necessary and effective policy in the United States, such as measures to restrict pesticides to the necessary yet minimal limits. These proposals could include categorical grouping of pesticides by hazard, subsidies to farmers for appropriate usage, and measurement and enforcement of usage limits. While it can be hard to see the importance of environmental safety over sheer production, these results essential to American policymakers, agriculturists, and the general public out of united interest in the health and prosperity of our world.
Use of electronic cigarettes by the youth population has been a trending problem within the past few years as it is creating a whole new generation of nicotine addiction. Recent research of this current issue has showed exposure to the youths through advertisements of these electronic cigarettes play a heavy role in the problem. This article serves the purpose of further researching this issue and seeing how much electronic cigarette use among youth populations and exposure to advertisements of these e-cigarettes correlate; for example, looking into certain methods of possible youth targeting such as the creation of candy flavored vape juices, and even points of unnecessary exposure of children to electronic cigarette advertisements in places such as grocery stores or gas stations. Going back to the idea if these electronic cigarettes should be allowed to have public advertisements at all. Overall, stacking up the argument for electronic cigarettes to be FDA regulated and have restrictions on forms of advertisements like tobacco cigarettes.
This is a classroom project for English 298. The purpose of this study is to analyze the way in which changing nutritional habits during college affect the mental health of students. Information for this study was obtained through the distribution of surveys to non-commuter students at the University of Tennessee, Knoxville. The surveys, sent out electronically via email, investigate any correlations between the quality of students’ diets and various aspects of their mental health such as mood, cognition, focus, etc. My work aims identify any harmful effects the college food environment may have on the well-being of students, and, ultimately, shed light on the importance of maintaining a healthy diet throughout college. Information obtained through the surveys reveals that unhealthy dietary habits in college correlate to lower levels of focus and cognition as well as higher levels of stress and anxiety among students.
With the rise in computational power and increase in data collection came the resurgence of machine learning (ML) and the increased development of gene editing. And given the capabilities of ML with recognizing patterns in complex systems, its application with gene editing is inevitable. However, this combination also carries ethical risks. And while there has been research into the ethical issues in machine learning and in gene editing, research into the combination of both fields is sparse. I will attempt to get a better idea of the unique risks that results from this combination as well find out the views that practitioners in both fields have on those risks and the general future of those fields. In addition, my work aims to define and compare those differences in views to better understand areas of disagreement that will need to be considered in the future. I hope my research will bring more awareness about these important technologies that are already having a controversial impact on society today.
Social media’s omnipresence today is undeniable. As such, much recent debate has occurred regarding if and how it has altered the way people participate in contemporary society. Specifically, the 2016 presidential election and multiple scandals suffered by various social media platforms have called into question the means by which the Internet affects the way citizens engage in politics—specifically American youth. This paper seeks to understand this relationship by synthesizing previous research with new qualitative data collected by the author. Subsequently, multiple interviews were conducted to gather more information and draw conclusions; political science majors and everyday users of social media were questioned in pursuit of an answer to this question. This study determined that social media’s effects on political participation are diverse. Though it provides more universal access to news and information, it often replicates the same hierarchical structures found in other aspects of politics and can foster apathy. However, it has become an incredibly useful and important tool utilized by the young people of both developed and developing countries to allow them political expression and participation in unconventional ways that supplement their standard education.
Despite advancements in scientific understanding and medical treatment, the cost of healthcare and prescription drugs in the United States has been increasing drastically in the past two decades. With this unprecedented expansion in consumer costs, patients are left with insurmountable medical bills, often overpacing the coverage of their insurance, and at other times completely crippling those without coverage. In fact, the cost of healthcare is the leading cause of bankruptcy in the U.S., even for individuals with health insurance. As a result of this growing financial burden, patients are no longer able to proceed with prescribed treatment and have the necessary flexibility to effectively communicate with their doctors. Accordingly, this study seeks to establish the deficiencies within the current healthcare system and elucidate actions that can alleviate this burden and move healthcare forward in an effective and holistic manner. Anecdotal evidence derived from two physicians’ first-hand experience was used as the primary method of gaining insight into trends of the adapting patient-physician dynamic and discerning measures that can be enacted to resolve these discrepancies. These testimonies were corroborated by secondary source research to provide a fuller picture of both the physician’s observations and recommendations as well as those of experts in the field. Both the physicians and secondary source research stressed the importance of administrative countermeasures, such as price transparency and implementing infrastructure to aid patients financially. Moreover, the physicians relayed that increased self-advocacy is key to reducing prices among a populous unaware of the details of the current model. Ultimately, the physicians were only able to recommend internal policy propositions that will vary among hospital networks; the advent of external, governmental policy has potential to altogether reestablish the healthcare system for a goal of equity and affordability for all.
The increase in the globalization of American culture has resulted in an increase in international students at American universities. To date, little research has been done on the effects that American culture has on students studying abroad from foreign countries and their perceptions of their home country’s societal, political, and economic values. At the University of Tennessee at Knoxville, 13% of the 28,894 students enrolled in the Fall of 2018 were international students, the most populous nationality being Chinese. This paper examines whether Chinese international students felt their views on China’s current societal, cultural, and economic values had changed. Using an online survey and several one-on-one interviews, it was determined that the majority of respondents saw the greatest change in the societal and economic categories, namely family structures, the state of the Chinese economy, and the wealth disparity in China. Conversely, the least amount of change was seen in the political category, namely the state of the Chinese government and the political system in China. Summarily, the areas of greatest difference saw the most change to the students’ perspectives. Future research could look into changes to Chinese students perceptions of America after their visit.
The purpose of this study was to examine the habits and motivations of young photographers, both amateurs and professionals. As smart phones continue to provide easy access to high quality cameras, it is important to investigate why people invest in real cameras and dedicate their time and money to photography. For the study, I interviewed four photographers in their late teens and early twenties with varying experience in photography. I questioned the subjects’ motivations for photography, their opinions about the nature of the popular “iPhone photography,” and their ideas of what art is. Through the study, some of the subjects indicated that photography was a hobby or source of enjoyment rather than a job, while most indicated they would be willing to utilize their cameras and experience in a professional photography setting. Furthermore, the nature of art was in contention among the photographers; almost every subject had a different idea of what art is. This study indicates that young photographers are largely pursuing photography for enjoyment and fulfillment that is not being met in other areas of their lives. Additionally, the popular notion that photographs are used by young people merely for preserving memories and sharing experiences is challenged by these findings.
This study examined college undergraduates’ attitudes toward climate change and biodiversity loss. It also explored the effect that exposing students to environmental science throughout their childhood has on their beliefs and concern about climate issues. Two undergraduates and a mother of an undergraduate were interviewed to determine their views and background knowledge concerning these issues. This study predicted that college undergraduates do not have enough knowledge of climate issues to be concerned about them. The interviewees supported the hypothesis by showing the trend that more knowledge leads to more concern towards environmental issues.
The use of complementary and alternative medicine has become one of the largest controversies in the medical world. While the number of patients desiring these types of treatments is steadily increasing, the number of doctors willing to provide and support these methods is staying fairly stagnant. Some of the opposition for the use of complementary and alternative medicine stems from the fact that today’s doctors are not well informed of the procedure and risks associated with these treatment tactics. Those in support of alternative medicine are pushing for the inclusion of these techniques into the curriculum of undergraduate medical courses. Complementary and alternative medicine can be anything from aromatherapy to acupuncture to faith healing. Most often, these treatments are used in conjunction with traditional medicine to relieve the symptoms caused by the cancer or the treatment. Chemotherapy in children can cause devastating adverse effects, stripping them of a “normal” childhood. Complementary and alternative medicinal treatments can not only reduce these adverse effects, but also may be the key to unlocking a new realm of pediatric cancer treatments.
Abstract

This is a classroom project for English 298. Communities revolving around members playing video games at a competitive level are relatively new; they started taking shape in the early ‘90s with the rise in popularity of arcade fighting games. One game that has gained a lot of popularity for competitive play is Super Smash Bros, a game with events garnering hundreds of attendees. However, little is known about how this game’s design choices influenced the creation of a community around playing it at a level of proficiency that exceeds that of the casual player, especially as it pertains to members of the community in Knoxville, TN. This paper tries to reach an understanding of which of the game’s design elements, from its mechanics to its visual and audio aesthetics, inspired the formation of the Smash community by interviewing some of its members and interpreting their responses. Their responses lead me to argue that Super Smash Bros’ focus on fun social interaction brings people into the community, while the diversity of the options made available during any given game keeps its players’ interest. This approach to design could be adopted by future developers, as well as designers in other media.
Sports technology constantly develops to allow more competitive performance from athletes. Newer, more efficient materials have been an important theme in athletic technology for a long time, but new innovations in biometric technology stand to be the “next big thing” in sports. Biometric fitness-trackers keep a digital log of metrics like heart rate and GPS location, then use that data along with robust algorithms to measure a user’s physical condition. Athletes from many disciplines are finding uses for biometric fitness-trackers: from NBA players to Tour de France contestants. For this project, three veteran cyclists were interviewed who shared information about the critical role fitness trackers play in biking. The goals of this project are to highlight important sports technologies and whether or not they live up to their potential, and to analyze indirect benefits to athletics that biometrics provide, including increased security, a reduction in unsportsmanlike conduct, and better protection for athletes’ health.
This study examined how educators in public schools handle discussions of controversial topics in their classrooms. To consider this question, four high school educators in the humanities (i.e. history, English, geography, government, economics, etc.) from Maryville High School were interviewed. They tended to emphasize the importance of letting the students create their own dialogue and acting as a facilitator in group discussions, mostly neglecting to share their own personal opinions about a controversial topic with their students. They also all emphasized the importance of discussing controversial topics to create a more learned and questioning society, laying the foundations for forming informed opinions throughout students’ lives. From their remarks, controversial conversations in the context of the Maryville High School environment often work best through student-led discussion facilitated and monitored by an educator, allowing for respectful discourse and informed decision-making amongst students.
College Student Perceptions and How They Affect the Fast Food Chicken Industry

The goal of this study was to determine why college students prefer certain chicken restaurants over others, in order to improve the quality of on-campus chicken locations. The research uses qualitative data to determine what atmospheric and food quality factors affect UT college students’ choices of on-campus chicken franchises. The study also examines how franchising and licensing affects quality control and how that applies to a university setting. Fifty-nine polled individuals were asked to rate how much they value nine different criteria and to then say which restaurant was the best in that specific area. They were then asked to describe what makes a good chicken tender and to indicate which restaurant best represents that impression of the best chicken. The study concludes that atmospherics and food quality are both essential to creating a profitable fast-food location and that quality of food, location, hours, and speed of service are the most important factors when choosing a fast food restaurant. The study found that students preferred Chick-fil-a as the best restaurant overall based on their superior food quality and location over Raising Cane’s and Dippers. The study recommends that change to the restaurant’s speed of service and quality of food be implemented to improve The University of Tennessee’s food chain profitability and customer satisfaction.
Abstract

Electronic banking has increasingly become the more preferred form of banking in America. This change in preference not only indicates traditional banking may be declining but also permanently ending. This paper seeks to determine if electronic banking will lead to the extermination of physical locations, particularly for community banks. This research attempts to do this by exploring a brief history of traditional banking while providing general information about electronic banking. It also describes several aspects of community banking that appear to be essential to a community bank's survival. Also, this work includes findings from three interviews held with professionals in the banking industry. They shared their knowledge and opinions on traditional banking, electronic banking, and community banking. Ultimately, this research concludes that physical bank locations will not be eliminated by electronic banking because of the desire to have relationship between banker and customer, the importance of a bank in its community, and the irreplaceable aspect of face to face contact.
This is a classroom project for English 298. College campuses have thousands of students studying, eating, and living in close proximity. Students being aware of preventative measures against influenza virus without taking those measures is a significant issue. In this study, the motivation behind students not taking these preventative measures was examined. After establishing this motivation, a plan to breach this gap and improve campus safety may be better formulated. For this project, I surveyed twenty undergraduate students to gain a better understanding of what preventative processes students actually participate in and what impact illness had on their schedule and stress level. As illustrated by the quantified survey results, the majority of freshman undergraduates at the University of Tennessee, Knoxville experience stress from missing classes due to illness. Additionally, a vast majority of students find it difficult to time to go to a doctor when sick, and the majority do not follow through with actually visiting a doctor or a clinic, despite knowing that they are feeling unwell. My project aims to call attention to the need for administrative action to improve student health.
Justin Vachon

A classroom project for English 298

Project Title: *Hip-Hop and its Growing Influence: Impact of Hip-Hop Culture on Criminal Activity Among Youths in the United States*

Hip-Hop has been a popular genre of music among teenagers and young adults since the 1970s when it originated. As the genre has continued to develop into what we know it as today, it has acquired some new elements. Many hip-hop songs released today glorify violence and materialism. With these new aspects prominent in the music, many youths are being influenced in negative ways by hip-hop and its culture. The goal of this project is to study how the increase in popularity of hip-hop music since the 1990s has affected criminal activities committed by people ages 13-24 in the United States. It also evaluates how social media has contributed to the influence, as well as the concept of celebrity worship and its consequences. The purpose of this project is to create awareness of the influences that youths are troubled with directly from hip-hop’s culture. This project analyzes multiple studies previously conducted regarding celebrity worship, tobacco and marijuana use, and gendered interpersonal violence and concludes that the newer, larger hip-hop culture does influence the types of crimes committed by youths, especially with the new reaches of social media.
It is inarguable that environmental sustainability is becoming an increasingly urgent issue across the globe, and it’s crucial that change must occur to stall the current path of environmental degradation that rampant consumption and industrialization has caused, especially in the United States. Numerous ways exist to implement sustainable practices into society, and some initiatives have worked better than others. The purpose of this research is to examine how geography and the culture of different areas within the United States can impact one’s sustainability habits and willingness to participate in eco-friendly actions. The findings of this study indicate that students who regularly practice sustainable behavior often cite their geographical proximity to nature as a reason for their participating. Also found was that initiatives that posed economic gain for those who participated in them, such as taxing plastic bags at grocery stores, were very effective among people in the United States: both those who are actively concerned with the environment, and those who are not necessarily. Those interviewed were either from Tennessee or had lived in Tennessee for a significant period of time, and all cited that their concern for sustainability was diminished in some way during their time there due to many factors, including what was described as accessibility of proper resources, southern culture, and lack of environmental knowledge.
Matthew Vasuta

A Classroom Project for English 298

Abstract

This paper investigates research in both the technology and family psychology sectors to examine the expected future between driverless technologies and family life. The research utilized in this study consists mainly of scholarly reports but also features other secondary sources and three first-hand interviews. The secondary sources show uncertainty regarding the introduction of autonomous vehicles (AVs) and connected vehicle technology (CVT), as experts disagree on how these technologies will impact the public. The author postulates that since families are segments of the public, any effects AVs and CVT have on the public will also influence the family. Hence, the author also studied family psychology literature, which indicates that parent-child interaction is beneficial for children, although the literature varies from one scholar to the next on how that is best achieved. This paper concludes that the likely admittance of autonomous vehicles as the standard should be advantageous to families because of AV and CVT’s influence on safety, the elderly, handicapped people, poorer families, and commutes.
Sylvia Vonderwell

A classroom project for English 298

For many years, the number of people on the national transplant waiting list has greatly exceeded the number of actual transplants performed. This shortage continues to increase each year. Due to this, many awareness campaigns have been launched by both the media and non-profit organizations to increase donation rate, yet the percent of registered donors remains low. A likely reason for this is the perpetuation of organ donation misconceptions by primetime television dramas. This study aimed to examine the perceptions of organ donation by college students, including where they receive their knowledge and whether or not their opinions are affected by viewing medical dramas. Interview responses revealed subjects knew almost nothing about how to become an organ donor or the organ donation system in general. As a result, most were not official organ donors despite showing resounding support. Subjects, whether or not they were regular viewers of medical dramas or not, admitted to learning about organ donation either from television or other popular media. Medical dramas, therefore, are an important asset to awareness campaigns and more emphasis needs to be placed on portraying accurate and positive organ donation stories. In addition, young adults need to be further educated about the truths of organ donation and how to become an official donor as they reach the eligible age to become one.
Public Perception of Lawyers

Lawyers have always borne the stereotype of being an elite class above the rest of society. Thus, many Americans believe that the men and women of this occupation are self-centered, overdramatic, and arrogant. This led me to construct an eighteen-question survey and distribute it to over eighty UT college students. I examined factors such as age, gender, and ethnicity that altered college students’ opinions of lawyers after gathering the responses. These results reveal that there is in fact various public opinions of lawyers. The reason for this is partially due to a person’s demographics as well as factors such as political beliefs and previous interactions with lawyers. This study recommends that the men and women of the legal profession need to consider their career’s public perception in order to be more successful with the clients in their occupation.
HOW THE MEDIA COVERS MASS SHOOTINGS: a classroom project for English 298

Abstract

How the media refines and presents bodies of information can negatively influence public opinion. In particular, scholars have debated whether the media coverage of mass shootings contributes to the stigma surrounding mental illness. This is because the media often correlates mental illness with the culprits of mass shootings, consequently perpetuating the negative stereotyping of this outgroup. Although the media’s intentions are to provide accessible information to a general population, fixating on correlating mental illness and mass shootings prevents the opening of an educated, productive discussion on gun violence. This contention is justified through an analysis of several articles that discuss the framing and stigmatization of mass shootings as well as alternate attributions for acts of extreme violence. If a proper discourse isn’t opened on gun violence soon, the lives lost in attacks will have been -unfortunately- senseless. Moving forward, the media needs to expand the scope of their coverage in order to provide the public with the factual evidence needed to shift beliefs. Once public conversations are driven by academic evidence, mental illness stigma can be removed from the gun violence narrative and society can focus on more important aspects of mass shootings.
Abstract
As technology advances and becomes more used within society, human communication is rapidly changing. The majority of communication occurs through a screen with typed messages, making it more impersonal and expressing less sincerity. This study examined the emotional value of handwritten communication within intimate relationships. A survey consisting of five demographic questions as well as ten questions pertaining to the participant’s handwritten communication practices was distributed through multiple social media platforms. Results showed that handwritten communication, while not practiced frequently by the majority of the population, is still regarded as a more significant form of communication when expressing emotional intent. The majority of participants responded that they do believe that handwritten communication is important due to its more personal style and emotional implications. Through this, the survey revealed that handwritten communication is still very prevalent and desired among the population, regardless of gender, ethnicity, education level, and type of education, and that many perceive it to be a more viable form of communication within intimate relationships where deep emotions must be expressed.
Factors for Homelessness: An analysis of the perceptions of financially dependent undergraduate students

Walker, Benjamin

A Classroom Project for English 298 Faculty Mentor: Nicks, Robin Jean Gray

Homelessness is a problem that affects thousands of people in every state across the United States. Studies by Tessler, Rosenheck, and Gamache (2016) and DeForge (2012) have shown that the perceptions of the causes for homelessness change based on gender, age, economic status, and other factors. One area that has not received much research is the perceptions held by young adults that have never had to financially support themselves. Through interviews with three undergraduate students, this research aims to give a clearer picture of the views held by undergraduate students that are financially dependent and how their views differ from those reported by homeless individuals as well as individuals of other demographics and economic statuses. The results show that undergraduate students place less emphasis on the economic aspects while putting more of an emphasis on individual problems such as drugs, alcohol, and illness. This study will help to increase our understanding of the younger populations view on homelessness and help future research understand when and possibly why some perceptions change as age increases.


Kaylee Walper

Abstract

This is a classroom project for English 298. It is a project designed to investigate the opinions engineering students have on climate change and the effects, if any, those beliefs will have on their future plans. Participants completed a survey stating if they believed in climate change, if they believed climate change was anthropogenic, and if they will take climate change into consideration when making future career choices. They were also asked if they believed climate change is a relevant societal issue and if they believe it should be more of a priority. Students were also asked if they had received any education on climate change in high school or at the University of Tennessee. Results were compared to evaluate if there was a significant difference in climate change beliefs among the different concentrations of engineering students at the University of Tennessee and to discover the likelihood of current engineering students to consider climate change in their careers. This project found that there was a lack of education resulting in engineering students’ misunderstanding of their roles in relationship to climate change. At least one student from each concentration believed that his or her future career would have no effect on climate change. In order to create a more sustainable future that is prepared for the future dangers of climate change, earlier and more consistent climate change education is needed for engineering students.
A Classroom Project for English 298

Poster #514
Student(s): Wilson Wang
Faculty Mentor: Gentry, Elizabeth Leigh
Project Title: Trophy Hunting: A Practice Essential to Animal Conservation and its Sustainability

Trophy Hunting: A Practice Essential to Animal Conservation and its Sustainability

The legal hunting of exotic animals for sport and trophies on conservation reserves has been a widespread practice for decades, but in recent years, people have come to question whether the practice is ethical or even beneficial. Wildlife conservationists, biologists, environmental scientists, and ecologists have debated the question of whether trophy hunting actually benefits animal conservation and if it can be sustained. Although this paper will ultimately defend trophy hunting and its sustainability, it will address and weigh the biological, environmental, and economical benefits and consequences of trophy hunting. Opponents criticize trophy hunting for having detrimental biological and genetic ramifications on populations and its susceptibility to corruption and mismanagement, while defenders assert that trophy hunting incentivizes locals to protect wildlife and provides crucial funding to animal conservation efforts. Although trophy hunting may not be an ideal practice and has flaws, it is still the most optimal approach to animal conservation and can be sustainable because it provides locals a tangible reason to protect animals and helps fund animal conservation.
The original purpose of the survey was to collect research on whether there is a correlation between understanding Southern dialect and view of the South, or if either of these factors could play a role in how society is now. The survey was conducted using software called Survey Pro, set up with three main sections: an introduction and disclaimer, the questions themselves, and demographics and final questions. A total of 176 participants took the survey. When asked about their opinion on living in the South, 31.61% said they don’t like it, 28.89% said they are indifferent, 22.41% said they liked it, 8.62% said they hate it, and 7.47% said they loved it. The results show that many people have no opinion or negative views about living in the South, and it can also be noted that the largest percentage of those under 18 through 35 had negative views of the South, while 35 and older individuals were more likely to have indifferent or positive views. In the survey, while all ages had about the same percentage of those who had heard the introduced phrases before, adults 35 and older were significantly more likely to have used the Southern phrases themselves, showing that the usage may be fading in younger generations. The more-negative views that younger generations had about the Southern culture could be due to the idea that Southern slang and culture is fading out in younger generations as time passes, which makes the South seem less homely.
Since the end of World War II in 1945, the United States has been considered by many to be the most powerful country in the world, and that position was only further solidified following the fall of the Soviet Union in 1991. This power is both in the form of so-called “hard” power, or the ability to forcibly coerce others, and “soft” power, or the ability to influence and shape the opinions of others. However, in recent years, China has slowly been increasing its influence in an apparent attempt to overtake the US and become the most powerful country. This project examines the various efforts China has been making to slowly increase both their hard power and their soft power, as well as their potential to be successful in their effort to become the world power. The specific things this project will look at will be China’s unique method of no-strings-attached foreign aid in Africa, their “New Silk Road” project in Central Asia, and how the US is responding to what China is doing.
Emotional Effect of Alternative Conception Methods
Watkins, Kolya
A Classroom Project for English 298
Faculty, Mentor: Nicks, Robin

Fertility treatment is an increasing industry in the US, but before investing in treatment women may not be prepared for how the treatment will affect them. Much of the research provided on ART treatment gives women only data on the chances of success, such as the study by Schröder (2004) on IVF pregnancy rates. However, they lack information on the emotional stress that comes with fertility treatment and adoption. The aim of this study is to investigate the emotional stress women go through while undergoing fertility treatment and how that affects their decision on which treatment to use or if they consider adoption. This investigation will be conducted through interviews with three women who suffer from infertility but who found another way to start a family. The results are likely to show a lack of emotional support from doctors to prepare the women for if the treatment doesn’t work, as well as feelings of disappointment in their selves for their body not being able to work normally. This study will provide an insight to what may be missing in the data provided to women seeking fertility treatment in addition the statistics that will help show them how the treatment will affect them mentally.

Reference:
The Prevention of the use of Cocaine in Pregnant Mothers in America

During the 1980’s through 90’s, thousands of cases of “crack babies” popped up all around America. These children were birthed by mothers who used crack-cocaine while pregnant, and said children were affected later in life physically, emotionally, and psychologically. In response to this trend, many state and local governments have set up laws to prohibit the use of cocaine while pregnant. However, while mother’s who use cocaine are being punished, it is only after the child is born, so the damage is already done. This is mainly due to how each government views the unborn child and its rights as a person. In order to end the use of cocaine in pregnant mothers, laws must be set up so that using cocaine while pregnant would be classified as child abuse, and therefore punishable before the birth of the child. There would also have to be laws instated that would allow for drug tests on mothers if there is reasonable suspicion. This review will discuss the history of cocaine and pregnancy as well as the development of laws throughout the years. It will finally also discuss many possible solutions and counter-arguments that would inhibit the road to eliminating this issue.
The Validity of the Insanity Defense: Understanding Its Necessity for the Mentally Ill

The public and select professionals believe the insanity defense should be replaced or even abolished; however, according to a plethora of evidence, the insanity defense is valid and necessary for protecting the mentally ill in the modern legal process. Several historical cases, including those of Hadfield and M’Naghten, as well as the exploration of insanity itself have shaped the insanity defense into its current form. Though the defense has potential to be improved, this does not change its inherent necessity for the mentally ill. The public’s misconceptions of the defense are due to several common myths such as the validity of the defendant’s mental illness, the overuse of the defense, the notion that the mentally ill are always a danger to others, and the use of the defense to receive a lesser sentence; the correction of these myths brings truth into the current, murky public perception. The misguided understanding of the mentally ill is partially due to the mass media’s inaccurate portrayal of this population which taints judgment of the defense’s necessity. The established history of the insanity defense has formed its current process which is integral for the mentally ill involved in the legal system.
In the Industrial Revolution era, the paid holiday allowed families to vacation every year in what is now known as the “annual family vacation.” As the demand for tourism grew over the decades, the tourism industries throughout the nation responded with increasingly extravagant and environmentally detrimental ventures. Often, this tourism is carried out on the lands of developing nations, who have no say and reap no benefits from business negotiations they were tricked into. Sustainable travel, or ecotourism, is an alternative to modern conventional tourism that seeks to uphold the tenants of environmental sustainability, economic equity, and cultural appreciation through the tourism industry. As part of a classroom project for English 298, I created a survey to investigate the characteristics of the typical college student’s vacation and gauge these students’ opinions on the model of the sustainable vacation. Overall, I found that a large number of college students had not before considered the economic or environmental impacts of their travel, but the vast majority were willing to learn about ecotourism and take steps to implement it in their future vacations. My work over tourism behaviors reveals that a demand-side approach to sustainable travel can spark a supply-side transformation.
An American Made Mystery: The Diseases that Killed the First English Colony

Abstract
The demise of the first European colony, Roanoke Colony, is one of the few mysteries left in American history. This report focuses on the possibility that the colony was consumed by disease. Several potential diseases (including smallpox, dysentery, typhoid fever, pellagra, beriberi, and influenza) that could have catalyzed the disappearance of the colony are researched in this work. This is performed by examining colonies in similar areas and times (the colony of Jamestown serves as an excellent comparison in particular) because modern, tangible research relating directly to Roanoke Colony is very limited. While one of the most popular disease suspects is influenza, the research performed for this report revealed that the prime suspect was likely multiple diseases combined, instead of just one disease by itself. It is thus argued that pellagra (a nutritional disease caused by a deficiency of niacin) weakened the immune system of the settlers, which then allowed a lethal form of smallpox (reflected from the Native Americans) to extinguish the majority of the population of Roanoke. This theory adds knowledge to the debate surrounding the colony and introduces the idea that the “disease” is actually a combination of a nutritional and a contagious disease.
Abstract

Automated vehicles are the future of transportation. They will be able to change cities along with the way that people live. The path to a fully automated network of vehicles is not simple, though. There are many barriers that must be overcome to reach the desired level of automation. Technology, safety, and privacy are all issues that stand in the way of implementing driverless cars. With time, these barriers can be surpassed, and technology could be put in place that changes the urban area as people know it. Once automated vehicles are implemented into everyday lives, cities will change drastically. Land will be freed for better uses, aesthetics will improve, and people will have more choice with where they would like to live. Automated vehicles would bring a massive change to cities, which could potentially be experienced in this lifetime.
Gulf War Syndrome: Why it Should Not be Neglected by the VA

Gulf War Syndrome (GWS), also known as Gulf War Illness (GWI), is a chronic multisymptom illness that affects veterans who served in the 1991 Gulf War. This qualitative research paper contains my examinations of the physical and mental symptoms of GWS and how they have affected veterans of the Gulf War. It asks the question of whether Gulf War Syndrome exists and are the symptoms identifiable. It explores how such a wide variety of symptoms in an illness could occur based on research and personal input from veterans. With prior outside research, I established a list of symptoms to place in a survey to establish some of the symptoms and how they have affected these veterans, I have surveyed a little over two hundred of those who served in the Middle East to collect data on which symptoms they have, whether they identified with one of the three possible syndromes within GWS, and how GWS has affected their lives, families, bodies, mental states, and potentially offspring. This research found correlations between their symptoms and is a step closer to finding what caused this disease based on their time and place of serving. The results show that, with the only healthcare for GWS provided to them being mostly poor in quality, the symptoms are not going away but are either dulled with the effects of medicine or worsened. With this research, I have concluded that Gulf War Syndrome, while it is a wide variety of symptoms, does exist and is identifiable. Further research is needed to instruct how the VA might treat these veterans.
Repetitive Head Impact and Brain Damage: The Aftermath of an American Football Career

An alarming number of former and current American football players are suffering from chronic traumatic encephalopathy (CTE). Since most of the injuries that cause the CTE are due to the longevity of football careers, changing the rules of youth football to reduce or eliminate contact would shorten their time exposed to impact, which could greatly reduce the number and severity of cases of CTE. This essay analyzes the effects and treatments of CTE, studies cases of athletes who started playing as young children, and explores possible solutions to minimize head impact within football gameplay. Some of these solutions involve making the athletes aware of how dangerous football is or changes to equipment and technique. Football undoubtedly plays a role in American culture, and it is not plausible to say it can be eradicated or completely changed to be safer. Despite providing excitement, scholarships, and other benefits to numerous individuals, football needs to shorten the careers of its players in order to cause their lives to not be shortened.
Gregory Brian Whited

A Classroom Project for English 298

Classroom research is often focused on how students respond to different types of instruction. This study, however, focuses on the educator and seeks to determine if there is a link between where an educator is at in their career and their teaching style. Moreover, this study directs its attention to the teacher, not the student, and there is no scrutiny towards the results or grades of their teaching, only on the practice itself and how the educator favored that teaching approach. Educators from the graduate to the professorial level in the Modern Foreign Languages and Literatures department were interviewed about their careers and teaching, with special attention being given to how language and communication can create a barrier in the classroom setting. The results from the interpretation of the data suggest that there is a difference between in how educators teach at different levels in their careers; the focus of the educator shifts from the student to the environment created in the classroom the further they are in their career. These findings show that experience favors the overall creation of a classroom environment that is inviting and welcoming to students and opposes overtly strict and disparaging teaching practices.
Retribution and Reoffending: An Exploration of Prisons’ Effects on Recidivism

Among academics, widespread acceptance of prisons as an effective means for controlling crime is deeply rooted in the trust of the establishment’s ability to deter offenders from future law-breaking. However, the current alarming recidivism rates in the United States disrupt that view. This essay examines past and present quantitative research relating the prison experience with trends in reoffending and dissects the characteristics of the prison process from entry to release. Moreover, it reviews the theoretical foundations of penal institutions and analyzes the nature of imprisonment and crime in the United States from a historical and comparative perspective. Overall, the findings show a strong causal relationship between the realities of custodial sanctions and incarcerated individuals committing subsequent crimes. Thus, the essay argues that prisons in the United States are contributing to recidivism, and to crime in general. Therefore, by attesting to the ineffectiveness of prisons to reduce crime, the essay also argues that it may be useful to look to other forms of criminal punishment instead when considering the safety and economic interests of society as a whole.
Ally Willoughby

A classroom project for English 298

Due to the constant use of social issues to enhance advertisements, the purpose of this paper is to focus on the actual responses and opinions that everyday people have to such commercials. By simply searching the debate on the Internet, there are differing opinions about whether this form of advertising is well received and worth the potential backfire. Thus, through an interviewing process of various age groups made up of both male and female, the responses and opinions on this form of advertising was recorded. By asking certain demographic questions and what their general opinions on advertisements were, ideas and themes arose in comparing the interviews. Females were more likely to have a positive view of Gillette’s commercials than the males did. Furthermore, all males and females had a positive view of the Always commercial. However, all interviewees concluded that companies’ including “woke” ideas into their advertisements seemed somewhat irrelevant and unnecessary. Understanding the potential advertisement responses is essential to marketing teams and companies, because avoiding scandals with social issues is essential to a brand’s success.
What will be done when antibiotics are fully ineffective? This essay explores the eminent annihilation that antibiotic resistance will foster and what solutions are being researched today to hinder its damage. Since the mid-1900s, pharmaceuticals have been producing antibiotics and antimicrobials at an unhesitating rate, selling to hospitals, clinics, grocery stores, and most importantly, big ag corporations. These companies overuse antibiotics in livestock feeding and have thus developed antibiotic resistance in an alarming and exponentially growing fashion. Researchers have attempted numerous studies to provide answers for what can be done. Unfortunately, between stronger antibiotics and stricter policy on the use of them, all solutions studied thus far have shown to be futile. This essay argues that, a previously unseen solution to antibiotic resistance, lab-grown meat, can end the need for big ag’s use of numerous antibiotics while growing cattle, swine, and poultry for slaughter, and diminish the obscene use of antibiotics in agriculture. The essay also provides other solutions that can inhibit the growth of resistance on a smaller scale, stating that individuals cutting their consumption of big ag meats and reserving antibiotics as a failsafe for infection can effectively aid in the fight against bacteria.
Riley Woody

A Classroom Project for English 298

Seeing the World through the Eyes of a Parent: Exploring the Psychological Effects of Childrearing

This study was intended to discern the consequences of childrearing on a parent’s worldview while also identifying external influences. By thoroughly interviewing five different generations of parents and potential parents, patterns and anomalies related to the transition to parenthood as it affects the psychological characteristics of the individual were observed and classified based on gender, upbringing, pre-parental beliefs and priorities, and external social and cultural influences. Interviewing individuals in each stage of life, provided varied points of view and experience that broadened the applicability of conclusions. Major consistencies found within the data related to religious background, the desire to have more than one child, and the unexpected difficulties and responsibilities of children, with notable exceptions in each category. The prevalent similarity in these categories suggests that childrearing initiates a level of maturation and selflessness caused by the shift of personal priorities and goals.
This is a class project for English 298. Religions' tenants, rules, and laws all point to believers being more trustworthy, more trusting, more cooperative, more likely to volunteer, and more likely to donate to charity, but is this really the case? Many sociologists and psychologists in recent decades have sought to answer this question with little conclusive results. This project’s goal was to help clarify some of the confusion by focusing in on college-age students and seeing if their religious belief, as well as the way they believe, influence the likelihood of volunteering. We found that belief, the way of belief, and the frequency of church-going do not seem to have a reliable influence on a college-age person’s likelihood to volunteer on believers, but that they may on non-believers. Community involvement in other forms seems to also be an influence. In addition to these findings, we propose other methods to find answers to this question.
Beyond Infinity: The Reality of the Multiverse, a classroom project for English 298

This essay responds to expert skepticism regarding the multiverse as testable and affirmable due to its unobservability and the complex laws of physics behind its theories. The multiverse entails the existence of many to infinite universes outside of the one we know. It asserts that though the multiverse’s existence has been made to seem far-fetched, the continuing research and proposed theories should not be written off as speculation, as progress is being made towards definitive findings. Justifications are provided firstly by citing reasons for professional speculation including the multiverse as a philosophical principle rather than a scientific one and its inability to be tested. Next, rebutting said speculation is done with two different lines of developed justifications for science behind the multiverse: anthropic reasoning, based in physics and statistics, and eternal inflation, based in quantum physics. It emphasizes professional research on these principles and the scientific nature of the findings, leading to a conclusion that the multiverse is plausible and is being studied more intently as time progresses. Therefore, it should not be dismissed by skeptics.
Preston Young

A classroom project for English 298

Lethal Autonomous Weapons Systems: Legality, Ethics, and Uses

Abstract

This paper examines Lethal Autonomous Weapons Systems through the extensive literature on the topic and the expert opinions of military professionals. Airforce Lieutenant Colonel Jeremy Taylor and Army Second Lieutenant Todd Koob discuss the legality, ethics, uses, regulations, and soldier response to the weapons systems with respect to International Humanitarian Law and a combined experience of over 40 years. This research shows that Lethal Autonomous Weapons Systems would be legal if they did not cause harm to civilians or their property. Weapons systems could achieve this by running on a system of do no harm in uncertain situations. This is viable for robotic systems because they do not have a need for self-preservation and can afford to not shoot first in a life or death situation. These systems should be created with perfection in mind; however, perfection is unachievable, and they should be overseen and regulated by humans. Soldiers will be willing to work with the systems because they will keep soldiers safer by reducing risk. LAWS will not solve all the problems of warfare, but they should be researched and developed because they will improve battlefield conditions and save lives.
Jacqueline Zuraf

A Classroom Project for English 298

Student Opinions on Advantages and Disadvantages of On-Campus and Off-Campus Housing

College years provide new independence for students who are leaving home for the first time. Most studies agree that living on-campus provides more advantages and opportunities for academic success and social opportunities than living off-campus. However, off-campus living varies from university to university in that residences can be extremely close to campus, provide numerous amenities, as well as other opportunities that may prove more beneficial to student health than on-campus residences. In this research project, I explore University of Tennessee and Middle Tennessee State University student preferences for the two main kinds of living situations, as well as survey their personal beliefs in how their current situation has affected their academic performance and their physical health. This research supports the idea that most students prefer living off-campus as opposed to on-campus because it provides a healthier balance between school and private and social life, as well as forces students to be more productive with their time because they cannot easily and efficiently return to their off-campus residence between classes.
Using the existing big box form to drive simple operations that assess the insufficiencies of the existing architecture, we address the scale of the master plan, ecological remediation, and sustainable strategies.

How can we change our society’s need for excess with efficiency? What programs would benefit the community and create a bustling center?

This project is based on research of Oak Ridge’s needs as well as the needs of the nation. The Manhattan Project was a time of dire need for the country and the world, as the City of Oak Ridge rushed to be built and to build the most revolutionary, technological weapon of all time. The war efforts were growing in Oak Ridge and there was a need for efficiency and a great demand for housing. The historic flattop houses were born from this society. They were built to satisfy the public’s needs and to experiment with housing techniques, prefabricated and later placed on site, these houses were highly revolutionary for their time.

Taking the core ideas of these houses into the contemporary era and furthering the idea of prefabrication, this project assesses the architectural need of today and the agency that prefabricated architecture allows. This project notes the prevalence of the unattractive empty big box typology that plagues every suburban area in the country and begins to analyze innovative solutions to the typology’s wasteful ways. This project utilizes prefabricated housing, that is transportable and efficient, to address the architectural inabilities of the big box. By nature, the big box is excessive and the growing number of abandoned big boxes is astounding. This classroom project assesses the architectural need for an innovative housing typology like this in the place of existing massive commercial spaces. This project proposes a viable solution to the complex problem with Oak Ridge’s big boxes and big boxes across the nation.
Collective Living

Haley Dennis, Katherine Hill, and Ashley Wolff

Collective Living is a study of housing for a new community development in Fond-des-Blanc, Haiti. The development, supported by the Haiti Christian Development Fund and the Kellogg Foundation, proposes increased density in a more sparsely inhabited rural area of the country in order to increase access to communal amenities and resources. Furthermore, it aims to integrate various socio-economic classes to develop shared social mentoring experiences.

After researching Haitian culture and delving deeper into the importance of community engagement within the area, we developed design objectives that focus on issues of social empowerment, community involvement, and flexible domesticity. The proposal, Collective Living, draws attention to the gender-specific place of the kitchen, where women’s time is often consumed by tasks of meal preparation and child-rearing. Time is a factor that largely affects people’s relationships to their communities. By affecting this limited resource through space-making, the proposal creates opportunity for strengthened social bonds. The project proposes a new typology that reimagines the kitchen as both central to the home and to collections of homes (the lakou), thereby empowering women and making them integral to the social structure of the community. In this way, the proposal reinforces the idea that individuals make the collective, the collective makes the community, and the community makes the genus loci.
Wind Mechanics | Social Mechanics

This project explores housing design for a community development in Fond-des-Blancs, Haiti. The hot and humid climate of Haiti is evident in all its cities. Fond-des-Blancs is lined with a river that cuts through a valley and is parallel to a mountainous terrain. The southeastern winds that blow over the Caribbean are altered and disrupted in this site due to the mountains surrounding the area. This proposal's objective is to study passive cooling strategies related to air movement, shading, and daylighting as form and spatial arrangement generators for each residential unit. The goal is to optimize housing ventilation and comfort levels of inhabitants.

Housing in Haiti is not normally optimized for passive cooling strategies. Thus, our approach is to direct the wind flow throughout each housing unit within the neighborhood on site. The proposal is manifest through two main ideas; the first consists of wind scoops on the vertical and horizontal building facade of the units. This technique pulls air in and through the interior space and redirects the winds of the exterior space. The second technique is the idea of horizontally staggering spaces to optimize the flow of wind in the housing areas.
A Community For Haiti reimagines the Haitian lakou as a contemporary model for housing development in Fond-des-Blanc, Haiti. Lakou refers to a cluster of houses built around a shared courtyard, typically found in rural areas of the country. It also describes a socio-economic model of community interdependence and autonomy from a greater governmental structure. A Community For Haiti addresses both these aspects, physical and social, and examines them in context of a planned community development by the Haiti Christian Development Fund.

An overriding goal of the proposal is to promote social interactions between people of varying socio-economic levels. These interactions occur at the scale of the single home, small clusters of homes, and the community overall. With the single home, we draw upon the unique program spaces on the Haitian gallerie and salon, as well as the distinct way they use the kitchen and preparations spaces. Focusing on the common areas between the houses, we have identified additional programming, such as outdoor cooking, daycare, study areas, recreational areas, and laundry, which have greater potential for social interaction. Finally, we have employed a larger neighborhood superstructure to organize the housing units and communal areas, orchestrating pedestrian passage and moments of pause. The superstructure helps to unify the varying scales of building and serves to unify the various classes, representing them as equal contributors to the community dynamic.
This project identifies crucial aspects of cultural, social, and individual transition, designing in a way that promotes transformative action and social mentorship in Fonds-des-Blancs, Haiti. The typical Haitian family occupies their home in spaces of black and white — where exterior spaces are seen as communal and social spaces, and interior spaces are for sleeping and intimate living. Through a comprehension of this local vernacular and the emboldened desires of our client, Haiti Christian Development Fund (HCDF), a new typology is formed — one that creates a gray space, seeking to create spaces of progress toward a new model of community through the built environment.

The HCDF serves both the Haitian family unity, at multiple socio-economic levels, but also offers flexibility for other demographics, such as more transitory professional individuals, to be part of the social mentorship system. Proposing a new housing model, our team is highlighting the individual ability to adapt for future uses of space, familial growth and generational involvement within the household, and larger scale social interaction and societal evolvement, all evoking a sense of welcomed familiarity while proposing new ways of communal living.

Our intent is to design these transitional spaces to facilitate social mentorship and infrastructural growth while providing a gradient of public and private spaces that accommodate the community’s needs for privacy and socialization. It is imperative that our structures of locality allow for all demographics to be socially immersed and dwell in spaces that no longer exist as black and white but begin to manifest in the realm of grey - neither rural nor urban, neither interior nor exterior, and spaces that are neither permanent nor impermanent.
Amber Stanfill, Tyler Sanford

The Grande Boolean Concert Hall uses architectural features to draw in the passerby and creates a pull for those considering Knoxville as a destination. The design infuses natural curves into the downtown area creating architectural intrigue and seats just over 1800 patrons for concerts or events. Boolean logic informed the programmatic flow and overall form celebrating the three Boolean operations: difference, intersection and union. The geometries informing circulation, enclosure and organization were the cone, sphere, and ellipse. These geometries were operated upon to create a plaza, entrance, and roof geometry directly relating to acoustic performance. A detailed acoustic simulation allowed for the iteration of acoustic reflector organization to ensure the greatest acoustic quality within the design.

Extraordinary methods of drawing including stone stereotomy, the historical art and science of cutting three dimensional stones from 2-d drawings, and descriptive geometry informed how the project was documented and helped cultivate the translation of 3-dimensional objects into 2-dimensional data. The initial research to develop these extraordinary methods included 2-d and 3-d algorithms testing the curvature documentation of fruit, a naturally doubly curved surface. Without these extraordinary methods the documentation of this design at a construction level would not be possible due to the doubly curved surfaces produced through the Boolean operations.
RESEARCH TITLE  
Design-Building as Community Empowerment through Green Magnet Academy’s Little STEAM Library

(200 words) ABSTRACT  
Architecture must consider its social obligations to the surrounding community. As such, design is not just a service, but also a tool for empowering local residents to learn about the project proposal process and to understand how to advocate for new community projects. This project teaches, learns from, and collaborates with students engaged in STEAM (science, technology, engineering, art, and mathematics disciplines).

Three details make this project an extremely important research investigation for design-build, student organizations. First, this project is a collaboration between the University of Tennessee chapter of Freedom by Design (FBD), the UT Center for Enhancing Education in Mathematics and Sciences (CEEMS), and Knox County Schools, specifically Green Magnet Academy. Design is inherently collaborative, and this project directly reflects the benefits of multiple collaborators in community projects. Second, through design workshops and feedback from local students, faculty, and parents, the project expanded the initial goal of a little library to also include an outdoor classroom space with book storage and enhance the school’s entrance. Third, the project is inherently process-driven. Community engagement was structured into each stage of design, construction, and evaluation processes. It is fundamentally a project for the community, by the community.
Poster #541
Student(s): Grace Altenbern
Faculty Mentor: Ambroziak, Brian Michael
Project Title: A Machine to Understand the Tennessee River

A MACHINE FOR INHABITATING WATER

THESIS STATEMENT: In Juhani Pallasmaa’s The Architecture of Image, he argues "man and space are one." This design further emphasizes his statement because it is a machine to inhabit the river and be one with it, while also allowing the user to develop a better understanding of the surrounding environment’s effects on the quality of the water.

1 EXT. THE GREENWAY—CLOUDLESS—SUNSET
ESTABLISHING SHOT: From the greenway, the camera slowly zooms in on a biker, as he rides on a path lit up by a grid of lights. To his left, cars speed by him on Neyland Drive. To his right, a swimmer is swimming freestyle in a long lap pool. This is something she looks forward to doing after work in the summer. A small room peaks from behind the lap pool and reflects onto the water. The biker wonders what’s inside, but his thoughts are interrupted by a loud honk coming from the street.

DISSOLVE TO: Same shot, six months later amidst a snowstorm

2 EXT. THE GREENWAY—SNOWY—DUSK
POV.CHILD. CAMERA shows the greenway engulfed in a new landscape. Snow and frost cover the land, in a white coat. It is freshly night as the child is being pulled by her mother through a glowing path. The curious child is trying to take in the scene. There is so much to look at, and not enough time. She catches the snow on her tongue and feels it melt. The mother is eager to show her child the lookout point down by the room on the river.

CHILD (V.O.): Snow is the most magical thing in the world tonight. It’s like the stars are falling from the sky above, and I am lucky enough to see them dance down onto the frosty river. This is a special place, where the landscape is infinite.
FADE TO BLACK: FADE UP:

3 EXT. UNDERWATER PATH– LATE SPRING– NOON
POV. STUDENT. as a study break during finals week, a student takes a walk on her favorite part of the greenway. She finds that this walk gives her both exercise and a place to experience the beauty of the river. This time of year the site is busy, but she doesn't mind because she loves to watch the activity. She finds the energy of the canoers gives her a bit of energy. The peaceful sounds of the swimmer give her a sense of tranquility. The lighthearted conversations of the boys fishing makes her feel a little less serious.

STUDENT (V.O.): This place is my escape from reality. Everytime I come here, I experience it differently. The temperature is different, the activity is different, the air is different. But, everytime I come here I get this ephemeral sensation that there is something happening in this place outside of myself. Then I am overcome with a stillness: a calm.

FADE TO BLACK: FADE UP:

4 EXT. UNDERWATER LOOKOUT POINT– NIGHT
ESTABLISHING SHOT: The camera zooms in from the road to the river. It focuses is on a professor in his work clothes. He has a step stool and binoculars, clearly prepared because he looks forward to this moment everyday. He eagerly jots down his discoveries in a small pocket notebook. This place means everything to him. It is the best spot to study the stars. The time flies as he watches the sky. When he gets tired of standing on the step stool he rests his back on the glass room, and sketches the grid of lights that lies before him. He loves to sketch here. He finds it is just as effective for studying the sky as taking notes.

FADE TO BLACK: FADE UP:

5 INT. ERODED STUDIO– FALL– DAWN
POV. SCIENTIST. CAMERA shows a nested form that seems as though it's been eroded by the river itself. Outside there is the rising fall sun, shining on colorful trees in the distance. The water is reflecting the sky and filled with a grid of lanterns. They swim through the water as they are reflected on the water's surface. We see a scientist studying a microscope, entranced in her work. She is taking samples from the river and studying the quality of the water.

SCIENTIST (V.O.): As I study the river, I am reminded of what this site does. Through a series of rain gardens, the water runoff from Neyland Drive is purified before it can enter the river. I am fascinated by the progress these rain gardens have had on the quality of the river, and the use of the land around it. This is what I study, and what better place to study this than right on the river itself.

FADE TO BLACK:
Borders exist through multiple outlets and are results after many handshakes. They divide, fracture, and break the natural flows of the landscape. Borders have caused war, political tensions, cultural rifts, and have displaced “placed” people leading to an identity crisis traveling through generations. The Pakistan-India border is a ‘no-mans’ land currently occupied by watch towers, military pawns, farmers, and politically displaced nomads.

The project speculates on the gradient conditions existing on the border, ultimately designing moments of exchange exploiting levels of diplomacy between displaced people. Through a kit of parts, the military watchtower, the marketplace and definitions of ‘home’ become redefined to respond to its contextual speculation in a spatial, cultural, and political sense.

Could the static nature of artificial borders shift into a system of exchanges, blends, spillage, and fuzziness between displaced nomads establishing a new typology of self-definition of identity. The border becomes a site of a new type of collision, one of hybrid exchanges.
Aubrey Bader & Emma Kate Chambless
EURēCA Abstract

Working with the Haitian Christian Development Fund, we are investigating designs for a new housing typology that address the challenges of a densified mixed-economic community in the rural mountains of Fond-des-Blancs, Haiti. Key questions relate to issues of identity and disparity among residents, social integration, economic and sustainable construction practices, energy resources, and cultural practices. Our proposal addresses these issues through various levels of design interventions.

Our principal strategy is the development of the communal galerie, a newly-conceived superstructure that translates the traditional Haitian porch, where the majority of outdoor living and socializing occurs, to a larger scale creating clusters of housing and social units. The primary material for the galerie is bamboo, which is able to combat site erosion as well as provide economic contributions in the form of farming and harvesting for community members. In addition, it is a regenerable resource that can be used structurally as well as aesthetically to form an overarching roof system which creates cooling shade for the homes and clear circulation. This system, moreover, emphasizes the togetherness and equity of all residents.

The home unit itself will have the possibility for growth, an important aspect in Haitian tradition, but no matter the size or stage in expansion, will be unified via the galerie superstructure. Additionally, there will be communal spaces containing a kitchen, dining, social, and outdoor area all within the galerie. Together, these elements push the true intent of the project: communal connection and unity in rural Haiti.
Pneumatic Tension is a Community Center for diversity located in the historic L&N train station. The Center will function as a learning tool for visitors. The building offers ample space for transformative events to inhabit and change the functions. A permanent library, bookstore, and café occupy the main floor, to be used as an attraction for daily visitors. Sunlight is utilized through floor openings to provide natural light to the large spaces. The design will attract visitors to experience the changing conditions created by a pneumatic structure spanning the length and height of the building. The inflatable design is tensioned and hung from the ceiling, and changes based on environmental stimuli. Temperature, carbon dioxide levels, and light cause the structure to inflate and deflate, changing the topography of the interior. The central event space, functioning during the day as an extension of the library with suspended inflatable seating, is at a state of constant fluctuation in conjunction with the current environment of the building.
Located in the old L&N station in Knoxville, Tennessee, the community center for women includes two opposing programs that seem to interlock with one another throughout the space. The community center provides a place of tranquility and refuge for women who have been or are victims of sexual assault, violence, or trauma. It will also serve as a space for events that empower women as well as celebrate women and their accomplishments, while also bringing awareness to the community about issues regarding women and their rights.

The design inscribes sexuality within a space by inserting feminist concerns into a masculine discourse. This project aims to shift from the illusion of privatized and public spheres, to the interlocking terms of cultural mediation, where architecture is treated as a system of representation. In the community center for women, gender is inscribed in the space by the way of yonic architecture, which is a force used to counterbalance the male eccentricity of art. The shapes that influenced the interiors for the project are a subtle contribution to women’s rights and reproductive power. Women are so sexualized in the media today, and yonic architecture uses the female form as a way to emphasize the beauty that that form holds.
Knoxville College's campus presents a story embedded with historical meaning and deeply personal connections. Presented within this project is a commentary on how reverence for history and evolving value can be expressed through an addition placed in service to McKee Hall, Knoxville College's most historic structure and administrative building.

The early motto of Knoxville College was “Let There Be Light,” and even in its state of decay, this statement is a powerful architectural sentiment; Oftentimes it seems as though the simple act of turning on a light can awaken an interest in the abandoned and reestablish a sense of place for the place-less. Through similarly simple gestures, this proposal sets out to be catalytic as it brings life back to an abandoned place and anticipates an unpredictable series of future programmatic demands. The proposed addition next to McKee Hall seeks to involve the surrounding neighborhood and town as an interactive archive—a timepiece of Knoxville College’s history of which all may partake—in order to create a community of active stakeholders. Additionally, it exists in symbiosis to McKee as a field office for the ongoing maintenance of McKee as it ages, evolves, and gets reinterpreted over time.

Ultimately, from what started as a research project on the life cycles of buildings with respect to the institutions they serve sprung into a user-informed architecture that extended the role of architect towards a greater community.
Procedural Everything
[the fifth edge]

James Halliwell

As man has entered into the anthropocene we have been spurred forward into a vast sea of
information through our technolyzation in The Great Acceleration. The explosion of information and
emergent networks have revealed the immeasurable complexity and interconnectedness of the
world, demanding a reevaluation of patriarchal and binary systems of rationalism at large. To this
end, Procedural Everything [the fifth edge] is a study of complex and chaotic systems and an
exploration of how autonomous and procedural processes can be utilized by architects and
designers to shape a hyper-complex reality which reflects and intertwines with the interconnected
conditions of the world. Four primary prototypical territories which intersect with Knoxville and
exist across a variety of scales have been chosen as objects of study: The Third Creek Greenway,
Sharp’s Ridge, The Tennessee River, and Interstate 40. Each of these sites represents a linear
infrastructural design object influenced by hyper-complex societal systems. Methods of crystal
growth, computer-aided procedural generation, natural byproducts, and designed remnants are
intersected with the chosen territories as initial modes of investigation.
Hollow Convergence

This project aims to answer how a design can incorporate natural elements in a more wholistic way and use them as a fundamental design decision rather than an external application. This speculative outdoor community center located in Knoxville’s Worlds Fair L&N Station studies the use of daylight as an informative part of the design process in order to activate both the exterior and interior environments. My design process began by studying sun path diagrams in order to determine how the sun interacted with the building both internally and externally. By determining the intersections of various sun paths at varying times of day and year, a clear path through the building was defined. The goal was to allow sunlight not only to pierce through the façade, but to penetrate deep within the interior spaces. In order to achieve a holistic reference to the nature, the programmatic intentions of this building are to provide outdoor recreational information and opportunities to those whose do not know how to access Knoxville’s rich outdoor scene. The space features bike rentals, an equipment retail space, information centers, classrooms and a climbing wall. This once hidden space now has the ability to become a welcome mat to the city and serve as an example of using nature in both a functional and aesthetic way.
Spatial Economies refers to systems of spaces and flows that dictate how individuals are able to use and interact with space in a complex, politically charged semi-urban environments. This project is concerned with how social justice may be carried out in a modern economic and political system that has the power to marginalize some populations based on socio-economic and racial identities. The research focuses on investigations of how a single individual that has been pushed outside of access to affordable, healthy, and enriching living environments through infrastructural developments and unaffordable housing market rates can respond to their environment and work to create healthy and meaningful space for themselves. Marginalized areas considered in through the course of this study include neighborhoods demolished because of private construction, like airports and manufacturing centers, public infrastructures like interstates, as well as places of living that are not physically removed, but socially stigmatized and neglected by public works and services. How is the definition of domesticity shaped by power but ultimately defined by those who inhabit space? What tools are used to do so? How can we understand marginalized individuals not as victims of injustice but as active and vibrant voices in their own livelihoods?
A quote from *The Adventures of a Photographer* reads, “Wasn’t his refusal to live in the present as a future memory, as the Sunday photographers did, leading him to attempt an equally unreal operation, namely to give a body to recollection, to substitute it for the present before his very eyes?”

The role of photography within the making of memory has become more important with the rise of social media. Historically, people depended on photography to tell them about sites or people that they have never encountered, lending a lot of power to the photographer in making decisions that will forever impact the memory of others. The photographer was allowed to create an allure from a privileged vantage point.

Instagram acts as a new surrogate of memory, impacting our interaction between space, people, and other worldly views through different agents. Allocating agents throughout Instagram in forms like the users, hashtags, posts, and geo-locations to aid in democratizing the creation of memory of place and site. The idea of curating a single image falls short to the intangible social interactions. Information becomes altered through a series of edits, forming a filtered truth within our identity.

Looking through the lens of Instagram and questioning how architecture and place is constructed through a forever changing database of memories.
Poster #554
Student(s): Logan Notestine
Faculty Mentor: Akerman, Jennifer Alford
Project Title: ALTERED REALITIES
architecture has always been used to manipulate the users' experience, but at what point does architecture cross the line from impotence to connivance?

at what point does architecture move away from simply being the setting to being an active player in the story?

how can space subvert the representitive and disiplinary nature of society in order to control the users?

these questions are located at the center of my research, which i hope will create a series of spaces that distort the reality of the individual through unique combinations of program and spatial conditions designed to further those programs. this project will lie at the intersection of architecture, psychology and anthropology. both psychology and anthropology will influence the ways that the spaces are designed. an understanding of topics like group think, personal comfort and the commonalities engraved in the human psyche will be pivotal to the success of this project. the intentions of groups or agencies, the spaces they employ to achieve said intentions, and the motivation of the individuals all create interesting variables that affect the outcome and success of these manipulations.

through research and design, i hope to explore both means of passive and active manipulation through spatial as well as social/organizational means of control. while this project is not meant to be a blueprint for societal manipulation, it will employ strategies that are used to alter the realities of people. the goal is to bring light to the means of manipulation of willing and unwilling participants which is administered through social and spatial organization.

l. notestine
Knoxville College, a historically black college/university (HBCU) located in Knoxville, Tennessee, developed largely as an industrial work college that gave students an opportunity to develop their own identity and the college’s in the bricks they made, structures they built, and agricultural fields and animals they tended on the campus. The geographic topographies and history of the agricultural department of Knoxville College create opportunity for new iterations of environmental and agricultural programming on the present-day landscape, both culturally and physically, through utilizing concepts of theories postulated by Charles Waldheim’s emergent theory of landscape urbanism, architectural adaptive reuse, and historic preservation.

The research analyzes the fertile ground in the connections that Knoxville College professes with a historically understated agricultural education program. Through architectural intervention inside the historically significant campus building of McKee Hall, the campus is redefined through encouraging reuse of the structure as an agricultural education center. It concludes that learning systems that confront traditional and nontraditional students do not have to be black or white, full-time student or part-time student, classroom or distance-learning: it is indeed possible to use speculative architectural intervention as a framework for redefining the idea of campus in favor of experiential learning for local communities in Knoxville. The research challenges notions of college campus, how it is used, and how it performs through creative, analytical thinking. The research posits itself as a collective force for architecture that encourages consideration of multiple different factors, both historical and current, when using adaptive reuse and historic preservation as a design strategy.
EUReCA Abstract
Elizabeth Ott
04.12.19

We want to be rid of unpleasant remnants of construction or built forms that laid empty for years and turn a blind
eye to these urban imperfections. They become latent.

And when these spaces are used, we admonish the users. The encouragement of spatial misappropriation is
frowned upon, as it is seen as an encouragement to bad behavior and failure in the future adult world. And
coupled with the questioning of surveillance, the desire to evade recognition, and manipulation of perception,
latent spaces can become habitable spaces.

I call upon the architect to harness the minds of urban vigilantes to evaluate their thinking of architecture into a
manner that visualizes latency as an architectural typology.

How may we alter the lens of perception from hibernating spaces into stored potential awaiting opportunistic
release? How can we use latency as an architectural quality rather than it be an urban excess? How do we
overcome the notion that we need the comfort of security by means of technology?

The intent of this study is to document and expose a database of latency typologies within an urban fabric by
means of investigating elements of spatial misappropriation, surveillance, camouflage, and perception by way of
the criminal lens.
Every day more and more interfaces present themselves for us to imprint a splintered version of our identities on. We continually find ourselves seduced by sleek and efficient ways of connecting and archiving ourselves in an attempt to preserve our presence into the memory of existence, for we continue to exist up until the moment the last person forgets us. It is because of these traits that we continue to allow ourselves to be tracked and monitored by technology under surveillance. On the surface they range from lighthearted texts to social medial posts to gaming. However, none of these interface profiles are correct representations of who we are, as it is impossible to log every word, thought, and emotion of ourselves...currently. These incomplete profiles are not completely false in the end. They are just splintered pieces of a puzzle that if pieced together can create a new whole, or a ‘DJ’. The ‘DJ’ is the combined entity of these splintered profiles. It creates moments where the digital realm leaks into the physical, or as Bruce Sterling describes it, “an explosion”, so how does it occupy space and how can it inform the way we interact with architecture?
ABSTRACT

Olivia Poston
Fifth Year Undergraduate Architecture Student
Self-Directed Project: Arch 493 Research

There is no room in our contemporary world for dust, dirt, and other such uncomfortable things.

As a result, we do not know how to live with our ruins and decay because we do not know how to inhabit them. Architecture that has fallen into ruin becomes an object on a shelf, a picture to be framed. The value of its previous layers are lost to the modern age.

I find a disconnect in contemporary architecture between ruin and rubble, what is valuable and what is disposable. In terms of the ruins in America, there is an infinite constellation pattern of overgrown and forgotten “ruins.” In fact, many of the local residents would never attach the word “ruin” to these found artifacts on the site. They have become so common, so formless, that there is little emotional value in decay.

“But dirt is not necessarily impure, buildings are made out of matter, earth is part of their fabric.”
On Weathering, Jackson 103

Today, these objects of ruin lie dormant: too valuable to be discarded, not valuable enough to have a place in our lives outside of charming decor. Where do we draw the line between what is in ruin and what is to be discarded as rubble? At what point do we become emotionally attached to objects in ruin? Do we only understand architectural ruin when it draws emotions of nostalgia?

Moving forward, this project will develop a tactile response to materials of age and objects of ruin. Is there a way to live with our ruins, the ones already scattered through rural America, in a provocative manner? In what ways does the role of the palimpsest play in our ruins today and how will it shape future experiences and interventions?

This proposal will address the ways in which one activates and engages with undervalued artifacts of decay in rural America. In the landscape, there are no ruins, only rubble and examples of forgotten artifacts. The goal is not to obtain tourists and visitors, nor it is to grow the population in the region.
My thesis is to explore the correlation between how the existence of marginalized / under-served groups and how as a result the expression of content or discontent has manifest itself into visual and physical formal means.

How does architecture play into this? There are two interrelated frames of my research that deal with the identity of the person within the community and the role of the community within the architecture. The origin how communities and infrastructures are built is often devoid of the opinions or influences of the people that activate these spaces.

Ingesting and abstracting these datasets through polemic drawings will provide a way to represent and preserve these aesthetic sub-cultures through communicating them to the masses. The absence of black voices and speculation within the architectural discourse has left much of the cultural urban fabric under-discussed and undervalued in terms of architecture's political and psychological impact. Therefore, building upon the work of Mario Gooden, Mitchell Squire, Walter Hood, and others, my work interjects into the conversation of how architectural neglect can be used to shape a speculative approach to how we shape interactions and what we perceive as “aesthetically pleasing” through architecture.
Through studying the characteristics of plastic and the way its usage determines movement through space, a need arose for a program that condenses products and systems into a smaller area. This program consists of a vertical farm which takes the traditional expanse of a rural farm and condenses the area into a city block or smaller and does not require the same heavy machinery that a typical farm would. It also yields up to three times as many crops and can reduce water usage up to 90% through a hydroponic growing system where the plants’ roots are sprayed with nutrient-rich water.

The goal is to take an unutilized site in Knoxville and integrate the program of the vertical farm into it. This vertical farm would grow the crops and store them on site to be distributed via a fleet of mobile markets to food deserts in Knoxville. Once harvested, a system of conveyor belts and elevators moves the produce to the lowest level of the project to be loaded into the trucks. The mobile markets will bring the produce to schools, hospitals, churches, and other businesses within food deserts, giving the residents of these areas easy access to fresh produce.
“Is the WAFFLE HOUSE universally awesome? A magical spiritual place; it is indeed marvelous. An irony free zone where everything is beautiful and nothing hurts. Where everybody regardless of race, creed, color, or degree of inebriation is welcome. Its warm yellow glow a beacon of hope and salvation inviting the hungry, the lost, the seriously hammered all across the South to come inside. A place of safety and nourishment: it never closes, it is always faithful, always there for you.”

///Anthony Bourdain, Parts Unknown Season 6 Episode 8///

As our first foray into the site-specific, our studio was asked to consider what it means to make space in architecture by focusing on the experiential. To start, we were given one building to reimagine: WAFFLE HOUSE. After weeks of meticulous research regarding the identity of Waffle House and its surprisingly complex innerworkings, the studio generated volumetric diagrams of themes we sought to use in our redesigns.

The concepts of CAMOUFLAGE and HUMAN PERCEPTION were two themes further advanced from this exercise. These themes were meant to create a physical manifestation of what was personally denoted as the Waffle House Effect, the state at which the occupant is so enamored by their surroundings that for 20 minutes, they can think of nothing else. The resulting building challenged rationale of the human mind and involved multiple scales: from the air--10,000 feet above, from the road--100 feet away, and in person--less than 10 feet away.
The investigation of the meal as a cultural phenomenon challenged an expansion of the meal as an active social construct, generating the venture of MEATSPACE. Phase one of this exploration derives from the vantage point of “Constructing Togetherness Through Consumption,” manufacturing identity through the utilization of food as a nutritional togetherness where social distinctions no longer contrive division. This physical togetherness begins to develop a narrative of continued understanding where a multicultural, multiethnic, and multigenerational body of people can shatter the division of social distinction.

The social and ephemeral qualities of the meal inform further research of spatial experience. MEATSPACE challenges the scale of design as it moves between the measure of the utensil, the body, the table, the room, the building, and the city.

MEATSPACE challenges artificial partitions between the psychological versus the physiological, attraction versus repulsion, art versus artifice, and the coincidental verses created culture. Seeking to reconcile conceptions of what is strange and what is beautiful, the curated layering of MEATSPACE conceals the innermost vulnerable spaces and leaves only a carefully marinated membrane exposed. MEATSPACE questions the process of creating the meal, the beauty within raw flesh, and the transition from a red crushed velvet lobby to the intimate sauna – speaking to the meal, communal vulnerability and structures of the built environment.
There exists a strong correlation between the identity of built spaces and the perception of self, with social complexes reflected in the value, maintenance, and relational qualities of architecture and its demographics. Throughout the Civil War, Civil Rights Movement, and history of the Historically Black College and University (HBCU), Knoxville College’s landscape served a monumental role in constructing identity and empowerment. This project dives into the historical narratives of McKee Hall as a structural representation of the institution and its relationship to the surrounding community of Mechanicsville, questioning how the construction of social spaces can foster dignifying interactions and promote a perception of citizenship and belonging.

A deeper understanding of localized black entrepreneurship, historical oppression through urban renewal, monumentality of landscape with the institution on a hill, and cultural importance of the relationship between the institution and the community, allows for a deeper understanding of how to formulate materialized space in such a way that begins to unify the town and gown.

Diving into the preservation of McKee Hall seeks to explore ways to physically, socially, and politically reunite Knoxville College with Mechanicsville in ways that deal with glorifying the historical traditions of each culture, and allowing those to manifest in relevance to today’s culture.
Going on a date at a private location or residence can be a dangerous experience. According to recent reports by the National Crime Agency (2016), more than half of sexual assaults resulting from an internet-initiated date occur at either the victim’s or perpetrator’s personal residence. However, LGBTQ+ individuals who go out publicly, are also subject to danger. In 2017, law enforcement agencies reported that approximately 15% of hate crimes were motivated by sexual-orientation biases, and in some cases, biases relating to gender-identity (United States Department of Justice). Both cases reveal a need for public, safe dating spaces. Businesses such as restaurants, bars, and cafes can be trained to provide these spaces for the community. This project aims to design a program to educate businesses to cultivate an atmosphere of safety and comfort for dating-app users and the LGBTQ+ community. In doing so, it will afford them the security and confidence to let their guard down and to have an enriching and intimate dating experience that is free of fear and anxiety.

Works Cited


Graphic design students lack the necessary writing skills for success. In order for students to gain the skills needed to clearly articulate ideas and thoughts, it is essential that additional writing exercises be added to the curriculum. The ability to analyze and synthesize information to produce logically-written briefs leads to more skilled designers.

Writing is an important form of communication, but many design students lack the skills to adequately articulate thoughts and ideas clearly. Many university professors complain that students struggle to write at a basic level, such as writing a complete sentence, much less construct a cohesive and logically-written brief. At the same time, students admit to not reading or writing outside of required assignments, and even then, they are not interested in the topics. A consequence of not being able to write adequately while in college could leave students unprepared to be successful in some careers, ultimately losing, or not getting a job due to poor writing skills.

This project intends to provide targeted writing exercises that will improve graphic design students’ language skills focusing on grammar, copy writing, and communication. Implementing more writing into the current curriculum will strengthen graphic design student’s communication skills and confidence in their writing.
The current cultures and curriculums of the School of Art and the College of Architecture and Design make it hard for students to feel comfortable exploring interests outside of their declared disciplines. In a series of recent surveys, it has been made apparent that A+A students and faculty this as a problem. As it stands 63% of A+A students surveyed feel discouraged to explore outside of their discipline, and yet 76% of students surveyed have interests in other disciplines within the A+A building. In a real world application, a collaborative effort is needed to solve big problems, which utilizes design thinking and holistic design practices.

Taking the form of an interdisciplinary course, that transitions into a faculty-run, student-driven design firm. UnDISCIPLINED offers art and architecture students the opportunity to explore other interests they may have, all the while exposing them to other students’ disciplines. Reshaping the manner in which students and faculty engage with one another, and appreciate students and faculty from other disciplines within the A+A Building is the desired outcome.
Intersectionality of African American Women During the Civil Rights Movement

Inspired by the efforts of Eleanor Moody Shepherd in the Alabama State College sit-down movement, an experience will be created for people wanting to learn more about this topic and intersectionality of African American women during the Civil Rights Movement. This project is crucial to us in 2019, especially since racial and gender tensions are still happening in large numbers across the country, including a recent event here at the University of Tennessee. We teach history like this in hopes that it’s never repeated, so comparing today’s racial/gender tensions to the Civil Rights Movement’s women and what they fought for to have equality would be telling.

Having both gender and racial inequality during the 1960s is something that is not spoken about much in history, so to bring light to it would better educate the public. Equality in pay was passed through congress in 1963, and the ban of discrimination for hiring followed in 1964, so the 60’s was a big event for not only women, but African Americans as well. Loving vs Virginia emerged in 1967, allowing interracial marriage in all states, so racial tensions were still alive well into the late 1960s and early 1970s, especially in the general public.
Abstract — Private Mirrors: 1960 Montgomery Sit In
Sarah Emory

Every revolution or movement comes with an abundance of turbulent emotions and in their end results, these initial feelings and passions are not usually a part of what we see. These feelings and ideas they expressed deserve to be shared. They can remove these people from a place in history and into a place that we can relate to their frustrations, passions, and hopes.

The time period before the Montgomery lunch counter sit in offers multiple opportunities to explore the point of view of a number of the participants, especially from the perspective of the students from Alabama State College who organized it. An interesting part of history is the private matters that are not mentioned in the overall documentation of an event, or are not as important to the event’s timeline. The goal of this exploration seeks to understand how these students felt and privately talked about events they were organizing and specifically, how does sharing these feelings the students had as well as their ambitions reflect our modern experiences in social movements.
America in the 1960s is known to most of us to be a moment in a textbook. It was a period of our history filled with segregation and hate, primarily in the southern part of the U.S. Places as large as business buildings and as small as water fountains were racially distinct, splitting the social sector between whites and blacks. With this hostility and animosity came push back from several protest groups and those standing up for equality. We are most familiar with people like Martin Luther King Jr. and Malcolm X, but the unsung heroes that changed the voice of the south came from a college campus in Montgomery, Alabama. A group of African-American students at Alabama State College staged a sit-in protest at a “whites only” lunch counter on February 25, 1960 that would revolutionize segregation on campuses and students’ rights to due process for decades to come.

This project intends to educate its users through an adventure that confronts the social oppression of the time, and aims to relate the characteristics of these injustices to the modern world. Through an interactive ARIS experience, users are offered several perspectives in which to view the civil rights activism taking place in Montgomery, Alabama during the 1960s. The experience allows a viewer to be challenged in their own way if they were presented with the injustices of those who lived during the time. Users will be asked to explore the quest of having a “hate situation” on campus, and the president of the university wanting to speak with them about it. From the viewpoint they decide, users will be guided throughout their campus by choosing their own adventure that come from making decisions that ARIS prompts them with.

By presenting the content surrounding racial segregation in the 1960s with a UX/UI experience on a personal smartphone, the information becomes directly accessible and maneuverable. Beginning in ARIS, we are able to envision how technology can assist in the educational component of specialized communication. The intention is to start here and build this system with the goal in mind to expand to a more developed UX/UI interface.
Montgomery, Alabama during the 1960s was a time of a lot of conflict and tension. Understanding the causes from a variety of perspectives could help users understand the conflicts of today. Through the creation of an experience using geography and exploring proximal relationships could be a way to form these comparisons. This experience would allow the viewer to explore specific sites and understand the significance of each of them. An additional layer would draw comparisons to events that we experience today. Understanding that the issues and conflicts that occurred in Montgomery in 1960 are still relevant today is an important step in dealing with these issues in a contemporary context.
Carrie Garrison

EUReCA abstract

This EUReCA project, will be an app that simulates an interactive and historical path through the 1960’s Montgomery student Civil Rights sit-ins related to the Dixon v. Alabama State Board of Education case. The focus will be specifically on the students and alumni involved in the planning prior to the sit-in itself. The interaction will allow you to meet the major players involved, and experience the event chronologically, not limited to an on-site experience in Montgomery, Alabama only. Meeting the individuals involved will allow empathy and create a connection to the students then and students now, in our climate on campus, currently. The application will be created through ARIS, which is an interactive app, that creates a story framework to lead the viewer through, in a choose-your-own adventure format.
Abstract

Despite the existence of numerous policies as well as frequent digital communications on matters of diversity, anti-discrimination, sexual assault prevention, and other initiatives aimed at providing a safe and friendly environment for its students, the University of Tennessee continues to rank near the bottom among the nation’s public universities. An ongoing and omnipresent public platform is needed to openly promote the University’s official stance on issues related to race, gender, and sexuality, to denounce all acts of violence, discrimination, physical and emotional abuse, and to outline challenges and announce initiatives to address them.

Project Description

Among the nation’s public universities, the University of Tennessee finds itself near the bottom of the list when it comes to providing a safe environment for all of its students. To its credit, the language promoting its policies of diversity, anti-discrimination, inclusion, and anti-violence, among other progressive issues, frequently appears in the university’s digital communications. The reality, however, is that many of those messages either fall flat or, worse, fail to reach its intended audience. In the age of algorithm-driven information feeds, custom-tailored to only include one’s interests and biases, and generally designed to dominate one’s attention, anything falling outside of that bubble of one’s preconceived notions is easily ignored with a click, a tap, or a swipe.

To many students, the UT’s efforts to make its campus feel safe and inclusive may seem haphazard at best. There is clearly a need for the university to find new methods to communicate its policy. Universities actively and openly promoting their progressive stance and efforts with regard to matters related to race, gender, and sexuality are more likely to attract a more diverse pool of prospective students and faculty. Such transparency also offers a safer, more welcoming environment for their existing students, thus improving the overall public image of the university.
This project intends to address the shortcomings in the University of Tennessee efforts to communicate its policies and promote its stance on issues of race, gender, and sexuality by creating a university-wide permanent, public, branded, and highly-visible platform, designed to engage the students in ways that they are more like to respond to and pay attention. The platform will consist of, but not limited to, time-rotating art and multimedia installations, building and street signage, poster walls, physical and digital displays. All installations will feature the campaign branding and links to its web and social media sites.
The 1960s was a major turning point in American history. One of the most recognizable developments throughout this time was the Civil Rights movement. While those events unfolded one particular action in Montgomery Alabama stood out. Still under the rule of segregation several students willingly chose to sit in areas reserved for white Americans despite facing ridicule and physical harassment. As a product of my research I will be developing an interactive experience in an app called “ARIS.” This experience will expose its users to the circumstances the students faced during the sit in movement. In addition, users will see the outcomes of Alabama’s sit in and how it affected the case of *Dixon v. Alabama State of Education*. I am proposing that a timeline is created to show users how these particular events unfolded.
Proving to make strides in the civil rights movement and the legal processes associated with it, *Dixon v. Alabama* highlighted both the discrimination against African Americans as well as the significant lack of legal rights provided to those of color in Montgomery, Alabama in 1960. Through the eyes of Fred Gray, Alabama State College (ASC) alumni, attorney, and civil rights activist, the students of ASC that took part in the lunchroom sit-in were unjustly expelled without due process and were denied their civil rights by the state, the school board, the college, as well as the federal government due to the color of their skin and the cultural and racially-charged climate at the time. Gray used his position as the students’ attorney to bring this issue to light through his examination of each party involved in the incident.

Gray provides a viewpoint unique to all architypes involved in the occurrence, as he was allotted the power to exploit each party, carefully interrogating them as to assess their true reasoning behind expelling the students involved.

Told through an interactive timeline, map, and story that brings the court case to view in a contemporary context, the content is intended to engage users in a manner that will provide a lasting impression.
The events that occurred during 1960’s Montgomery, Alabama set off a chain reaction that helped progress, yet hinder the Civil Rights movement. Mass media coverage via newspaper spread headlines of the promising change and optimism, yet others ran headlines to further the racial bias of those who didn’t agree. The perception of what was really going on was essential to gaining the momentum that the movement needed for the mass public to want change. Today, the perception of these racial events is still essential with how they are handled with the masses. With the recent racial events at the University of Tennessee Knoxville stirring up the emotions of the public in a similar way as the 60’s, we at the Design department have been tasked with developing a framework of an educational experience for people to better understand what happened then and why the history of those actions should never be repeated. The aspect that I believe we should focus on are the chain of reactions that caused the movement to snowball into the greater events that changed history. A timeline would be the best for visualizing how the optimism and pessimism of the time waged against each other and how one prevailed and failed against the other. We are tasked with using the geographically-based app ARIS developed by the University of Wisconsin - Madison. We can virtually map out an experience through GPS and develop a “game” in which we can educate and create awareness through environments and movement. The idea is to take that concept of movement and use real environments to emulate a timeline of events across an area to have an experience that educates the user of the past and relate it to a modern space.
Currently the Earth is going through its sixth mass extinction, the largest since the extinction of the dinosaurs. Species are becoming extinct faster than they can adapt to their ever-changing environment. This great loss of life has negatively impacted the food chain and the ecosystem, which will soon cause human beings to be significantly affected by a lack of resources.

Younger generations are the future for the planet’s wildlife. Habits are formed at an early age, so teaching these generations ways to further prevent damage, will have a lasting effect and they will continue to use this knowledge to help save species from extinction. This project intends to make the youth aware of their impact on endangered species and help reduce the current state of the planet’s mass extinction, through a bi-monthly educational subscription box named “Imprints.” Imprints will bring awareness to the mass extinction of species, while also implementing ways of future prevention, one box at a time.
Empowering Women with PCOS: Lifestyle Tracking Made Simple

Haley Ivey

Women suffering from PCOS (Polycystic Ovarian Syndrome), a fairly common hormonal imbalance condition, struggle to understand how this condition affects their reproductive systems apart from biological diagrams and conditional descriptions. Frustration for these women arises from misunderstanding symptoms and how to approach self-care.

According to the U.S. Department of Health & Human Services’ Office on Women’s Health, 1 in every 10 women of child-bearing age suffer from PCOS. Of these women affected, nearly half go undiagnosed their entire lives.

Cysta, a mobile application, assists in equipping and empowering women struggling with PCOS through lifestyle-based tracking, thus helping gynecologists in determining appropriate treatment for unique cases.
Robert Parker Jenkins
Studies in Solitude

The current technological age drives individuals to create digital identities for themselves that overshadow who they are at their most bare and vulnerable. It has become harder to find one’s most intrinsic self and confront what lies underneath the carefully curated facade. According to a comprehensive study published in the Personality and Social Psychology Review on empathy and self-awareness in American college students, younger people more frequently remove themselves from deep interpersonal social situations and become immersed in isolated online environments. These physically distant online environments can functionally create a buffer between individuals and their inner selves. There should be a reminder of the importance and beauty in connecting with and confronting one’s own personal identity – emotionally, physically, and mentally. This project looks at coming face-to-face with the self through a simple exercise in mental, physical, and emotional solitude. This exercise, performed on a number of individuals, will be synthesized into a book in order to observe the various responses to the exercise. Persons brought up in the age of digital technology may find the ability to access deeper truths about themselves and achieve a greater state of being through this experience of self-exploration.
Black high school students are not as inclined to pursue a creative field. According to the 2014 BFAMFAPhD report, a census recorded that black artists consisted of about 12.3% in 2012.\textsuperscript{1} This same report stated that addressing the importance of art education, visibility and workforce development in order to continue influencing individuals to pursue creative fields. More representation from successful black creatives is needed to properly support, teach, and influence aspiring black high school students to pursue a career in creative fields. The outcome of this project is a website that aims to connect black high school students to creative art professionals along with providing information on various creative fields.

The majority of Atlanta sports fans are apathetic towards the Hawks. With a redesigned arena and a team built for the future, the time is now for the Hawks to capitalize on a growing city already filled with NBA fans. A surge in the Atlanta Hawks fanbase could lead to the addition of higher quality players through free agency and change the losing culture of Atlanta sports. This project, a wide-spread marketing campaign, intends to convince Atlanta’s NBA fans that the Atlanta Hawks are worth supporting.
When thinking about the historical events of Montgomery, Alabama, 1960, it can become easy to lose perspective and appreciation for the magnitude of the actions taken by individuals and their effect on the ensuing events. Imagine quantifying this data and using physical walkways and topography in our own city to visualize this journey for civil rights. It could send users on a more symbolic journey that highlights the historical figures in Montgomery and their struggle for rights or it could be something more destination-based and send users on a history-based quest that draws connections between significant civil rights events in Knoxville and Montgomery. With the relevance of racial tensions that still exist today, this experience could be really eye-opening and illustrate the importance of empathy. There are numerous possibilities with time, installation, and interactive interfaces that can help this story come to life. After analyzing the first person accounts and relevant information, crafting a metaphor that draws a connection between distance, physical location, time, and the events of Montgomery in the Spring of 1960 would be an interesting approach. The potential of interactivity and metaphor would be particularly powerful in this context.
Getting Comfortable Talking About Psoriasis

Living with psoriasis affects one’s ability to become intimate with others. Because of this, young adults living with psoriasis need better ways to communicate their autoimmune disease with partners—in order to feel comfortable during intimacy. In a recent study, 61.2% of survey takers worry their partner will remove themselves from physical intimacy because of their psoriasis.¹ Various aspects of intimacy, such as sexual, emotional and psychological are often neglected in clinical settings. Those living with psoriasis have indicated in surveys that the attention given to sexual issues by their healthcare provider is insufficient.² This project will offer an app-based communication tool for those living with psoriasis to better discuss their condition at a time when they feel most vulnerable.

Abstract
Wenxi Lyu

Loneliness is a human condition, but people tend to refuse it. All human beings have some degree of loneliness. This is our natural state. There are many articles suggesting to have activities like join social groups, meet more people, have a pet and so on to eliminated being alone. But loneliness is a subjective experience, it can not be erased by simply avoiding being alone.

“To feel lonely is to join the rest of humanity in acknowledging the painful reality that we are somehow fundamentally separated from each other, never to be fully understood.” (thehappyphilosophor.com)

To contemplate and accept what loneliness is to human beings helps to appreciate one’s own loneliness. The idea of the project is to motivate profound contemplation of what loneliness is to human beings in order to appreciate what it is to one’s self. Adults age 22 to 35, who suffer from feeling lonely and tend to avoid being alone are the targeted audience. It is to those audiences that this project wants them to start contemplating what loneliness is to human beings and to them.
Almost everyone wants to be recognized for their work. People want to see their projects soar, just like they had dreamed about them the first moment they felt the spark of inspiration. Small game developers often struggle to realize their work’s full potential. As a result, many producers abandon their games altogether. Only one third of the games, funded between 2009 and October 2012, had been fully delivered to their backers by the start of 2014.

But why do small game developers have such a hard time getting their work recognized? With 64% of the general US population being gamers, one would think that it would be easy for games to be discovered. More often than not, games that have serious potential end up slipping through the cracks of the gaming society due to issues such as lack of funding or simply not getting enough attention outside the local community.

This project conceptualizes a convention that gathers game developers who are serious about taking their work to the next level. The convention would tour the United States, taking place in the largest and most central cities and allowing developers from around the country to gather, share, collaborate, and even potentially help fund each other’s work. This could be someone’s chance to make their dream a reality.
For the first time in history, consumers are faced with a food market that is calorie rich and nutrient poor. The average consumer is overstimulated by an oversaturated market that does not effectively communicate nutritional information. According to consumer behavior studies, few consumers take the time to assess the FDA's current nutrition facts labels before purchasing or consuming a product because they are not user-friendly. In today’s society we see an influx of digital natives leading busy lives that are interested in shopping smarter to improve their health but feel they simply do not have the time to do so. The public’s current engagement with nutrition information is not at the level it could be in a society with technology at its fingertips. The average consumer should be able to easily shop smarter for their own nutritional needs in order to improve their overall health over time by making a series of small choices when buying food. This project will provide consumers with a tool within an app that scans entire aisles of products simultaneously by utilizing recent technological advances that will easily facilitate conscious shopping based on an individual's own personalized dietary and nutritional needs.
Human Use—A study of Clothing Dyes and Eco-Conscious Fashion
By: Madison Moody

Synthetic dying methods are extremely harmful to the environment. According to Farah Maria Drumond Chequer, “the wastewater from textile plants is classified as the most polluting of all the industrial sectors, considering the volume generated as well as the effluent composition. In addition, the increased demand for textile products and the proportional increase in their production, and the use of synthetic dyes have together contributed to dye wastewater becoming one of the substantial sources of severe pollution problems in current times.” The dying process could be analyzed to inform consumers, of the negative effects of dyes. With more in depth research of dyes and dyeing technology, my project can make a positive impact on the environment, while improving human’s quality of life. This project aims to develop a system that promotes transparency to both inform consumers and hold companies accountable for their part in reducing harmful waste caused by the clothing industry. By taking the form of a non-profit, this project partners with companies, that are already aware of fashion’s effect on the environment and interested in making changes to their manufacturing to make actual change to the industry, to make the clothing industry more eco-conscious.
For my EUReCA research process I want to dive into how it was like for people of Montgomery 1960 and connect it to the University of Tennessee, Knoxville's Campus. While using the ARIS app I would like for someone to be prompted to show what would be happening in Montgomery, Alabama compared to what is happening in the present of today's society. Although this would be a straight forward idea, I think it is important to show reflection on both time periods. I think this will connect the people to a time period, and connect the people around the campus to show the importance of past and present time. Using the ARIS app will also be at a convenience for this topic and give a visual on the 1960 time period of Montgomery, Alabama.
Local Business Community Improvement

Locally run businesses in Knoxville could do more to improve their community. Because they reside in the community, local businesses are able to best identify issues in that area better than an outsider. Local businesses should be more invested in their community issues because if the community is thriving, chances are the businesses will too. Knoxville has an abundance of local businesses, many of which are placed directly in communities of locals. Since Knoxville is in a period of exponential growth, the city is focused on large-scale projects and often the smaller issues go unattended. Problems such as homelessness, litter, waterway pollution, and poverty are often put on the backburner while the city is focused on renovating and growing a big business presence. These issues directly affect communities and their wellbeing. This project intends to help local businesses plan and organize community improvement projects. The project will accomplish this goal by creating a manageable plan of action for the businesses to follow and offer physical assistance for them.
In today's age, many young designers have the desire to begin freelancing rather than work at an agency. However, most designers are unsure of how to begin their freelance careers because there are limited resources and tools to guide them. A platform is needed to help designers begin their freelance careers and answer the questions that a quick Google search cannot fulfill. This project focuses on the success of designers in the freelance world by giving them tools and resources to price themselves appropriately, ask for advice from other designers, and help manage their projects so they stay on track. By doing so, this project hopes to give young designers a tool in which they can rely on through any stage of their design process.
Improving Reading Among College Students: It’s Lit Podcast

Emma Russell

The majority of university students do not read books for pleasure on a daily basis and are unaware of the benefits reading can have on their overall health. According to a study conducted by American Academy Arts and Sciences, in 2015 the average American spent less than 20 minutes a day reading for pleasure. Students might be more inclined to read for pleasure if benefits such as stress reduction were made available. Research conducted by the University of Sussex in England revealed that reading for only 6 minutes reduced participants stress level by 68%. The project aims to provide students with information on the benefits of reading. It will take the form of a podcast, entitled “It’s Lit,” which will convey this information in a contemporary that appeals to the average university student. The end hope is that they will be inspired to tie reading for pleasure into their daily lives.
Disability can be a difficult and confusing problem for people to understand. Often it can be difficult to get a true understanding of how a disability can affect someone, and it can be very awkward to broach, due to the sensitive nature of the subject. Often having a disability, even one that leaves a person looking and acting relatively normal, can make the afflicted difficult or impossible to approach. Numerous texts exist to provide “tips” and “advice” for how to interact with the disabled, such as “Disability Etiquette: Tips on Interacting with People with Disabilities,” and “Learning About Blindness: Interacting with a Person Who Is Blind or Visually Impaired in the Workforce,” however, while their intention is noble, such a list only serves to cement the disabled as “other,” to be cautious around.

This project aims to aid an individual in developing understanding of what it is like to have a disability, as well as develop or begin to develop the ability to confidently and comfortably interact with the disabled. The project takes the form of an abbreviated autobiography, focusing mainly on how being legally blind affects the author’s day to day life working in the field of Graphic Design. The challenges this creates are presented in a relatable way that anyone can understand and potentially relate to, as well as with a lighthearted and irreverent tone meant to put the reader at ease.
Evan Zelem  
EUReCA Abstract  
March 12, 2018

**Dixon vs. Alabama State Board of Education**

Our EUReCA research study group will be focusing on the students, alumni, and legal council that were involved and were integral pieces of the organization, planning, and executing of the Montgomery Courthouse sitting. The group is solely focusing on the actual planning of the events, deeply looking into different groups of people and what their primary roles, and the chronological orders that they took place in. We will be representing our information and research through a mapped out experience presenting locations, moments, and conversations that occurred and were influential to the final outcome of the planning events that took place. This information will be collected and represented through the app ARIS that will allow us to create a mapped out experience that can be interactive with the user and help them to digest the events that happened and their significance in the Civil Rights movement. The goal of this project is to collect and sort through 15 years of research behind the Alabama State Civil Rights movement and create an experience that all can be a part of and learn the importance of the events that occurred.
Dixon vs. Alabama State Board of Education

Our research study group will be examining the integral planning stages of the courthouse sit in in relation to the Dixon vs. Alabama State Board of Education case. After initial debate, our research group concluded that studying the input of students, alumni, and legal counsel into the planning stages in chronological order would reveal the most applicable outcome. It is our desire to investigate each party’s influence to the student’s goal and translate that material into an easily digestible format for the average user. With this ambition in mind, it is our goal to synthesize the data provided to us in addition to our own reflection and construct a dynamic experience using the app, ARIS, in order to relate our findings to the largest audience. Through this we hope to analyze the foundational beginning to an event which operated as a catalyst to the Civil Rights movement in Montgomery, Alabama.
Horse Lords is a group whose music is both sophisticated and accessible, offering the listener catchy melodic phrases and rhythms backed by deep musical intentions. Drawing from influences such as African drumming, Gamelan, American blues and country, electronica, trance and classical minimalism, Horse Lords maintains an aesthetic that is eclectic, yet completely homogeneous. Furthermore, the band employs a tuning system based on whole number ratios, known as Just Intonation. Through literature review, transcription, analysis and primary interview, the present research sought to understand the groups’ influences and compositional techniques. By placing the band within the context of the tradition of Just Intonation fretted instruments, it was found that their implementation of the tuning system ultimately contributes to a perceptual phenomenon known as “Meta-Music.”
Language Acquisition Through Immersive Game Development

Jacob Duffy

University of Tennessee // The App.Farm
EUReCA 2019

During the language learning process, whether in a classroom setting or naturally through real life experience, immersion is key to effective engagement. In the absence of true immersion, immitating cultural and context is a viable alternative. Using video game design in conjunction with content/script development provides students with multiple opportunities to experience language learning in a contextual format across many different conversations.

Design as learning

Using French culture + language acquisition as the subject matter and employing cross-functional teams including Graphic Design, French, Computer Science, and Music, students and faculty collaborate to facilitate the design and development of an app. Students were challenged to design materials to help peers understand specific course content in a meaningful way. Using the individual strengths of each member and their respective fields, the team gains insight in multiple domains. Technical limitations are factored into the design, asset development is factored into the narrative or context.

Production as learning

We have created a pipeline for game production that involves team based learning and problem solving. In addition to designing the game, granular research is required to create scenes, dialogues, sounds, music, and code. The research and collection of the reference materials creates a dynamic where students seek the information, rather than being lectured to.

Learning about different cultures is an educational requirement by many programs to further enrich their student's lives. Unfortunately general interest in the orthodox teaching methods of foreign language is low in the US, additionally retention of these programs is often difficult for many students to grasp. Our team has come together in order to attempt to solve these problems. The team has approached the challenge of integrating game design with educational theory and language acquisition. By creating an interactive and immersive experience for the student, they could become more invested in the subject matter, as well as experience valuable contextual insights that are often not available in traditional classroom settings.

Playing as learning

The project hopes to impact student language retention rates by adding passive exposure to language to the student's learning resources. The work that the Bonne Chance team has accomplished has laid an essential foundation for future students to further develop the project. This work includes development of an intuitive framework to streamline level design, selection and implementation of interactive gameplay mechanics, and significant improvements to the existing workflow system.

Website // playbonnechance.com
Researcher: Cheyenne Peters

Project Title: Analyzing the Gender Gap in Second Language Acquisition: A New ESL Curriculum for Latina English Learners

Research focus: Sociolinguistics & Graphic Design

School: The University of Tennessee, Knoxville

Student Level: Undergraduate

Abstract: According to the 2013 United States Census, 25% of men working in the service industry have limited English proficiency (LEP), whereas 45% of women have LEP. This unequal distribution of linguistic capabilities insinuates a gap in the rates of Second Language Acquisition between male and female English learners in the United States. To connect this issue to the Latinx community specifically, over half of the LEP population is Latinx (63%). The opportunities that women have to pursue SLA through English as a Second Language (ESL) classes are limited for a variety of social and cultural factors; however when this disparity is considered within the context of the Latinx community, the effect social and cultural factors are increased due to traditional gender roles. Because this gender gap in SLA exists, specifically within the Latinx community, I will be investigating the gender gap in second language acquisition among Latina immigrants through the creation of a new ESL curriculum in which English-learning students can experience more proportional representation and acquire necessary skill sets by addressing accessibility and language-based needs through relevant educational resources, as well as technological literacy through digital implementations.
With the research acquired from the Montgomery sit-ins our group intends to create an app that focuses on the week of the 25th of February 1960 through the narratives of the students from Alabama State University. This particular week created a movement and demonstrated how to create positive social change, and we want to use it in a way that helps combat racism that is occurring presently on the University of Tennessee’s campus. Using the events of February 1960 in Montgomery, AL, and contrasting them with current events, we hope to create a tool that allows users to understand the multiple perspectives of the people who fell victims to various acts of racism on a college campus.

Overall, we want to create a forum for students inspired by the actions and reactions from the sit-ins that occurred at Alabama State and all over the deep South. Though Knoxville is removed from the setting of mid-century Montgomery, the movement that was created there is still relevant in our contemporary culture. A forum would allow like-minded students, especially students of color, to share their personal experiences with racism on and around campus so that other students could begin to be aware of the racism still occurs today. Thanks to the due process that was created by the students at Montgomery, we have the right to protest if we don’t agree with something that is happening on campus, and we hope to raise awareness of this through our app.
This research provides a stylistic survey of contemporary choral composer Ola Gjeilo’s compositional style as well as draws comparisons with several of his contemporaries including Eric Whitacre, Dan Forrest, René Clausen, and Morten Lauridsen. Using formal and harmonic analyses of several of Gjeilo’s most notable pieces, this research dissects Gjeilo’s treatment of text, his use of tertian relationships, his consistency in formal designs, and his use of polytonal and polyfunctional relationships. Multi-parametric analyses of Gjeilo’s works reveal the characteristics of his music. This research deconstructs Gjeilo’s approach to text painting, which portrays the broader idea of a text and exploits its coloristic elements. In addition to text, this research demonstrates Gjeilo’s consistent devotion to the number three through tripartite forms and mediant harmonies. Neo-Riemannian analysis supports this claim through Gjeilo’s incorporation of tertian relationships. These relationships play a critical role in Gjeilo’s sectional divisions and chordal progressions. In addition to this, Gjeilo’s use of mediant relationships causes a sense of tonal ambiguity through his use of polyfunctional and polytonal harmonic structures. This survey concludes by connecting Gjeilo’s compositional techniques with those of other contemporary composers, providing the expanse of their influence.
While an abundance of research exists concerning many aspects of music in Bali, little research has been conducted concerning the suling and its role in Balinese music. Due to an exceptional lack of information on the subject, this important member of Balinese gamelans is often left unnoticed. My research seeks to fill this void. Here I demonstrate how the suling functions as a key member of Balinese gamelan music, with its importance coming from its contrasting tone color to the more dominant metallophones within the ensemble, its soloistic role within the texture of the ensemble, and its extended pitch range.

I argue that to better understand the suling in Balinese music, we must consider the performance practices, compositional uses, and musical significance of this instrument. I focus on works from both gamelan gambuh and semar pegulingan repertoire. Here the suling proves a vital instrument, forming “the core of the gamelan” with its “distinctive, ghostly sound” (Tenzer 2011, p. 24). My transcription reveals important aspects of the suling’s performance practices: doubling an existing melody, ornamenting a melodic line, and sustaining notes over moving lines. Combining my transcription with existing literature, I articulate the integral position of this instrument within these ensembles.
Music as a Metaphor for Culture

_Bonne Chance_ is an interactive French learning game that has been in development at the App Farm. With changes in gameplay come larger overhauls in music production in order to fit with the pacing and general world of the game. Previous research for the musical elements of _Bonne Chance_ were primarily focused on the historical aspect of each time period, which pieces would reflect best those art movements, and basic instrumentation that would work with the minimalist art that is displayed graphically in the game. With the change from a 2D side-scroller game to a larger-arched action/adventure game, the music had to evolve into a much more involved piece of game mechanic. As a result of this change, the music must be more concrete, involved, and cinematic. Leveraging historical, pre-existing pieces were explored to create a more integrated gameplay experience. Consideration of technical limitations, contemporary composition, and appropriate sonic environments have informed the final choice for the music of Bonne Chance.
Molly Rodabaugh

This project is a theoretical scenic design for the musical *Little Shop of Horrors*. I began the process by analyzing the script in search of themes that could be translated visually on stage in order to more poignantly tell the story. I found that the musical, set in the Skid Row of the mid-twentieth century, was filled with characters that, while caricaturized, represented the authentic pain felt by the actual occupants of that place and time. Their struggle to escape their surroundings forces them to make desperate decisions, and their naivety and goodness is sacrificed along the way. I set out to capture that same sense of obscured beauty and goodness in the midst of a dreary, realistic Skid Row. After a lot of preliminary research into 1950’s Brooklyn and the Bowery, I settled upon the dilapidated, brick neighborhood I wanted to surround the Flower Shop, and worked it into my beginning sketches. I then worked to create this representative model box in 1:48 scale using realistic textures pulled from photographs of the time period and manipulated them to fit in the logic of this world. All placement of buildings, walls, platforms, and floors was predetermined by my drafted floorplan of the set. The model box is representative of the dimensions of our Clarence Brown Theatre.
Lighting Designer: Collin Hall

Lighting Design for *The Real Inspector Hound*

Tom Stoppard’s *The Real Inspector Hound* is a comedic murder mystery involving hidden identities, dramatic irony, and meta-theatrical staging. For the Clarence Brown Theatre’s 2019 production of the play, the creative team focused on developing a theatrical environment reminiscent of a 1950’s theatre on the West End in London. With this focus, we were able to exaggerate the meta quality of the action on stage and emphasize the ending, when the identity of the real Inspector Hound is revealed.

To accomplish this goal, the lighting design primarily used a modified version of the traditional McCandless method in order to recreate a historically accurate lighting style in the modern day. In order to develop this idea, I first analyzed the play and then I researched the context of the play, including the history of production, the biography of the playwright, the genre, and prominent lighting design theories of the twentieth century. With this research in mind, I then created the light plot and design specifics that would allow me to imitate the choices of a 1950’s English lighting designer. I finished the lighting design process by carrying these ideas with me through technical rehearsals and the opening of the production.

I am also using this production as my capstone project.
When the brain experiences ischemic trauma, its neurons are overstimulated, causing cell damage and eventually death: a phenomenon called excitotoxicity. However, not all regions of the brain are equally affected. The suprachiasmatic nucleus (SCN)—which regulates circadian rhythms or the body’s twenty-four hour clock—might be more protected than others, rendering it more resilient to excitotoxic shock. Specifically, I am investigating the degree of damage to the SCN compared to the hippocampus and cortex following neurodegenerative disease or an event such as a stroke. We are isolating tissue from different areas of the mouse brain, including the SCN, hippocampus, and cortex and treating them with NMDA, which induces excitotoxicity. Then we fix, section, and quantify cell death using propidium iodide, a cell death marker, and DAPI, a nuclear marker. Preliminary data suggests there is less cell death in the SCN relative to the other tissues. Future investigation involves understanding the mechanisms underlying SCN excitotoxic resiliency, with a specific focus on the ERK1/2-CREB-ATF3 and TrkB pathways as well as glial cells. These findings can lead to stroke treatments that function by manipulating cell structure and communication within the SCN after ischemia.
ABSTRACT
Kara Delbridge

Since the discovery of the Kautsky effect, the use of fluorescence measurements and the corresponding parameters, F0, Fv, Fm, and Qy max, have become nearly ubiquitous within the plant science field. This is because of the benefit of the noninvasive nature of these fluorescent measurements, and the ease at which these tests allow to obtain important photosynthetic information. Commonly, the rating of Qy max in plants is found to be ≈ 0.83; however, the Qy max for cyanobacteria is highly variable in the published reports ranging from 0.22-0.50. Although this area is contentious, there are multiple biological reasons that interfere with the interpretation of the PAM analysis of cyanobacteria such as involvement of phycobilin light harvesting complexes, respiratory losses, and loss due to the Mehler reactions. In addition to these intrinsic issues we have also discovered instrumentation issues that limited the utility and even validity of these PAM measurements. In our tests of optical and spatial variables we attempted to understand and minimize the variability of the common parameters F0, Fv, Fm, and Qy. We have used the PSI FluorCAM to investigate Thermosynechococcus elongatus BP-1. We discovered large variations in samples in 96 well plates. We have systematically altered many variables including plate material, plate color, sample concentration and sample volume. Through a combination of changes we have settled on improved conditions that give highly reproducible results within all wells of a 96-well plate. Finally, the effect of spatial arrangement within the FluorCAM instrument was also investigated because of the angled configuration of the LEDs and detectors. With these improved protocols we are now investigating the influence of various environmental effects such as inhibitors, temperature, light quality and light intensity on the PAM properties of different cyanobacteria.
Cyclin-dependent kinase-like 5 (CDKL5) deficiency disorder is an X-linked neurodevelopmental disorder, where children exhibit motor, speech, and cognitive deficits during development as well as early onset of seizures and infantile spasms. CDKL5 disorder results from de novo mutations in the CDKL5 gene, which phosphorylates many proteins. How mutations in CDKL5 gene result in these neurological deficits is unknown.

Using mouse as a model system, our project involves characterizing synaptic plasticity deficits in CDKL5 deficient male and female mice, during development and adulthood. We use perineuronal nets, which are extracellular matrix structures surrounding GABAergic neurons in the cortex, as markers for synaptic plasticity, based on their roles in the developing critical period and adult experience-dependent plasticity. We will present our results on how CDKL5 deficiency affects perineuronal net expression in different brain regions and discuss their effects on behavioral phenotypes.
Global population is projected to increase nearly 30 percent to 9.2 billion by 2050. To meet the ever-increasing food demand, farmers must constantly look for ways to increase resource efficiency to maximize crop yields. We therefore seek to better understand how plants regulate trafficking between cells and tissues via pores called plasmodesmata. Knowledge of how plasmodesmata form and function in controlling nutrient partitioning and signaling-molecule trafficking between tissues could facilitate engineering to optimize resource allocation to fit human needs. Given that these pores are necessarily cell wall components, we hypothesize that cell wall-modifying proteins are involved in the regulation of nutrient trafficking and signaling molecules via plasmodesmata. Here, we examine the xyloglucan endotransglucosylase/hydrolase (XTH) family of cell wall modifying enzymes to determine their function in cell-to-cell trafficking. Working in the woody tobacco *Nicotiana benthamiana*, we have silenced expression of the genes encoding a subset of these enzymes using RNA interference. Silencing of some *NbXTH* genes decreased intercellular trafficking of green fluorescent protein (GFP). These results suggest that XTHs and other cell wall-modifying enzymes could be new targets for engineering to optimize resource allocation via plasmodesmata in crops.
The respiration of organic matter by microorganisms in marine sediments is an important control on carbon and nutrient cycles. With oxygen, sulfate is the major electron acceptor used to oxidize organic carbon. Inorganic sulfate is the major source of oxidized S to marine sediments, but a range of organic compounds also contain sulfate and other oxidized S functional groups, including carrageenan, a major product of marine algae which contains sulfate esters, and taurine, which contains a sulfonate group. Here we test the hypothesis that these oxidized S groups can be released from organic molecules to join the pool of free sulfate/sulfite. In order to investigate this, taurine and carrageenan will be incubated in fresh water sediment from the Ijams Quarry area in Knoxville, TN, and changes in free sulfate and sulfite will be observed. These experiments have the potential to expand our understanding of how the S cycle in sediments operates.
Application of Exogenous Polyamines Attenuate the Effects of Abiotic Stress on Photosynthesis in the Aquatic Monocots, *Lemna Minor* 370 And *Spirodela Polyrhiza* 432

Truc Le₁, Jyotirmoy Mondal₁, and Barry D Bruce₁

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Recent reports have suggested that the naturally occurring polyamines, such as spermine, spermidine and putrescine, may attenuate the effects of exogenous, abiotic stress such as extreme temperature, salt, toxin, UV-B radiation, ROS and neuronal degeneration in many model systems including rats, Arabidopsis thaliana, rice (Oryza sativa), cucumber (Cucumis sativus), and gerbils. Recent research has also shown a protective property of polyamines in higher plants against various environmental stresses such as increased irrigation, salinity and temperature changes resulting from climate change. Our research compares the protective properties of the three common polyamines, spermine, spermidine, and putrescine, on duckweed plants, *Lemna minor* (Lm370) and *Spirodela polyrhiza* (Sp432) when exposed to the herbicide, DCMU [3-(3,4-dichlorophenyl)-1,1-dimethylurea] and Paraquat (1,1’-Dimethyl-4,4’-bipyridinium dichloride). DCMU is a commonly used herbicide because of its ability to disrupt the photosynthetic pathway through the inhibition of the Q₉ binding site of the plastoquinone pool in photosystem II (PSII). Paraquat inhibits photosynthesis through its interference with electron transfer of ferredoxin. Duckweed is used as the model organism due to its very small size, rapid and vegetative growth, and photoheterotrophic metabolism. Chlorophyll fluorescence measurements including Fᵥ (variable fluorescence), Fₐ (maximum fluorescence), Fₘ (minimum fluorescence) and Qₑ (maximum quantum yield) of photosystem II is taken to measure the photosynthetic productivity of the duckweed by PAM fluorometry using both a PSI FluorCam and a BioLogics JTS-100 spectrophotometer.
One of the factors which contributes to the lethality of certain cancers is their ability to metastasize. Metastasis often requires cancer cells to migrate across constricted areas, such as the extracellular matrix (ECM), and through spaces smaller than their nucleus. Within the nucleus, the DNA is organized in a non-random fashion that is essential for cellular functions. Identification of structural elements within the genome which are associated with constricted migration will facilitate the development of specific therapies that target aspects of genomic architecture to prevent metastasis.

Through experiments with malignant melanoma (A375) cells, we have selected subpopulations of A375 that are not migratory (A375-NM) or highly migratory (A375-M) through constricted spaces. Subsequent experiments revealed differences in nuclear morphology which, along with differences in migratory capacity, are preserved through numerous rounds of cell division. To further evaluate these differences under more physiologically relevant conditions, we mimic in-vivo ECMs by constructing 3D collagen matrices and then examine the nuclear structure of cells as they migrate throughout the matrix. Through immunofluorescence microscopy, we obtain a high-resolution snapshot of nuclear components during 3D migration which allows for the identification of morphological characteristics that are specific to migratory and non-migratory cells during 3D constricted migration.
The decoupling of the fundamental processes of cell division and growth is important for maintaining cell integrity. Through a chemical approach, we delayed the clock that controls when cells separate, uncoupling cell division and cell growth. This led to polarized cell growth before the cells completed separation. Using fluorescent markers to denote the cell’s stage in the cell cycle, we observed that only cells that were in mitosis exhibited this uncoupling. Previously it was thought that growth resumption occurred after completion of cell division, but this observation suggests that growth is triggered earlier, from a mitotic cue. This mitotic cue allows the tips to become better equipped to compete with the septum, causing the septum not to separate. Cdc42, a conserved GTPase that is a master regulator of cell division and polarity in eukaryotes, appears at the septum and remains there until the cells separate then oscillates between the cell tips. However, in the uncoupled cells, Cdc42 leaves during septum formation, before the cells separate and is found at the tips. Further investigations into the specific cues could lead to a better understanding of what this cell cycle trigger is and how this cue affects Cdc42 at the tips.
Abstract

Rachel Shah

Identifications of dying larval neurons during early phase of metamorphosis and genetic factors involved in their apoptosis in *Drosophila melanogaster*.

Apoptosis is programmed cell death where proteins called caspases break down the cellular components needed for survival in the cell, in other words “cell suicide”. Currently not much is known about the upstream regulation of apoptosis in cells. To create a better understanding of apoptosis, we attempted to find larval neurons undergo apoptosis particularly during early phase of metamorphosis by utilizing GAL4/UAS system. Two different screenings were attempted. The first screening included caspase sensitive GFP to find dying larval neurons. Three out of 19 gal4 lines tested contained dying larval neurons by apoptosis. The second, included screening with a double reporter (mCD8-GFP and nuclear RFP) to find dying larval neurons. The third screening included using UAS-mCD8-GFP; shakB-gal4 lines to test knockdown of various genes to find any specific genetic factors required for regulation of PCD of shakB motoneurons. Two out of 17 tested showed premature cell death.
1. Margaret Spangler 2. Zachary Beamer

*Arabidopsis thaliana* NIP2;1: A Lactic Acid Transporter With a Role in Plant Survival Under Low Oxygen Stress

In *Arabidopsis thaliana* oxygen deprivation, or hypoxia, occurs as a result of flooding leading to a genetic response through the expression of 49 core hypoxia genes that encode fermentation and glycolytic enzymes as well as other proteins associated with an adaptive response. Included in these core hypoxia genes is *AtNIP2;1* which encodes a member of the aquaporin superfamily of membrane channel proteins, specifically a subgroup called “Nodulin-like Intrinsic Proteins” (NIP). Unlike other aquaporins, *AtNIP2;1* shows a transport selectivity for the protonated form of lactic acid as opposed to water. This protein is hypothesized to play a role in the transportation and compartmentalization of lactic acid (toxic byproduct of lactic acid fermentation) during anaerobic respiration. *AtNIP2;1* is expressed primarily within the vasculature of the roots with transcript levels drastically increasing 300-fold under hypoxia challenge. In this study, the elucidation of the physiological role of *AtNIP2;1* within the plant and its function as a response mechanism to hypoxia is explored. Our data suggests that *AtNIP2;1* localizes to the plasma membrane, plays a critical role in plant survival under conditions of extended hypoxia, and may have multiple points of regulation that affect the level of *AtNIP2;1* expression.
Zachery Stooksbury

Estuarine and deltaic sediments are responsible for forty-four percent of Earth’s organic carbon burial due in part to preservation of organic matter by sorption to sediments. Organic matter sorption is controlled by sediment grain size and mineralogy. Here, we report the grain size and minerology of sediments collected from the White Oak River Estuary in order to characterize their relationship to both the preservation of organic carbon and the utilization of this carbon by microorganisms. The White Oak River is an estuary with rapidly accumulating sediments producing an anoxic environment a few millimeters below the sediment-water interface. Sampling of the White Oak River estuary consisted of collecting 80cm push cores that were then sub-cored in 3cm increments in order to create a down core profile analysis. Grain sizes of the White Oak sediment where characterized by removing all organic matter and analyzed by a Malvern 3000 Laser diffractometer. Determining the linkages between the preservation and utilization of this organic carbon with the geology and microbiology should provide a broader perspective in the understanding how this dynamic system operates and how the White Oak River Estuaries and other estuaries can contain a large proportion of Earths preserved organic carbon.
During melanoma metastasis, cells must squeeze through tight junctions in the endothelial layer of blood vessels in order to migrate to different parts of the body through circulation. To successfully migrate, cells must contort and compress their nuclei. When squeezing the nucleus, the DNA structure can be changed and sometimes damaged due to the stress of compression. Using a sequential migration system, where cells are submitted to migration through a transwell, we have seen that cells became progressively more adept at migration with repetition. In this project, we aim to analyze the behavior of these highly migratory cancer cells in a simulated tissue environment. In the body, cancer cells are interacting with other cells in a 3D environment and this can have a great impact on their behavior. We are simulating tissue by seeding migratory and non-migratory melanoma cells into an organoid with normal human fibroblasts. To visualize the behavior of the melanoma cells amongst the fibroblasts, we use histological techniques and immunofluorescence. We have observed that migratory melanoma cells fail at forming round organoids while non-migratory cells form organoids with a rounder and tighter structure. These results suggest that adhesion and polarity are compromised in highly migratory cells, making them more prone to metastasis.
Investigation of Drosulfakinin-expressing Neurons in *Drosophila melanogaster* (Fruit Fly).

**Faculty Mentor:** Dr. Jae H. Park

**Undergraduate:** Richard Q. Vuong

With the average American eating over 3,600 calories daily (well above the recommended 2,000 to 2,600), many have suggested that increased caloric intake is the leading cause of obesity. Many have looked to the applications of the mammalian peptide cholecystokinin and the insect neuropeptide sulfakinins, which have been shown to influence feeding behavior and the induction of meal-related satiety. In this project, we examined the spatial and developmental expression patterns in the Central Nervous System (CNS) of the *Drosophila melanogaster* homologue of these genes, *drosulfakinin* (dsk), by using promoter-driven gene expression. We observed that dsk gene expression is induced throughout larval development, whereas *drosophila insulin-like peptide* (dilp2), another neuropeptide related to feeding behavior, and *myoinhibiting peptide precursor* (mip) are continuously expressed at a constant level. Becoming familiar with these genetic lines establishes the next step of this project—developmental assays. These assays will involve comparison of fruit fly development between lines of dsk overexpression, dsk ablation, and controlled levels of DSK. Particular attention will be given to relative body size and timing of specific growth checkpoints (puparium formation, eclosion, etc.). The final part of the project will be examining how the feeding behavior of adults is affected by DSK and will utilize a food intake measuring device to do so.
Strategies for coping with stress can vary dramatically between individuals. The origins of these different strategies are not fully understood, but there is strong evidence supporting a role for environmental factors such as social dominance. This study used a social defeat model to examine potential links between types of coping strategies and dominance status. Female Syrian hamsters were paired in daily social encounters for two weeks to establish a dominant-subordinate relationship. Then, animals were paired with new social partners for two weeks so that half of the animals changed their dominance status, while the others remained either dominant or subordinate. After the creation of dominance relationships, all animals received acute social defeat stress which included 3, 5-min aggressive encounters with a trained aggressor. Following social defeat exposure, we used a social interaction test to assay status-dependent differences in social avoidance. We hypothesized that dominant Syrian hamsters would show greater social interaction at testing compared to their subordinate counterparts as well as former dominant animals that lost their social status. Unexpectedly, subordinate animals spent more time investigating a social target than did dominants. In addition, initial dominance status appears to have a stronger effect on defeat-induced social avoidance than subsequent status changes. These findings indicate that social dominance modulates how female hamsters respond to social defeat stress. We are currently performing ΔFosB immunohistochemistry in the nucleus accumbens to investigate neural activity in brain regions known to modulate stress susceptibility.
Climate change is causing increases in thermal variability in addition to rising global temperature averages. Organisms may utilize plasticity to respond to rapid thermal changes, but few studies have examined developmental plasticity (permanent alterations to phenotype triggered by developmental cues) as a mechanism to mediate the impacts of climate change. Using the dung beetle *Onthophagus taurus*, we investigated the potential of developmental plasticity to buffer species from climate change by examining the effects of increasing temperature mean and variation during development on the thermal responses later in life. Beetles were reared at one of nine treatments using a full factorial design including three average temperatures (22, 24, 26°C) and three amplitudes of fluctuation (±2, ±4, ±8°C). At pupation, we measured thermal sensitivity of metabolism (TSM): the relationship between carbon dioxide production and temperature, which provides an estimate of energetic costs at a given temperature. Beetles reared in the warmest (26°C) and most thermally variable treatments (±8°C) had the lowest TSM, and incurred the smallest energetic costs. Beetles reared in less variable treatments (±4, ±2°C) had greater TSM. These findings demonstrate that developmental temperatures can affect how individuals cope with thermal environments later in life, ultimately affecting responses to climate change.
DEVELOPMENT OF A MOLECULAR GENETIC METHOD FOR CHARACTERIZING AMPHIBIAN DIETS. Alexander Funk* and Todd W. Pierson, Department of Ecology and Evolutionary Biology, University of Tennessee Knoxville, afunk4@vols.utk.edu

Dietary studies can provide key insights into the ecology and behavior of animals. Methods common in dietary studies of amphibians (e.g., gastric lavage, fecal analysis, dissection) often fail to identify prey beyond the level of Order, are time intensive, and can be biased against soft-bodied prey. Here, we are developing a DNA metabarcoding assay to characterize amphibian diets from non-invasive fecal samples. In DNA metabarcoding, barcoding loci from mixed community samples (e.g., feces) are sequenced on a next-generation sequencing platform, and resulting reads are used to identify members of that community (e.g., diet composition). To validate this method, we will prepare COI amplicon libraries from 27 fecal samples collected from wild Blue Ridge two-lined salamander (*Eurycea wilderae*) during the breeding season. We will sequence these reads on an Illumina MiSeq and compare resulting reads against a reference library of sequences of known identity to characterize invertebrate diet composition. Some of our samples are derived from male *E. wilderae* with two alternative reproductive tactics—“searching” and “guarding”. Because the latter is more likely to be found in aquatic habitats in the breeding season, we expect to find a great representation of aquatic invertebrates in its diet. We hope that this method will prove to be more accurate and efficient than previous methods, providing a new, versatile tool with which amphibian diets can be characterized and compared.
Fungal response to wildfire in southeastern forests: effects at the urban-forest interface.

V. Rosanne Harpe, Jackson M. Turner, Leigh C. Moorhead, Jessica A.M. Moore, Stephanie N. Kivlin

Fungi are key to ecosystem function, yet post-fire recovery of fungal communities has not been examined in many ecosystems. A massive wildfire in 2016 in the Great Smoky Mountains National Park (GSMNP) and surrounding urban landscape (Gatlinburg, TN) presented an opportunity to study post-fire fungal response within urban-forest ecosystems. We surveyed soils and plants in GSMNP and Gatlinburg, TN 1.5-2 years post-fire to assess colonization of arbuscular mycorrhizal fungi (AMF, aseptate hyphae) and decomposers/pathogens (septate hyphae) from 13 plant species across 18 sites, (9 park, 9 urban).

Overall, colonization by aseptate (intraradical $R^2=0.46$, $P=0.03$) and septate (intraradical $R^2=0.19$, $P=0.01$; extraradical $R^2=0.07$, $P=0.03$) hyphae decreased with increasing fire intensity. This pattern was primarily driven by GSMNP sites (intraradical, $R^2=0.28$, $P<0.01$; extraradical $R^2=0.26$, $P<0.01$), with colonization decreasing in roots but not soils—suggesting soil recovery precedes root recovery for symbiotic AMF. Meanwhile, the decrease in intra- and extraradical septate colonization suggests this community recovers more slowly after wildfire than AMF. The sensitivity of our fungal communities to wildfire alongside predicted changes in wildfire regimes suggests declines in fungal abundance throughout southeastern Appalachia.
Title: The impact of climate warming on the breeding behavior of the rainbow scarab dung beetle *Phanaeus vindex*

Anthropogenic climate change is threatening to modify the behavior of a multitude of organisms. One such organism is the dung beetle *Phanaeus vindex*. My goal was to investigate how temperature affected behavior exhibited during reproduction. We housed 10 beetles in seven-gallon buckets buried to the rim in an open-air pasture. Half of the buckets were randomly assigned greenhouses which increased temperature mean and variation by up to 5°C and +/- 3 °C respectively, and the remaining buckets received no greenhouse. Since eggs develop into adults within the broodball, the conditions that surround this broodball are vital to the development of the next generation. We recorded the depth, mass, and amount of broodballs. Our results show that there is a significant difference in depth and mass of the broodballs between the treatments. In addition, broodballs in greenhouse buckets were placed in locations with significantly greater temperature mean, but the same temperature variation compared to broodballs in control buckets. These findings suggest that dung beetles respond to increased temperature mean and variation by altering their breeding behavior, thus altering the developmental temperatures experienced by the next generation. This behavioral adjustment may help buffer offspring from the stressful temperatures associated with climate change.
Much of investigation in the field of evolutionary biology involves understanding how the development of certain characters can impact the rate of diversification on lineages. In this project, we investigated how deliquescence as a method of spore dispersal causes rate changes in the fungal family Psathyrellaceae. Mushrooms that deliquesce, colloquially known as inky caps, auto-digest upon maturity and drip their spores into the earth, as opposed to the standard wind dispersal of most mushrooms. Deliquescence is estimated to have evolved at least four times independently, three times in Psathyrellaceae and once in Agaricaceae. For our project, we downloaded genomic sequences of each species in Psathyrellaceae from GenBank and organized them in AliView. After pruning further through the program Mothur, the sequences were used to render several different phylogenetic trees through BEAST and RAxML. An ultrametric tree was then analyzed by BAMM to detect variation in speciation rate across the branches.
Research Title: Staining cells in 1,000,000 year old permafrost

Peibo Li, Katie Sipes

Abstract: A community of microorganism survive and reproduce under the extreme environmental conditions such as subzero temperature, water stress, high salinity and low nutrient availability in permafrost. In order to further understand the cells that can survive in the permafrost we must first find out the fraction of cells that are present. By using a rapid epifluorescence staining with the assistance of LIVE/DEAD Bacterial Viability Kit (Baclight™) to find the fraction of cells that are alive or dead we can determine the viability of cells that are found in ancient permafrost. We replicated the methods used in Burkert et al. 2019, which used permafrost aged at 33,000 years old. Since our samples extend to 1,000,000 years old, we aim to distinguish the ratio of viable to compromised cells throughout the depth of the permafrost samples. We use the methods in the aforementioned paper to compare results and discover the secrets behind phenomeno.
EUReCA Abstract

My research is focused on looking at the impacts different resolutions have on fire assessment using remote sensing technology. The area of focus for this study is the part of the Great Smoky Mountains that was affected by the 2016 wildfires. The resolutions I will be testing are at 1m, 3m, 10, 30m, and 100m. To do this, I have gathered satellite and aerial imagery of the study area from various sources, including Landsat 8, Planet, NAIP, and Sentinel-ESA, all with different resolutions. By calculating the Normalized Difference Vegetation Index (NDVI), I can see the amount of vegetation that was burned in the wildfire as well as the total area that was affected. I will use this area to create a fire boundary to work within. Then, I will use ArcGIS (or other remote sensing software) to do classification to assess the accuracy of each of the different images to see which ones are the most accurate and therefore the best for fire assessment. My hypothesis is that the lower resolution images will have the higher accuracies while the lower resolution images will be less accurate and therefore less reliable when doing fire assessment.
Title: Using Behavioral Variation to Explain Wolf Spider Community Structure

Key Words: Behavior, Phenotypic Plasticity, Personality, Niche

Authors: Isabella Ritchie

Abstract: Species interactions, physical conditions, and other environmental constraints within a microhabitat drive the structure of an ecological community within niche habitat. Abiotic and biotic pressures select for beneficial traits within a given environment, driving coevolution of community members, and interspecific similarities in behavioral responses to environmental stressors have been well documented. I describe the variation in wolf spider community makeup across several microhabitats in east Tennessee and investigate how interspecific variation in behaviors drives and shapes community composition. These microhabitats have prompted differentiation in a suite of favorable behavioral traits for each community, based upon variation in species diversity, richness, and interactions at each location; I investigated spider aggression at both the species and community level to determine any existing patterns. I hypothesize that a high proportion of aggressive individuals within a given microhabitat indicates increased environmental stressors within the area, whether due to increased competition, predation, or some physical factor.
How does age-related floral trait variation affect reproductive success in an annual plant, 

*Collinsia verna*?

Plants, like all species, require resources to efficiently grow and reproduce. However, the way they allocate these resources towards vital processes (growth, reproduction, and maintenance) differs greatly among species. How species distribute resources simultaneously and make tradeoffs between processes remains a difficult question. Furthermore, in self-compatible species, unreliable pollinators favor alternative means of pollination for reproductive assurance in otherwise outcrossing species, notably autonomous self-pollination (selfing). We are exploring the links between floral traits and fruiting success while considering potential age-related patterns in the annual plant *Collinsia verna*, a species that expresses delayed autonomous selfing. Prior work in our lab quantified age-related patterns of stigma-anther distance and declining pollen germinability, which can directly affect selfing and suggest strategies related to reproductive success. However, diminishing resource availability with age may explain these age related patterns. We designed an experiment to (i) document age-related patterns in reproductive trait variation; (ii) tease apart the effects of resource limitation and developmental constraints on these traits; and (iii) determine how these traits affect fruiting success.

We counted the number of flowers, and measured flower size and stigma-anther distance to estimate floral trait variation and we measured pollen germinability, pollen number per flower, and seed set to estimate reproductive success. To determine how resources, affect these reproductive traits, we altered individual resource budgets by hand-pollinating half of the 40 study plants and allowing the others to self-pollinate. Our results indicate a sharp decrease in stigma-anther distance early in the flowering period, followed by a gradual decline in pollen number and germinability with plant age. Flower size, seed set, and flower production rate all rose to a midlife peak then dropped with age. Stronger declines in pollen count and germinability in hand-pollinated plants relative to unpollinated plants suggest that high allocation of resources to developing seeds early in a plant’s lifespan likely decreases resource pools available for developing flowers. Overall, our results suggest these annuals alter floral development and allocation to male and female function as they age, and shift from outcrossing to selfing. These findings add to our knowledge of plant resource allocation and mating system evolution.
Morgan Steckler, Dr. Kelsey Ellis

Movement of lifetime maximum intensity locations during the North Atlantic hurricane season

Where a storm reaches its lifetime maximum intensity (LMI) can be a powerful indicator of tropical cyclone intensification patterns. Any changes in this location may demonstrate how hurricanes are affected by climate change. Studies on the annual and decadal trends in LMI location have shown that the latitude where storms are reaching their LMI is shifting, but at different rates and in different directions depending on the ocean basin. In the North Atlantic, for example, LMI location seems to be moving slightly closer to the equator, especially for those storms with the greatest intensities. LMI location patterns have yet to be explored within the hurricane season. We assess how LMI location moves through a hurricane season based on climatological mean locations, showing how time of year affects where a storm reaches its greatest intensity. This work contributes to our growing knowledge on hurricane intensification patterns, which are one of the main ways that climate change affects tropical storms.
Habitat loss and degradation for urban or agricultural use are among the largest factors leading to a decline in biodiversity. Understanding how these land use changes affect the distributions of amphibians and reptiles is important for conservation. The Southern Zigzag Salamander (*Plethodon ventralis*) is a relatively recently described species (1997) and has been the subject of little research. This species can be locally abundant in the Ridge and Valley—including in some urban and disturbed habitats—but populations often appear to be discontinuous across the landscape. Here, we are using repeated sampling of random quadrats and occupancy models to better understand the predictors of *P. ventralis* occupancy among urban forests in Knox County, TN. We plan to evaluate models with site-level occupancy covariates like forest patch size, isolation, and underlying geology and observation-level detection covariates such as temperature and precipitation. We hope that these data will improve our understanding of the local distribution of *P. ventralis* and, more broadly, how amphibians respond to urban development.
Title: Association of BMI with Increased Anastomotic Time in Kidney Transplantation


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Introduction:

Body mass index is a known independent predictor of poor graft function in kidney transplantation. Additionally, warm ischemia time, which is comprised mostly of anastomosis time, is a critical factor in kidney transplantation outcomes. It is unknown whether greater BMI causes technical difficulties during the operation that mitigate this discrepancy in outcomes for obese patients. In this study, we aimed to measure the correlation between BMI and anastomosis time.

Methods:

A single center retrospective review was conducted of patients undergoing living-donor kidney transplantation from 2006-2016. Operative records were analyzed for warm ischemia time, defined as the time at when graft was taken off ice until the vascular anastomosis was performed and the graft was reperfused. Patient demographics were analyzed using descriptive statistics. Factors associated with prolonged anastomotic times were evaluated using multivariate logistic regression in R version 3.4.3 (2013).

Results:

404 patients were identified and included in the study. The study population was 65% male (N=262) and had an average age of 45.5 years, with an average BMI of 28.5. Regressional analysis demonstrated that a BMI >25 was associated with longer anastomosis times (p=0.007). Additionally, a subgroup analysis between BMI classifications of overweight (N=133), obese (N=85) and morbidly obese (N=69) patients also demonstrated increasing mean anastomotic times, 19.51, 19.93 and 20.97 minutes, respectively.

Conclusions:

This study shows a statistical association between BMI and increased anastomotic times, however, it is uncertain whether the small absolute differences in anastomosis time between BMI subgroups is clinically relevant. This suggests that BMI does not affect anastomotic time to a degree that increases substandard outcomes in obese transplant recipients. Further investigation is needed to determine what comorbidities and other factors lead to poorer outcomes in kidney transplant patients with higher BMI.
What did the pup squeak? Decoding mouse pup vocalizations during pup retrieval behavior

James Buchanan, Radha Awasthi, Carter Sanders, Anu Kumar, Raymond Senu, Sarah-Anne Bowyer, Billy Y.B. Lau, Kevin Reilly, Keerthi Krishnan

Rett syndrome (RTT), a disorder that primarily affects females, is a neurological disorder that is caused by mutations in MECP2 gene. It is characterized by impairments in motor, sensory, social and cognitive processes. Girls with RTT live well into their middle age. How lack of MECP2 affects adult women and how the syndrome proceeds from development to adulthood is understudied. Our lab studies the pathogenesis of Rett syndrome by studying learned maternal behavior in mice. This behavior is a wonderful model to study adult experience-dependent plasticity. Our hypothesis states that plasticity is regulated by MECP2. Plasticity is the process by which the brain learns, adapts and reacts to its environment. MECP2 dysfunction could lead to impaired plasticity, which ultimately results in stereotypic behaviors.

We study how mice with MECP2-mutation communicate with and retrieve their pups in a dark environment relying on their auditory, olfactory and tactile senses. In previous work, surrogate mothers containing MECP2-mutations were shown to perform pup retrieval less efficiently. We are currently interested in determining the cause of this impairment by integrated video and audio analysis. The goal of this project is to determine if ultrasonic vocalizations and tactile interactions detract MECP2-mutant females from efficient pup retrieval.
Acute social defeat-induced neuroinflammation in the vmPFC of Syrian hamsters via microglial activation

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Research suggests causal relationships between neuroinflammation and stress-related psychopathologies. Exposure to moderate or chronic psychological stress in rodents leads to increased activation of microglia, the brain’s resident immune cells. The ventral medial prefrontal cortex (vmPFC) is a key limbic region involved in top-down regulation of psychological stress and mediates the deleterious effects of microglial activity following prolonged restraint stress. While there is a growing body of literature indicating that chronic social defeat increases microglial activity in the vmPFC, there has been little research investigating the effects of acute social defeat stress. Here, we used an acute social defeat paradigm in male Syrian hamsters consisting of three, 5-minute aggressive encounters in the home cages of a three, novel resident aggressors. 24-hours later, the effects of defeat-induced priming of ionized calcium-binding adaptor protein (Iba-1) expression, a microglial activation marker, was assessed by a subsequent exposure to 0, 20, 100, or 500 µg/kg (i.p.) injection of lipopolysaccharide (LPS). Four hours after injection, hamsters were euthanized, brains extracted, and expression of Iba-1 was later quantified via optical density and total pixel area measurements. In a subset of animals, administration of minocycline, a microglial activation inhibitor, was assessed to determine if blocking microglial activity in defeated animals will have functional behavioral consequences in a social interaction test and conditioned defeat test. 2x4 (stress x LPS) ANOVAs on optical density and total pixel area in the vmPFC suggest significant main effects of social defeat and LPS on both dependent measures. These results indicate that both acute social defeat and LPS treatment alter the activation of microglia in the vmPFC. Importantly, these data are the first to demonstrate that an acute stressor is capable of activating microglia in the vmPFC, which suggests that acute social defeat may prime vmPFC microglia to more rapidly display a phagocytic phenotype following an immune challenge.
Previous studies have postulated about the relationship between the robusticity of the skeleton and environmental factors. There is a possibility that environmental factors will influence the level of robusticity of the skeleton, therefore affecting skeletal scoring methods. In this study, environmental factors include reported lifelong occupation and habitual activities of one-hundred and twenty individuals. These individual’s demographic and metric information were compared in order to observe for significance between skeletal morphology and habitual activities/occupations. The occupational data reported from the one-hundred and twenty individuals have been scored on a scale of one to five, with five being the most rigorous. Likewise, the habitual activity data have been scored on a scale of one to three, with three also being the most rigorous. Measurements were taken from commonly used skeletal traits of the os coxa, cranium, and humerus. Currently standing, there is no significance between Phenice and Walker traits and reported habitual activities and occupations (p>0.05). There is, however, significance for the olecranon fossa shape and depth (p=0.00492) and the angle of the medial epicondyle of the humerus (p=0.02878). This could be because of the preference for arm use, sexual dimorphism of the inferior humerus or the frequency of the elbow joint use compared to other joints of the skeleton. Further implications stemming from this study could include research into the applicability of dominant limb use in environmental factors such as habitual activities or occupations.

Key words: human biology, human, variation and variability, musculoskeletal functional morphology and biomechanics: postcranial
Background
Differential diagnosis of Borderline Personality Disorder (BPD) and Bipolar Disorder (BD) is often difficult because of the significant overlap in symptoms, and psychopathology researchers debate whether BPD should be classified within the bipolar spectrum (Fiorentini et. al, 2019; Paris, 2014).

Overlapping symptomology is found in DSM-5 (APA, 2014) diagnostic criteria for BPD and BD. Similar criteria include impulsivity/excessive involvement in potentially self-damaging behavior; affective instability; identity disturbance/unstable self-image; feelings of emptiness and loneliness; and suicidal behavior, gestures, or threats. This significant overlap in diagnostic criteria makes differential diagnosis of BPD and BD controversial and difficult (Ghaemi, 2014).

The Minnesota Multiphasic Personality Inventory, 2nd edition (MMPI-2; Butcher, Graham, Ben-Porath, Tellegen, Dahlstrom, & Kaemmer, 2001) is a self-report measure used to assess adult psychopathology and personality. The MMPI-2 includes ten clinical scales, including depression (D), psychopathic deviate (Pd), psychasthenia (Pt), and schizophrenia (Sc). Prior studies found patients diagnosed with BPD scored above the clinical threshold (T>65) on all four scales (D scale M=74, Pd scale M=77, Pt scale M=72, Sc scale M=79; Bell-Pringle et. al, 1997). Patients diagnosed with BD show a similar pattern of elevation on these four scales (D scale M=75.94, Pd scale M=66.56, Pt scales M=73.69, Sc scale M=71.25; Bagby et. al, 2005).

The goal of the present study is to compare scores on all clinical scales of the MMPI-2 in patients with BPD and BD, to help shed light on the potential utility of the MMPI-2 as a tool in differentially diagnosing the two disorders.

Participants
Study participants were a clinical sample of 1,030 patients that were assessed at a university training clinic between 2005-2015. Each participant was given an MMPI-2 at intake. Out of the 1,030 patients tested, 25 were diagnosed with BPD and 48 were diagnosed with BD.

Method
Correlations will be calculated between BPD, BD, and all MMPI-2 clinical scales. Then, multiple linear regression analysis will determine whether BPD and BD uniquely predict scores on the MMPI-2 clinical scales. All analyses will be conducted using SPSS version 25.

Conclusions
Study results will demonstrate how MMPI-2 clinical scale profiles differ amongst patients diagnosed with BPD and BD. It is predicted that the clinical scales of depression, psychopathic deviate, psychasthenia, and schizophrenia will significantly correlate with both BPD and BD.
diagnosis. Due to previous findings that patients with BPD show heightened levels of depression, impulsivity, and self-harm (Paris, 2011), we hypothesize that the depression, psychopathic deviate, and psychasthenia clinical scale scores will be uniquely predicted by BPD diagnosis. These findings will illuminate the potential clinical utility of using the MMPI-2 to differentially diagnose BPD and BD.
There is a large amount of variability in how individuals cope with stress. Social dominance is a key factor influencing how animals respond to stress events. In this study, we used Syrian hamsters to test whether the display of an active or passive coping strategy predicted an animal’s future dominance status. We also examined whether a change in dominance status produced a change in active or passive coping strategy. We predicted that hamsters with an active coping strategy would more likely achieve dominant social status compared to hamsters with a passive coping strategy. We also predicted that maintaining social dominance would lead to the development of an active coping strategy. We paired female Syrian hamsters in same-sex dyads and tested animals in daily 5-minute social encounters for two weeks. In females, dominance relationships were formed readily and remained stable during the two-week period. Coping strategies were tested both before and after the creation of dominance relationships via a light/dark transition test, novel object exploration test, and open field exploration test. We found that dominant and subordinate animals did not significantly differ in the amount of time spent investigating a novel object either before or after establishing a dominance relationship. Although animals did not differ in open field activity prior to the formation of dominance relationships, we found that dominant animals spent less time in the center of an open field compared to subordinates after dominance status was established. These findings suggest that while coping styles do not predict subsequent dominance relationships, the maintenance of social dominance alters anxiety-like behavior in female hamsters. Overall, these results support the conclusion that social subordination leads to more activity in an open field test and a more active coping style.
Neuroendocrine Correlates of Dominance Relationships in Female Syrian Hamsters

Annie L. Loewen, Brooke N. Dulka, J. Alex Grizzell, Ashley V. Campbell, and Matthew A. Cooper

Understanding the neuroendocrine mechanisms that support stress resilience is an early step toward developing more effective treatment options for patients who suffer from stress-related psychopathologies. Although social defeat models in male rodents are frequently used to investigate the cellular mechanisms of stress susceptibility and resilience, much less research has included female subjects. We have previously shown that male Syrian hamsters exhibit elevated social avoidance following acute social defeat stress. Interestingly, male hamsters with dominant social status exhibit elevated plasma testosterone, increased androgen receptor expression in the medial amygdala (MeA) and less defeat-induced social avoidance compared to subordinates and controls. The objective of this study was to investigate whether female hamsters show status-dependent differences in defeat-induced social avoidance and androgen and estrogen receptor expression in the MeA. Adult female hamsters were matched according to their estrous cycle and paired in 12 daily social encounters to establish dominance relationships. To avoid dyadic encounters when females were in estrous, we skipped encounters every four days. Immediately before the first dyadic encounter, 15 min after the first dyadic encounters, and 15 min after the 12th dyadic encounter, blood was collected via retro-orbital eye bleed. After the final dominance encounter, animals experienced acute social defeat stress and 24 hours later received a social interaction test with a same-sex, unfamiliar, confined hamster. While acute social defeat stress produced social avoidance in the female hamsters, dominance status did not alter social avoidance, plasma testosterone, or androgen receptor expression in the MeA. Following acute social defeat, female dominant hamsters show an increase in estrogen receptor (ER) alpha immunoreactivity in dorsal MeA, whereas subordinate hamsters show a decrease in ER-alpha receptors. We are currently testing whether dominance status alters the expression of estrogen-beta receptors in the MeA. These findings suggest a sex-difference in the neuroendocrine mechanisms controlling the effects of social status on defeat-induced changes in behavior. This line of research improves our understanding of the neuroendocrine mechanisms regulating sex-differences in vulnerability to stress-related mental illness.
ABSTRACT: Cortical hemodynamic responses undergo significant changes during challenging listening conditions, often recruiting and co-activating with additional brain regions beyond those recruited during favorable listening conditions. Expanding upon our previous findings (Defenderfer et al., 2017), the current study applies a newly developed image reconstruction approach with functional near infrared spectroscopy (fNIRS) to assess frontotemporal activation during a speech perception task. Normal-hearing adults were instructed to listen to sentences and repeat aloud what they heard. Responses were scored for accuracy. Speech quality was reduced by vocoding (simulated cochlear implant (CI) speech) or adding background noise. Sentences in quiet were used as baseline comparison. Performance in degraded conditions averaged around 50% correct across subjects, allowing for balanced comparison between correct and incorrect trials. A custom headpiece comprised of thirteen 30 mm long channels and one 10 mm short channel measured activation over the left frontal and temporal lobes. Results of the image-based analyses revealed global neural activation across ROIs, reflected by significant concentration changes of oxy- and deoxy-hemoglobin ($\Delta$HbO and $\Delta$HbR, respectively). When the listening condition was difficult, clusters of activation in the frontal and temporal lobes revealed interactions between perception accuracy and type of degraded speech. Activation in the middle temporal gyrus (MTG) and inferior temporal gyrus (IFG) was greater in response to correctly perceived trials compared to incorrect trials, collapsed across both vocoded speech and speech-in-noise listening conditions. Activation in anterior STG exhibited a three-way interaction: when noise was added to sentences in quiet, a significant increase in activation is observed, possibly compensating for reduced signal quality. Yet, when vocoded sentences are degraded further by adding noise, the cortical response lacks this compensatory mechanism. Finally, cortical response of the IFG and STG/MTG were found to be inversely predictive of behavioral measurements between subjects. The coincidence of higher IFG $\Delta$HbO and lower temporal lobe $\Delta$HbO was correlated with speech-in-noise performance. Overall, these results demonstrate the advantage of accessing a proficient frontotemporal network during degraded speech perception.
Cystic fibrosis (CF) is an inherited disorder that affects the mucosal lining of the lungs and digestive system due to a defective gene that causes blockages of tubes, ducts, and passageways. The type of mutation correlates with the severity of the condition, but with modern medicine individuals can live into their 50s. We propose a differential diagnosis for identifying CF in the skeleton based on bony pathologies that occur in higher frequency in CF patients. CF patients exhibit chronic sinusitis, clubbing of hands and feet, vertebral fractures/collapse and abnormal curvature, significantly shorter stature, lower bone density, rib fractures, and an increased chest diameter. While each pathology can occur related to other diseases, trauma, or variation, we argue that skeletally, if observed collectively, it would be sufficient evidence to suggest an individual had CF. Most significantly, a medial bulge in the nasal walls of CF patients is a unique etiology, distinguishing them from the non-CF population. While prehistorically, life expectancy would have been much shorter, it is important to note that living close to the salty air of the ocean would have mitigated CF symptoms. In a bioarcheological coastal population, an individual with a less-severe gene mutation might have survived longer.
Rett Syndrome (RTT) is a postnatal neurological disorder that predominantly affects 1 in 10,000 females worldwide. After a short period of normal development, girls with RTT exhibit impaired motor, sensory and social communication. RTT is hypothesized to be the result of altered synaptic connectivity and plasticity, caused by abnormal experience-dependent synapse development and maintenance. RTT is caused by mutations in the X-linked gene, methyl CpG-binding protein 2 (MECP2). How mutations in MECP2 cause RTT phenotypes are unclear. We have previously developed an ethologically-relevant maternal experience-assay titled the pup retrieval assay, which is a learned behavior with multisensory integration features. We showed that the Mecp2 heterozygous mutant female mice (Het), a clinically-relevant mouse model of RTT, failed to efficiently retrieve pups during this task. This phenotype correlated with an increase expression of inhibitory markers, including perineuronal nets (PNNs), in the auditory cortex. As the pup retrieval behavior involves multisensory modalities (i.e. audition, sensation, olfaction and goal-directed movement), we hypothesize that the expression of inhibitory markers is mis-regulated in the associated brain regions of Het. Our ongoing work, using manual quantification, show that in the primary somatosensory cortex (SS1) of Het, the expression of PNNs is abnormal prior to exposure to learned maternal behavior paradigm, compared to wild type siblings, and unlike in the auditory cortex of Hets. Moreover, we observe hemispheric- and subregion-specific changes in PNNs, suggesting possible experience-dependent connectivity pattern dysregulation in Hets. Taken together, our data suggest that MECP2 deficiency results in atypical expression of PNNs in a context-dependent, hemispheric-specific and region-specific manner, which might result in restrictions in learning new tasks and behaviors.
Recent studies indicate students have anxiety towards active learning practices, but unexplored is the extent to which anxiety varies spatially in classrooms. In six introductory biology classes at a public university, students answered a series of questions to measure their anxieties about various classroom practices. They reported where they preferred to sit in a lecture class and explained why they selected their preferred seat. The researchers coded the student responses without knowing the anxiety levels or seating preferences of students. They compared nine locations via ANOVA: front-right, front-middle, front-left, middle-right, middle-middle, middle-left, back-right, back-middle, back-left. The back-left had higher clicker and group work anxiety. The middle-right had higher anxiety for volunteering and being called on to answer questions. Communication anxiety did not differ significantly by location. The back-left and front-middle had high test anxiety while the back-right had the lowest test anxiety. Engagement codes, such as “seeing/hearing” and “paying attention,” were highest in the front of the classroom. Ease and avoidance codes, such as “getting in and out” and “wanting to be unnoticed,” were more prevalent in the back. The trends in spatial anxiety can be useful for teachers when implementing active learning practices during class.
Spying on Mice: Video coding and quantifying pup retrieval behavior in adult female mice

Parker Stevenson, Anu Kumar, Billy Y.B. Lau, Devin Casenhiser, Keerthi Krishnan

The neurodevelopmental disorder Rett Syndrome (RTT) is caused by a non-inherited mutation in the X-linked MECP2 gene and affects 1 in 10,000 girls. It is characterized by impaired motor and sensory information processing and therefore, overall behavior as well. Many women with RTT live well into their middle age. Our goal is to determine how RTT pathogenesis changes with physiological states such as adulthood, and we utilize an adult female mouse model of RTT for this purpose. We study maternal behavior within these mice, observing how those affected by the MECP2 mutation differ in how they interact with and retrieve pups in a dark environment compared to wild-type mice - the pup retrieval assay.

MECP2-heterozygous mice (SurHet) with Rett Syndrome do not perform the pup retrieval assay efficiently. We spied on our surrogate mice – both with (SurHet) and without (SurWT) the MECP2 mutation – to see the differences in how these mice spend their time. We used Datavyu coding software in each individual video frame (i.e. search, pr-good, ab). Within this poster, I will report on our current findings and speculate on the results. We hope to understand how humans affected by Rett Syndrome may perceive the world around them differently.
Circadian Rhythmicity and Neurodevelopment of disco and grim mutations in Drosophila Melanogaster

The well-known death gene grim has been studied extensively for many years because it is an inducer of apoptosis or programmed cell death. When flies are maturing from embryo, larva, pupa, to adult, their nervous system undergoes drastic changes. During these changes, some of the neurons in the larval stage that are not needed in the adult stage will henceforth undergo apoptosis. Although much is known about grim, much less is known about the effects of grim mutations on locomotor assays or circadian rhythms. The circadian system in adult Drosophila is extensive containing several cell types and associated proteins. The primary neurons we will be concerned with include small ventrolateral neurons (s-LN_v′s) and large ventrolateral neurons (l-LN_v′s) which are recognized as the circadian pacemaker cells in the brain proper. We have observed irregular patterns in the time series of grim^{A6C} mutants showing more prominent morning peaks throughout the free-running period. Alternatively, disco mutants have shown opposing effects with weak rhythmicity during free-running periods. Our goal is to investigate the neurodevelopment of the circadian circuitry and their associated locomotor activities in these drosophila mutations.
The neural circuitry of sweaty palms: a neuroimaging meta-analysis

Sydnie Toler, Derek Wenger
Student’s Department: Interdisciplinary Studies
Faculty Mentor: Allen, Ben

Emotion and cognitive processes often cause autonomic nervous system responses. A common example is when the palms of your hands become sweaty before giving a speech or when a police officer is driving behind you. Increased sweat on the palms is a marker of sympathetic nervous system (SNS) activity. The aim of this study was to identify networks of brain activity that make our palms sweat. We compiled a list of neuroimaging studies that report brain activity associated with palm sweat. Our search resulted in sixteen studies, comprised of 251 participants. We used activation likelihood estimation analysis to determine nonrandom clustering of activation and deactivation of brain regions associated with palm sweat. Using a functional connectivity analysis performed on 1,000 human subjects, we identified the neural networks that encompass these brain regions. We found that palm sweating was associated with activation of brain regions (i.e., insula) in the salience network and deactivation of brain regions (i.e., precuneus) in the default mode network. This pattern of findings is consistent with previous research showing that detection of salient stimuli leads to activation of brain networks associated with focused attention and deactivation of brain networks associated with rest and introspection.
A PilZ Receptor is Essential for Oxygen Sensing in *Azospirillum brasilense*

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The University of Tennessee, Knoxville, TN

Plant growth promoting bacteria that can be inoculated to important crops are possible sustainable alternatives to chemicals fertilizers. *Azospirillum brasilense* is an alphaproteobacterium that is found in the rhizosphere and able to promote the growth of over 100 different plant species, including agriculturally important cereals and grains. Root surface colonization is a prerequisite for the bacterium-mediated plant growth promoting effect. Chemotaxis, the directed movement of motile *A. brasilense* in gradients is essential for plant root colonization and it depends on chemotaxis receptors that specifically recognize chemical cues. In *A. brasilense* the ability to move in gradients of oxygen, or aerotaxis, is a major motility response important for plant root surface colonization. Our lab has identified a PAS domain containing chemotaxis receptor (Tlp26) that is hypothesized to mediate aerotaxis in *A. brasilense*. To determine the role of Tlp26 in aerotaxis in *A. brasilense*, we constructed a deletion mutant and used functional complementation to characterize chemotaxis and aerotaxis. We found that Tlp26 is essential for aerotaxis but dispensable for chemotaxis to various organic acids. Some of our findings suggest Tlp26 is critical for sensing elevated oxygen concentrations in a gradient which is important for the microaerophilic *A. brasilense*. Our ongoing work consists of plant assay colonizations derived from the interaction of A. brasilense with cereal roots to test whether are meaningful interactions in the form of bacterial output.

Discipline: Biochemistry & Cellular and Molecular Biology
Chemotaxis or directed movement in chemical gradients in motile bacteria allow them to navigate toward source of nutrients and away from deleterious chemicals. Bacterial chemotactic behavior depends on the transmission of signals received by specific receptors to flagella motors via signal transduction. *Azospirillum brasilense* is a motile free living chemotactic soil bacterium that promotes growth of plants upon inoculation. *A. brasilense* has several chemotaxis pathways two of which (Che1 and Che4) are well described and required for chemotaxis. Che1 and Che4 pathways control swimming speed and swimming reversals, respectively and thus both contribute to the motility pattern of these bacteria. A unique feature of *A. brasilense* is the ability to fix atmospheric nitrogen and convert it into ammonium through the action of the nitrogenase enzyme. The nitrogenase is sensitive to oxygen and nitrogen fixation is energy-demanding. As a result nitrogenase activity is tightly regulated by oxygen and ammonium. Evidence in the laboratory suggested that some of the components of the chemotactic signal transduction pathways Che1 and Che4 were functionally linked to the regulation of nitrogen fixation. Therefore, we hypothesized that defects in chemotaxis signaling should alter nitrogen sensing and nitrogen fixation. Conversely, defects in nitrogen sensing or nitrogen fixation should impact chemotaxis behaviors. The work presented here tests these hypotheses.
Snow algae are a group of fresh-water species with a wide geographical range. Snow algae, such as *Chlamydomonas sp.* are considered an important primary producer in icy ecosystems; they utilize sunlight to convert CO2 into biomass, while releasing molecular oxygen; this in turn provide substrate for heterotrophic bacteria and fungi that also reside in snow and glaciers. Despite the potential importance of snow algae in glacier ecosystems, much remains poorly understood about their ecology, specifically the potential for symbiotic relationships with heterotrophs. Here we present on the ecophysiology of a *Chlamydomonas sp.* enrichment culture, which was obtained from snowpack near Easton Glacier in Washington State. To evaluate the effect of the heterotrophic microbes on the growth of the snow algae, an enrichment was grown at two different temperatures, 2°C and 10°C, exposed to different treatments of antibiotics and antifungals. Growth was monitored by measuring chlorophyll using a fluorimeter. Algal cells were also counted using a fluorescent microscope. Our preliminary results indicate that bacterial communities induce the growth of the snow algae, whereas, fungal communities reduce growth. Understanding the effect of the different microbial communities on the growth of the snow algae, will improve our understanding of the role of glacier ecosystems on geochemical cycles temperate alpine ecosystems.
Microbial genomes contain combinations of nucleotides that code for genes which subsequently determines the function of the cell. This information provides significant insight into the unique niche of microbes from extreme environments. Here we use two sequencing technologies, the Oxford Nanopore MinION with accompanying software and Illumina HiSeq, to generate a hybrid genome for a *Shewanella* strain isolated from an Antarctic glacier. Bioinformatic programs, *Albacore* and *SPAdes*, allowed us to decrease the time of genome assembly while also obtaining a large quantity of information related to the *Shewanella sp*. Our combined approach yielded a high quality genome assembly 5.3 Mb in length, consisting of 24 scaffolded contigs with an N50 value of 2.8 Mb. The hybrid assembly method allowed for use of higher quality data than older methods to generate the genome sequence. After gene annotation, using *prokka*, we found several genes that inform us on the lifestyle of this isolate including a potentially horizontally transferred *fabf* gene, polar flagellar synthesis pathway, and the QseC-QseB (quorum sensing) two-component regulatory system. Ultimately, we aim to modify our pipeline for remote genome sequencing to extract information from microbial field samples in remote locations allowing us to understand microbial life in environmental conditions.
Toxoplasma gondii (T. gondii) is a protozoan parasite that affects up to 60% of the human population in various locations around the world. Felids serve as the most important host, as they shed the parasite through feces and enable further infection in most warm-blooded animals. While typically asymptomatic, infection in immunocompromised patients and human fetuses has been associated with high morbidity and mortality. Previous studies show a potential link between T. gondii strain type and disease severity in human infection. Currently, T. gondii strains can only be identified by the polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP), which relies on isolation of parasites from human blood or tissue samples to obtain enough DNA for identification. This requirement makes it difficult to identify T. gondii in a clinical setting. The need for a more simple and sensitive method to identify T. gondii may be achieved through serotyping based on polymorphic peptides in genes of genetically diverse T. gondii strains. In this study, we aim to develop a sensitive serotyping method using a highly sensitive plasmonic gold chip multiplex immunoassay to measure antibodies against different T. gondii peptides in serum samples. This method has a wide dynamic range that can detect antibodies with extremely low titer, potentially serving as a method for infection diagnosis and pathogenicity classification. With a goal of development for clinical implementation, this innovative method of testing offers a profound step toward mass-screening for T. gondii infection.
Ammonium and nitrite are toxic metabolic waste products generated by aquatic macroorganisms. They are of particular concern in closed systems, such as commercial aquaria. Typically, biological filtration systems are employed to regulate levels of toxic N species as they are more cost-efficient compared to water removal and replacement. Microbial communities that reside in these systems play vital roles in transformation of toxic N species. Commonly, nitrite and ammonium are converted into nitrate via nitrification. However, even nitrate is toxic at higher concentrations. Bacteria belonging to the phylum Planctomycetes can transform ammonium and nitrite to N\(_2\) via anaerobic ammonium oxidation (anammox). In this study, we are investigating the presence and role of anammox bacteria in multiple tanks at the Tennessee Aquarium in Chattanooga, TN. DNA was extracted from water and filtration systems of four different aquaria. Metagenomic analyses, looking for the presence of genes diagnostic of the anammox reaction, were performed and no known annamox pathway-specific genes were identified. Given the typically low representation of Planctomycetes in microbial communities, a nested PCR approach targeting Planctomycete-specific 16S rRNA genes was used to enrich for and identify organisms capable of anammox. Analysis using this targeted PCR approach is ongoing.
Viruses that infect bacteria (temperate phages) engage in complex interactions with their hosts. These phages can have two life cycles: lytic and lysogenic. For the latter, the phage can integrate its genome into that of its host and harmlessly replicate alongside with it. Conversely, upon induction, these integrated viruses can excise from their host genome and initiate the lytic cycle. A current paradigm is that phage induction is in response to host cell stress. However, in the absence of stressors, a low level of induction in a population occurs. This poorly understood phenomenon is referred to as spontaneous prophage induction (SPI). This project aims to better understand the metabolic response of two bacteria-phage systems. Our lab has isolated a bacterial strain with an integrated phage, termed CB-D. We have generated a derivative strain, CB-A, that shares 85.65% sequence identity with that of CB-D. These two strains show differences in SPI. Our objective is to quantify differences in cellular metabolite and lipid composition between the strains, during growth on glutamate. These data identify significant variations that provide insight into bacteria-virus interactions.
Genetically engineering *E. coli* to degrade toxic contaminants by utilizing dehalogenating mechanisms

The University of Tennessee’s International Genetically Engineered Machine (iGEM) Team is a multidisciplinary organization of undergraduate students dedicated to solving environmental problems through synthetic biology. In 2018, the UT iGEM team decided to develop bioremediation tools for two toxic organic contaminants: dichloroacetate (DCA) and dichloromethane (DCM). Both of these compounds are chlorinated industrial contaminants that are prevalent in groundwater systems. To address widespread DCA contamination, a dehalogenating enzyme known as haloacid dehalogenase (HADase) was genetically engineered into *E. coli*. A variety of HADase genes were identified using both NCBI and KEGG databases. Two unique HADase genes were successfully engineered into *E. coli*, displaying active DCA-degradation. Additionally, widespread DCM contamination was addressed by developing a potential biosensor for DCM-identification within environmental samples. By utilizing a widespread gene cassette within dehalogenating microorganisms, a model for a DCM biosensor was established. Through the addition of HADase genes capable of breaking down DCA as well as the development of a DCM biosensor, we are generating biological organisms capable of cleaning industrial contamination.
Genes in estuarine sediment microorganisms that relate to the metabolism of sulfonates and sulfate esters

Maryn F. Miles, Taylor Royalty, Andrew D. Steen

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Estuarine and deltaic sediments account for roughly 40% of marine organic carbon sequestration. In anoxic sediments, microorganisms oxidize organic carbon to CO₂ using a range of electron acceptors, of these electron acceptors sulfate is quantitatively the most important. There are also large quantities of sulfonates and sulfate esters, which are oxidized forms of sulfur, produced in large quantities in marine plants and certain algae. It is possible that heterotrophic microbes could use these forms of oxidized sulfur as an electron acceptor in the place of sulfur. To better understand this possibility, we examine genomes of microorganisms in anoxic sediments from an estuary in coastal North Carolina for genes related to the metabolism of sulfonates and sulfate esters. We have identified genes in pathways for degradation of sulfoquinovose diacylglycerol, an abundant sulfonate-containing sulfolipids, and carrageenan, a sulfate-ester containing polysaccharide. To identify what organisms in estuarine sediments are capable of carrying out this biodegradation process, we performed BLAST searches of a metagenomic database of the White Oak River estuary in coastal North Carolina. We then use SignalP to determine whether these enzymes are secreted or remain within bacterial cytoplasm. If it is present in many of the organisms that are present in the White Oak River Estuary sediments, this could be an important new aspect of the sulfur and carbon cycles of estuarine sediments.
Kishen M. Patel

Shiga-toxin producing *Escherichia coli* (STEC) is a class of foodborne pathogens causing human infection due to their ability to asymptotically reside in cattle and subsequently transmit to meat. Once consumed, STEC colonizes the large intestine of humans and expresses Shiga-toxin, a protein known to inhibit protein synthesis and cause apoptosis of epithelial cells. This can lead to the development of hemolytic uremic syndrome (HUS). Urgency to identify new therapies able to treat frequent human infections from STEC serogroups O157:H7, O26, O45, O103, O111, and O145 without promoting Shiga toxin production is increasing. The recent re-emergence of phage therapy suggests a potential treatment for infectious disease. We isolated virus from multiple agricultural and environmental sources. *Escherichia* phage were then amplified, isolated, and purified from *E. coli* host cultures and subjected to aerobic and microaerobic dose-response assays to identify the most potent phage. Of these trials, 8 phage specific to O111 were found and imaged using transmission electron microscopy. Lactate dehydrogenase assays may reveal the phage induce less Shiga-toxin production than antibiotics such as mitomycin C. These results indicate phage can be readily isolated from the environment and that they may provide a specific, antibiotic-free method for reducing *Escherichia* colonization of hosts.
Human Cytomegalovirus (HCMV) is a ubiquitous beta-herpesvirus that can cause severe disease in immunocompromised individuals, such as AIDS patients and organ transplant recipients. It is also the leading cause of congenital infections resulting in gradual ear and vision loss and mental retardation. The current antiviral vaccines are toxic to human cells and are at risk for antiviral resistance. A better understanding of CMV’s dissemination process, viral genes involved, and the host response can potentially lead to a new effective, vaccine target. Currently, the proposed dissemination model suggests CMV specifically recruits innate immune cells to the infection site by expressing its own viral chemokines. Once the innate cells arrive at the infection site, they become infected by the virus, and aid in the dissemination of CMV throughout the body. The objective is to study the HCMV chemokine vCXCL-1’s mechanism in a mouse model to determine impact on HCMV’s dissemination. A recombinant mouse cytomegalovirus strain expressing vCXCL1 from the HCMV Toledo strain was made and transformed into two bacterial strains of Escherichia coli using CRISPR/Cas9 technology. Initially, Galk (galactokinase) is inserted into the viral genome housed within a strain of E. coli deficient for Galk. This allows for rapid screening of mutants based upon ability to utilize galactose on galactose medium plates and confirming on MacConkey Agar plates. Then, once confirmed, the CRISPR/Cas9 system will make a double stranded break in the Galk gene to facilitate homologous recombination of the Toledo vCXCL-1 gene into the mouse strain. Screening is done in this stage as well, to confirm successful recombination. This recombinant virus can now be used in further experimentation by infecting mice for further research on HCMV dissemination and the role of the expressed human chemokines in this process.
Abstract

Campylobacter jejuni, a major cause of gastroenteritis, is considered a serious threat due to its antibiotic resistance. Consequently, it is important to understand the mechanism of disease as a potential target for future treatments. One such example is the acquisition of iron which is often limited in its free form in a host but can be found in compounds such as heme or hemoglobin as sole iron sources. The hypothesized outer membrane receptor protein, ChuA, has been previously identified as essential for C. jejuni growth in the sole presence of heme or hemoglobin. The receptor region of ChuA has been identified using MiST. This region of the gene was transformed and expressed in E. coli JM109. Protein expression was subsequently induced using IPTG. The protein was demonstrated to be insoluble in lysis buffer containing sodium phosphate, sodium chloride, and imidazole. We aim to test a variety of lysis buffers to solubilize ChuA for downstream experiments on protein functionality and ChuA-heme interactions. These experiments will yield greater insight into the mechanisms enabling pathogenic iron acquisition during infection.
Creating a cell line that expresses both CRISPR-Cas9 and control guide RNA.

Chris Tabeling, Joseph Jackson, Trevor Hancock, Dr. Timothy Sparer

Abstract:

Human Cytomegalovirus (HCMV) is a double stranded DNA virus belonging to the beta herpesvirus family. HCMV is present in 50-80% of the adult population, and is spread via bodily fluids such as saliva, urine, and blood. HCMV is asymptomatic in immune competent hosts and establishes a lifelong latency. HCMV causes disease in immunocompromised individuals, such as HIV/AIDS, organ transplant, and cancer patients. Additionally, HCMV is a leading cause of congenital birth defects, such as mental retardation, microcephaly, and hearing loss. Treatments to date have largely been ineffective at preventing successful viral infection. Virus infection begins with successful virus entry into host cells. Heparan sulfate proteoglycans (HSPG) are expressed on the cell surface and HCMV has shown its ability to bind to and enter via HSPG. These glycans provide a target for potential anti-viral therapies. We hope to find the specific features of HSPG that allow virus entry by mutating genes that create and modify HSPGs. To accomplish this mutagenesis, we generate a CRIPSR construct specific to genes that encode or modify HSPGs. These constructs allow the generation of cell lines with modified HSPG that we can infect with virus and measure viral infectivity.
How does elevation affect arbuscular mycorrhizal fungal abundance?

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High-elevation ecosystems are experiencing increasingly rapid climate change. Arbuscular mycorrhizal fungi (AMF) contribute to ecosystem productivity by acquiring limiting nutrients for plants. Therefore, changes in AMF in response to global change may have cascading effects across ecosystems. We collected soil samples from Gothic, Colorado at six elevations along six elevation gradients (2700 - 3700 m) over five weeks in summer 2018. We hypothesized that AMF abundance would increase with elevation due to increasingly cool and wet soils and a delay in the growing season compared to lower elevation sites. To address our hypotheses, we compared AMF abundance to elevation and soil moisture.

The abundance of AMF increased with elevation \( (R^2 = 0.14, P < 0.001) \) and with soil moisture \( (R^2 = 0.16, P < 0.001) \). Soil moisture increased with elevation \( (R^2 = 0.12, P < 0.001) \) possibly due to delayed snowmelt. AMF abundance shifted throughout the growing season. AMF abundance peaked around July 15 after the summer monsoons at low elevation and snow melt at high elevation. These results suggest that shifts in annual snowmelt or monsoons may shift the abundance of AMF in high alpine grasslands, with unknown consequences for plant productivity and ecosystem nutrient cycling.
Intercellular trafficking and communication are essential for maintenance of cell functions within multicellular organisms. Plasmodesmata (PD) are intercellular pores that connect neighboring plant cells. They facilitate the movement of metabolites and small molecules as well as larger signaling macromolecules including protein transcription factors directly between neighboring cells. Plant pathogens, such as Tobacco mosaic virus (TMV), are known to use PD for their intercellular movement. Viruses increase PD trafficking through a process known as gating. It has previously been shown that during viral infection, gating results in increased intercellular movement of small fluorescent dyes and proteins. The influence of gating on the trafficking of mobile endogenous plant proteins has not yet been investigated. We hypothesize that trafficking of these signaling proteins will be affected differently than the freely diffusing exogenous molecules from previous experiments. *SHOOTMERISTEMLESS* (*STM*) is a plant encoded transcription factor that moves between cells via PD. N- or C-terminal mRFP fusions to STM were generated and localized to the cytoplasm and nucleus when transiently expressed in *Nicotiana benthamiana* leaves. Using confocal microscopy, we are investigating the effect of TMV infection on the intercellular movement of these STM fusion proteins. These results will provide valuable information on the dynamic nature of PD cell signaling and determine if gating alters the trafficking of plant signaling molecules, illuminating how virus infection causes symptoms in host plants.
Analysis of *dClk* and *Gong* mutants for longevity, circadian locomotive rhythm, and neurodegeneration in *Drosophila Melanogaster*.

**Faculty Members**
Dr. Jae H. Park

**Department**
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**College**
Arts and Sciences

**Year**
2019

**Abstract**
*Clok (Clk)* is one of the most important genes for regulation of circadian rhythm in both vertebrates and insects. Interestingly we also found that a *Drosophila Clk* mutation, *dClk*<sup>jrK</sup>, showed significantly shorter life span. Secondly *Gongpo (Gong)* involved in the PS biosynthesis pathway similarly showed significantly reduced longevity as *dClk* mutants as well as age dependent neurodegeneration. We want to further test if *Gong* mutants have any defect in circadian locomotive rhythm and *dClkj*<sup>rK</sup> mutants in neurodegeneration.
The Role of HIPP1 in Genome function
Nastasya Davenport, Emily Stow, Mariano Labrador

Insulator protein complexes play an important role in chromosome structure and gene expression. Through recruitment of partner proteins and modifications of core components, insulator proteins have a variety of roles which include forming boundaries between regions of gene expression and repression, blocking communication between enhancers and target promoters, and facilitating contacts between distal genomic sites. Heterochromatin Insulator Partner Protein 1 (HIPP1) is a recently discovered partner protein of the Drosophila insulator complex Suppressor of Hairy wing (SuHw), and it remains unknown how HIPP1 contributes to genome function and to the function of this complex. HIPP1 is homologous to the human CDYL protein which is known to facilitate DNA damage repair by silencing gene transcription at damaged sites. By studying Drosophila mutant for HIPP1, we find a conserved function between the CDYL and HIPP1 proteins in DNA damage repair. We tested the ability of wild-type and HIPP1 mutant larval brains to recover from DNA damage by quantifying the number of chromosome aberrations present following recovery from X-ray treatment. This quantification revealed that HIPP1 mutants contain a significantly higher number of chromosome aberrations when compared to wild-type, suggesting that HIPP1 is important for DNA damage repair. We also found novel roles for HIPP1 in association with the Su(Hw) insulator complex. Through phenotypic analysis of Drosophila overexpressing HIPP1 or Su(Hw), we observe that overexpressing either HIPP1 or Su(Hw) has a severe effect on cell proliferation. These results confirm HIPP1’s role in DNA damage repair and its homology to CDYL in humans as well as provide evidence for a role of HIPP1 and the Su(Hw) insulator complex in cell cycle progression.
Cytolytic Properties of Transmembrane Peptides

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Abstract Transmembrane peptides are under investigation for their therapeutic and disease-causing properties. One toxic peptide secreted by pathogenic *Candida albicans*, termed candidalysin, damages human epithelia by inducing cytolysis in affected cells. Interestingly, a variant candidalysin is associated with decreased *C. albicans* pathogenicity. Here we used a sulforhodamine B leakage assay to measure the level of perturbation to lipid bilayers triggered by variant and wild-type candidalysin. We found that the variant caused less leakage than the wild type, suggesting a reason for reduced pathogenicity. Next, we repeated the leakage assays for a series of rationally designed anticancer peptides, including ATRAM (*acidity-triggered rational membrane peptide*) and TYPE7 (*transmembrane tyrosine kinase peptide for Eph*). Both groups target acidic tumors by inserting into plasma membranes as a transmembrane alpha-helix under a threshold pH. We investigated whether membrane perturbations might occur in noncancerous cells by comparing leakage at low and neutral pH. We found that TYPE7 and ATRAM peptides showed varying levels of pH responsiveness in terms of leakage, although adding a negatively charged phospholipid caused a marked decrease in leakage for the ATRAM peptides. These results demonstrate how leakage assays can quantify the amount of membrane perturbation induced by peptides under a variety of conditions.
Many marine microorganisms excrete enzymes into the external environment, which break down organic matter into smaller, simpler molecules that can then be taken up across the microorganism’s membrane. By looking for signal peptide sequences in genes for hydrolytic enzymes, we can identify which enzymes are secreted. We hypothesize that these genes are more diverse and more frequently horizontally transferred than comparable non-secreted enzymes. To test this, we took genomes from cultured organisms from the NCBI Reference Sequence database of well-annotated genomes, and analyzed which enzymes were extracellular, measured their tetranucleotide frequencies, and compared it to the rest of the cultured genome. Then we took environmental metagenomes from the TARA ocean dataset, measured the tetranucleotide frequencies and compared it to the cultured organism. By doing this we can obtain a dN/dS ratio that gives evidence of whether or not these extracellular enzymes undergo positive selection.
Plants encounter severe low oxygen (hypoxia) stress under conditions of submergence or poor soil aeration, which results in a cellular energy crisis. Plants adapt to hypoxia by preventing translation of non-essential proteins, and by upregulating protein and RNA degradation to conserve energy. *Arabidopsis thaliana* CALMODULIN LIKE 38 (CML38) is a calcium sensor protein, and corresponds to one of 49 core hypoxia genes. Compared to wild-type plants, CML38 knockout plants show decreased survival after hypoxia challenge, suggesting CML38 has a critical role in cell homeostasis during hypoxia. Autophagy, a conserved pathway for delivering unwanted proteins or RNA to the vacuole for degradation and recycling, is upregulated during hypoxia. Based on current work in our lab, I hypothesize that CML38 is degraded via autophagy during hypoxia and recovery. I have been characterizing CML38 protein accumulation using CML38-EYFP plant lines and fluorescent microscopy during hypoxia, and CML38 autophagy-regulated degradation using two autophagy pathway inhibitors. Additionally, I have been characterizing autophagy during long-term hypoxia using the autophagy marker ATG8e-GFP, allowing real-time observation of hypoxia-regulated autophagy. This research will help advance our understanding of CML38’s role during hypoxia and how autophagy regulates cellular CML38 protein levels.
How is Rho1 activation mediated at the division site?

Emma Koory

Cytokinesis is the final step of cell division, and cells with cytokinetic defects can become cancerous. We are interested in researching the mechanisms that regulate cell cytokinesis, using *S. pombe* as a model organism. Two cytokinetic regulatory proteins, the small Rho-family GTPases Rho1 and Cdc42 in *S. pombe*, participate in and have distinct roles in cytokinesis. Both Rho1 and Cdc42 are activated by specific guanine nucleotide exchange factors (GEFs), Rgf3 and Gef1, respectively. The mechanisms of Rho1 activation and regulation at the division site are poorly understood. We find that Rho1 activation is mediated by Gef1. In both WT and *gef1*Δ cells, Rgf3 localizes to the division site at approximately the same time, in early anaphase A in conjunction with the completion of actomyosin contractile ring assembly. Surprisingly, in WT, Rho1 is activated much later than in *gef1*Δ cells, around the onset of ring constriction. In *gef1*Δ cells, Rho1 is activated shortly after Rgf3 localizes to the division site, which suggests that Gef1 inhibits Rgf3-mediated Rho1 activation by an unknown mechanism. Current research is focused on how Gef1 inhibits Rho1 activation and the significance of this inhibition.
The inhibition of programmed cell death is a factor believed to be responsible for the survival of cancer cells. Using *Drosophila* as models, factors contributing to the process of programmed cell death can be studied. Neurons die throughout *Drosophila virilis* development to allow the addition of new neurons. The groups of neurons programmed to die are Death Class I neurons, Death Class II neurons, and Death Class III neurons. Ecdysone is a hormone responsible for the timing of programmed cell death (PCD) in the Death Class neurons. Elevated levels of ecdysone are associated with the initiation of PCD of Death Class I and II neurons. In order to determine how ecdysone levels are related to PCD of Death Class III neurons, the receptor of the ecdysone hormone (ECRA) was inhibited by mutation of the gene that codes for the receptor and microRNA degradation. Results were determined by imaging ECRA mutants and control with Casor (Caspase Sensor), a gal-4 driver that codes for a peptide designed to highlight cell death under fluorescent light. Flies with ECRA inhibited showed premature cell death compared to control that had no ECRA inhibition, suggesting that ecdysone is responsible for inhibiting the PCD of Death Class III neurons.
Title: Extracellular enzyme activity from hot springs in Central America
For submission to EURECA 2019

Andrew Lonergan¹, Katherine Fullerton², Karen G. Lloyd², Andrew D. Steen¹

University of Tennessee Departments of ¹Earth and Planetary Sciences and ²Microbiology

Abstract: Microbes found in subsurface water and sediment play an important role in biogeochemical cycling. Heterotrophic microbes require extracellular enzymes to cleave bonds of macromolecules, in order to take up and ultimately metabolize organic carbon and nutrients. Geothermal features are characterized by a wide range of temperatures, pH, and other geochemical parameters, and can add to our understanding of microbial effects on fluxes in the carbon cycle. Here we perform enzyme assays to examine microbes from various hot springs in southern Costa Rica and northern Panama and their enzymatic activity on different substrates. Using temperatures similar to that of the hot springs (20-60°C), we use fluorogenic substrate proxies to assay the potential activities of diverse extracellular enzymes in multiple hydrothermal springs. We will compare extracellular enzyme activities to 16S libraries and metagenomes from the same sites to better understand microbial degradation of polymeric material in these geothermal environments.
Mutations in the Insulator Protein Suppressor of Hairy Wing Induce Genome Instability

Andrea A. Mancheno Lopez, Shannon R. Stroud, James R. Simmons, and Mariano Labrador

Chromatin insulator proteins are a type of regulatory element that facilitates long-range contacts between regulatory sequences and distant promoters throughout the genome. Insulators block interactions between enhancers and promoters as well as serve as barriers between heterochromatin and euchromatin. The Drosophila insulator protein, Suppressor of Hairy wing [Su(Hw)], is a DNA-binding protein that is required for gypsy insulator function and female germline development. Mutations in the su(Hw) gene are viable, which provides the opportunity to study insulator functions. We prepared Drosophila larval brain squashes and chromosomes were then scored for the presence of chromosomal aberrations (CABs). This assay revealed a significant increase in average ratio of cells per brain that contain CABs in the su(Hw) mutant background in comparison to the wild type strain, Oregon R (OR). Similar observations were made in brains from trans-heterozygous su(Hw)v/e04061 mutant genotype; this line also exhibits a high frequency of lagging chromosomes during anaphase. These observations suggest that su(Hw) plays a critical role in maintaining genome integrity in dividing somatic cells.
Samantha McIntire

Arabidopsis thaliana *NIP2;1*: Role in the Genetic Response and Effects on Metabolic Activity Under Hypoxic Stress

*NIPs* are nodulin-intrinsic proteins that are specific to plants and involved in transport of water and other uncharged solutes. *Arabidopsis thaliana* consists of nine *NIP* genes.

In the current study, attention has been focused on *AtNIP2;1* (*NIP* subgroup I), one of the representative Arabidopsis *NIPs*, in accordance with its cellular and subcellular localization, tissue, transport activity, and biological roles in Arabidopsis.

It has been shown in experiments that *AtNIP2;1* is especially responsive to hypoxia-induced stress. Hypoxia is a condition in which most of the oxygen has been removed from an environment. In hypoxic environments, plants construct a specific mechanism to cooperate with hypoxic conditions, such as increasing glycolytic flux to provide ATP, increase of fermentation metabolism, and induction of morphological and developmental changes. A functional analysis of *AtNIP2;1* has shown that *AtNIP2;1* transports lactic acid, and may play a role in adaptation to fermentation of lactic acid under anaerobic stress.

In this study, it is shown that the presence/absence of *NIP2;1* plays a role in the plant’s genetic response to low oxygen stress. Specifically, this study examined the abundance of glycolytic/fermentation enzymes as well as other core hypoxia response genes using reverse transcription-quantitative polymerase chain reaction (RT-qPCR) for hypoxic wild-type and *NIP2;1* plants.
Plasmodesmata (PD) are pores that connect two adjacent plant cells and allow the direct communication from one cell to another. This connection is essential for plant growth and development, yet their regulation is not well understood. The *Arabidopsis thaliana ise2* mutant has defective PD mediated trafficking. Microarray gene analysis identified defects in secondary metabolism in *ise2* mutant plants. Preliminary data suggest mutants with defects in secondary metabolism (e.g. *tgg1*) also exhibit defects in intercellular trafficking via PD. Additionally, the myrosinase TGG2 was found to interact with ISE2 in pulldown experiments. A yeast-two-hybrid assay will be used to verify the protein-protein interaction previously observed and to identify the protein domains involved in the interaction. We hypothesize that the interaction will be confirmed in the yeast-two-hybrid system. Bate and prey constructs were generated using traditional restriction enzyme cloning. In the initial cloning, we have generated one of the four constructs necessary for this project. Once the four constructs are made, we will be able to use them in combination with the ISE2 constructs already made to determine interaction. The interaction is observed by growth and the expression of varying reporter genes. Future studies will help elucidate the specific role of this interaction and its effect on plasmodesmata mediated trafficking.
The effect of osmolytes on ligand binding to dihydropteroate synthase
Ojee Sharma, Deepika Nambiar, Michael Duff, Elizabeth Howell

Folic Acid helps synthesize amino acids and nucleotides. Osmolytes are compounds that maintain the cell’s volume and fluid balance during osmotic stress. Previous studies have shown that osmolytes weakly interact with folate which shifts the equilibrium to the free enzyme and ligand. Osmometry studies have shown that weak interactions of the ligand are dependent on type of osmolyte. For example, trehalose interacts with phosphate groups whereas betaine excludes it.

To analyze the effects of trehalose and betaine on ligands containing phosphate groups, we looked at dihydropteroate synthase (DHPS), an enzyme of the folic acid synthesis pathway. DHPS uses 6-hydroxymethyl-7, 8-dihydropterin pyrophosphate (DHPP) and para-aminobenzoic acid (pABA) to form dihydropteroate and pyrophosphate.

Isothermal titration calorimetry studies show that pteridine pyrophosphate (PtPP) weakly interacts with DHPS in the presence of trehalose whereas PtPP binds more tightly to DHPS in the presence of betaine. When studying pABA, tighter binding of pABA to DHPS was observed while a weaker binding of pABA occurred in the presence of betaine. Trehalose also tightened sulfa drug binding to DHPS whereas betaine weakened it. These results indicate weak interactions can disrupt drug binding to macromolecules. In conclusion, weak interactions influence the behavior of macromolecules.
Cytokinesis is the final step in cell division, where a cell separates into two daughter cells. Cytokinesis involves many steps that must be organized in a spatiotemporal manner. In many eukaryotes, it involves the assembly and constriction of an actomyosin ring. The fission yeast *Schizosaccharomyces pombe* serves as a good model system to study cytokinesis because they divide via actomyosin-dependent-cytokinesis.

The Rho-family of small GTPases are molecules involved in the regulation of cell growth and division. The GTPase Cdc42 helps promote timely onset of ring constriction and septum formation in fission yeast. Studies with many other organisms show that Cdc42 must also be inactivated at certain points during cell division for proper cytokinesis. Cells lacking *rga4* and *rga6*, the GAPs that inactive Cdc42, exhibit delayed cell separation, due to overactive Cdc42.

We find that the GAP mutants display membrane remodeling defects during cell abscission. Cdc42 is likely involved in the regulation of membrane trafficking. Indeed, fimbrin, an endocytosis marker displays abnormal localization in the GAP mutant. This suggests that there is an endocytic defect in cells lacking both *rga4* and *rga6*. Future directions will investigate how membrane remodeling defects impair cytokinesis.
Equation of State Dependence of the Observable Properties of Turbulence-aided Neutrino-driven Core-collapse Supernovae

Brandon Barker

March 11, 2019

Abstract

In the proto-neutron star formed during a core collapse supernova (CCSN), densities can reach several times nuclear density. Due to uncertainties in nuclear physics, there are several different physical models for the equation of state (EOS) at the densities present in the CCSN environment. The outcomes of CCSN simulations can depend sensitively on the EOS. 1D CCSN simulations are key in predictions of the outcome of stellar evolution, neutron star mass distribution, nucleosynthesis, and ultimately, galactic evolution. However, uncertainties in nuclear physics causes changes in these results: simulations using different EOS tables can lead to entirely different predictions. We explore the sensitivity of CCSNe to variations in input nuclear physics. Using 10 different EOS models, we ran 1D CCSN simulations with progenitor masses ranging from $9\,\text{M}_\odot$ to $120\,\text{M}_\odot$ using a new model for driving 1D explosions that includes the crucial effects of turbulence and convection. We found that the neutrino and gravitational wave signals depend sensitively on the EOS. A quantitative understanding of how different EOS tables affect the outcome of core collapse is crucial to our ability to make predictions.
Purines consist of a pyrimidine ring fused to an imidazole ring and include important chemicals such as adenine, caffeine, and guanine. Molecular properties of purines include π-stacking, hydrogen bonding, and donor-acceptor ability. Purines have been studied for use in molecular electronics, emitters, chromophores, sensors, and templates for nanomaterials. My research focuses on the relationship of molecular design and the resulting properties for polymers synthesized containing the purine scaffold in the main chain. This synthesis uses cross-coupling polymerizations to form fully conjugated polymers. Purines have four sites for synthetic modification, which allows different monomer systems to be analyzed for use in fully conjugated polymers. Current work has given rise to the first example of a fully conjugated poly(purine), but efforts to make multiple polymers is hindered due to poor solubility. To characterize poly(purine)s, ¹H NMR and ¹³C NMR spectroscopy, along with UV-Vis spectroscopy, electrochemical methods, fluorescence tests, and size exclusion chromatography, are used to analyze the chemical and electrical properties. Through this research, a better understanding of the fundamental building blocks of purines and corresponding polymers can be obtained.
The role of transition metal-mediated oxidation of alkanes has proven to be one of the greater challenges in various branches of chemistry. Consequently, the elucidation of the mechanistic aspects that lead to the catalytic conversion of methane to methanol has received considerable attention. This is primarily due to the fact that nearly 40 million metric tons of methanol processed each year are converted into everyday products ranging from fuels to shampoos. Since current industrialized processes are unable to efficiently convert methane to methanol, the role of metal oxides as thermodynamically favorable, direct catalytic systems is currently being investigated.

The focus of our research is on the description of chemical systems relevant to small molecule activation through computational electronic structure theory methods. Our goal is to understand the mechanisms of transition metal complexes relevant to green chemistry. Iron(IV)-oxo complexes are of interest to our group due to their ability to undergo a catalytic cycle in which a hydrogen is abstracted from methane, affording methanol as a product. In this study, the $\sigma$- and $\pi$-pathways of high-valent iron(IV)-oxo complexes capable of functionalizing aliphatic bonds are elucidated through the use of high-level wave function theory methods including CASSCF and CASPT2 as well as density functional theory (DFT).
High carbon emissions have shown a strongly correlated trend with rising global temperatures as the world’s climate undergoes a dramatic shift. Work to mitigate the potential damage using methods such as metal organic frameworks (MOFs), covalent organic frameworks (COFs) and polymer membranes have proven successful in large scale approaches; however, research is still being performed to enhance the capabilities of these materials to be used in an industrial scale. One area which could lead to the improvement of these methods is the discovery of functionalized species with a greater interaction strength for CO$_2$ which additionally selectively bind CO$_2$ over other gas molecules. Calixarenes, named after their resemblance to a chalice, are promising candidates for use in gas separations due to their large basket shape which allows for the possibility to bind multiple CO$_2$ molecules per site. In this study, density functional theory (DFT) calculations were performed on various functionalized calixarene molecules to explore their interactions with CO$_2$ and determine their viability for this type of separation. Conclusions from this study can aid in guiding synthetic efforts for materials incorporating these functionalized materials.
Adam Johnston

My research outlines the creation of a 3-dimensional array which models the magnetic field from a wire apparatus consisting of two perpendicular Helmholtz coils sets and a set of current carrying loops running the length of a beam line which will be used in the search for mirror matter at High Flux Isotope Reactor (HFIR) at Oak Ridge National Laboratory (ORNL). The goal of the research is to model the most uniform field possible for the maximum fiducial volume around the beam line which is at the center of a large vacuum tube, with the goal of ± 2.5 mG uniformity. The model can be used to calculate the theoretical period of neutron ($n$) to mirror neutron ($n'$) oscillation in experiment at HFIR. Magnetic field affects the energy of neutron, which in turn affects the period of oscillation of the coupled-oscillating system $n \rightarrow n'$. By taking into account the velocity distribution of the beam and the uniformity of the magnetic field the beam will see along the its flight path line we can calculate the probability of $n \rightarrow n'$ oscillation.
Poster #683  
Student(s): Kevin Kleiner  
Faculty Mentor: Dygert, Nick  
Project Title: Modeling Solid-Liquid Interface Reactions with Next Generation Quantum Molecular Dynamics

Primary Author from UTK:  
Kevin Kleiner

Abstract: In the realm of computational materials chemistry and physics, next-generation quantum-based molecular dynamics (QMD) simulations have the potential to accurately model electron transfer reactions occurring on solid-liquid interfaces. An open problem in hydrogen fuel cell research is identifying non-Pt catalytic materials to assist with O₂ reduction into H₂O at the cathode. QMD is applied to simulate this reaction at an interface of a nitrogen-doped graphene sheet and water. To remove the overhead of completely relaxing the system’s electronic structure after each time step, the electronic structure is updated dynamically while constrained by a harmonic oscillator pre-conditioner about equilibrium. By including a rank-1 updated Kernel term in this method, pre-QMD electronic relaxation is more efficient and energy conservation is improved. Preliminary charge transfer analysis reveals this Kernel-based QMD can accurately capture the O₂ bond breaking, which is the precursor for catalyzed O₂ reduction when H⁺ is included in this system.
Abstract Title: Computational studies of alkanol reaction pathways on a SrTiO$_3$ perovskite surface

Authors: K. Reid Mason, Robert C. Chapleski Jr., Sharani Roy

Abstract:

In an effort to understand the role of charge transfer and electron donation from an alkyl group on reaction pathway selectivity, Density Functional Theory (DFT) calculations were used to explore proton transfer and selectivity of subsequent competing dehydration and dehydrogenation pathways for various alkanols adsorbed on SrTiO$_3$(001).

Geometry optimization calculations are used to determine adsorption energies on the SrTiO$_3$(001) surface for each alkanol prior to and following the initial transfer of the hydroxyl proton to the surface. The energies of these states can then be compared to evaluate the roles of adsorbate structure and size of the electron-donating alkyl group on protonation upon adsorption, and thus on subsequent dehydrogenation/dehydration steps.

Following optimization, vibrational frequency calculations verify that each optimized alkanol structure on the surface indeed corresponds to a minimum value on the potential energy surface. These theoretical spectra, as well as rate and equilibrium constants resulting from adsorption energies, and molecular geometries of adsorbed species, are then compared to vibrational sum-frequency generation spectroscopy results for experimental systems as performed by our collaborator, Dr. Benjamin Doughty at ORNL.

Not only do our results highlight the role of electron donation by the alkyl group on reaction pathway selectivity but they also are a part of a larger effort to elucidate the role of a pre-reaction geometry on conversion selectivity of alkanols on catalytic perovskite surfaces.
Using ATRAN Telluric Correction to Investigate the 3µm Feature on Asteroids

Lucas McClure¹, Dr. Sean Lindsay¹, Dr. Joshua Emery¹, Dr. Andy Rivkin²

University of Tennessee—Knoxville¹, Johns Hopkins University Applied Physics Laboratory²

Small-bodies of the Solar System, such as asteroids, provide an abundant amount of information about planetary formation and evolution. In particular, the characterization of asteroids is vital to understanding the distribution and abundance water throughout the Solar System. Recent findings in asteroid spectroscopy have provided evidence for the surface presence of water-ice and hydroxide, likely due to silicates on asteroid surfaces interacting with H⁺ ions from the solar wind. To investigate surface hydration, astronomers analyze the 3µm region, where an absorption feature is exhibited. Atmospheric water, however, affects the quality of the data around this particular region, but a significant portion of the feature can be recovered by telluric correction routines, such as ATRAN. Here, ATRAN telluric correction code is employed to finalize spectra of 11 asteroids and 1 Jovian moon, some of which have been previously evidenced to show signs of hydration, and the results are presented to highlight particular aspects of the routine.
Abstract:
Turbulent fluid flow is an incredibly unpredictable subject that continues to confound scientists and engineers. All of the empirical data that has been the basis of conventional turbulent computational fluid dynamics (CFD) models for decades only extends to roughly the equivalent turbulence created when Michael Phelps swims in a pool. The problem is that this data is then extrapolated out many orders of magnitude in order to design cruise ships, airplanes, and rockets which operate in significantly more turbulent flow regimes. This creates an incredible degree of uncertainty in the design process that demands over-engineering and increased expenditures.

The development of a new technique that allows scientists to capture high resolution flow data for extremely turbulent conditions as a function of three-dimensional space and time could revolutionize the aerospace industry. A proof of principle experiment has been developed that utilizes the unique properties of superfluid cryogenic helium and metastable helium-2 excimers to directly image turbulent flow on the scale of tens of microns. By scaling this technique up, a new generation of turbulent flow models will be created for the modern age.
Dmantle xenoliths collected from the San Quintin and Mojave volcanic fields exhibit deformation-induced foliation textures. This study focused on constraining the deformation conditions and deformation history of the xenoliths using their major element geochemistry. Elemental analysis confirmed the existence of Cr-Spinel, Olivine, Orthopyroxene and Clinopyroxene in the lamellar fabric of the samples. Chemical analysis by electron microprobe and scanning electron microscopy quantified major element abundances in the minerals, which were used to calculate geothermometric temperatures recorded by the samples. The geothermometers record temperatures of ~900-1000° C. Tectonic reconstructions suggest southwestern North America experienced a flat slab subduction event in the late Cretaceous to early Tertiary that deformed the mantle lithosphere causing metasomatism and lithospheric duplexing. Eventual removal of the Farallon slab resulted in adiabatic melting and upwelling of the underlying Mojave asthenosphere [1]. Our xenoliths preserve deformation textures consistent with this complex tectonic history. However, agreement of temperatures from slow and fast resetting thermometers suggests the San Quintin and Mojave xenoliths come from an environment that was thermally stable in the recent past. The stability in the recent past does not explain the deformation seen in the samples, so trace element analysis was performed. Using concentrations of heavier elements, new geothermometers can be used to determine geothermal events further in the past than what initial microprobe analysis could do.

Citation:

[1]

Measurements of neutron beta decay correlation parameters yield a ratio of axial and vector weak couplings as well as test physics beyond the Standard Model. The Nab (Neutron a b) experiment will extract these parameters by coincidence detection of beta decay's protons and electrons, which includes energy and time of flight determination. Because of the experiment's expected high data throughput in the form of digitized waveforms from pixelated silicon detectors, it is important to extract energies and times quickly and reliably. This talk will present results from timing and statistical studies using graphics processor based energy and time extraction.
Because Mars lacks a global magnetic field or protective ozone layer, its surface is unshielded to harsh radiation from space. This ionizing radiation breaks down any organic components in the soil at the martian surface on timescales of tens to hundreds of millions years (10–100 Ma). In planetary geology, we use the density of impact craters as a proxy for time: older surfaces tend to accumulate more craters. Using impact craters, we can assess the exposure age and therefore organic preservation potential of the Martian surface from orbit.

The goal of this ongoing project is to better understand exposure ages and organic preservation potential across Mars by analyzing the size-frequency distribution of impact craters at selected sites across the surface. Specifically, we use JMARS, a GIS program developed by ASU’s Mars Space Flight Facility [Christensen et al., 2009], to examine CTX (Context Camera) images of Mars in a gridded array over Mars so that we can document the density of craters between 100 m and 1 km in diameter, which are the most susceptible to erosion. The data for the collected craters is then analyzed on CraterStats, a crater counting analysis software by the Freie Universität Berlin [Michael, 2013], where we document the transition diameter between erosion and production.

Preliminary results [Thomson, 2018] indicate that at high latitudes greater than about ±45° N and S, fewer small diameter craters are present than at regions closer to the equator, indicating more active erosion. This latitudinal pattern is consistent with other observed surface parameters, such as the depth to diameter ratio of 3-5 km diameter craters [Robbins and Hynek, 2012] and the surface roughness measured in MOLA (Mars Orbital Laser Altimeter) profiles [Kreslavsky and Head, 2000].

References:


Aziridines are both biologically active compounds and useful reagents in organic synthesis. Iron-tetracarbene catalysts have been shown to catalyze the reaction between alkenes and azides to form aziridines. However, current versions of these catalysts either lack stereochemical selectivity or are unreactive with alkyl azides. Furthermore, all current versions produce an inhibitive iron-tetrazene complex. A new, chiral iron-tetracarbene catalyst was proposed, and computationally investigated using density functional theory to map the free-energy pathway of the aziridination reaction between this catalyst, \( p \)-tolyl azide, and several alkenes of varying steric bulk. An important iron-imide intermediate, formed during first step of the reaction, was computed to be more stable than the reactants and less stable than the product aziridines. The undesired iron-tetrazene complex was found to be less stable than both the iron-imide and aziridine, suggesting no competition between tetrazene formation and aziridination. However, the open-chain radical intermediate, formed after the addition of the alkene to the imide, was calculated to be highly unstable, likely making the radical pathway to aziridination energetically inaccessible and the proposed iron-tetracarbene complex catalytically inactive. However, computations revealed the formation of a rare product in which the iron imide isomerizes and inserts between a Fe-C bond of the catalyst.
Abstract

Controlling electric polarization in ferroelectric materials has become a vital basis for the development of modern electronics. By controlling both the magnitude and direction of the electric polarization within a material, one can create an incredibly memory-dense device. In order to control and stabilize this storage, these devices are used in conjunction with magnetism in ferroelectric and dielectric materials. Therefore, measurements of electric polarization under various conditions have become essential in the testing of magnetoelectric materials. This allows for certain ferroelectric to be tested for their consistency and storage capability to determine their potential for use in future electronics devices. Therefore, my research has been focuses on developing and integrating a system to reliably test these different characteristics on thin ferroelectric films. In particular, I have studied the development of a system to measure the piezoelectric materials to tension and the hysteresis measurement of ferroelectrics. We have studied these properties in the past, but the goal of this experiment is to automate and optimize the process in order to enable the acquisition of more massive and more accurate data. For the materials that exhibit strong memory capabilities, the next step would be to look into integrating them into storage devices.
Tissue, blood, and bone fragments (also known as bioburden) can often dry on surgical tools during or after surgery, making the instruments much more difficult to clean and sterilize. Precleaning surgical instruments is a common procedure currently done manually before the instruments leave the OR. However, current precleaning methods are ineffective, and bioburden can remain on surgical tools during sterilization, causing infection in following surgeries. Over the course of the fall 2018 academic semester, the Technical Biomedical Designer team designed a bioburden precleaning device for use in operating rooms at the University of Tennessee Medical Center. This product will remove bioburden from surgical tools in a timely and efficient manner, preventing dried bioburden from contaminating tools and therefore reducing infection in later surgeries with the same tools. Because the device is quick and easy to use it will also decrease the amount of time nurses spend away from patients during surgery. Using technologies like ultrasonic cleaning and induction heating, the device will quickly clean even the small crevices in orthopedic surgical instruments that are currently difficult to clean and can harbor biological material during the sterilization process. The final design is small, easily transportable, and cheap, making it an appealing and competitive product for hospital use.
One major issue occurring in urban waterways throughout the world is the recurrence of floating garbage, both natural and anthropogenic. This garbage is not only aesthetically displeasing, but it can also be harmful to both humans and aquatic organisms due to the potentially dangerous chemicals and bacteria that result from it. The excess organic garbage can increase the biochemical oxygen demand in the water, while the anthropogenic garbage, particularly plastics, can break down into microplastics that may be ingested by fish and other aquatic species. Our project, TRACE, which stands for Trash Removal and Collection Equipment, will work to remove this harmful floating garbage from an urban waterway in Knoxville. This device will be semi-automated and will include an angled boom to concentrate the garbage, a conveyance system to remove the garbage, and a storage component to both drain and store the collected garbage. Sensors will be utilized throughout the system to ensure the equipment functionality during high flow events as well as to alert a city worker when the storage component is full and needs to be emptied. With this system, urban waterways will be able to return to a healthier state and will no longer be a threat to those that want to enjoy them.
Design of a Solar-Powered Non-Thermal Plasma Device for Microbial Disinfection

Students: Cabot Anderson, Jordan Brewer, Calvin Conn, Luke Martin

Mentors: Dr. Philip Ye, David Smith

Abstract

Non-thermal plasma (NTP) generation is a proven method of microbial disinfection used in water treatment, offering a fast acting, highly effective disinfecting mechanism with little waste. An NTP water disinfection system, consisting of a dielectric barrier discharge ozone generator, ozone injection system, and solar-based power supply, is proposed for use in remote areas without a reliable power grid. Ozone, a strong oxidizer generated by NTP, is this design’s main disinfection method. Flow path is designed to achieve the necessary residence time for the ozone to completely disinfect the water. An off-road utility cart is outfitted with necessary attachments to contain the entire system in a portable manner. Functionality and safety are assured through testing, both of plasma generation and water disinfection. Plasma generation is tested using a lab-scale power supply and done through observation of the qualities of the plasma, including homogeneity, smell, and sound. Water disinfection is done via IDEXX E. coli testing. Results of lab testing show high effectiveness of disinfection and efficiency of discharge, suggesting strong potential for device implementation. Overall system components including solar power system, user interface, and system mobility are optimized to increase practicality of the device.
Stormwater Infiltration Enhancement Team

Matthew Johnsen, James Lewis, Christian Patterson, and Ryan Watson

Abstract

Rain gardens concentrate stormwater into a depression populated with water-tolerant plants, where water then gradually infiltrates into the soil, abating erosion. Unfortunately, rain gardens are expensive to install and often clog due to compaction and poor drainage. Excess ponding creates anaerobic conditions, leading to biofilm formation further reducing infiltration rates.

To address the problem, a probe capable of loosening compacted soil through injection of slurries was designed and prototyped. Using pneumatic pressure, the probe was inserted through compacted soil layers to deliver water-biochar slurries. This resulted in fractured subsoil with biochar slurries placed in the crevasses, creating a network of macropores that improved the pore size distribution and increased contact area between the ponded water and compacted subsoil. Moreover, it is stipulated that biochar integration could result in the improvement of subsoil structure, removing pollutants from the infiltrated stormwater.

A completely randomized design experiment is proposed which will compare three treatments: an untreated control, a borehole, and to a fractured biochar-slurry injection. Increases in infiltration between the insertion and the fractured plots will indicate that the fractures had a significant effect, proving this remediation technique could potentially repair failed rain gardens at a significantly lower cost than reconstructing the infrastructure.
The waterphone is a musical instrument that produces sound by resonating the entire body of the instrument. Long thin rods are affixed to a broad basin containing water and are played with a bow or mallet to make the rest of the instrument resonate. The frequency generated with the rods resonates in the basin and then is directed through a central pipe, which doubles as the handle. Movement of water in the basin changes the frequency and amplitude of the vibrations to affect the quality of the sound. This gives the waterphone a characteristic horror/science fiction sound of movies such as Alien and Poltergeist. The resonance is strongly dependent on the material and shape of the resonating body. Changing the processing (heat treatment of the rods), material (stainless steel or copper basins and stainless steel or brass rods), and instrument design (size of the basin) used in the construction of the instrument will have a perceivable effect on the produced sound. By performing analysis on the instruments’ processing-structure-properties-performance relationship, the variables and their effects may be better detailed, and the instrument better understood. Analysis will be done by scanning electron microscopy, electron dispersive spectroscopy, hardness mapping, and waveform analysis and will be used to characterize the instruments. A cost analysis will also be conducted to determine the feasibility of increasing the availability of these uncommon instruments.
The Influence of Heat and Tension on Thin Film Monolithic Polymers and Polymer Laminates

The purpose of our project is to optimize processing parameters associated with labeling consumer product packages. The materials of interest are laminate polymer films (typically bilayer laminates). The process used to label these laminates is known as rotogravure printing, a type of intaglio printing that utilizes a rotary press. During this process, sheets of polymer are pulled under tension through gravure cylinders (where ink is applied) and then into ink-setting ovens. Problems with this process arise because some polymer laminates are different than others, so that processing parameters (heat and tension) need to be modified as packaging requirements change. Currently, new operators of the rotogravure press lack the necessary materials properties knowledge for polymers, which require critical decision making for heat and tension settings, to ensure successful package labeling.

To address these issues, our project aims to characterize the heat and tensile sensitivities of model monolithic polymers (such as polyethylene, PE, and oriented polypropylene, OPP) and the properties of bilayer laminates of these constituent polymers (e.g., OPP/PE). In this presentation, we will present experimental results on polymer behavior under tension (at ambient and elevated temperatures), as well as results of thermal stability measurements (e.g., glass transition and softening temperatures).
Traditionally, gold and silver have been used as plasmonic materials due to their high electrical conductivities and low dielectric losses. Refractory ceramics, such as titanium nitride (TiN) and zirconium nitride (ZrN), combine these electrical properties with an increased melting temperature, allowing them to be used in higher temperature applications. Additionally, the Ti<sub>x</sub>Zr<sub>(1-x)</sub>N ternary system may allow for the tunability of the optical properties, improving their plasmonic qualities. Combinatorial thin film sputtering was utilized to produce a Ti<sub>x</sub>Zr<sub>(1-x)</sub>N thin film gradient to explore refractory plasmonic materials. Thermodynamically, the Ti<sub>x</sub>Zr<sub>(1-x)</sub>N system is immiscible and thus a phase separated alloy is expected. The as-deposited film will be characterized using scanning electron microscopy (SEM), energy dispersive x-ray spectroscopy (EDS), x-ray diffraction (XRD), and spectroscopic ellipsometry. The sample was annealed at a high temperature to enhance crystallization and the as-deposited and annealed film properties will be compared.
Effect of a Humid Environment on Cable Lifespan at Elevated Temperatures

Cable aging, which results in embrittlement and degradation, is a costly problem occurring in the nuclear industry, specifically in light water reactors, and there is still much unknown about how it occurs. These environments with high amounts of humidity are of particular interest due to complications added by the presence of water. These electrical cables are exposed to harsh environmental conditions and elevated temperatures for decades which causes to the polymer shell of the cable to become embrittled, and failure can lead to dangerous and costly consequences. To provide a better understanding for the mechanisms behind cable aging, embrittlement, and other environmental failures, cable insulation made from cross-linked polyethylene (XLP) and ethylene propylene rubber (EPR) were examined. These insulative polymers will be exposed to high and low humidities at elevated temperatures to simulate light water nuclear reactor environments. Samples of new cable insulation were artificially aged in a tube furnace with water vapor to simulate humid environments. Pristine, service simulated, and service exposed samples were analyzed by differential scanning calorimetry (DSC), thermogravimetric analysis (TGA), dielectric testing, Fourier Transform Infrared Spectroscopy (FTIR), and Raman spectroscopy.
Deployment of Strain Gauges for In-situ and Permanent Monitoring of Pressure Experiments

Project Group 4

Alyssa Lindsey, Emma Berry, Andrew Howell, Austin Henson, Sam Trimble, Cody Knight

Pressure cells are a common tool in applying extreme conditions to a test sample though offer no real-time measurement of the pressure applied. Strain gauges allow a method of calculating stress on a material via electrical resistance as a product of strain. Provided the correct selection criteria, strain gauges can measure down to the micro scale and withstand cryogenic temperatures. The proposed project will select a set of gauges and a corresponding adhesive that will be used to compose an active feedback system. This system will be assembled into a bridge circuit and utilize the Control System Studios (CSS) computer interface as a means of communication. The finalized product aims to measure the forces of cryogenically exposed pressure cells as they are in the ORNL spallation neutron source.
Characterization of Microemulsions for Use as a Power-Dense Electrolyte Solution Implemented in Redox Flow Batteries

K. McKensie Nelms

The purpose of this research project is to characterize microemulsions for use as a power-dense electrolyte solution implemented in redox flow batteries. Microemulsions are nanoscale dispersions of water in oil, or oil in water, formed by addition of a surfactant which creates monolayers between them. The microemulsion system Tween®-20/Butanol/Toluene/Water was studied in the absence and presence of the oil-soluble charge carrier, ferrocene. Phase diagrams, conductivity, and cyclic voltammetry were used to characterize the microemulsions systems. Phase diagrams determined the oil-in-water one-phase region, and conductivity tests aided in determining the structure of the microemulsions. The addition of ferrocene in the oil did not cause a significant change in the phase boundaries or conductivities of the system. Cyclic voltammetry results determined that the system is electrochemically reversible at lower surfactant concentrations, but becomes more irreversible as the surfactant concentration is increased. Overall, the Tween®-20/Butanol microemulsion solution has resulted in useful data, and more research on it and other microemulsion systems will be studied in future work.
Ultramicrobacteria (UMB) are a largely uncultured, globally abundant, and metabolically active group of bacteria. UMB have cell diameters ≤0.3μm, cell volumes ≤0.1 μm³, and small streamlined genomes. Recent findings indicate that UMB aid in bioremediation and nutrient cycling, but future investigations and comprehension of current findings are skewed by highly variable nomenclature and a lack of databases for functional, genomic, geochemical, or spatial data specific to candidate UMB. We aim to develop a user-friendly open-access database of various UMB candidates linked to an open-access online map where researchers can gather genomic, spatial, and geochemical data. Our comprehensive review of literature and genomic databases revealed several mis-identified UMB candidates, unique highly-conserved fermentation pathways, and novel membrane proteins. We are actively updating this resource and working to link this database to the K-base bioinformatics platform on the Oak Ridge National Laboratory Supercomputer. This database is one of the first steps towards further investigations of the function, structure, and potential biotechnical applications of UMB.
The bioremediatory capacity of methanotrophic bacteria encompasses a wide range of pollutants due to the high versatility of the methane monooxygenase (MMO) enzyme. This MMO enzyme has been utilized to treat groundwater trichloroethylene (TCE) contamination. While other organisms may also offer a pathway for TCE breakdown, these do not happen at comparable rates. Given that the methanotrophic carbon source – methane – and TCE must compete for MMO substrate sites, there can be antagonistic relationships in between the rate of TCE degradation and the frequency of methane pulsing. The impact of varying time intervals in between methane pulse exchanges on TCE degradation kinetics will be investigated. *Methanosarcina quisquilarum* is a methanotrophic strain which has not received prior characterization of TCE degradation capabilities. A preliminary growth curve study has been conducted to confirm that *M. quisquilarum* can tolerate TCE concentrations up to 200 ppm. Future studies will compare TCE degradation as measured with GC-MS and bacterial population growth across these variable conditions - 24-hour pulse intervals, 48-hour pulse intervals, and 72-hour pulse intervals – to better understand the effect of pulse intervals on TCE bioremediation.
What Microbes are in Recreational and Urban Park Streams in Knoxville?

Thomas Geissberger, Andrew Putt, Sa’ad Abd Ar Rafie, Dominique Joyner, Terry Hazen

There is a lack of accessible data regarding the microbial diversity of Knox County’s surface waters. Sources such as the Environmental Protection Agency, Tennessee Wildlife Resources, Tennessee Department of Water Resources, or Tennessee Department of Environment and Conservation have data on only pathogen and chloroplast indicators. This project aims to measure microbial communities and overall microbial diversity in urban streams of varied water quality. Microbial biomass was extracted from surface water collected at eight publicly accessible urban streams, and from five springs located in Knoxville parks and greenways. High purity DNA was extracted using a Power Soil Extraction kit and sequenced on an Illumina MiSeq. The resulting 16S rRNA sequences were analyzed using the Qiime 2 decentralized microbiome analysis package to identify archaea and bacteria present in the environment. The results identified classes of alpha-, beta- and gamma- Proteobacteria, Actinobacteria, and Chloroplasts as the most abundant bacteria and indicate notable community variation among samples. These data allow us to better understand the functions and structure of microbial surface water communities and to explore the impacts of anthropogenic influence.
Cerebral shunts are commonly used as a standard treatment for patients suffering from life-threatening intracranial pressure (ICP) disorders, particularly congenital hydrocephalus, which is present in roughly 1 per every 1000 newborns [1]. While a cerebral shunt often leads to symptoms of relief and prevents immediate brain damage and death, the failure rate is around 40% within the first two years of initial placement and continued risk thereafter. These failures result in continuous neurosurgeries throughout a patient’s lifetime due to various complications, including the most prevalent, obstruction of the proximal catheter that diverts cerebrospinal fluid (CSF) from the ventricles to the shunt valve [2]. Understanding the dependence of CSF flow on the structure of obstructed catheters is critical to optimize ventricular catheter design. In this work, we present our effort to investigate the influence of different design parameters (catheter depth, inlet hole size, and insertion position) on CSF flow in ventricular catheters. A ventricle that mimics the human ventricle system is first modeled via additive manufacturing. The obtained ventricle is filled with water to represent CSF as the relevant properties of water are similar to those of CSF. A catheter is then placed into the ventricle and the flow rate of water that passes through the catheter is measured. By recording the water flow rate at various depth, inlet hole size, and insertion position of the catheter, we could establish the correlation between the catheter structure and fluid flow rate. This correlation provides the guideline to discover the optimal design parameters of the catheter with desired flow rate.

Thinking About Knowing: Investigating Epistemic Metacognition Among Undergraduate Engineering Students During Self-Directed Study

Lauren Jennings
Kayla Arnsdorff

The goal of this study was to investigate the interactions of mechanical engineering students in a study group using epistemic metacognition as a lens. We sought to understand how the group’s goals with respect to gaining knowledge and understanding (epistemic aims) changed with contextual factors, such as time working on the assignment, group member dynamics, and proximity to the assignment deadline. Additionally, we identified interactions that occurred among group members to characterize how knowledge was constructed and shared in the group. For this work, we wrote ethnographic field notes based on video recorded observations of an organically formed study group with three core members. We then analyzed the field notes to identify hierarchies of knowledge within the core group and how interactions with new group members affected the hierarchy. From this analysis, we identified that as the time spent working on the homework increased, the group’s epistemic aim to understand the concepts decreased. This aim also decreased in the session with a closer assignment deadline compared to the other. The additional members outside of the core students varied between sessions and caused shifts in the ways the group members interacted and viewed each other as knowledge sources.
Abstract for Analyzation of Raw Muscle Data on Goat Hind Limbs

By Becka Klein & Brittani Lopez

One potential application of biomaterials is to improve healing of large tissue defects. To facilitate this application, researchers at the University of Tennessee College of Veterinary Medicine have developed animal models in which large bone defects were created by removing a mid-section of the tibia of goats. To support the limb with the defect, the researchers placed a splint on the limb for sixty days post-surgery, which immobilized the knee joint. However, it was observed that this resulted in significant atrophy of the goat muscles.

In order to obtain a quantitative measure from this data, various muscle architecture measurements were taken from both the affected and unaffected limbs. The gastrocnemius muscles were separated and dissected in order to obtain raw muscle data. Such measurements include muscle length, muscle mass, fiber length, and sarcomere length. These parameters were obtained and utilized to compute optimal muscle length as well as adjusted sarcomere lengths for comparison. This data was contrasted between the unaffected limb and the affected limb. This served to quantify the amount of atrophy experienced by the gastrocnemius muscles. It was found that muscle atrophy caused a decrease in muscle length and mass in the affected muscles. This resulted in shorter fiber lengths and, consequently, a decreased optimal muscle length for maximum force production.

As expected with a decrease in load and alteration to the limb, the loss in muscle mass resulted in decreased fiber and sarcomere lengths. The differences in the gastrocnemius muscles noted are related to the change in relative load that the muscle experienced after alteration. This alteration led to remodeling of the muscle architecture occurring with decreased use, causing a change in respective optimal lengths. Although these differences were not absolute, they represented significant morphological changes that have functional consequences.
Abstract—Children who are deaf or hard of hearing often suffer from low literacy and reading comprehension rates [1]. Over the past 50 years, research had concluded that literacy rates for these children rarely passes a fourth-grade level [2]. However, little research has been done regarding intervention for reading comprehension skill development [3]. Our long-term study seeks to incorporate social robotics and reading comprehension development to provide an option for in-home and in-school reading focused interventions.

This study represents an initial validation of a social robotic system for reading comprehension testing. The study suggests a closed-loop robot can listen and provide feedback on answers to evidence-derived reading comprehension questions. The study also found that the System Usability Scale is a valid tool for accessing the quality of participant interactions with the social robot, however additional testing with age-matched participants is needed to verify the relationship between errors and SUS scores.

Keywords—Social Robotics, Reading Comprehension, System Usability, Deaf or Hard of Hearing
References


ABSTRACT

Hydrocephalus is characterized by the accumulation of cerebrospinal fluid (CSF) in the ventricular system of the brain. This buildup leads to an increased pressure inside the head and can be fatal if left untreated. Hydrocephalus can be caused by many reasons such as obstructions in the flow of CSF in the brain, unsuccessful absorption of CSF on the surface of the brain, and genetic birth defects. Some symptoms of hydrocephalus include learning disabilities, nausea, headaches, head disfigurement, and seizures. It has been estimated that hydrocephalus effects over one million people and 1 in 500 births [1]. The common treatment for patients with hydrocephalus is the insertion of a shunt into the ventricle to pump the excess CSF out of the brain and into other parts of the body where it can be absorbed. This shunt was developed over 50 years ago and is underdeveloped for use in modern medicine. On average, patients with hydrocephalus can expect 2 to 4 surgeries in just the first 10 years after diagnosis due to the failure of this shunt [2]. Research is currently being done to improve the shunt design so that there are minimal complications and failures attributed with them. This research is important, complex, and faces many engineering challenges.

The intention of this research is to investigate obstructions of ventricular catheters. Experimental testing that compares key fluid dynamic properties of ventricular catheters with their corresponding scaled-up models will provide insight into the causes and effects of catheter obstruction. This will be accomplished by a geometric scaling of an on-the-market catheter and pressure differences that mimic intracranial pressures of patients with hydrocephalus. Results from this experiment will be compared with current literature on ventricular catheter flow and obstructions, which is currently lacking. Furthermore, it aims to provide researchers a simple way to test the efficiency of new catheter designs through physical measurement and calculation of flow rates, pressures, and resistances. Results of this experiment are intended to furnish an academic paper submission for publication.

REFERENCES


Fuel cells and electrolyzers are electrochemical energy conversion devices, that can operate in alkaline environment. Anion exchange membrane fuel cells (AEMFCs) use hydrogen gas as the fuel to produce electricity when it is electrochemically combined with oxygen. An electrolyzer uses electricity to separate water in hydrogen fuel and oxygen. While these devices produce clean energy (electricity or hydrogen gas), they are limited by performance losses in alkaline media, in particular, poor hydrogen kinetics for hydrogen oxidation and evolution reactions. High loadings of Platinum, the catalyst typically used for these reactions, are required. Bimetallic platinum-based catalysts have been shown to improve catalytic activity.

Platinum-ruthenium and platinum-nickel have proven to be ideal bifunctional catalysts. The enhanced activity of these catalysts is attributed to their oxyphilicity. Ruthenium and nickel bond with OH\(^-\) groups, freeing up more active sites on platinum to bond with H\(^+\). In this work, platinum-ruthenium and platinum-nickel catalysts were synthesized using a variant of chemical vapor deposition (CVD), known as poor man’s CVD (PMCVD). The PMCVD method produces highly dispersed metal nanoparticles via sublimation of a precursor. The highly dispersed nanoparticles are believed to result in higher catalytic activity due to larger electrochemical surface areas.
The potential use of nanoparticle organic hybrid materials (NOHM) as electrolytes in redox flow batteries is being explored. Redox flow batteries present the advantage of providing large-scale energy storage. The most common active material used is currently Vanadium, which is expensive in a pure form, has a corrosive environment, and decreases battery capacity over time. NOHMs are composite particles formed by polymers grafted (ionically or covalently) onto surface-modified inorganic nanoparticles. Such structure has great potential to capture and carry nonpolar electroactive species. Copper is introduced to evaluate the effect NOHM structures have on metal cation uptake. Both NOHMs considered in this analysis comprise silica cores ionically grafted with polymer tails, polyethyamine for the NOHM-I-PEI and polyetheramine with a sulfonic acid linker for the NOHM-I-HPE. Cyclic voltammetry was used to investigate the electrochemical behavior of the copper species as the concentration of the NOHM of interest increases. NOHM-I-PEI’s continuous peak inhibition trend suggests the formation of the cuprammonium complex. The formation of this complex was also explored via acid-base titration and UV-Vis. NOHM-I-HPE exhibited a shift in the onset potential and a slight peak inhibition. Not reaching a point of complete inhibition in this case suggests the formation of weaker complexes.
Exploring Anti-CRISPR Proteins as Potential Mediators of CRISPR-Cas based Antimicrobials in E. coli

Dylan Chitwood

Abstract

CRISPR-Cas systems act as a bacterial defense mechanism against bacteriophages by destroying the genome of an invading virus. In recent years, CRISPR systems have been employed as programmable genome editing tools. The commonly used Cas9 protein from Streptococcus pyogenes functions by targeting a DNA sequence complementary to the guide RNA (gRNA) and breaking the DNA with a double-strand break (DSB), which either results in cell death or mutation upon repair. Naturally, phages have evolved their own countermeasures. These anti-CRISPR (Acr) proteins were originally found in bacteriophage genomes and inhibit Cas9 by various mechanisms including DNA substrate mimicry. In this study, we aim to utilize Acr proteins as a mechanism to control the activity of a self-targeting Cas9/guide-RNA complex designed to target an essential bacterial gene. We explore this capability by coexpressing the Cas9/guide-RNA and the anti-CRISPR AcrIIA2 on separate plasmids in our model organism, Escherichia coli, using both antibiotic selection and arabinose induction to control AcrIIA2 expression. Three different guide-RNA constructs were used to determine whether target gene choice impacted the inhibition efficacy of AcrIIA2. The results showed that while there was an initial delay in growth, E. coli carrying Cas9/Acr systems are capable of growing to the same optical density as wild-type E. coli. This result suggests that anti-CRISPR proteins can be used to create a controllable antimicrobial system.
EUReCA ABSTRACT

THE EFFICACY OF APPLIED DESIGN THINKING IN A BIOTECHNOLOGY LABORATORY

Often, customization/improvement of laboratory equipment and procedures may be desired by the researcher to elevate the difficulty of obtaining quality results. Design Thinking may provide a function methodology for innovation in this setting. Though Design thinking’s roots can be traced back to John Arnold’s experimental ‘Creative Engineering’ courses at the Massachusetts Institute of Technology, the rationale is not formally taught in the contemporary engineering practice. Similarly, rapid prototyping techniques integral to the methodology, while gaining traction in many curricula, are inadequately promoted as functional skills of the modern engineer, especially in the non-mechanical engineering fields. By leveraging common design thinking strategies such as ‘stakeholder mapping,’ ‘interviewing,’ and ‘walk-a-mile immersion,’ the principles of iteration and prototyping were applied to improve the effectiveness of a biomolecular engineering research team at the University of Tennessee. Main areas of improvement included but are not limited to equipment customization, throughput, and clarity of results. These results suggest that Design Thinking paired with modern prototyping technologies such as CAD, 3D printing, and laser cutting, are useful for the engineer regardless of discipline.
Comprehensive Spectral Analysis of Pyrolysis-MBMS Data Using Statistical Learning and Bioinformatics Approaches

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Pyrolysis-molecular beam mass spectrometry (py-MBMS) is a high-throughput method used for quantifying the relative lignin content and syringyl/guaiacyl ratios in biomass samples. However, resolving some specific compounds in the resulting spectra and understanding some ions specific structural or compositional sources can be challenging. Here, we aim to use statistical and bioinformatics approaches to gain a more comprehensive understanding of the spectral patterns associated with biomass py-MBMS spectra. We demonstrate our approach by analyzing py-MBMS spectral data taken from 492 \textit{Populus trichocarpa} genotypes and by using Spearman’s rank-order correlation and Markov clustering to define clusters of highly-correlated ions. As predicted, we see that ions indicative of the same macromolecules positively correlate and form distinct groupings, even without Markov clustering. Also, ions associated with lignin anti-correlate with the ions associated with carbohydrates, potentially representing the carbon trade-offs within their respective pathways. The resulting ion clusters could further be used as input phenotypes for multivariate genome-wide association studies (GWAS). The results of this study will provide new insight into py-MBMS spectra, allowing for more information to be obtained from high-throughput characterization of biomass samples and ultimately enhancing biofuels and biomaterials research.
I am applying to receive funding to attend the American Institute of Chemical Engineering (AIChE) Annual Student Conference. The conference will be held in Pittsburgh, Pennsylvania during the dates of October 26th - October 29th. This conference is the premier event for chemical engineering students. In addition to presenting the research I’ve work on over the last year at Oak Ridge National Laboratory, I will have the opportunity to attend research presentations from experts in the field and network with representatives from the best graduate programs in the country. This experience is highly important to me, as I will be graduating in May 2019.

The abstract for my poster submission is as follows:

Pyrolysis-molecular beam mass spectrometry (py-MBMS) is a high-throughput method used for quantifying the relative lignin content and syringyl/guaiacyl ratios in biomass samples. However, resolving some specific compounds in the resulting spectra and understanding some ions specific structural or compositional sources can be challenging. Here, we aim to use statistical and bioinformatics approaches to gain a more comprehensive understanding of the spectral patterns associated with biomass py-MBMS spectra. We demonstrate our approach by analyzing py-MBMS spectral data taken from 492 *Populus trichocarpa* genotypes and by using Spearman’s rank-order correlation and Markov clustering to define clusters of highly-correlated ions. As predicted, we see that ions indicative of the same macromolecules positively correlate and form distinct groupings, even without Markov clustering. Also, ions associated with lignin anti-correlate with the ions associated with carbohydrates, potentially representing the carbon trade-offs within their respective pathways. The resulting ion clusters could further be used as input phenotypes for multivariate genome-wide association studies (GWAS). The results of this study will provide new insight into py-MBMS spectra, allowing for more information to be obtained from high-throughput characterization of biomass samples and ultimately enhancing biofuels and biomaterials research.
This project seeks to increase the efficiency of rapid engineering strain design by elucidating the functionality of a modular cell. The modular cell theory insinuates that there exists a baseline cellular framework from which cellular products can be produced by inserting a designed production module into the cell. In this study, recombinant gene cloning techniques were used to design metabolite production modules that focused on increasing the production, titer, and yield of ethanol and lactate within Escherichia coli (E. coli). An auxotrophic chassis cell was created by ModCell2 and multi-objective strain design to determine the genes necessary for deletion. The resulting chassis cell and production modules were combined in a “plug in and out” fashion and then characterized for modularity. The characterization of the modular cell focused on observing a growth coupling phenomenon, characteristic of a modular cell. The growth of the cell was quantified via optical density measurements in a spectrophotometer, and the titer of the desired metabolites were measured using high performance liquid chromatography (HPLC). As a result of this study, it was determined that the modular cells for both ethanol (pHS0238) and lactate (pHS0143) exhibited growth coupling and demonstrated modular potential.
Characterization of Microemulsions as Novel Electrolytes

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Renewable energy sources, such as solar and windmill farms, can produce electricity in a clean manner. However, electricity from these sources is intermittent, requiring energy storage devices. Redox flow batteries (RFBs) can store large amounts of energy, which makes them ideal to work in parallel with renewable energy sources. The most common type of RFB uses vanadium as the energy carrier, but the high cost of vanadium and battery capacity fading has motivated the search for alternatives. In this work, we explore the use of oil-in-water microemulsions as a possible electrolyte for RFBs, taking advantage of the oil phase to introduce nonpolar charge carriers. The microemulsion system studied was tween-20 as the surfactant, butanol as the co-surfactant, toluene as the oil, and water. Ferrocene was introduced as the charge carrier in the oil. When toluene is added, oil microdroplets form and distribute in the solution. The maximum amount of oil the solution can uptake before observing phase separation was at 40 wt.% oil. Cyclic voltammetry was used to determine the ferrocene’s electrochemical reversibility, and to explore mass transport parameters of the microemulsion system, where it was found that the system significantly deviates from reversible behavior at higher concentrations of surfactant.
Within all complex biological processes intricate proteins are expressed to complete every niche and necessary task. Many express multiple allosterically regulated conformational states, with protein function regulated by effector molecules and other ligands. One such protein is the LFA-1 surface integrin protein and its inserted domain, the I-domain. We isolated the I-domain for investigation of determining binding properties and understanding conformational regulations of affinity changes to its target ligand ICAM-1, for further use in chimeric protein switch design. A large change in binding affinity was found through the deletion of a sub-sequence of amino acids in I-domain known as the α7 helix. Our investigation shows that, when the α7 helix is deleted, I-domain converts into a permanent high affinity state in which binding affinity to ICAM-1 was increased, and this state can be reversed by co-expression with soluble α7 helix peptide. These results conclude that the α7 helix stabilizes the I-domain in its low affinity conformation in a ligand-like manner, allowing relaxation to the high affinity conformation upon disruption of α7 helix interaction. While deletion of the α7 helix yields higher binding affinity in I-domain it cannot be applied in design of chimeric protein switches due to its permanent conformational state. Because of this, our switch design has a focus of allosterically regulating the I-domain and α7 helix through utilizing on/off switching of conformational states. I-domain is fused with EF3 and EF4 hands of calmodulin, which then regulates binding affinity to ICAM-1 through interaction with α7 helix, when the EF hands’ natural ligand peptides are present. Currently, mutant switches are being developed to alter EF hand binding specificity which, when bound to new target ligands, will cause an increase in I-domain-ICAM-1 binding affinity in switch molecules. The results of these allosteric regulations highlight the potential of chimeric protein switches for design of environmentally responsive targeting agents and suggest that, through directed evolution, regulated binding to a range of novel targets could be achieved for therapeutic intervention.
Abstract
In the nuclear industry, the development of a Thorium-based reactor system has been a topic of increasing interest. To make this system feasible, a process for isolating significant amounts of Thorium oxide at a high purity level has subsequently stimulated research in the field of chemical engineering. Monazite ore has been selected as the raw material for this process because it has a high composition of Thorium and other rare earth elements (REE) and is available at a low cost. Various process design options were developed to create an economically viable and safe plant design. A base flow rate of 1000 kg/hr of monazite with a 5.4 weight percent of Thorium was assumed for the process simulation. The rare earth elements, REEs, enter the process in phosphate form and are reacted with sulfuric acid. The components of the monazite are then separated primarily through solid liquid separation with the additions of appropriate acids or bases at optimized processing conditions. A pure Thorium product stream was isolated with a 99.99% yield. Byproducts of La\textsubscript{2}O\textsubscript{3}, Ce\textsubscript{2}O\textsubscript{3}, UO\textsubscript{2}, and Nd\textsubscript{2}O\textsubscript{3} were successfully isolated in subsequent reaction steps to a product purity above 95%.
Matthew Adams

Dry reforming of methane (DRM) is a widely studied reaction due to its ability to utilize greenhouse gases for production of syngas, a widely used feedstock for the production of useful hydrocarbons. Nickel-based intermetallic compounds on oxide supports were prepared and evaluated for their performance for DRM. In this study, we tested catalysts with various nickel loadings to gain insights on the effects of atomic properties on selectivity, activity, and catalyst stability. DRM was performed between 100-700 degrees C at a pressure of 1 atm with an equimolar feed ratio of CH4/CO2 diluted in Argon to determine optimal reaction temperature to perform catalytic stability tests. The samples tested were characterized through X-Ray Diffraction (XRD), Transmission Electron Spectroscopy (TEM), and Low Energy Ion Scattering (LEIS). The obtained results indicated that an increase in nickel loading resulted in higher overall activity with a low H2/CO selectivity ratio at 500 degrees C. The catalysts tested were resistant to coke formation, showing only a small decrease in activity over a time period of 20 hours. Density Functional Theory (DFT) calculations were used to further explore the reaction mechanism for DRM on Ni-based intermetallic compounds through calculations of adsorption energies for all possible reaction intermediates of the reaction mechanism.
Lithium, an alkali metal, is commonly extracted from a solution of potassium chloride and lithium chloride. Isolating lithium from this solution is generally accomplished through chemical precipitation, adsorption, and extraction. Lithium is often used in the production of lithium batteries. Membrane separation of ionic species like lithium is an especially appealing method of separation due to it being highly efficient and environmentally friendly. To find an optimal current density at which potassium separates out of lithium, an experimental cell was set up using a cathode and anode chamber with a Nafion cation exchange membrane. The anode side consisted of 60 mL of 1M of equimolar LiCl-KCl solution and a carbon cloth. The cathode side consisted of 60 mL of high purity deionized water and a platinum wire. Ten experiments were conducted and calculations were made to determine the time of each trail. All experiments were performed on a Bio-Logic SP-200 Potentiostat using chronopotentiometry. All samples were analyzed on the ICP_OES with four standards. Results from the ICP_OES were collected and subsequently analyzed in excel. Calibration curves were constructed from standards with previously known concentrations and were used to interpolate concentration values for each sample. Concentrations values were then used to find the separation factor. Many of our low current density trials could not reach the desired current until a significant amount of salt concentration was transferred to the cathode chamber.
Sulfonated block copolymers are widely studied for applications in water purification, dehumidification, and electrochemical devices because they combine the transport properties of ionomers with the mechanical properties of thermoplastic elastomers. When sulfonated block copolymers are processed into thin films via solution-casting, the film morphology is influenced by the types of interactions between the polymer and solvent. In this work, we examine the self-assembly of sulfonated block copolymers in mixtures of polar and nonpolar solvents, and then compare the solution-state structure with the resulting film morphology. When the solvent mixture is selective to one block, the self-assembled structure becomes lamellar in solution, and films cast from these solutions are also lamellar. However, as solvent composition becomes more neutral, the structure in solution becomes disordered, leading to films with a network-like arrangement of lamellar domains. The transport properties of the films are very sensitive to the morphology: The transition from ordered lamellae to a disordered network produces a twofold increase in water uptake and a fivefold increase in proton conductivity at 52% relative humidity. These studies reveal a simple and systematic approach to control the morphology and transport properties of sulfonated block copolymer films by tuning solution-state interactions.
Title: Evaluation of Chloramphenicol Acetyltransferases for Ester Production at High Temperatures

Noah Dunlap (Undergraduate Researcher)
Dr. Cong Trinh (Principle Investigator)
Hyeongmin Seo (Graduate Researcher)
John Hill (Undergraduate Researcher)

Abstract
The goal of this research is to evaluate chloramphenicol acetyltransferases (CATs) derived from bacterial strains for a thermostable ester production system developed in thermophiles. The CAT protein arose from the need to detoxify chloramphenicol in bacteria but in some forms can effectively catalyze alcohols into esters. Dozens of CAT varieties were screened by measuring reactivities acetyl-CoA and chloramphenicol, and the top six most reactive with isobutanol were identified. Thermostability was investigated among those six by assessing enzymes’ thermal inactivation and melting curve. Purified enzymes were incubated in a heat bath, after which residual reactivity was measured. Additionally, the melting temperature of each enzyme was found by thermal shift assay. These data measure the enzymes’ resistance to unfolding and the point where the enzyme denatures. The enzymes with the highest melting point and lowest thermal inactivation suggest the most promising CAT candidates for a variety of esters at elevated temperature.
Chloe Frame

Bistability is an important feature of cell signaling networks involved in binary decisions between stable inactive and active states, including those in regulation of cell division. Positive feedback in reaction networks can lead to bistability and signal propagation by domain growth, and switching between states in a bistable system can occur spontaneously due to inherent stochastic fluctuations. Here we investigate how diffusion, confinement, and spatial patterning regulate spontaneous activation in a simple two-component reaction network with positive feedback. Stochastic simulation trajectories are generated using the Gillespie algorithm and spatial patterning is introduced with blockades that prevent molecules from diffusing into specified regions. We characterize the time it takes for an inactive state to spontaneously activate. As the concentration of particles in the system increases, the system activates more rapidly due to increased interactions between particles. In contrast, increasing the density of blockades increases the activation time due to a decreased likelihood of active molecules aggregating. Furthermore, when the diffusion coefficient decreases, active molecules are less likely to encounter other molecules before deactivating, thus increasing the activation time. Studying switching times in confined, spatially patterned environments is useful for understanding how signaling networks operate in real biological environments and provides insight into designing synthetic biological systems.
Urban stormwater is a major contributor to surface water degradation in the United States, prompting cities to invest in ways to naturally capture, store, and slowly release runoff through “Green Infrastructure” (GI) such as urban trees. Interception describes a tree’s ability to capture and store rainfall, reducing the volume of stormwater that can degrade urban streams during storm events. While rainfall interception for full canopy environments is well studied, limited research is available that characterizes the interception of open-grown trees, which are commonly found in urban areas. Nine trees from three common, urban, native species planted in three Knoxville-area parks were studied to quantify interception. Continuous measurements of interception were made using several automatic rain gauges positioned underneath tree canopies. When compared to gross precipitation, the measurements quantify interception, throughfall (rainfall that passes through the canopy), and stemflow (rainfall that travels down the trunk) of each tree. Data was collected for one year to account for seasonal variations in canopy cover and precipitation patterns. Results demonstrate the effect of event duration, rainfall intensity, and seasonal variations on the interception potential of each species, allowing them to be properly credited as part of urban watershed restoration efforts.
Towards a Convenient Brain/Body Trainer:

A Hybrid Brain-Computer Interface, Virtual Reality Car Racing Game

Michael O’Neil, Jinxiao Yu, Soheil Borhani, Xiaopeng Zhao

We have designed a hybrid BCI car racing game in a three-dimensional (3D) virtual environment using Unity software. The setup integrates various modalities and sources including electroencephalographic (EEG) headsets, gyroscopes, and accelerometers to map users’ intentions of steering a virtual car in a 3D environment. Three cameras have been set up to show a driver’s view, a bird’s-eye view, and a following camera’s view. The central platform revolves around lab streaming layer as a gold-standard data communication protocol for real-time neurophysiological data collection. The setup is being created to combine all of these components for easy integration into mind-controlled robotics research projects.

We implemented a hybrid BCI which is capable of decoding users’ intention of moving a virtual car with different sources of neural and non-neural signals. We combined Engagement Index (EI) and Steady-State Visually Evoked Potential (SSVEP) as a neural source of user intention which can be used interchangeably to stop or move the car. While SSVEP is a stimulus-driven paradigm, EI relies on “resting” and “pushing” to modulate users’ brain activity. We also include gyroscope and accelerometer as the external source of control. The platform so far can synchronously collect data from Emotiv Pro, gTec Nautilus, and gtec Unicorn EEG headsets.
The goal of this project is to develop a self-adjusted balancing robot (SABR) using a neuromorphic implementation. Implementations of two-wheeled balancing robots have been achieved using traditional algorithms, often in the form of proportional-integral-derivative (PID) control. We aim to achieve the same task using a neuromorphic architecture, which is expected to yield higher power efficiency than conventional processing techniques. For the purpose of comparison, a traditional balancing robot was first designed using PID control, which uses a feedback loop using angle and motor encoder input. PID control was calibrated to send an appropriate pulse width modulated (PWM) signal to the motors to balance the robot. Next, a neuromorphic implementation for the robot was constructed. Using the traditional implementation for verification, an accurate, nonlinear model of the robot was developed. This model was used to train a neural network with sensor and encoder input and PWM output. The network was implemented on the Digilent PYNQ-Z1 field programmable gate array (FPGA) with an ARM processor.
GRANT EUReCA Abstract

Adam Foshie & Jonathan Ambrose

March 2019

1 Abstract

Neuromorphic computing, or computing inspired by the cognitive processes of the brain, has garnered attention as the need for a more scalable, while also energy and space efficient, computational construct than the traditional Von Neumann based architectures has grown. Particularly, computing structures that perform complex tasks such as classification, anomaly detection, pattern recognition, and control automation are desired. Using the novel neuromorphic computing architecture developed by TENNLab (Laboratory of Tennesseans Exploring Neural Networks), DANNA2 (Dynamic Adaptive Neural Network Array 2), along with TENNLab’s hardware/software co-design framework and evolutionary optimization for neuromorphic systems (EONS) as the training method, we present GRANT (Ground Roaming Autonomous Neuromorphic Targeter): a roaming, obstacle avoiding robot controlled by a spiking neural network. With an array of DANNA2 neuromorphic elements loaded onto a Pynq Z1 FPGA, GRANT uses LiDAR to read sensory input from its surroundings and uses this data as input to the neural network. The outputs from the neural network are processed and used to control the motors allowing GRANT to navigate its surroundings and avoid obstacles along the way. Future work will be the addition of more complex operations in the form of object identification and targeting.
ABSTRACT

The ARMor App: An Augmented Reality Prototype for Reliability and Maintainability
Lorna Treffert - Industrial and Systems Engineering

Augmented Reality (AR) technology provides the ability to superimpose digital objects and information onto the physical world. AR provides immense potential for understanding and simulating complex systems in real time, and is therefore rapidly being developed for use in fields such as healthcare and manufacturing. In the field of Reliability and Maintainability, the true potential lies in allowing the user to understand and manipulate machinery and systems that would have traditionally required a halt in production. In line with the current emphasis on cyber-physical systems and Internet of Things technology, the ARMor app utilizes Augmented Reality to allow the user to have the knowledge of an experienced craft worker at their fingertips. In this EUReCA, we have developed a prototype with the following functions:

1. AR Object/Image Recognition of the Equipment
2. An interactable AR Model which includes component identification and function/purpose
3. A System Map which displays
   a. inputs to the system (power, steam, flows from other equipment, information)
   b. connected equipment and sensors, as well as their status
   c. system outputs and connections
4. Essential Equipment Information and Reliability Metrics
5. Work Order Requests and Completion
Plasmonic Properties of Chitosan Films integrated with Silver Nanostructures

Author Names: Emilee Counce, Krishna Prasad Koirala, V Prasad Sandireddy

Author Department Affiliations: Material Science and Engineering, Department of Physics and Astronomy, Department of Chemical and Biomolecular

In this work, we investigate the role of processing on the plasmonic response of chitosan films integrated with Ag nanostructures. Chitosan films were prepared by solution casting, while the Ag nanostructures were deposited by e-beam evaporation. The films were annealed in air at temperatures ranging from 50°C to 150°C. The optical and morphological properties were characterized using UV-vis spectroscopy and electron microscopy. The optical absorbance was found to increase with increasing temperature. This Ag-Chitosan system can be utilized as a biocompatible, biodegradable, and mechanically flexible plasmonic device.

Emilee Counce, R K, and K P K acknowledge support by NSF grant ECCS-1607874 and the Center for Materials Engineering.
Investigation of shape instability of nanoparamidal plasmonic structures under fluid annealing

Authors: Kate Eikel, Prasad Sandireddy

The thermal stability of plasmonic nanostructure in various fluid environments determines its usefulness in sensing techniques like Raman sensing and surface plasmon resonance sensing. Here we have prepared Ag and Ag/Co nanoparamidal structures using nanosphere lithography. The samples were annealed in various fluid environments and the resulting shape change was investigated using optical spectroscopy and scanning electron microscopy. We found that the shape change of Silver in glycerol occurs at much higher rates than in water and the Ag/Co system can be much more stable. These results can help design new materials for plasmonic sensing applications requiring high temperatures and fluid environments.

Authors acknowledge NSF grant # ECCS-1607874 and the Center for Materials Processing.
Effect of Varying Sintering Temperatures on Novel Lithium Gallium Oxide Compositions for Scintillator Applications

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Synthesis and characterization of ceramic pellets is a time- and cost-efficient alternative to growing single crystals when investigating novel compositions for scintillator applications. In this study, pellets of three different lithium gallium oxide compositions were doped with 5 wt% cerium oxide (CeO2) and sintered. Photoluminescence (PL) data was recorded for LiGa5O8:Ce and LiGaO2:Ce showing various excitation and emission wavelengths in the 400-500 nm range and 450-650 nm range respectively. In previous research, x-ray diffraction (XRD) analysis showed that LiGaO2:Ce sintered at 1100°C for 10 hours had a single phase with a cubic crystal structure. However, LiGa5O8:Ce sintered at 987°C for 10 hours and Li5GaO4:Ce sintered at 500°C for 10 hours both had several phases, motivating further exploration into sintering conditions. In literature, the corresponding melting temperature for each of these compounds is not explicitly stated, which makes the determination of sintering temperature a challenge. Therefore, differential scanning calorimetry (DSC) was used to find the melting temperature of Li5GaO4:Ce and LiGa5O8:Ce. The melting temperature for Li5GaO4:Ce was determined to be 716°C while the results for LiGa5O8:Ce were inconclusive because the material did not melt. A new Li5GaO4:Ce set of pellets was sintered twice at 480°C for a longer dwell time of 15 hours. LiGa5O8:Ce was sintered at 987°C for a longer time of 15 hours. In future research, x-ray diffraction will be used to determine if a single phase formed for both compositions under their new sintering conditions, PL data will be recorded and compared to the PL data of the previous set of pellets, and DSC will be used to optimize thermal conditions of these compositions.
The Power of Paper

Eli Christoph, Emma Counce, Alexander Harper, Madeline Loveday, Christopher Webb

Students’ Department: Materials Science  
Faculty Mentor: Zhuravleva, Mariya

In Materials Science 101, we are introduced to the schools of thought that engineers use in the field when evaluating materials for their purpose and lifecycle. Our discussion group is researching the properties and history of paper. During the course of our research, we will attempt to make paper out of upcycled paper pulp and/or other cellulose-containing materials. We aim to do this using a simplified version of the basic technique that has been employed to create artistic paper for hundreds of years. Following this technique, we will make a slurry of cellulose fibers and water from various solid, cellulose bearing materials. We will then separate the cellulose from the water using a filtering and drying process. Lastly, we will iron the paper to do the final drying and shaping of the fibers into the finished product. We will then compare the products and evaluate the success of our methods. We will do this by comparing the properties (strength, method of decay, and or quality/endurance of the fibers) of the resulting products to different versions of existing paper.
Abstract:

In the construction of roads, asphalt is paved in individual layers. To ensure that these layers behave as a single, cohesive unit, a bituminous tack coat is applied between layers. It is critical that this tack coat is adhesive when the hot mix asphalt is applied and non-adhesive otherwise. As of present, there is no standard method for testing the adhesion of bituminous tack coats. A procedure was developed such that a sample tack coat of ~1 mm thickness was allowed to adhere to a temperature-controlled lower plate. After a set time, the upper geometry was lowered until a set normal force was achieved. After a short adhesion period, the upper geometry was raised as a controlled, constant rate such that a plot of the resulting normal force over deformation could be generated. The area beneath the resulting curve was determined to be the pull-off work necessary for contact between the upper geometry and the tack coat to be broken. Using this method, two asphalt bases were tested with incremental increases in additive to empirically determine the relative tackiness of each sample. By this method, the bases and their modifications could be ranked qualitatively in terms of tackiness for easy reference.
Molten salts with high heat capacity can be used to store thermal energy. These thermal “batteries” are used in renewable energy applications including concentrated solar power (CSP) and in molten salt reactors (MSR). The CSP plants capture the heat of the sun and use it to generate electricity. The salt is heated by the concentrated energy of the sun then transferred by metal pipes constructed of high-temperature alloys containing chromium. The contact between the liquid salt and metal pipes leads to Cr dealloying from the alloys and contamination of the salt, which could affect both the pipes integrity the salt’s properties. The particular salt compound of interest for this application is K$_2$MgCl$_4$ (a eutectic mixture of KCl and MgCl$_2$). This study seeks to understand the effect of Cr contamination in K$_2$MgCl$_4$ salts using high temperature x-ray diffraction (HTXRD). HTXRD data was collected Cr-doped and undoped K$_2$MgCl$_4$ salt under vacuum and data were taken at 25 °C increments from 25 °C to 400 °C. Data were analyzed using Rietveld refinements to determine the phase fractions of compounds present and the lattice parameter at each temperature. The compound exhibited an isotropic thermal expansion behavior with a coefficient of thermal expansion of 3.26 x10$^{-5}$/°C. Both cr-doped and undoped samples displayed a phase transition from K$_2$MgCl$_4$ to K$_4$MgCl$_6$ and KCl when the samples were heated. The Cr-doped sample also experienced melting during the experiment, which indicates that the addition of Cr lowers the melting temperature of the sample.
The effect of laser power on defect characteristics, microstructure, and texture was studied on laser powder bed fusion (L-PBF) processed 316L stainless steel. A fully-dense and a lack-of-fusion specimens were additively manufactured with a laser power of 300 W and 200 W, respectively, with a fixed scan speed of 800 mm/s using a selective laser melting system. Then, the evolution of defect properties (density, size, shape, and orientation) in each specimen was observed in-situ during tensile deformation using x-ray computed tomography. Moreover, the changes in the preferred crystallographic orientations were investigated using high-energy synchrotron x-ray diffraction. The effect of laser power on defect and texture characteristics in as-printed specimens, their evolutions during subsequent tensile loading, and correlations of defect- and micro-structures to macroscopic strength and ductility will be discussed.
Entropy-stabilized oxides are a new class of ceramic material inspired by high-entropy alloys. In entropy-stabilized oxides, many metallic elements in approximately equal amounts occupy one lattice site. The large number of atom types present in the crystal results in a high degree of disorder. The purpose of this study was to determine if a single-phase sample of the entropy-stabilized perovskite \((\text{Gd}_{0.2}\text{La}_{0.2}\text{Nd}_{0.2}\text{Sm}_{0.2}\text{Y}_{0.2})\text{MnO}_3\) could be successfully created through the solid-state synthesis method. Following solid-state synthesis, the resultant pellet was ground into a powder and characterized using x-ray diffraction (XRD) and scanning electron microscopy (SEM). Both XRD and SEM confirmed that a single-phase sample of \((\text{Gd}_{0.2}\text{La}_{0.2}\text{Nd}_{0.2}\text{Sm}_{0.2}\text{Y}_{0.2})\text{MnO}_3\) was obtained. Future research on \((\text{Gd}_{0.2}\text{La}_{0.2}\text{Nd}_{0.2}\text{Sm}_{0.2}\text{Y}_{0.2})\text{MnO}_3\) should seek to determine both material properties and potential applications.
Kea Francis and Heon Joo

The project evaluates response to social robots for purposeful tasks. The study uses a social robot, Rapiro, along with a smartphone that serves as a visual interface for the robot system. My role was to design a program on a Raspberry Pi that allows simultaneous control of Rapiro’s actions and a response from a phone application. The phone app is downloaded to an Android phone and designed using MIT App Inventor software. This allows pre-programmed and real-time control of the robot. The user inputs what they want the robot to say through the terminal of the Raspberry Pi. Through serial communication the command is received by the phone and the app outputs the desired message.

The experiment’s objective is to observe whether human to human interaction differs from human to machine interaction. The subject will attempt to hit an unseen target distance using a roller ball. For one set of experiments the subject will receive feedback from the experimenter. In another set, feedback will be provided by Rapiro. In both cases, the information will be identical. The results of this study will benefit our understanding of how humans respond to information depending on the delivery mechanism.
Eureca Abstract

An important attribute of the compression molding process is the requirement of (Sheet Molding Compound) SMC. The fibers, commonly glass or carbon fibers, are impregnated with thermoset resin and collected in continuous form on a conveyor belt. The SMC charge is rolled between rollers to wet out the fibers with resin. The SMC charge is then compression molded to a desired part reflecting the designed mold. The part could be an automotive part or any other industrial applicable part. Compression molding with fibers and polymers is the largest component of most of the manufacturing industries in the world. Whether it is the components of the interior of a car, a tooth brush, or a plastic chair, a compression molded part is used in most of the day-to-day use objects.

With development in this field, stronger molded fiber parts are cheaper to manufacture. With increase in demand, the time of production can be cut down as well as cost. My research, along with my cell group at the Fibers and Composites Manufacturing Facility, focuses on the use of SMC production line, while perfecting the use of randomly oriented fibers, compression molded parts are characterized for mechanical properties. Various check points need to be addressed for smooth functioning of the SMC line, such as SMC conveyor belt motion, jamming of the fiber cutter, random fiber lengths, and uneven fiber distribution. Due to the randomness of the fiber lengths and distribution, compression molded parts lack consistent mechanical properties. Mats contain high degree of flaws and could not be used for compression molding. By researching methods to minimize the flaws in the SMC charge we can help companies to manufacture cheaper and more effective SMC material in a smaller amount of time, boosting the mass production of products.

Glass fibers (GF) and carbon fibers (CF) are used to make SMC charge and characterized for various fiber length and fiber weight fraction. The automobile industry is cost sensitive and SMC is used to reduce the weight and enhance the efficiency of the vehicle. Though CF is expensive than GF, it is used to increase the stiffness and reduce the weight of the final part. In commercial SMC manufacturing, it is not easy to combine GF and CF as the fiber surface properties are different for a given resin system. Hence in this trial both GF and CF are combined with polyester resin using slow compaction technique and post cure at 90 °F for 24 hours.
Decoding Brainwaves for Visual Attention to Faces and Scenes

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Abstract
Attention is a multidimensional cognitive function that can be broken down into a series of filtering and searching subprocesses. Deficiencies in attention are commonly seen in many brain disorders such as Alzheimer’s Disease and Attention Deficit Disorder (ADD) and have an impact on an individual's overall cognitive and perceptual capabilities. Many studies have been conducted to evaluate and train brain computer interfaces (BCI) to distinguish between brain signals released during periods of attention in individual with average and deficient cognitive ability. This study focused on distinguishing between electroencephalography (EEG) signals released during periods of visual attention to faces and scenes for individuals of normal cognitive ability. Within this work, signal pre-processing methods, such as band-pass filters and the Continuous Wavelet Transform (CWT), and deep learning paradigms were tested and optimized to increase decoding accuracy. Data augmentation was also utilized and tested to increase the model training size to increase decoding accuracy.
Changes in Residual Muscle Architecture Following Limb Amputation

Samantha Brachter

Abstract
Following amputation, the architecture of residual muscles is expected to degenerate with disuse, which could lead to degradation of muscle force and therefore control of motorized prosthetic limbs. Despite this, residual muscle architecture has not been quantified before. We performed a pilot study to determine how amputation affects muscle architecture in a rabbit model of hindlimb amputation. Two healthy 13-week-old New Zealand white rabbits underwent unilateral (right) hind paw amputation (ankle disarticulation). All soft tissues crossing the ankle were severed. The tibialis anterior and Achilles tendons were fixed to the distal end of the tibia bone. The animals were euthanized after a two-week recovery period. The lateral gastrocnemius (LG), medical gastrocnemius (MG), soleus (SOL), and tibialis anterior (TA) of the intact and residual limbs were dissected for muscle architecture measurement. Muscle mass, length, volume, fiber length, and optimal fiber length were generally lower in the residual limb than in the intact limb. Our results showed that muscle architecture was generally worse and consistent with lower force-generating capacity in the residual limb than in the intact limb, as expected. In future studies, we plan to quantify muscle changes in more animals and test methods to preserve muscle architecture after amputation.
Comparing EMG- and Goniometer-Driven NMI Control For A Virtual Target Acquisition Task
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Discrepancies between the estimated and intended movement can limit users’ control of neural-machine interfaces (NMIs) such as in myoelectric prostheses [1] and virtual interfaces [2]. A novel electromyography (EMG)-driven NMI controller based on a musculoskeletal model of the hand was previously developed and evaluated users’ control of a virtual hand during a real-time target acquisition task [3]. The objective of our study was to quantify movement estimation errors through use of an EMG-driven test and a Goniometer-driven test. During the target acquisition task, seven able-bodied subjects attempted to match and hold target postures for 2 seconds with a 2-degree-of-freedom (wrist and metacarpophalangeal (MCP) flexion/extension) virtual stick-figure hand. In different trials, subjects controlled the virtual hand using either EMG (measured with 4 sensors placed on the forearm) or joint angles (measured with electrogoniometers placed across the wrist and MCP joints). There was less error between the subjects’ actual and virtual hand joint angles and better overall task performance with joint angle control than with EMG control. This suggests that accuracy of movement estimates does influence real-time task performance for EMG-based NMI control. Future studies should identify error sources and improve movement estimation accuracy.

Foams, zerogels, and aerogels form interesting material systems due to their porous structure that gives them a combination of high surface area and low weight. Here, as part of the MSE 101 class, we have investigated the synthesis of metal oxide foams made from vanadium oxide with varying amounts of silver nitrate. The foam rise rate, volume, color, morphology and microstructure were investigated. Addition of silver nitrate significantly influenced the foaming behavior of vanadium oxide.
Comparing durability and memcapacitance of polymer bilayers for applications in neuromorphic computing.

When creating soft smart materials, toughness and durability of the material are extremely important factors to consider. In past work, we have seen polymers and polymer bilayers are generally more durable than lipids and lipid bilayers. We have also identified an oil medium that enables bilayers to create ideal levels of memcapacitance. However, which polymer can create the longest-lasting, toughest bilayers while simultaneously producing the most memcapacitance? How quickly memcapacitance can be induced is important to consider as well. Neurons and current computing hardware can complete computations in milliseconds; to mimic this we need our polymer bilayers to switch memcapacitance very quickly. In this study we continue our previous work in neuromorphic computing to determine which polymer creates the most durable, memcapacitive bilayers for future use in smart materials. This was done by comparing viscosity, reaction time, thickness, duration, and maximum voltage for PEO-PDMS-PEO and PEO-PE polymer bilayers.
Metallic Nanomaterials (MNMs) are nanoscale metal materials which range from 1 nm to 100 nm in size. Due to their small size, properties such as the MNM’s melting point, electrical conductivity, magnetic permeability, and chemical reactivity change dramatically with respect to the size of the particles. MNMs, therefore, are constantly rising in popularity. The synthesis of MNMs using liquid ablation can be done using no hazardous chemicals as with most synthesis techniques. This methodology, however, is still not fully understood and the discovery of new uses for the metallic nanoparticles are becoming more and more frequent for an ever-growing scale of industries. Designing an MNM for a specific application, by changing specific parameters within the synthesis procedure, is the next step in working to better understand the synthesis process. By determining what characteristics change with the change in synthesis procedure, the synthesis procedures required to design an MNM for a specific application can be determined. The MNMs and the uses currently being researched include: Iron graphitic nanoparticles which can be used in magnetic fluid hyperthermia for pediatric cancer treatment. Platinum Nanoparticles encapsulated in Metal Organic Framework (MOF) structures used in oxygen reduction reaction for fuel cell research. Graphene oxide - cobalt oxide nanorods used in 3D printed graphene-based supercapacitors. Also, graphene coated aluminum nanoparticles used for solid fuel rocket propulsion.
Nuclear thermal propulsion is the most efficient and viable option for manned missions to Mars. This method of space propulsion is twice as efficient as the current chemical systems in place. In addition, it could reduce the duration of a crewed journey to Mars by up to 40%. For this efficiency to be fully realized, reactor materials must be able to withstand temperatures of up to 2,500 K while displaying minimal corrosion when exposed to hydrogen. Ceramic metallic (cermet) samples were created by consolidating different concentrations of zirconium dioxide, as a surrogate for the UO$_2$ fuel, into a matrix of molybdenum via spark plasma sintering. The samples were then polished down to a mirror finish using SiC papers and diamond solutions to make observing abnormalities after testing more apparent. To investigate degradation of the zirconia fuel surrogate and the molybdenum matrix, the samples were exposed to hydrogen flow at 2000, 2250 and 2500 K under both continuous exposure and thermal cycling conditions. Data was collected on the effects of hydrogen corrosion at varying temperatures and thermal cycles by mass loss measurements, x-ray diffraction, scanning electron microscopy, and Raman spectroscopy.
Irradiation can produce a variety of structural changes in different materials, such as phase changes, amorphization, and enhanced ionic conductivity. Of particular interest for nuclear fuels and waste storage is the damage produced by fission fragments. Fission fragment-type damage can be mimicked with energetic heavy ions from an accelerator rather than from spent fuel to study the damage produced under controlled (and less radioactive) conditions. With the use of the UNILAC beamline in Darmstadt, Germany GeV-energy gold ion fluences of $10^{12} - 10^{13}$ ions/cm² are achieved regularly. This allows for the synthesis of sufficient quantities of homogeneously damaged materials to utilize various techniques, including neutron diffraction, to yield structural data. Neutron diffractions studies at the Spallation Neutron Source (SNS) at ORNL have revealed the formation of novel phases in irradiated materials that would ordinarily not be present under ambient conditions. Furthermore, this type of experiment can be used to compare the irradiation responses of different crystalline materials, oxides in this case, to determine which materials are more or less resistant to this type of damage.
To keep a nuclear power plant operating as efficiently as possible, it should produce only as much power as is needed at any time. In natural gas plants, this is done through load-following; that is, changing the heat produced to meet demand. However, this load-following process can cause a large amount of thermal stress in the primary loop of a nuclear power plant. Alternatively, a thermal energy storage (TES) system can be used to minimize these stresses while still meeting electricity demands on the grid. This poster will summarize the development of a model of a thermal energy storage system built onto a model of the Molten-Salt Reactor Experiment at ORNL in the 1960s. The model serves to demonstrate a coupled thermal energy storage system with a molten salt reactor by showing that such a system can follow a varying power demand while maintaining a constant temperature in the primary loop, thereby reducing thermal stresses in the primary system. The TES is controlled by independently changing the mass flow rate of the hot and cold tanks to match a demand power output and to maintain constant primary loop temperature, respectively. The model was tested with a variety of power demands and it successfully achieved desired energy output while maintaining a constant temperature in the primary loop.