

PROCEEDINGS

OF THE
SEVENTH ANNUAL UNDERGRADUATE
RESEARCH SYMPOSIUM



THE UNIVERSITY OF
TENNESSEE
KNOXVILLE

PROCEEDINGS

of the

Seventh Annual Undergraduate Research Symposium

April 2nd, 2016
The University of Tennessee, Knoxville
Haslam Business Building

The Seventh Annual Undergraduate Research Symposium is organized by the Undergraduate Research Students' Association (URSA), which was founded in 2010 and is dedicated to expanding access to research for undergraduates at the University of Tennessee, Knoxville. The Symposium provides a space for undergraduates in all disciplines to give oral presentations of their work to an audience composed of the general public, their professors, and their peers. More information about URSA can be found online at www.ursautk.org.

The Seventh Annual Undergraduate Research Symposium is sponsored in part by the Office of Undergraduate Research. This program is funded in part through the Student Programming Allocation Committee (SPAC). We especially thank the Haslam College of Business and its staff for their gracious accommodations for this year's Symposium.

Schedule of Events

9:00 - 9:55 AM

BREAKFAST AND REGISTRATION

Please join us for coffee and breakfast pastries on the ground floor of the Haslam Business Building.

9:45 - 9:55 AM

OPENING REMARKS

10:00 - 10:55 AM

SESSION I

11:00 - 11:55 AM

SESSION II

12:00 - 12:55 PM

LUNCH

Lunch will be served on the ground floor of the Haslam Business Building.

1:00 - 1:55 PM

KEYNOTE SPEAKER

Dr. Vitaly Ganusov, Assistant Professor, Department of Microbiology and Department of Mathematics

2:00 - 2:55 PM

SESSION III

3:00 - 3:55 PM

SESSION IV

4:00 - 4:55 PM

SESSION V

5:00 - 5:15 PM

CLOSING REMARKS

ABSTRACTS

Alphabetical by Last Name

A Singular Value Decomposition of $15M_{\odot}$ Progenitor Chimera Entropy Data

Brandon Barker

Faculty Mentors: Dr. Anthony Mezzacappa and Dr. Eirik Endeve

University of Tennessee, Knoxville

Physics, Mathematics

Core collapse supernovae are characterized by multi-dimensional dynamics. Computational models have shown that the shock formed at core bounce always runs out of energy and invariably stalls. Until the development of axisymmetric (2D) simulations, little progress towards reviving the shock had been made. Modern simulations, however, have granted some insight into the mechanisms of shock revival. Neutrino driven convection and the standing accretion shock instability (SASI) play pivotal roles in reviving the stalled shock. These mechanisms can increase the time material spends in the gain layer. This layer, the region near the stalled shock where net neutrino heating occurs, is dominated by turbulent flow. The turbulence in this region is necessary for maximizing the efficiency of the neutrino heating mechanism. We attempt to employ a singular value decomposition (SVD) in order to explore the relative contributions of the neutrino driven convection and SASI mechanisms. In particular, we have begun decomposing the kinetic energy in order to gain insight into its behavior in frequency space. This often gives information about different modes, which correspond to flows on different spacial scales. This is important in understanding turbulent flows, which are vital to the revival of the shock. Eventually, we hope to decompose other forms of energy, which could yield insight into the conversion of one form of energy into another.

Embedded Linguistics: The Language of Social Media Networks

Katie Beckett
Faculty Mentor: Dr. Jessica Grieser

University of Tennessee, Knoxville
Linguistics

In today's modern world, a new form of communication that has become more prominent is social media networking. They range from the ever-popular Facebook all the way to the mysterious world of Tumblr. However, one aspect they have in common is language, and each have their own distinct style. They have also become modes of transportation for what some of us call "slang" and what others use on an everyday basis for their discourse community. Also with this type of communication, we see items we thought carried little crucial information (such as emoticons and abbreviations) that can now broadcast a complete idea.

The data for this study came from four different avenues: Facebook, Tumblr, Twitter and Instagram. The posts examined are also from a wide variety of posters: business professionals, part-time bloggers, every-day youth and adults. From these four varieties of postings, we are able to gain an insight into four different communities and the language they use. Once the postings are chosen, they are then deconstructed based on the style of language they use, the lexical components and the meanings behind the words or images chosen.

Within this research, what becomes apparent is how despite these postings coming from four different social medias and different communities they are all based on the same structures. In result, many of the meanings cross over to be understood by other users even if they are not a part of the same community. However, this can also have the opposite effect where the "poster" is misunderstood or misuses language that is now available for the world to see.

The Effects of Cuddling in Neonates Experiencing Neonatal Abstinence Syndrome

Rebecca Jeannine Bell
Faculty Mentor: Dr. Deb Chyka

University of Tennessee, Knoxville
Nursing

Among the population of neonates experiencing Neonatal Abstinence Syndrome (NAS) being cared for in the NICU there is a deficit of maternal care. Maternal care is critical to the physical and emotional development of any infant; it is especially critical in the development of an infant experiencing symptoms of drug withdrawal. Because of this maternal care deficit, many neonates experience withdrawal symptoms without the nurturing comfort of a maternal presence. Nurses therefore serve as a proxy for these struggling neonates; however, they do not have the time to provide individualized care that is equivalent to that of a mother. A gap exists in the literature that does not address the effect of “cuddlers” on the temperament and development of neonates experiencing NAS. The stimulation provided by the cuddler may prove to be calming both physically and emotionally. This research will address the gap by evaluating the neonate’s response to the time spent with the cuddlers. Initial evaluation of the neonates will include assessment of physical responses such as heart rate and respirations. Additionally, retrospective evaluation will take place to determine the effects of cuddling on factors such as blood pressure, quality of sleep, and Finnegan Scores. Results from this project may provide evidence that supports the criticality of touch, as well as a calming and quiet environment for neonates in order to meet typical developmental milestones.

Inactivation of Pyruvate Dehydrogenase Mediates Decreased Butyrate Oxidation in Colorectal Cancer Cells

Natalie Bennett

Faculty Mentor: Dr. Dallas Donohoe

University of Tennessee, Knoxville

College Scholars

Colorectal cancer (CRC) is the third most diagnosed cancer and the second leading cause of cancer-related deaths in the United States. Diet is one of the risk factors associated with colorectal cancer susceptibility and dietary modifications have been proposed to lower colorectal cancer incidence and mortality. Bacteria in the colon ferment dietary fiber into butyrate, which has been shown to have anti-proliferative and pro-apoptotic effects on colorectal cancer cells. Non-cancerous colonocytes utilize butyrate, a short-chain fatty acid, as their primary energy source. In contrast, colorectal cancer cells show increased glucose utilization and glycolysis (the Warburg effect), while simultaneously decreasing butyrate oxidation. This is vital as butyrate accumulates in the cancer cell and exerts its anti-cancer actions through altering gene expression. My hypothesis was that by blocking the Warburg effect and increasing oxidative metabolism, butyrate oxidation would be increased in the colorectal cancer cell.

Dichloroacetate (DCA) is a pharmacological agent that has been shown to hinder the Warburg effect and increase oxidative metabolism. Specifically, DCA inhibits pyruvate dehydrogenase kinase (PDK), which results in unphosphorylated and active pyruvate dehydrogenase (PDH). DCA should decrease the Warburg effect and increase butyrate oxidation.

Using a Seahorse XF Analyzer to measure butyrate oxidation and Western blot to monitor PDH phosphorylation, I found that DCA does increase butyrate oxidation in colon cancer cells. DCA treated cells showed 10 times less phospho-PDH compared to non-DCA treated cells. These data confirm that the Warburg effect is a major contributor to diminished butyrate oxidation and butyrate's anti-cancer effects.

A Four-Legged Bull? The Interpretation of τετραόρου in Sophocles' *Trachiniai*

Samuel Brakebill

Faculty Mentors: Dr. Justin Arft and Dr. Robert Sklenar

University of Tennessee, Knoxville
Classics

In line 508 of the *Trachiniai*, Sophocles uses the phrase *τετραόρου φάσμα τάνυρου* to describe the river god Acheloös. The meaning of *τετραόρου* here is unclear, as the word means "four being yoked together" and is typically used of chariot races and carts. In fact, this usage continues to dominate in the 5th century. Therefore, the idea of *τετραόρου* as four-legged, which appears to stem from an ancient scholiast's attempt to interpret the meaning, is lackluster and a better translation of this word would be to treat it as almost participial, translating it as "having the strength of four yoked together" instead. This translation instead captures the etymological idea of *τετραόρου* as well as more accurately fitting the athletic and heroic context of this chorus. The implication of this translation on the wider text is that a comparison between the younger Deianeira of the chorus' song and the Deianeira who finally takes action and attempts to place a love charm on Herakles is emphasized. This comparison, and its echoing comparison between a young Herakles and a dying Herakles, sets up a comparison between Deianeira and Hera in the context of the birth of Dionysius. Sophocles uses this comparison, along with serpent and venom imagery, to bring the audience partially into the mystery cult in an attempt to exalt the ritual plays of the Greater Dionysia.

Developmental Cognitive Neuroscience at the Birkbeck Babylab

Kimberly Bress
Faculty Mentor: Dr. Katarina Begus

University of Tennessee, Knoxville
Neuroscience

During the summer after my second undergraduate semester at the University of Tennessee, I served as a research intern at the University of London Birkbeck Babylab. Under the direction of researchers Katarina Begus and Carina de Klerk, I assisted with three research projects. Two of these projects involved the use of functional near infrared spectroscopy (fNIRS), a novel brain imaging technology, to investigate social development in human infants. While the first project investigated infants' ability to imitate and mimic, the second investigated infants' understanding of social relationships. Specifically, this study focused on the importance of the temporal parietal junction and superior temporal sulcus in the conceptualization of social interactions.

Using developmental neuroscience to investigate the mechanisms of social processing has important implications for understanding the emergence of social processing disorders. Through this independently organized research experience, I gained a valuable insight regarding the research principles of developmental cognitive neuroscience, in addition to experience with essential brain imaging technologies.

Evaluating the cytotoxic effects of cellulose nanocrystals (CNCs) using autbioluminescent yeast and human cells

Julianna Burchett
Faculty Mentor: Dr. Steven Ripp

University of Tennessee, Knoxville
Environmental Science

Cellulose nanocrystals (CNCs) are widely used in different industries including pharmaceutical and cosmetic production due to their adept physical and biological properties. Because CNCs are becoming a more prevalent material and have a high potential of being redistributed in the environment, it is important to understand their toxic potentials in biological systems, including organisms of various trophic levels. This study evaluated the cytotoxic effects of CNCs in the lower eukaryotic organism *Saccharomyces cerevisiae* and human embryonic kidney (HEK293) cells using autbioluminescent yeast and human cell reporters, respectively. The *S. cerevisiae* and HEK293 reporter cells were engineered to express a synthetic bacterial luciferase operon (*luxCDABE*) that self-generates all the required substrates for bioluminescent production. As a result, these reporter cells allow for continuous monitoring of the same cell population throughout the period of toxicant exposure, providing a facile means for tracking the temporal dynamics of toxic effects on living cells. When exposed to CNCs at concentrations ranging from 0.001 g/L to 1 g/L, both the yeast and human cells reported time and dose-dependent effects. Exposure to CNCs at 0.001 g/L and 1 g/L reduced bioluminescent output in *S. cerevisiae* by 5% and 10% compared to untreated control cells 8 hours post-treatment, respectively, and further decreased the signal by 25% and 70% 12 hours post-treatment, respectively. In HEK293 cells, treatment with CNCs at 1 g/L initialized a significant decrease (by 23%) in metabolic activity at 2 days post-treatment, and the bioluminescent output continued to decline to less than 10% compared to untreated controls at 7 days post-treatment. CNCs at 0.001 g/L did not result in significant changes in metabolic activity throughout the entire period of exposure. These results demonstrate the cytotoxic potential for elevated concentrations of CNCs in varying biological systems.

Cross-Linguistic Phonosemantics

Raleigh Butler
Faculty Mentor: Dr. Jessica Grieser

University of Tennessee, Knoxville
French and Francophone Studies, Linguistics

For my research, I have chosen to concentrate on linguistics, the study of languages. The basic premise of my research focuses on the subfield of phonosemantics/sound-symbolism, or the idea that sounds comprising a word carry inherent “meanings” or connotations. For instance, one could argue that the sound ‘s’, due to its hissing sound, has an evil connotation (hence its presence in “snake,” sly,” and “slither”).

Based on my studies of phonosemantics, I hypothesize that there is an inherent cross-linguistic meaning of sounds. I expect native Indo-European language speakers to have similar reactions as Non-Indo European language speakers, despite differences in language origins.

In order to gauge participants’ perceptions of sounds, I will ask variety of written questions. These will be phrases dominant in one phoneme (sound) or invented words for which participants are asked to establish a connotation. Using a variety of both quantitative (opinion rating) and qualitative (short answer) questions, I will collect participants’ reactions.

Both Miall and Whissel conducted extensive analyses, but focused purely on English. While Fischer-Jorgensen explores both Indo-European and Non-Indo European languages, he conducts an analysis of three languages, making it difficult to see trends. In my research, I will gather participants of several different languages, ensuring to equally represent Indo-European and Non-Indo European. This will dissolve any confounding variables. Therefore, I hope to provide more definitive results that show a cross-linguistic trend (or lack thereof) in phonosemantics.

An Answer in Genesis: An Analysis of American Biblical Literalism and its Public Presentation in the Context of Religious Tourism

Kaitlyn Cherry
Faculty Mentor: Dr. Erin Darby

University of Tennessee, Knoxville
History

Biblical literalism is an ever pressing issue in today's America, as it often forms the backdrop for political positions and policy decisions. Literalists interpret the biblical text, particularly sections in the book of Genesis, as if they accurately describe events from the past. This paper analyzes the phenomenon of modern biblical literalism in America by examining the mindset of one such group, Answers in Genesis, and their attempts to build a replica of Noah's Ark, a museum which will be open to the public on July 7, 2016.

The interpretation of biblical passages, as well as early religious debates over the proper way to approach the text help us understand and contextualize phenomena like the Noah's Ark replica and its intended audience. I will present the history of relevant textual interpretations, along with the rise of literalism in America, which took on a unique tinge, separating it from previous theological traditions. For example, Answers in Genesis embraces a "family friendly" theology through their website and publications, which I use to examine their arguments and contrast them with established religious dogma as well as historic consensus about the likelihood of Noah's Ark.

In sum, the paper uses the words and actions of Answers in Genesis and its founder Ken Ham to evaluate the theoretical underpinnings and, in many cases, inconsistencies of biblical literalism, the methods of dissemination, and its potency in contemporary America, particularly in the south.

The Appropriation of Indigenous Gender Identity as Modern Colonization

Robert Cremins

Faculty Mentors: Dr. Sarah Dees and Dr. Erin Darby

University of Tennessee, Knoxville

Religious Studies, Social Work

This paper examines white, radical Queer appropriation of Indigenous constructions of gender identity, drawing on Postcolonial theories, to explore the relationship between culture, sexuality, and spirituality. Before colonization, many Native American tribes including the Navajo, Paiute, Zuni, Lakota, and Cheyenne promoted institutionalized gender diversity (Gilley, 2006). Gender diversity, in these traditions, resulted from the belief that a person could have two spirits within them, one being masculine and the other feminine. Colonizers stigmatized and referred to these gender variant people as berdaches. In the early 1990's, the pan-Indian movement coined the term "two-spirit" to reclaim Indigenous gender variance.

Because gender is a socially and culturally constructed performance of identity, it is subject to cultural appropriation (Butler, 1988). The Radical Faeries, a predominantly non-Native, Queer, countercultural group, continue to appropriate Native gender identity by identifying themselves as berdaches and two-spirits. They believe that they share a transhistoric and essential "gay soul" with Native two-spirit people. The Radical Faeries appropriate Native American spirituality through the performance of "indigenously coded" rituals in their attempt to find their own power as gender variant people who have been oppressed by Western hegemonic ideology.

This paper will draw on Postcolonial theorists like Homi Bhabha, Philip Deloria, and Michelle Cameron to explore the conscious and unconscious functions of the Radical Faeries' appropriation of Indigenous genders to increase their power, which further subjugates Natives through essentializing and supersession. I will argue that the performance of Indigenous gender identities allows the Radical Faeries to claim Indigenous oppression and history as their own. This unconsciously causes them to assume the role of colonizers, oppressing the Natives with whom they claim to share a spiritual connection.

HIV-related Stigma Among Women in Appalachian Tennessee and Alabama

Caroline Darlington
Faculty Mentor: Dr. Sadie Hutson

University of Tennessee, Knoxville
Nursing

Southern Appalachia holds the highest incidence of HIV/AIDS in the United States (US). While same-sex transmission is common among men, heterosexual contact and IV drug use are the most common means of transmission among Appalachian women. Societal stigmatization of HIV/AIDS due to assumptions about transmission and associated lifestyle plays a substantial role in the psychosocial well-being of people living with this chronic illness, particularly women in regions with traditional values. Sources of stigma among women include misconceptions about HIV among healthcare professionals and the conservative cultural perceptions regarding promiscuity and same-sex transmission typically associated with HIV infection. Clinically significant effects of stigma include lack of medication adherence, depression, self-isolation, decreased self-worth, and compromised sexual and reproductive decision-making. Support groups, visual media, and spiritual coping have been effective mitigators of these effects among HIV-positive women. Yet, stigma continues to play a significant role in the burden of illness in Southern Appalachia; stigma reduction interventions have not been well studied in this geographic and cultural region.

The purpose of this study was to comprehensively describe stigma among HIV-positive women in Appalachian Tennessee and Alabama to build the foundation for future intervention research. The Berger HIV Stigma Scale ($\alpha = 0.96$) was completed by HIV-positive women in Appalachian counties of Alabama and Tennessee either on paper or via Qualtrics, a web-based platform. The 40-item stigma scale was analysed using descriptive statistics. External stigma sources and internalized stigma effects will be derived from the quantitative survey via subscales. Final analysis of the data is underway. Stigma is culturally-specific. An understanding of the stigma unique to Appalachian women has the potential to improve our ability to create tailored stigma-reduction interventions to mitigate the destructive effects of stigma, particularly those that interfere with early identification of the illness and adherence to highly-effective pharmacological treatments.

Defining Chechen Identity during the Second Chechen War

Desiree Dube

Faculty Mentor: Dr. Natalia Pervukhin

University of Tennessee, Knoxville

History, Russian Studies

It was 21 January 2000, only a few months into the Second Chechen War, when Vladimir Putin, acting president of the Russian Federation, stated that “neither today nor in the near future will the intensity of the information battle lessen, either inside the country or abroad.” Of central importance to this “information battle” was the fight to define Chechen identity. Throughout the Second Chechen War the Russian government, Chechen rebels, Chechen civilians, and journalists sought to define who Chechens were in order to further their own various goals. During the war, Chechens were labeled with many conflicting identities. They were alternately identified as dangerous criminals and terrorists, separatists, normal people, and helpless victims. I argue that the Russian government’s label of the Chechens as dangerous won this war and had great impact on the daily lives of people.

Analysis of ICPMS Accuracy for Fusion Energy Advancement

Lauren Finney

Faculty Mentors: Dr. David Donovan and Dr. John Auxier II

University of Tennessee, Knoxville
Chemistry

Inductively coupled plasma mass spectrometry (ICP-MS) is an innovative technique that has revolutionized the way trace elements are detected. ICP-MS is one of few techniques capable of performing both elemental and isotopic analysis and with accuracy far beyond most competing techniques (parts per trillion in solution). This is used in the research surrounding the DIII-D fusion energy project, which is a device that confines extremely hot plasma (greater than 10 million degrees Celsius) allowing deuterium fuel particles to fuse. Particles eroded from the vessel walls are able to reach the plasma as impurities that remove much needed heat from the fuel particles. These impurities need to be identified and the relative amounts of each type of impurity quantified. The presentation will cover the studies done at The University of Tennessee at Knoxville (UTK) in determining the main trace elements and isotopes, specifically tungsten (W), present in DIII-D. W is a very important material for fusion research because it has the highest melting point of any metal, low erosion, and low retention of H isotopes.

Some of the tests being run are to determine which process best extracts the trace metals from the graphite collector probes used to catch the contaminants inside DIII-D. The current procedures tested are using tape to remove the materials collected on the surface and dissolving this in acidic solution. Various grades of graphite considered for use for the collector probes are also being analyzed to assess the prevalence of minor impurities. The main focus is to push the limits of ICP-MS to measure the absolute amounts of the different isotopes of W present on the collector probes. The discoveries are compared to previous analysis done on the materials to improve the precision and determine the most efficient technique to use. This research uses advanced methods to further improve our understanding of fusion energy technology.

Focal adhesion kinase inhibition promotes adult olfactory stem cell proliferation via ciliary neurotrophic factor

Dustin Gilmer

Faculty Mentors: Dr. Cuihong Jia and Dr. Theodore Hagg

East Tennessee State University
Physics

The neural stem cell niche consists of stem cells, blood vessels and multiple extracellular matrix proteins (ECMs). ECMs regulate stem cell adhesion, proliferation, differentiation and migration via integrins. One of the main mediators of intracellular integrin signaling is the Focal Adhesion Kinase (FAK). Our previous studies found that FAK inhibition increased adult brain neurogenesis via up-regulation of Ciliary Neurotrophic Factor (CNTF). The olfactory system is another site where neurogenesis continues throughout life. We tested whether FAK inhibition also promotes stem/progenitor cell proliferation through CNTF in the adult mouse Olfactory Epithelium (OE). Adult male and female C57BL/6, CNTF wildtype and knockout littermate mice were systemically injected with PBS or PBS plus FAK inhibitor (FAK14). Proliferating cells were labeled by injecting BrdU or EdU, which is incorporated into newly synthesized DNA, for 3 days and their numbers were counted in histological sections through the OE. In C57BL/6, FAK14 doubled the number of BrdU+ cells. CNTF wildtype and knockout mice had comparable numbers of EdU+ cells, indicating absence of CNTF does not affect baseline of normal OE neurogenesis. FAK14 increased proliferation in CNTF wildtype mice but did not have an effect in CNTF knockout mice. Collectively, these data indicate that FAK normally inhibits neural stem cell proliferation by reducing CNTF expression in adult mouse OE, and identifies the OE is a good model to study neuroregenerative mechanisms in the CNS. Supported by the College of Medicine, East Tennessee State University. Special thanks to Hanna Malone for her part in the experiment; for the animal care and collection of the tissue.

If This Wall Paper Could Talk: Symbolism in *The Yellow Wall-Paper*

Emily Gray

Faculty Mentors: Dr. Salvatore Musumeci and Dr. Andrew McCarthy

University of Tennessee, Chattanooga

English: Literature and Language

In her short story *The Yellow Wall-Paper*, Charlotte Perkins Gilman compensates for the length of her story by using the wallpaper as a symbol to help convey her message. Through her characterization of the titular wallpaper, Gilman elevates it from a mere setting detail to a symbol of the female protagonist's descent into madness. The first similarity between the wallpaper and the protagonist's mental illness is the fact that both are their host's most prominent flaw. By creating this relationship, Gilman showcases the deterioration of the protagonist's mental health via the dilapidated state of the summer home in which the narrator resides. In the same way the wallpaper causes the upstairs room of the estate to be unusable in the eyes of the narrator, her own decreased mental faculties render her incapable of fully fulfilling her role as both a mother and a wife. The pattern of the wallpaper also parallels the narrator's transition from lucidity to insanity. By likening the lines on the paper to the lady's writings, Gilman highlights the abruptness of her insanity. The woman's writing style changes just as suddenly and drastically as the lines on the wallpaper. The pattern also serves as a representation of the destructive effect of her mental illness on her ability to think coherently. Lastly, Gilman uses the narrator's description of the wallpaper as having more than one pattern to discuss the multiple layers of the woman's personality. While on the surface she may seem as put together as the linear print of the paper, underneath she is as disorganized as the figure who seems to lurk just beneath the wallpaper's surface. The convergence of the wallpaper's many patterns serves as a depiction of the housewife's personalities fusing to create a new, single demeanor ruled solely by her illness.

Ultimately, this essay examines Gilman's use of the wallpaper as a symbol of the narrator's experiences. Aligning the wallpaper's evolution so closely with that of the protagonist allows Gilman to effectively portray the drastic and destructive nature of the woman's mental illness in a limited number of pages.

Predictive Risk Assessment Model for 30-Day Readmissions Among Heart Failure Patients in Southeast Appalachia

Matthew Grimm

Faculty Mentor: Dr. Mary Lynn Brown

University of Tennessee, Knoxville
Nursing

There are many specific contributing factors to 30-day hospital readmissions among heart failure patients. In such, many generalized predictive risk assessment models that have been created in response to the financial cost of hospital readmissions over look these factors. These contribute to skewed results when used for the specific patient population of those with heart failure. Therefore, a growing need for focused risk assessment models that accurately represent heart failure patients, especially in Southeast Appalachia, has been seen. This research examines known contributing factors of 30-day readmissions among heart failure patients and compares them to the variables used in preexisting predictive models in an effort to determine the reliability of said models based on its representation of, or lack thereof, known contributing factors. Online databases including CINAHL and PubMed were searched systematically according to the following keywords: 30-day Readmissions, Heart Failure, Predictive Modeling, Contributing Factors, and Risk Assessment. A complete review of 41 abstracts and their references identified 19 articles for inclusion. Results found that major contributing factors for heart disease 30-day readmissions were not always fully integrated into generalized predictive models. As a result, when tested against specific demographics or patient groups, like heart failure, there was no reliable data that could be used to accurately predict a heart failure patients' likelihood of being readmitted in 30-days. The inadequate number of studies addressing this particular issue shows the need for further research.

The purpose of this research study is to create a predictive readmission risk assessment model for heart failure patients in Southeast Appalachia. This model would be used to calculate a readmission risk score based on known causes of 30-day readmissions, such as demographics, comorbidities, hospitalization, mental health, and compliance. The goal is that high-risk patients can be identified prior to discharge in order to allow for healthcare provider intervention aimed at educating patients about strategies to prevent readmissions within 30 days.

Examining Reactions to a Dating Vignette

Valisa Harris

Faculty Mentor: Dr. J. Gayle Beck

University of Memphis

Psychology

Intimate Partner Violence (IPV) has become a serious problem in the past several decades. IPV can be described as physical, sexual or psychological harm by a current or former partner or spouse (Campbell, 2002). In 2011, about one million women were victims of IPV (Yamawaki, Shipp, Pulsipher, Harlos, & Swindler, 2012). Yamawaki et al. (2012) also suggest that this number has the potential of being much higher due to underreporting. Attribution of blame towards the victim may be the answer to why so many victims do not report IPV. To date, most studies on attribution of blame have focused on physical IPV and dependent variables such as: victim's behavior prior to the IPV, gender of the observer, and participant's history of violence. However, a study by Capezza and Arriaga (2008) used psychological IPV and examined how the victim's response to the IPV (e.g., mildly aggressive or passive) and gender role (e.g., housewife or career woman) influenced how participants attributed blame. The goal of the present study is to examine how participants attribute blame in abusive dating relationships. In particular, this study will investigate whether the victim's response (e.g., assertive or passive) and the form of IPV (e.g., psychological or physical) impact how the participants attribute blame. In addition to examining how the participants attribute blame, this study will also investigate other possible outcomes related to attribution of blame, such as the perception of the victim (e.g., positive or negative), perpetrator exclusion of responsibility, the seriousness of the IPV, and advice for the victim. This study will also examine whether or not there is a correlation between the participant's acceptance of domestic violence myths and attribution of blame.

Physical Health Experiences of a Male Caregiver of a significant other with Breast Cancer

Meredith Haynes

Faculty Mentors: Dr. Sadie Hutson and Dr. Joanne Hall

University of Tennessee, Knoxville
Nursing

Breast cancer is the most common cancer diagnosis among women; the majority of women who bear this diagnosis are married. Male spouses of women with breast cancer are affected by the diagnosis in numerous ways including: intimacy and communication, emotional responsiveness, and sexual satisfaction. The purpose of this presentation is to elucidate the current state of the science regarding the effects of a breast cancer diagnosis on the male partner. The majority of published studies focus on psychosocial effects experienced by male spouses such as depression, mood changes, anxiety, tiredness, and psychological distress. In many cases, these effects have been associated with a decreased quality of life. Physical health effects of the male caregiver are largely unknown, leaving a gap in the science. Understanding the overall physical health of the male partner during diagnosis and treatment of breast cancer is critical to address the partners' needs, particularly in light of their caregiving responsibilities during this difficult time. Findings from this review have the potential to lay the foundation for healthcare providers, including oncology nurses, to develop interventions and preventive strategies to tailor clinical care and psychosocial support to male spouses of women with breast cancer.

I have conducted a review of existing literature with four key intersecting ideas: caregivers, men who have a wife/partner with breast cancer, aspects of support and communication, and healthcare. I examined articles using CINAHL and PubMed. Through this review, significant gaps in the literature were found. These gaps are important to the initial assessment in a nursing/patient interview, significant for the breast cancer patient's healing process, vital for the overall state of health of the caregiver (partner), and have the potential to improve patient care and outcomes under the scope of treating a male who is caring for or has cared for a partner with breast cancer. There is a lack of research on treating the physical health of the male caregiver. Clinically, this treatment would focus on prevention as well as medical treatment if/when physical manifestations of disease or any other deviation from good health arise.

SOLITARY – A Glimpse Into Lives of Forced Confinement

Dylan Haywood and Hannah Summers
Faculty Mentor: Dr. Michelle Brown

University of Tennessee, Knoxville
College Scholars; Sociology

SOLITARY is a short documentary film that provides a look into the practice of solitary confinement in the United States. The film was originally created under the advisement of Dr. Michelle Brown, as a campaign piece condemning the practice of extreme isolation punishment for an upper division Sociology course focused on Punishment and Society. Combining video clips and photographs as the primary visuals, the film is set to a piece of background music as it invites the viewer to explore some of the most foundationally important facts about the use of solitary in the US. The information presented is gathered from prominent sources such as Solitary Watch, the VERA Institute of Justice, and the United Nations General Assembly Human Rights Council. The film was featured in December 2015 on the University of Tennessee Knoxville Department of Sociology's Facebook page, where it received over 400 views. Offering key facts about the widely criticized use of this extreme form of punishment, the film offers an introduction to the topic and an invitation to viewers to become involved in efforts to end the use of solitary confinement in the United States. Film length: 7 minutes

Deciphering how plants adapt and respond to environmental stress in *Arabidopsis thaliana*

Jeremiah Holt

Faculty Mentor: Dr. Albrecht von Arnim

University of Tennessee, Knoxville
BCMB

According to the central dogma of biology, organisms can monitor gene expression at any level from DNA being transcribed into RNA, to RNA translation into proteins. Control of gene expression at the translational level is a mechanism used by all eukaryotic organisms to regulate global protein synthesis at a quick rate in response to stimuli. One pathway that has been studied little in plants is the role of the alpha subunit of the eukaryotic initiation factor 2 (eIF2 α). The alpha subunit of eIF2 is phosphorylated at a serine amino acid residue to down regulate protein synthesis by protein kinase GCN2 as a response to certain environmental stresses such as hypoxia and amino acid starvation. However, this phosphorylation event has been found to up regulate the translation of select mRNAs in yeast, specifically those harboring inhibitory upstream open reading frames (uORFs.) As plants lack the ability to change their environment, it has been a necessity for them to evolve a variety of mechanisms to respond to abiotic stresses. On top of this, uORFs are found in approximately one third of *Arabidopsis* mRNAs, so it can be hypothesized that many of these are under some translational control with eIF2 α . To test the validity of this hypothesis, I have employed site directed mutagenesis to alter the DNA sequences of both eIF2 α genes on *Arabidopsis* chromosomes two (At2eIF2a) and five (At5eIF2a) so that the serine residue at position 56 is an alanine, which is not a target of phosphorylation. Mutants with an aspartic acid at position 56 have also been cloned, which serve as phosphorylation mimics. Also, homozygous plant lines (At2eif2a^{-/-} and At5eif2a^{-/-}) lacking the eIF2a protein have been acquired. Transgenic *Arabidopsis* lines harboring phospho-null and phospho-mimic eIF2a will be generated by agrobacterium-mediated transformation of the mutant allele into At2eif2a and At5eif2a lines, and transcription and translation will be monitored by luciferase reporter gene assays. All things considered, this will allow us to have a new picture of the effect eIF2 α phosphorylation has on protein synthesis in *Arabidopsis*.

Disaggregated cost-benefit analysis incorporating ecosystem services and disservices: A case from SAI Sanctuary

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College Scholars: International Relations and Sustainable Development

Under private management and ownership, privately protected areas provide opportunities for *in situ* environmental conservation. These areas also provide ecosystem services and disservices for various stakeholders, but their impact on various stakeholders has not been comprehensively studied. To evaluate the economic impact of a privately protected area, a disaggregated cost-benefit analysis was conducted on SAI Sanctuary incorporating its ecosystem services and disservices on private owners of SAI Sanctuary, as well as local and global stakeholders over a 10-year period from 2010 to 2020. SAI Sanctuary is a privately protected area located in southern Kodagu, a district in the Western Ghats forests of Karnataka, India. To value costs and benefits, interviews were conducted with private and local stakeholders, along with a literature review integrating other valuation techniques. Discount rates of 0% and 6% were selected, and sensitivity analysis yielded various tradeoffs borne by each stakeholder group. Results indicate private stakeholders bear the greatest net costs, while local stakeholders gain the greatest net benefits, largely due to pollination, a regulating service valued between \$546,210 and \$774,810 by the year 2020. Global stakeholders remain the least affected by SAI Sanctuary with net benefits ranging from \$27,900 to \$39,570 by 2020. Still, the results validate predictions by private owners that SAI Sanctuary not only sequesters carbon, it provides a range of ecosystem services while harboring biodiversity and producing natural capital. The results also indicate that environmental conservation occasionally yields unintended tradeoffs with disproportionate costs and benefits. In sum, environmental conservation can have a multiplicity of outcomes, but measuring these outcomes and bringing privately protected areas into strategies for global conservation is vital.

Do You Have “Connections” at the Courthouse? An Original Survey of Citizen Beliefs about Informal Influence and Judicial Rulings in the Middle East

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Political Science

Under what conditions do citizens of developing countries view judges as neutral and fair or biased and arbitrary? This study addresses this question through an original, nationally- representative survey from the Middle East and North Africa (MENA). Completed in Morocco, the 1201-respondent survey is the first of its kind from the MENA to assess citizen beliefs about how a person’s informal influence at courts facilitates the acquisition of favorable rulings from judges. It finds that 82 percent of respondents believe that citizens with “connections”—known as *wasta* in Arabic—get favorable judicial rulings. Yet, some citizens are more (or less) likely to put import on informal influence. Whereas rural citizens and ethnic minorities value informal influence, citizens from the cultural elite undervalue it. This study concludes by demonstrating that belief in the importance of informal influence reduces citizen trust in courts, which can hinder court effectiveness and prospects for democratization.

Sovereignty Metaphors in Southern Baptist Rhetoric: An Analysis of Conceptual Metaphors in Westboro Baptist and Pleasant Valley Baptist Church Sermons

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Linguistics

The Cognitive Theory of Metaphor, first extensively detailed in *Metaphors We Live By* by Lakoff and Johnson (1980), states that metaphors are not simple, linguistic ornamentation but are complex systems of understanding one thing in terms of another, which heavily impacts the way in which we engage with the world and others. Nowhere is this more evident than in religious rhetoric which attempts to provide several different systems of metaphor in order to understand one of the most abstract concepts: God. The author here looks at transcripts of sermons from two Southern Baptist churches and outlines a system of metaphors related to the sovereignty of God and warfare. After outlining this conceptual system, the author discusses the historical origins of this metaphorical system and argues the nature of religious practice sustains the vitality of the Sovereignty metaphor and prevents it from becoming conventionalized. After providing these arguments, the Sovereignty metaphor is then contrasted and compared with other well-documented systems of metaphor which exist in Christian rhetoric and the issue of how these metaphorical systems influence inter-religious aggression and the conceptualization of other religions portrayed by the Southern Baptist rhetoric in these sermons. This paper then concludes with observations on how this research could be implemented to decrease inter-religious violence.

Pronouns and Thoughts on Neutrality: Gender Concerns in Modern Grammar

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Linguistics; College Scholars: Educational Linguistics

With increased social awareness of transgender and non-binary individuals, universities across the United States have implemented policies, made suggestions for inclusive language practices, and provided gender-neutral pronoun guides to avoid marginalizing these groups of people through adjusting personal pronoun usage. However, these measures have been met with mixed reception from some students, parents, administrators, and legislators. As linguists, the authors looked at the situation with gender-neutral pronouns on campuses and investigated 1) an overview of how exactly languages plays a role in identifying someone's gender; 2) the historical, linguistic, and social contexts that surround this issue; 3) the viability of generic 'he' and singular 'they' as gender-neutral pronouns; and 4) the sociolinguistic pressures involved in the social movement for pronouns outside of the gender binary. The paper concludes with recommendations for gender-neutral pronouns in compliance with federal policies and university visions, missions, and goals to be more inclusive of genderqueer and non-binary individuals.

Audience, Content, Media: A Literature Review about Factors to Consider When Designing Technology Based Asthma Education Programs for Children

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Nursing

Childhood asthma is a growing societal problem that causes suffering for children and families. Short of finding a cure, the best way to address this problem is to give children with asthma the resources they need to control their condition. Unfortunately, research and resources for young children with asthma are lacking. The authors hypothesize that an approach using technology based delivery methods to provide age-appropriate education, which promotes self-regulation and includes psychosocial elements, could help children with asthma decrease exacerbations in the short term and establish healthy habits in the long term. To lay the groundwork for the initial investigation of this hypothesis, the authors reviewed the literature for three elements: audience (children with asthma), content (self-regulation and psychosocial elements), and media (mobile technology applications and digital story). Literature was reviewed for children's beliefs about illness and medication, self-regulation versus self-management, the psychosocial elements of parental support and peer influences, technology and education, clinical computer-based education, electronic educational games, and smartphone applications. The gaps in the literature found regarding these topics point to areas where future research would be instructive for designing effective, technology based applications for children with asthma. To produce the most effective asthma education materials for children, all three elements in this literature review—audience, content, and medium—should be investigated in future research studies.

Inquiry into the Intended Structure of "The Grand Inquisitor"

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Russian Studies

I address the structural label of "The Grand Inquisitor" because its style and placement in Dostoevsky's *Brothers Karamazov* is unusual and clearly meaningful, if only because of the treatment of it by Ivan—its fictional author—and Alyosha Karamazov. Because Christ is portrayed in the "poem," and because its content is both theological as well as philosophical, I analyze what this particular piece of Dostoevsky's work has in common with the general modus operandi of Søren Kierkegaard. I make this connection because of their corresponding belief systems and show that their writing styles are similarly polyphonic as a logical result of those belief systems. In Kierkegaard, his use of pseudonyms that take on their own personas; in Dostoevsky, the absence of authorial finality and the unbridled expression of characters with whom he disagrees. Dostoevsky and Kierkegaard have been compared by other scholars, including Lev Shestov, and they have been shown to employ similar methods of dialogic writing. Based on this, I conclude that "The Grand Inquisitor" can more interestingly, and perhaps more accurately, be thought of as a dialogue, rather than as a monologue (as it currently is). In my opinion it is a Dostoevskian dialogue, which has been altered by the author due to the applicability of certain exceptions: Dostoevsky is motivated by his belief system to mask the dialogue with the silence of one of its participants, Christ. Making those exceptions highlights his beliefs about faith and free will, and demonstrates his fascinating use of the structure of "The Grand Inquisitor" to do so.

Analysis of Environmental Factors and Their Effect on the North Bosque Watershed

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Geology

The development of a watershed is dependent on topographic, geologic, and hydrologic conditions. The North Bosque watershed surface water features, i.e. rivers, and runoff from rainfall eventually drain to other bodies of water affecting water quality, conservation, and restoration. The watershed is affected by any changes to the area such as elevation, mining, and agriculture. In order to analyze the North Bosque Watershed, a geographic information system will be used in order to compare environmental factors within the basin including stream drainage density, stream order, elevation, runoff, infiltration, soil types, temperature, and evapotranspiration to determine their effect on the watershed. In particular, infiltration, elevation, and runoff are factors that significantly impact a watershed; therefore, this project will analyze soil surveys, aquifers, rainfall, and Digital Elevation Models. The computer-based North Bosque watershed will simulate terrestrial and riparian landforms and processes, both spatially and temporally, and will provide a critical analysis of the watershed and data that may be used for further research.

Civilizing Rebels: The Manichean Allegory in De Lisser's *The White Witch of Rose Hall* and *Revenge: A Tale of Old Jamaica*

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English, History

Early twentieth century Jamaican author H.G. De Lisser occupies a conspicuous spot in the history of Caribbean literature, lauded by Birbalsingh as “the first important novelist of the English-speaking Caribbean.” However, scholars have paid very little attention to De Lisser, perhaps because of his uncomfortable position as a colonialist of mixed race in a literary tradition that is generally critical of colonialism. De Lisser’s most famous and most widely circulated novel, *The White Witch of Rosehall*, is particularly conservative, making frequent use of the Manichean allegory, privileging British characters and institutions over Jamaican ones, and viewing African-derived religions as lesser than European-derived Christian traditions. In addition, De Lisser’s less famous novel, *Revenge: A Tale of Old Jamaica* exhibits many of these same colonialist themes. The two novels are particularly similar in their “monstrous” depictions of black-led rebellions, including the 1831 Christmas time slave rebellion and the 1865 Morant Bay rebellion. De Lisser’s novels *The White Witch of Rose Hall* and *Revenge: A Tale of Old Jamaica* attempt to present a Jamaican imperialist argument for a “civilizing mission” based on the Manichean allegory; however, De Lisser’s argument is self-defeating, and his novels ultimately show the hypocrisy of an imperial system that claims to value a “civilizing mission” but sees “the native” and his/her culture not only as the absence, but the inverse of civilization.

The Town Coon and the Country Coon: What's For Dinner?

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Wildlife and Fisheries Management

Rabies is a viral disease affecting the nervous system of mammals and is considered to be the most deadly infectious disease in the world if left untreated. Raccoon rabies has plagued the eastern United States for over a decade and costs hundreds of millions of dollars each year in vaccination programs, health care costs, and animal control. Wildlife Services, a division of the United States Department of Agriculture – Animal Plant Health and Inspection Services, spreads vaccination baits via air and ground from Maine to Alabama each year to stop the spread of raccoon rabies. Raccoons are superb urban adapters and readily consume human foods. Raccoons typically experience higher densities around these food sources which has important implications for vaccine dispersal. In order to target urbanized areas for vaccine dispersal, it is important to understand the extent of raccoon human food consumption and the factors affecting consumption levels. To date, there has been no prior research measuring raccoon human food consumption through stable isotopes. Using carbon (^{13}C) and nitrogen (^{15}N) stable isotopes, we examine the effects of land-use and human density upon raccoon human food consumption. Hair samples from 241 raccoons trapped in a Hamilton County, TN vaccine-dispersed area were tested for stable isotope levels and ArcGIS was used to map trapping locations and compare with national land cover and human population data. Standard home range buffers were created for every raccoon based upon prior research and the human density and percent of human-developed landcover were calculated for each raccoon. We found that the driving factors for human food consumption was driven by individual weight and human population density for male raccoons, while female consumption was driven by percent developed landcover and trapping area location. These results could have serious implications for future vaccine dispersal and warrant further research.

Bioarchaeological Protocols and Analysis for Islamic period remains at 'Ayn Gharandal in southern Jordan

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Psychology, Anthropology

Bioarchaeologists face challenges in countries such as Jordan because authorities may forbid the removal of human remains from archaeological sites and often limit the use of laboratory analyses on the remains. In Jordan, these rules are especially important when burials are related to a Muslim population. Nevertheless, the examination of human remains is integral for answering questions related to the health of local populations, burial practices, ritual, and nutritional intake.

As a result of these challenges, the 2015 season of the 'Ayn Gharandal Archaeological Project (AGAP) developed on-site analyses that maximized data while still respecting Jordanian cultural and religious mores. 'Ayn Gharandal is a Late Roman through Islamic period site in southern Jordan. The burials at the site took place after the Roman period structures were abandoned, at which time the site was reused extensively as a burial ground for several hundred years.

The burials at 'Ayn Gharandal date to the Islamic period, as indicated by the position of the human remains facing Mecca and recent Carbon 14 analysis from burial shrouds. Overall, the human remains are preserved fairly well because of the dry local climate. As a result, the overall bioarchaeological research goals for the site integrate archaeological excavation of the burials as well as on-site non-invasive sample collection in order to answer the following research questions: (1) determining if the population was nomadic, (2) determining any possible relations between interred individuals, (3) identifying the lifeways and health of the population, and (4) any previously undocumented developments in burial techniques as well as indicators of a system of hierarchy among the cist burials. In order to present the ongoing AGAP bioarchaeological research, this paper will give a brief history of the site and the human burials, describe the bioarchaeological research protocol within the cultural and religious context of modern Jordan, and examine in closer detail human burials that I excavated during the 2015 season.

An Italian in Paris: Casella's *Barcarola et Scherzo Op.4* as Representative of Italian Impressionism

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Music Education, Flute Performance

In the early twentieth century, Italian composers embraced stylistic changes like in other nations across Europe. This was exemplified by the "generazione dell'80" who have been characterized as a group that was inspired by traveling throughout Europe, challenging traditional Italian compositional practices. Alfredo Casella is one such composer whose works combined classical forms and styles with the new influences of French impressionism. Casella's *Barcarola* clearly expresses the fusion of Italian classical and romantic traditions with French impressionism. This piece, written for flute and piano in 1903 is one of Casella's earliest published pieces while studying in France. This paper will examine *Barcarola's* form, harmonic structure, and thematic development as representative of his unique compositional style. Casella uses this unique compositional style to cohesively bind the classical forms of the romantic era with the new ideas of French Impressionism. This allowed Casella to successfully introduce and promote impressionistic ideals in Italy. The paper will suggest formal and traditional connections between Casella's *Barcarola* and Beethoven's scherzo from his *Piano Sonata Op.14 no.2*. It will also propose impressionistic connections between Faure's *Barcarolle in Eb Op. 70* and Casella's *Barcarola*. These connections will reinforce Casella's fusion of Italian classical and romantic traditions with French impressionism to create a unique compositional style that would change the way Italy view impressionism.

Chretien de Troyes: An Analysis of Twelfth Century Marriage

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History

One aspect of the twelfth century that has persisted into modern media and historical representations has been the ideals of Courtly Love. This notion is exemplified by the romances of King Arthur's court, in which, a knight goes on a quest on behalf of a married woman whom he could never truly obtain. However, the author of the first Arthurian romances as we know them today, Chretien de Troyes, wrote to challenge the ideals of Courtly Love. In Chretien's romances, he demonstrates that the youthful fantasies of Courtly Love are worthless, indeed, it was the realities of marriage that dictated the adventures and transformations of characters such as the protagonists of *Erec* and *Enide* and *Yvain, The Knight of the Lion*. As such, his romances are an important look into the changing social systems of Northern France; law, specifically marriage law, was becoming less feudalized and aristocratic families had less authority over their children's marriages. Using twelfth century marriage contracts, Chretien's romances, and biographical accounts of marriage, this paper argues that Chretien's writings were not simply entertainment for the aristocracy, but subversions of Courtly Love fantasies by the realities of marital and social responsibilities in a changing society.

Applying the Quality Effects Model of Meta-Analysis to Measure Outcomes of Children of Gay Parents

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Business Analytics, Psychology

The field of literature on children of the LGBT community is quickly growing. However, no meta-analysis has specifically examined the children of gay fathers and no meta-analysis has applied the newly developed Quality Effects Model to this research. This study applies the Fixed Effects, Random Effects, and Quality Effects meta-analytic models to 12 studies (45 effect sizes) from the past 10 years to measure child psychological, social, and gender/sexual identity outcome. Preliminary results indicate that children of gay fathers show no difference in psychological outcome under the quality effects model and actually have higher outcomes than their peers under the random effects and fixed effects models. Results for social and gender/sexual identity outcomes should be available by the conference date. Limitations and applications of the study are discussed. Stephanie Kors is a co-author of this research.

Impact of Hospital-Associated Sitters in Care of Unaccompanied Pediatric Patients

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Nursing

In the acute care setting, it is not uncommon to find pediatric patients who are unaccompanied by their caregiver, the literary term for parents, family or otherwise legal guardians of the pediatric patient. Various social and environmental factors often lead to the absence of a child's caregiver. Caregiver presence is influential in reducing anxiety, falls, and pain, and improving the physical and mental health of the child. The literature establishes that the absence of caregivers is detrimental to the patient and the success of healthcare providers' interventions; however, no alternative solutions or means of mitigating this absence have been established. Multiple Tennessee pediatric hospitals have made intermittent use of hospital volunteers as surrogate supervision during the temporary absence of the patient's family or legal guardians. A further understanding of the phenomenon of unaccompanied pediatric patients and the impact of hospital-associated volunteers is necessary for hospitals and the nursing community to provide safer, higher quality, and family centered care of the pediatric patient.

Changes to Primary Education to Increase Postsecondary Hispanic Enrollment Rates in Tennessee

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Hispanic Studies - Language and World Business

In Tennessee, the Hispanic enrollment rate in higher education is statistically lower than other racial demographics.

To better understand the current demographics and to illustrate where the problem lies, this paper first focuses on the immigration, demographic, and postsecondary enrollment trends nationally as well as in Tennessee. By focusing on which ways primary education can better prepare Hispanic children for higher education, which in turn improves the long term postsecondary education enrollment, the paper centers on three general methods. These methods are providing specialized assistance within elementary schools for the children, providing home assistance for the families, and using community outreach methods to aid newly immigrated families with young children. Research showed these methods to have strong potential in improving early academic success that will lead to higher postsecondary enrollment.

Development of Separation Methodology for Post-Detonation Fission Products

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Nuclear Engineering

Current methods to chemically separate heavy metal isotopes in nuclear post-detonation debris are slow, necessitating the development of more rapid, yet equally accurate, methods. Currently under investigation is a method to separate the elements of interest by their thermodynamic properties in a gas chromatography oven before differentiating them by mass with a mass spectrometer. This would allow precise differentiation between separate elements with isotopes of overlapping masses. However, the difficulty of volatilizing heavy metals at easily achievable temperatures has required the development of a new instrument and methods. Presented is the progress from a coupled gas chromatography quadrupole mass spectrometer, or Quadrupole GC-MS, to a gas chromatography inductively-coupled plasma time-of-flight mass spectrometer, or GC-ICP-TOF-MS. Significant challenges relating to fragmentation of organic ligands and rapid deterioration of the gas chromatography quartz column leading to large background signals necessitated the change to the more specialized instrument. Additionally, several early challenges encountered with the GC-ICP-TOF-MS coupling system, namely, temperature and pressure gradients, are presented with their solutions, along with promising results indicating the validity and viability of the method.

A Literature Review of Substance Abuse Among Anesthesia Providers

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Nursing

Research has demonstrated that anesthesia providers are more susceptible to substance abuse than any other healthcare provider. Several preventative measures are being implemented in Certified Registered Nurse Anesthetist (CRNA) programs to educate these future anesthesia providers about the risk factors, trends, and outcomes associated with substance abuse. Given that the rate of substance abuse continues to pose a threat to CRNAs and anesthesiologists, more research is needed that is aimed at the implementation of preventative strategies in the educational setting. The purpose of this literature review was to examine the state-of-the-science related to pre-disposing risk factors, prevalence of substance abuse, and the preventative measures regarding substance abuse among anesthesia providers. References were identified using PubMed, CINAHL, and Google Scholar using the following search terms: "anesthesia," "student," "wellness," "stress," "substance abuse," "satisfaction," "personality," "depression," and "nurse." The existing science underscored that stress, career satisfaction, personality, genetics, and fatigue all play a significant role as risk factors for substance abuse among anesthesia providers. Both students and board-certified healthcare providers fall prey to substance abuse due to ease of access, high stress associated with administering anesthesia, and the propensity to become addicted to opioids and other anesthetics. Finally, preventative measures currently include educational videos, peer support groups, wellness programs, and computerized documentation and accountability. A gap in the science exists about which, if any, of these strategies are effective. Future research should emphasize the integration of preventative strategies in the educational setting in order to create a safer environment for anesthesia providers and their patients.

Development of GC-ICP-TOF-MS for Nuclear Forensic Applications

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Nuclear Engineering

The field of post-detonation nuclear forensics aims to characterize the design of a nuclear weapon after it detonates. More specifically, post-detonation forensic research at the University of Tennessee uses glassy debris generated in the fireball of a surface nuclear blast, or nuclear melt glass, to help characterize the elemental and isotopic constituents of a nuclear weapon. To successfully improve state-of-the-art analytical practices in post-detonation nuclear forensics, a new approach must demonstrate both improved accuracy and more timely results to be considered for implementation over currently established analytical methods. One of the most time-consuming aspects of technical nuclear forensic analysis is the chemical separation process, where fission and activation products are identified and quantified for isotopic analysis. It was therefore deemed prudent to develop a more rapid approach to fission product separations of post-detonation debris samples. A coupled gas chromatograph inductively-coupled plasma time-of-flight mass spectrometer, GC-ICP-TOF-MS, was developed to exploit the rapidity of gas-phase chemistry. Primary accomplishments in the development of this instrument are presented here. Much work was undertaken to overcome challenges in volatile organometallic sample preparation, kinetic and thermal continuity, and sample injection methodology. The solutions to these hurdles, as well as preliminary results from the instrument, are presented.

Plant selection of mycorrhizal symbionts in response to abiotic stress

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Environmental Science and Soil Science

To thrive and be healthy, plants require certain macronutrients that are difficult to obtain by physiological mechanisms alone. Plants rely on mutualistic relationships with mycorrhizal fungi to obtain these limiting nutrients. Arbuscular mycorrhizal fungi (AMF) and dark-septate endophytes (DSE) are mycorrhizal fungi that often co-colonize root space, but provide different nutrients to plants in exchange for carbon substrates. Arbuscular mycorrhizal fungi are involved in phosphorus acquisition while DSE acquire nitrogen for host and are more stress tolerant. Patterns of co-existence between AMF and DSE are commonly observed in plant roots, but it's unknown what drives their co-existence. We tested whether plant hosts mediate fungal co-existence in response to two abiotic drivers – water and nutrient availability. We conducted two separate greenhouse studies using field-collected individuals of *Potentilla gracilis*. In the moisture experiment, we grew *P. gracilis* under three soil moisture conditions: (20-25% water, 15-20% water, and 10-15% water). In the nutrient experiment, some received nitrogen or phosphorous fertilization only, some received both nitrogen and phosphorous, others received labile carbon substrates, and the control group were not fertilized at all. We hypothesized that the plants that are under water and nitrogen limitation will have more DSE present in their roots and plants will host more AMF under wetter, less stressful conditions and when phosphorous is the main limiting nutrient. To test this, we measured colonization in roots of the *Potentilla gracilis* after 10 weeks of growth in the fertilized or unfertilized treatments. We found that DSE fungi are more abundant in the plants experiencing water stress and nitrogen limitation, while AM were more abundant in favorable growing conditions and in treatments where phosphorous stress was prevalent. Knowledge of these behaviors of plant selection may reveal larger trends in environmental science and ecology where abiotic conditions structure the interactions between biotic ecosystem components. As global change alters temperature and precipitation regimes and agricultural use of fertilizer introduces added nutrients to natural systems, changes in belowground communities can scale up to affect ecosystem function on a wide-spread scale.

The Hospital Staff Nurse's Perceptions of His or Her Role in the Hospital Reimbursement System

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Nursing

Nurses make up a high percentage of healthcare personnel working in a hospital setting. As healthcare professionals, much of their daily work is the provision of direct patient care. Nursing-sensitive indicators serve as a way to measure the impact nurses have in the promotion of quality care delivered. Existing research highlights the value-based purchasing system implemented by the Affordable Care Act. Yet, very few studies have explored nurse involvement as a critical facet to this system. This literature review provides a state-of-the-science addressing nursing-sensitive indicators regarding the delivery of quality care, hospital assessment related to value-based purchasing and the role of patient satisfaction regarding nursing care in the reimbursement of hospitals. The PubMed and CINAHL databases were queried using search terms such as "value-based purchasing," "nursing sensitive indicators," "quality care," and "hospital reimbursement." This review provides a synthesis of the existing data related to nurses' roles in value-based purchasing and the way that nurses take part in reimbursement efforts. A consistent theme in the literature is that the HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) survey accounting for 30% of the total performance score and thus impacting funds allocated by the Affordable Care Act depends on patient satisfaction and therefore on nursing quality. Other studies acknowledged that nursing sensitive outcomes depend on many patient variables that may depict nursing professionals negatively, such as age and culture differences. A gap in the science exists regarding the nurse's perspective on their evaluation by these measures. Future research should serve to assess the clinical nurse's perception of the way their care impacts the hospital reimbursement and healthcare costs. Results from such research improve hospital reimbursement by targeting nurse clinicians to provide them with a more comprehensive understanding of the system and their role in performance at the bedside.

External Forcing Factors that Affect Torque Resistance Among Hardwood and Softwood Species, Norris Dam State Park, Tennessee, U.S.A.

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Geography

On two research trips to Norris Dam State Park in eastern Tennessee, we observed major differences in our ability to core trees between the winter and spring seasons. This observation led to an overarching set of research questions: does the amount of torque required to bore into a tree vary by species, elevation, tree age, or tree size? We used torque to measure the number of foot-pounds it takes for a person to core three species of trees representing the three types of wood structure: softwood (*Pinus* spp.), diffuse porous hardwood (*Nyssa sylvatica*, Marshall), and ring porous hardwood (*Quercus* spp.). We quantified the degree to which the hardwood and softwood species vary based upon torque (foot-pounds) measurements. We used basic plotting and linear regression models in RStudio to explore the relationships between torque, elevation, age and DBH (diameter at breast height). We found elevation and DBH play the largest role in determining torque with oaks, but not with any other species. With an increase of 1 meter in elevation the amount of torque it takes to core an oak increases by 0.12 foot-pounds. On the other hand, with an increase in 1 centimeter in DBH the amount of torque it takes to core an oak decreases by -0.11 foot-pounds. Therefore, the easiest oak to core would be a large oak located at a lower elevation. Also, on average, using blackgums as our reference group, it takes 6.482 more foot-pounds to core into an oak and 9.175 fewer foot-pounds to core into a pine. Our study quantifies the well-established principle in dendrochronology that it requires more force to core into ring porous hardwoods than into softwood (conifer) species.

Lunar Base Shielding

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Nuclear Engineering

Habitats designed for long-term occupation on the moon or on Mars will require adequate shielding from the radiation environments there. The primary source of radiation exposure in those locations comes from Galactic Cosmic Rays (GCR), which are composed primarily of charged ions ranging from protons to iron, and electrons. Although neutrons are not a component of the GCR field, they are produced when GCR ions interact in shielding materials. Because the shielding required to reduce the effective dose from primary GCR ions will be thick, the secondary neutrons produced by GCR interactions can comprise a significant fraction of the effective dose behind shielding. Through proper choice of shielding material, however, the dose from neutrons can be reduced while affording the same level of protection from the primary GCR. In this study I have completed a series of radiation transport model calculations to determine what choice of material best reduces the dose from neutrons as a function of shielding thickness for a lunar habitat. The habitat geometry used in the calculations is a simple dome-shaped structure with uniform wall thickness together with a separate floor material. The materials studied were aluminum, polyethylene (a material known for its effectiveness in reducing the dose from GCR), and lunar regolith. The studies indicate that polyethylene reduces the neutron fluence when compared to the other materials. The studies also indicate that the choice of floor material is critical in reducing the dose from albedo neutrons – neutrons created by GCR interactions in the lunar soil – and that aluminum flooring may increase the neutron fluence instead of reducing it.

Point Defect Analysis in MoSe₂ Derived by Mechanical Exfoliation and Chemical Vapor Deposition

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Materials Science

Two-dimensional MoSe₂ is a semiconductor with a direct bandgap making it a promising material for nanoelectronic and optoelectronic applications. This investigation studies the point defects in MoSe₂ derived from two different synthesis methods. One technique used to isolate these monolayer films is referred to as mechanical exfoliation or otherwise known as the scotch tape method. In a recent paper by Huang et al, an improved method of mechanical exfoliation is outlined. Where they focus on isolating graphene from bulk graphite, we extend this to a transition metal dichalcogenide and show that this new mechanical exfoliation process more reliably produces single layer flakes. The second synthesis method looked at is chemical vapor deposition method where single layers are grown from a gaseous precursor at high temperatures, rather than isolating from a bulk crystal. Characterization of sample is done with electron energy loss spectroscopy (EELS) which gives information of chemical composition and bonding; as well as, optical properties and z-contrast microscopy performed on the state-of-the-art fifth-order-aberration correction Nion UltraSTEM which produces atomic resolution images for direct point defect observation. We find, through electron energy loss spectroscopy and high-spatial resolution z-contrast imaging, that the number of point defects in chemical vapor deposition grown materials is greater than the point defect concentration of mechanically exfoliated two dimensional materials. The defect concentration plays a vital role to charge carrier concentration because each point defect acts as a scattering site to charge carriers. Finally, we suggest ways to decrease the amount of point defects in MoSe₂ from chemical vapor deposition since chemical vapor deposition method is the most applicable for large scale production of these materials when they find themselves integrated into current technology.

The U.S. Justice System, Incarceration, and the Structural Disenfranchisement of Women of Intersectional Identities

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Anthropology, Hispanic Studies

Though the United States of America (U.S.) has a reputation as an all-inclusive, “melting pot” nation, it is clear that certain people are given preferential treatment in society and under the law over others. People of color in the U.S. often face injustice and disenfranchisement: from enslavement, to the era of Jim Crow, to now, during the rise of what scholars call ‘The New Jim Crow,’ mass incarceration. Black people are incarcerated at a rate almost six times higher than their White counterparts and are given longer, harsher sentences for the same offenses [1]. Because of a national perception that attributes criminality to people of color, these communities are often more heavily and more harshly policed. These race-based disparities have been largely discussed and investigated in respect to how they affect men; however, women, whose incarceration rates have increased over 800 percent in the past thirty years [2], are largely unrepresented in discourse. In addition to mass incarceration, women of color also face the burden of having their sexualities policed and criminalized; and, many women, especially poor women of color, find their reproductive rights jeopardized by the state. Victims of sexual harassment, sexual assault, and rape are often ignored or are even persecuted in courts, never seeing justice. In this paper, I argue that the current state of the legal system allows for the systematic exploitation of and violence against women of color living in the U.S. Through an intersectional framework, I explore some of the unique plights of women of various marginalized identities.

Two Murders and a Tonnetz - An investigative analysis of Prince Carlo Gesualdo and his composition, "Tristis est anima mea"

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Music Performance

There are many facts, myths, and mysteries that surround Prince Carlo Gesualdo. What little is known has been dramatized and twisted into dark and menacing tales; but unlike countless others in history, a deeper glimpse into this man's subconscious is merely a page turn away. Gesualdo lived from 1566-1613, but despite his musical achievements in both sacred and secular composition, Gesualdo spent most of his time involved in matters of a much darker nature. These matters included locking up young men to beat him upon command, fraternizing with witches, and committing two vengeance-laced executions.

Gesualdo's life-long turmoil is reflected in his tumultuous music, evident specifically through his prolongation of dissonances, emphasis on mediant relationships, and utilization of non-functional triads; contradicting the rest of the musical world that sought to codify the foundations of functional harmony.

This presentation will develop a comparative analysis between analytical techniques from the 17th and 20th centuries, focusing specifically on contextualizing the relationship of harmonic linear patterns and contrapuntal motion in "Tristis est anima mea." This presentation will also expand upon the connection between composer and composition; concentrating on how Gesualdo's life is reflected in the compositional legacy he leaves behind.

ADHD, Aggression, and Young Adult Delinquency

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Psychology

Attention-Deficit/Hyperactivity Disorder (ADHD) is a childhood neurodevelopment disorder with a prevalence rate of 8-12% world-wide (Faraone, 2010). Individuals with an ADHD diagnosis often make careless mistakes, have difficulty organizing tasks, display restlessness, and possess little patience and these symptoms interfere with typical functioning and development (American Psychiatric Association, 2013). Because of the hyperactive and impulsive traits, ADHD diagnostic status has been associated with aggressive behavior and social problems (Retz, 2010). The link between a childhood diagnosis of ADHD and juvenile delinquency has not been thoroughly investigated. This relationship could have major consequences for both individuals and the criminal justice system. In this review, the contribution of ADHD symptomatology and other common comorbid disorders (e.g. Oppositional Defiant Disorder and Conduct Disorder) to delinquent behavior is explored. Preliminary results indicate that a diagnosis of ADHD increases the chances of engaging in criminal behavior by 8.8% (Sigurdsson, 2014). In light of Sigurdsson's (2014) finding, it is imperative to understand this relationship and implement delinquency prevention measures for children with ADHD.

Using an iPad interface for bedside communication with Spanish-speaking families in pediatric acute care: A feasibility pilot study

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Nursing

The growing number of Spanish-speakers in the U.S. poses distinct communication challenges to health care institutions. Language barriers in pediatric acute care have been associated with increased risk for adverse events, longer hospital stays, and decreased quality of care. Although current strategies such as in-person and telephonic interpreters exist, the pattern of interpreter use is disjointed among hospital clinicians. Nurses are often without interpreter support during daily bedside care of limited English-proficient patients and families. Nursing staff at a pediatric regional children's hospital in the Southeastern United States identified a clinical challenge in communicating with Spanish-speaking patients and families. A basic communication interface supported by iPads (*UTalk version 1.0*) was developed with input from staff, a certified medical interpreter, and Spanish-speaking members of the community for use at the bedside in a pediatric hospital to supplement communication.

The purpose of this study is to examine the usability of *UTalkv.1.0* for basic communication between Spanish-speaking, limited English-proficient families and nurses at the bedside on a medical-surgical unit of an urban children's hospital in the Southeastern United States. Methods: A feasibility pilot study is being conducted on a medical surgical unit of a pediatric hospital to test the interface's usability and engagement through interviews with nurse-family dyads. Nielsen's model for usability testing will guide the feasibility testing of *UTalkv.1.0*. Conclusions: Improved communication impacts quality of care, and a bedside communication interface may supplement communication among nurses and Spanish-speaking families. Findings from this study will direct modifications to *UTalkv.1.0* and serve as a reference for the development of future communication technology interfaces at the bedside.

(Vapor) Waves of Future Past: Context and Consumption in the Endless Mall of the Internet

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Cinema Studies and American Studies

As time moves ahead, less space exists between media. Content from disparate points in time and space can be accessed online easier than ever before, causing an increase in our rates of consumption. This furthers cycles of hyper-capitalism, while also removing cultural objects from their original contexts and juxtaposing them in ways that lend new meanings to old things. These phenomena are perhaps best exemplified by vaporwave, a genre of music that came into existence online in the early 2010s. Vaporwave takes influence from corporate forms of music like elevator music and smooth jazz and embraces a retro-futuristic view of capitalism in its accompanying visual aesthetic. The genre mirrors changes in the habits of consumers, as it exists both as a critique of and ode to modern capitalist culture. The Internet gives us an awareness of the "manufactured-ness" of so much of the content we absorb, but because of its passive nature as a medium – actions online lack a sense of immediacy or consequence – consumers are distanced from the potential drawbacks of mass production and do not necessarily view them as negative. Thus, vaporwave simultaneously lampoons and adopts cultural signifiers of late capitalism, operating as a reflection of the cultural impact of digital spaces, particularly on the behaviors of consumers.

The Appropriation of Indigenous Gender Identity as Modern Colonization

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Nursing

Beginning in the 1950s, the United States has seen a rapid increase in the number of unmarried couples and a subsequent decline in married couples. These couples participate in the same family practices like those of their married counterparts such as having children and cohabiting in the same residence. Studies have shown that marriages contribute to healthier pregnancies with healthier neonates. Married mothers participate in less risky health behaviors such as smoking and alcohol consumption, and report lower rates of stress and depression. Furthermore, improved pregnancy experiences and outcomes result when the partner participates throughout the pregnancy and antenatal care process. These healthier pregnancies prevent neonatal low birth weight, prematurity and mortality. However, there are no studies that explore the perceptions of first-time mothers about the influence marriage and partnership can have on their reproductive health and that of their neonate.

Through a phenomenological pilot study, the perceptions of cohabiting married and unmarried, first time, heterosexual mothers will be explored with three specific aims. These three aims include (1) the quality and commitment of the relationship, (2) the impact of quality and commitment upon maternal reproductive behaviors and (3) the impact of these behaviors upon neonatal outcomes. A convenience sample of 8 participants (4 unmarried and 4 married) will be recruited. Data will be collected from eight face-to-face, 60-minute interviews with semi-structured questions. Data will be analyzed using descriptive statistics for the demographics and thematic analysis for the qualitative data. The findings will then be used to fill the knowledge deficit related to the effect of one's perceptions about marriage and partnership on maternal and neonatal health during pregnancy. This knowledge can contribute to future research and healthcare practices to promote the well-being of both mother and child during the antenatal process.

Behavior Management: Behavior Change Project

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Special Education

The challenging behaviors of children have complicated the lives of mankind for decades. These behaviors often cause confusion and frustration amongst parents, teachers, and other caretakers. Deciphering through the possible causes of the challenging behavior, and determining the most effective approach to correcting the behavior can be a daunting task. For these reasons, behavior analysts have conducted extensive research that has proven function based intervention to be a very successful approach to correcting these challenging behaviors. During this project, I collected data on a student with autism, who had severe challenging behaviors. After which, I formulated an appropriate replacement behavior, as well as developed a behavior contract, and implemented a behavior intervention plan to correct the student's challenging behavior. As a result of the behavioral intervention, the student's challenging behavior decreased significantly, and was replaced with a more desirable behavior. The objective of this project was to determine whether or not a student's severe challenging behaviors could be diminished, or even eliminated, with the proper use of a function based intervention. Based upon the outcomes, my research supports the behavior analysts' findings that a function based intervention is proven to be a successful approach to correcting severe challenging behaviors among children, including those who have been diagnosed with a disability.

New Perspectives and Substantiation: The Findings of the 'Ayn Gharandal Archaeological Project, Summer 2015 Field Season

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Religious Studies, Anthropology, Judaic Studies

The archaeological site of 'Ayn Gharandal is located approximately 70 km to the north of the Gulf of Aqaba in southern Jordan. Aqaba, both today and in antiquity (then known as Aila), is a port city with a major highway starting there and running to the north. It is on this highway that 'Ayn Gharandal is located – a site which we now know to be the Roman fort Arieldela, military base for the Cohors II Galatarum dating to roughly the fourth century CE under the emperor Diocletian. The summer of 2015 marked the most recent field season for the site by a team from the University of Tennessee and the University of Missouri, Colombia, opening multiple squares in the bathhouse and one to the east of the fort's principia. It is on this latter square that this presentation will focus, tracing the progress through the field season, from the preseason hypotheses of locating a courtyard or antechamber to ultimately revealing the finds and conclusions drawn by the dig team of which I was a part. Finds from the 2015 field season include multiple complete or nearly complete vessels with their origins at Petra, sherds of Egyptian Red Slip (a first ever at the site), painted plaster featuring Greek letters, Roman coins, and significant architectural finds, including a partially uncovered potential early Christian church, the entryway into the principia from the east helping to date the structures in the fort, and a series of tertiary walls within the fort with perplexing orientations and unclear functions.

Kanye West: The Brand

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Advertising

Hip-hop artist and creative genius Kanye West is inarguably one of the most infamous people in the public sphere today. Kanye Omari West was born in Atlanta on June 8, 1977, but moved to the infamous south side of Chicago with his mom when he was three after his parents got divorced. But how did Kanye become the man he is today? How did he reach a status where every one of his tweets can become a news story, his face is projected on the side of buildings across the US, and he claimed the most liked Instagram post in history?

While Kanye's celebrity status, as well as marrying into social media royalty, obviously helped him overcome the natural obstacles to a large social media following, his enduring need to be innovative and do something that has never been done before and break the mold has led to several state-of-the-art promotions that have separated him from the traditional advertising and promotional efforts that musicians typically resort to. Kanye's endeavors have transitioned from simply music to performance art, clothing and fashion, a record label, and an entire creative agency named after his late mother DONDA. With the addition of each facet under Kanye's brand comes unique advertising and promotional efforts. Kanye's album releases are events, a date on the calendar for many, and this is done solely through carefully calculated movements and him just being himself.

Throughout this thesis, the background to the formation of the Kanye brand and Kanye's unique advertising and promotional efforts throughout the years as well as a highlight of the recent release of his new album *The Life of Pablo* and clothing line Yeezy Season 3 will be illustrated. Using secondary research, Hootsuite monitoring, and Salesforce social listening software, a detailed analysis of how Kanye is able to reach so many people, whether they want him to or not will be revealed.

Scoring Human Decomposition from Photographs: A Validation Study

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Anthropology, Biology

Megyesi et al. (2005) is the most widely used method for recording human decomposition stages. The body is divided into three portions (head and neck, trunk, and limbs), which are individually assigned a score based on visually assessing presence or absence of listed criteria. The scores are summed to provide a total body score that correlates to an estimated post mortem stage. While this method was designed for field use, anthropologists frequently receive photographs of decomposing bodies along with a request from law enforcement for an estimation of time since death. Before this method can be implemented using photographs, a validation study must be conducted to determine whether decomposition scoring is as accurate from a photograph as it is from directly visualizing the body. This study is intended to test the accuracy of decomposition scoring from a photograph compared to scores taken in the field. Inter-observer error and intra-observer error are also considered in this study.

Early Woodland Ceramic Systematics in Upper East Tennessee

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East Tennessee State University
Anthropology, Archaeology

My project involves prehistoric pottery of early Native Americans during the Early Woodland period (3000-2000 years ago). These people were the first pottery-making cultures in our region. Archaeologists use classifications to categorize these ceramics, according to shape, temper composition, surface treatment, etc. The classifications form the basis for the creation of pottery types; types that are not always applicable. This presents a problem because the types are only arbitrary designations which do not accurately represent the people in question or the world they lived in. This makes it difficult if not impossible to accurately discern key elements of the culture and broad, regional associations of this time period. Even if we *could* quantify differences in Early Woodland pottery, we cannot be certain they would be culturally or technologically meaningful because they are arbitrary constructs. Using ceramic analyses from several sites, associated radiometric dates, and a pilot pxf study, I present evidence to demonstrate that these classifications are not currently quantifiable and thus perhaps not culturally significant. The differences could be functional but little experimental work has been conducted to examine this idea. Further, measuring techniques typically used were largely designed to analyze sherds, or pieces of pottery. Moving forward, measuring techniques must be focused on whole vessels: things like volume and orifice diameter. Differences between vessels and “types” could also reflect different household preferences and/or communities of practice. In early pottery-making cultures that were essentially experimenting with a new technology, there were likely few, if any, (design) demand constraints placed upon potters. Thus variation could simply reflect experimental and personal choices and thus is better viewed as stochastic variation.

Understanding Trends in Social Media Advertising from the Agency Perspective

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Advertising

As social media platforms grow and evolve, how are brands keeping up and staying relevant? The purpose of this honors thesis is to find out how brands develop a social media strategy and how it is integrated into an advertising campaign. To further explore these questions, twelve in-person qualitative interviews were conducted over the span of a week with predominately account managers who work in the advertising industry in New York City, the advertising capital of the world. These people worked at a variety of agency sizes from small and specialized to large and international. During the 30-45 minute interviews, some of the discussion topics included social media platforms and advertising trends, influencer marketing campaigns, and an evaluation of the current digital landscape along with future predictions. Combining the insights from the qualitative interviews with secondary research, a better understanding of trends in social media advertising is achieved.

Unit level Changes in Central Line-Associated Bloodstream Infection Before and After Implementation of the Affordable Care Act and Mandatory Reporting Legislation

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Nursing

Central line-associated bloodstream infections (CLABSI) prevention efforts have increased over the past decade due to implications of the Affordable Care Act (ACA) and mandatory reporting laws. These legislative measures allowed for reduction of Medicare reimbursement to hospitals for those with high level of CLABSI and other healthcare-associated infections (HAI). Local effects were unknown. We hypothesize that CLABSI rates and central line usage would decrease over time after enactment of the ACA and mandatory reporting. We performed a retrospective review of medical ICU patients in January 2008, 2012, and 2015 to examine changes in CLABSI reporting by two methods (International Coding of Diseases by Providers and Center for Disease Control by Infection Preventionists (IP)) as well as changes in central line use over time. Data were summarized and compared. Among 465 patients admitted to ICU over all periods, 89.7% were white, 52.0% were males and the mean age was 58.5 ± 17.3 . A total of 5 CLABSI were identified by ICD-9 coding and 1 by IP reporting; however, 4 CLABSI were present on admission. Reportable CLABSI were the same by both reporting methods (1 in January 2008). Central line usage was similar during each period 64/148 (43.2%), 68/147 (49.3%), and 71/170 (41.7%) for 2008, 2012, and 2015, respectively. There were no reported CLABSI since these legislative changes. Our findings were limited to 3 one-month periods and more research is needed over a longer period to draw conclusions about the influence of legislative changes. We did not identify discrepancies between the two reporting methods as described in other studies. Central line usage remained steady over the time periods. The majority of CLABSI were present on admission. Research is needed to understand and prevent community-associated CLABSI leading to ICU admissions with sepsis.

Exploring Black women's perceptions of midwifery and antenatal care in Knoxville

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Nursing

Non-Hispanic Black women are at higher risk of preterm birth than non-Hispanic White women. Research to determine the cause of poor birth outcomes among Black women has addressed many potential factors, however, few investigators have explored Black women's own views concerning risk factors contributing to preterm births, or how they experience their pregnancies. This literature review summarized the current state-of-the-science regarding cultural and situational risk factors facing Black women in the context of pregnancy-related health disparities. Several significant themes emerged, suggesting that nationally, the quality of provider relationships, community support, and internal cultural barriers to antenatal care are major factors which influence Black women's experiences of antenatal care. In addition, there is evidence that the midwifery model of care tends to improve the care experience and birth outcomes of Black women with uncomplicated pregnancies. Overall, there is a lack of data existing on Black women's perspective of antenatal care, particularly regarding midwifery care. Future research should explore this area, focusing on Black women's expectations regarding changes and care. The results will enable researchers and healthcare workers to develop culturally-congruent care that has the potential to improve outcomes for Black women and their neonates.

