April 25, 2019

Dear Faculty, Students, and Guests:

The *Promise of PC* is our strategic plan to help students achieve their full potential in today's world. What better time to see the *Promise of PC* in action than on Honors Day, a day devoted to academics and student success? The writing assignments, presentations, and research that students work so hard show us how well we are accomplishing the mission of Presbyterian College. I'm proud of the standard of excellence put on display in the honors work that our students complete under the guidance of faculty mentors.

Honors Day is a time to celebrate our students' achievements. It's also an inspirational day of creativity and research. I hope each of you will join me in listening to our students present their work, ask questions, and evaluate responses. The day culminates with Honors Convocation, a time for us all to acknowledge the extraordinary academic achievements of students.

Congratulations to those who are presenting their work, those who are receiving awards, and those who have mentored them along the way. Each of you is a great example of what it means to be a Blue Hose.

We have numerous guests on campus today who are with us to witness and celebrate these accomplishments. To all, I extend on behalf of the Faculty of Presbyterian College a hearty welcome to Honors Day 2019.

Sincerely Yours,

Bob Staton

Bob Staton '68
President

April 25, 2019

Members of the PC Family,

We are excited to highlight the particular academic and creative accomplishments of our students. The projects you see here highlight the intense and exciting work students pursue with faculty mentors in the College of Arts and Sciences and the School of Pharmacy. In pursuing these creative activities, students are enhancing their academic abilities and demonstrating the drive to succeed in their various pursuits.

Students may participate in different research opportunities throughout the year. A capstone experience is required for all major programs on campus. The PC Summer Fellows program highlights the joint work of students and faculty outside the traditional curriculum. Honors research provides the opportunity for exceptional students to explore deeper issues within their majors. This Symposium, then, gives us a unique opportunity to share these experiences, and all of the hard work that goes along with them, with all of you on this very special day.

Congratulations to everyone participating in the 2019 Honors Day Symposium, and that includes those of you who have served as mentors, supervisors, and guides for our presenters. Special thanks go to those faculty and staff who have organized today's events and compiled this booklet for your review. Without their diligence and commitment to the success of our students, this day would not be possible.

I hope each of you enjoys the 2019 Honors Day Symposium.

Sincerely,

Donald R. Raber II, Ph.D.
Provost

HONORS DAY
SYMPOSIUM

PRESBYTERIAN COLLEGE
APRIL 25, 2019

The Surprising Prevalence of Child Marriage in the United States: An Examination of Factors of Impact on States' Rates of Child Marriage

Brenna B. Ashe
Dr. Erin S. McAdams, Ph.D.
Department of Political Science

While both adolescent males and females enter into child marriages globally, the phenomenon disproportionally affects young girls. In fact, child marriage affects many minor males and females in the United States each year. This research aimed to answer the question of what factors, and to what extent do these factors, impact state's rates of child marriage in the United States. The legal age to marry (with and without parental consent), legal age of sexual consent, level of educational attainment, and poverty status were each examined to see their impact on state's rates of child marriage, minors wed to adults over 21, and minor females married to adults over 21. Data on each of these variables were collected through a variety of public and governmental publications and a quantitative analysis was conducted. The results show that level of educational attainment consistently has the greatest and most significant impact on a state's rates of child marriage, minors wed to adults over 21, and minor girls married to adults over 21. The results also show that poverty status and legal age of sexual consent have an impact on states' rates of child marriage in the United States.

The Camp David Accords: America's Cure to the Cancer It Created

Robert P. Baker
Dr. Roy B. Campbell, Ph.D.
Department of History

This literature examines whether more responsibility should be attributed to the United States government in regards to the Arab-Israeli conflict. Specifically, the Camp David Accords are heralded as the solution to the dispute, however this literature questions why they are regarded in such a positive light. Has there been U.S. foreign policy that contributed to the Arab-Israeli war? Were the Camp David Accords a success? Factors such as propaganda, government aid, and military prowess will be highlighted, as the U.S. involvement is uncovered.

School Choice and Its Impact on the Resegregation of American Public Schools

Robert P. Baker
Dr. Justin E. Lance, Ph.D.
Department of Political Science

This literature examines whether school choice programs have contributed to the resegregation of American public schools. I hypothesize that school choice programs increase segregation in American public schools by race. This notion is hypothesized, to control for income and residence. The examination will rely on a comparative analysis with independent private schools to determine if there is segregation in terms of enrollment between blacks and whites.

U.S. Relationship with Iraq before 1991

Seth H. Barbee
Dr. Roy B. Campbell, Ph.D.
Department of History

The U.S. relationship with Iraq before 1991 was complex with its own issues. This research paper explores the questions of what compromised the relationship between these two countries, such as what were the causes that made the relationship become compromised in the first place, and what did each government do to further repair the damage? The main question of this research is, what was the main factor that exacerbated the demise of the U.S.-Iraqi relationship? The proposed thesis explores three main schools of thought that could have affected the ties between the U.S. and Iraq. The first is the U.S. desire to keep a hold on the Middle East, the second is communism, and the third is oil. The exploration of these topics shows how this alliance fell apart throughout the years leading up to 1991.

Analysis of NHE9 as a Candidate Gene for Autism Spectrum Disorder

Natalie J. Barnett
Dr. Evelyn J. Swain, Ph.D.
Department of Chemistry and Biochemistry

Autism Spectrum Disorder (ASD) is a range of neurodevelopmental disorders characterized by a large spectrum of symptoms including impaired communication and social skills, learning disability, and repetitive behaviors. There is currently no single known cause. The purpose of this research is to further analyze the function of the yeast gene NHX1 in relation to vacuolar pH and glutamate accumulation, since there have been observations of glutamate accumulation in autism patients' brains and blood. NHX1 codes for a Na^+/H^+ exchanger located in yeast vacuoles and endosomes. It is the homolog to the mammalian gene, NHE9. Missense mutations in NHE9 are genetically linked with autism and are related to pH regulation and vesicular trafficking. Change in vesicular pH can decrease the expression of membrane proteins, as with the glutamate transporter, AVT6. Decreased expression of glutamate transporters would result in glutamate accumulation. The objective of this experiment is to use *Saccharomyces cerevisiae* as a model organism to functionally evaluate NHX1's role, apply it to NHE9, and relate the findings to ASD. It is hypothesized that vacuolar pH is decreased due to loss of function of NHX1, resulting in an accumulation of glutamate in vacuoles because of a decrease in surface expression of the glutamate transporter, AVT6. The results of this experiment could help further ongoing research into the unknown etiologies of ASD and provide further investigation of NHE9 as a candidate gene of autism.

Measuring the Granular Density of Modes in 3D

Sydney A. Blue
Dr. Eli T. Owens, Ph.D.
Department of Physics and Computer Science

Sand covering the earth, snow on a mountainside, and even plastic balls in a ball pit are all considered granular materials. These athermal materials, while ubiquitous, behave in a unique manner. For instance, granular materials have the ability to behave like all three phases of matter; sand in a sandstorm behaves like a gas, whereas sand flowing in an hourglass behaves like a liquid, and packed sand on a beach behaves like a solid. The solid/liquid transition is known as the jamming transition. This study will experimentally measure the granular density of modes, which is analogous to the density of states in a thermal system. In order to measure the granular density of modes, we need to mimic the randomized motion of thermal particles. We accomplish this using a white noise acoustic wave to vibrate the particles of the granular material allowing us to measure the density of modes using methods from thermal physics. From our measurement of the granular density of modes, we are able to study the jamming transition in a 3D granular material; since, as the jamming transition is approached, there is an excess number of low frequency modes in the density of modes.

Embryogenesis in the Live-bearing Fish, *Poecilia latipinna*, a Study in Correlative Microscopy

Tiffany C. Bogan
Dr. James T. Wetzel, Ph.D.
Department of Biology

Our initial goal was to build an image bank of the normal stages of embryogenesis in a viviparous teleost, which would then serve as a model for comparison against future studies concerning the effects of various teratogens and environmental pollutants on embryogenesis. This study was further designed to determine whether there is regional specific absorption of nutrients in the larval gut of a viviparous teleost. In many viviparous, matrotrophic species (*Poecilia, Xiphophorus*) embryos hatch precociously within a brood sac wherein small molecular weight proteins and sugars are then absorbed from histotrophe secreted into the ovarian pouch from maternal vessels, and then imbibed by the developing embryos. Our hypothesis was there would be no regional specialization found in these viviparous species. Rather, the entire length of the embryonic gut is nonselective and serves for complete absorption of all materials needed to support the rapid growth associated to matrotrophy. However, in our study, we did observe regional absorption within the gut. This part of our research will bridge the use of a viviparous teleost as a model system to study gut development and related studies of matrotrophy using contemporary techniques of light microscopy (histology) and electron microscopy (ultrastructure) and x-ray diffraction (elemental analysis) as complementary research techniques of correlative microscopy.

Iran-Contra Affair: Who is Really Responsible?

Brian R. Branch
Dr. Roy B. Campbell, Ph.D.
Department of History

My presentation will dive deep into the scandalous background of the Iran-Contra affair. I will try to determine by looking at historical evidence who is truly to blame for the infamous scandal. Through the examination of all the evidence, I believe responsibility falls solely on the president, Ronald Reagan. His relentless will to carry out his foreign policy led to him causing one of the most infamous affairs in United States history.

Joan of Arc: Lack of Justification for Canonization

Jacob R. Bridges
Dr. Richard R. Heiser, Ph.D.
Department of History

Joan of Arc and her legacy has been immortalized by her canonization in the Catholic Church in 1920. She was burned at the stake and declared a heretic by the English church for her role in the Hundred Years War to push the English out of France. Years afterwards, the French king held a second trial of Joan in order to declare the ruling of the first trial as biased. Her canonization was largely due to external pressure from French patriots who hoped to push her as a figurehead for French pride. While her roles and impact on the Hundred Years War is undeniable, the decision to declare her as a saint lacked accurate justification and was based off of falsehoods and unreliable testimonies from bias sources. Joan of Arc's canonization was not justified because of her failure to respect Holy Days, her signed recanting of her claims, and the church's rushed process of deciding to canonize her due to external pressure from French activists.

War Sells: Impact of Media on Selling the 2003 Iraq War

Haleigh E. Brooks
Dr. Roy B. Campbell, Ph.D.
Department of History

This research looks into the 2003 Iraq War. Specifically, I focus on how President Bush used the media to spread his propaganda of Iraq as a danger to America in the aftermath of the 9/11 attacks and how that swayed the American public into supporting a damaging, costly, and pointless war. Furthermore, questions to be answered include how did American mass media allow this to happen and when it is the job of the media to act as a watchdog for American democracy? It is the foundational basis of this research that the Iraq War occurred because of two simple words, War Sells.

My Brothers in Hell: A WWI Documentary

Collin B. Burnett
Dr. Stefan Wiecki, Ph.D.
Department of History

The First World War is perhaps most famous for its use of "trench warfare." But what was it truly like in these trenches, and why did so many soldiers of this conflict, even when faced with the choice to leave the front, willingly remain and continue to fight under such horrific conditions? This documentary seeks to answer these and other related questions by exploring the developments, hardships, and horrors of trench warfare and considering the accounts of those that experienced this struggle.

The Pity of War: A Study of Poetry during WWI

Collin B. Burnett
Dr. Stefan W. Wiecki, Ph.D.
Department of History

No conflict has ever been so closely linked with the poetry and literature of its age than the First World War. Why is that? Did WWI truly have an effect on poetry and if so, how? More importantly, what does this change tell us about the First World War and those that experienced this struggle? In my research, I answer these and other related questions by exploring the immense impact that the Great War had on the soldiers and poets of this time, as well as what their poems reveal about this horrific conflict.

Decision Making Through the Lens of the Distinctiveness Model of the Narcissistic Subtypes (DMNS)

Caroline G. Christenbury
Dr. Stephanie D. Freis, Ph.D.
Department of Psychology

When most people think of narcissism, they think of a personality disorder associated with grandiosity, self-worship, and obsession with oneself. However, this clinical stereotype has become outdated. Recent research has indicated that there are two subtypes of narcissism: grandiose (GN) and vulnerable (VN). Current research largely focuses on personality traits or self-esteem but these models are limited in the predictions they can make about the subtype differences. Thus, in this study we are investigating the newer Distinctiveness Model of the Narcissistic Subtypes (DMNS, Freis, 2017), which suggests that both subtypes share a need to be distinct, but differ in how they orient to that need: either through a promotion focus or a prevention focus. To test the DMNS, we recruited 313 participants online through Amazon's MTurk and randomly assigned them to read a fictitious advertisement about a unique yet boring product that was framed with either promotion- or prevention-focused language. They then completed a series of questionnaires. We predict that individuals scoring high on GN (measured with the Narcissistic Personality Inventory) will be more persuaded by the promotion-focused advertisement and will therefore view the unique product more favorably. We also predict that individuals scoring high on VN (measured with the Hypersensitive Narcissism Scale) will be more persuaded by the prevention-focused advertisement and will therefore view the same product more favorably.

La Manie des manifs chez les Français

Caroline G. Christenbury
Dr. Patrick D. Kiley, Ph.D.
Department of Modern Foreign Languages

This research serves to investigate the political, religious, and cultural influences which cultivate the French lifestyle of *travailler pour vivre* (work to live) in contrast to the American way of *vivre pour travailler* (live to work). The differences between France and the United States will be examined through the lens of the French strike culture. Striking is a form of protest characterized by the refusal of employees to work in an attempt to gain more privilege and or compromise from the employer. The French, famous for striking during the warmer months, will '*poser un grève,*' or go on strike to purposefully inconvenience others in order to persuade employers to increase their benefits, salaries, or vacation days–and it works! The strike culture in France has evolved to be so systematic that a schedule of strikes is provided in advance each year, allowing tourists and locals alike to plan not only their vacations, but also how they will get to work daily. In this paper, I consider how the political, religious, and cultural aspects of France which reinforce this behavior are quite different in America, offering possible explanations as to why the French strikes have become so widely accepted, and yet remain an obscure concept in the United States.

The Effects of Urbanization as a Proxy for Climate Change on the Dendroclimatic Signal of White oak (*Quercus alba*) in the Upstate of South Carolina

Alexis K. Clark
Dr. Michael O. Rischbieter, Ph.D.
Department of Biology

Over the past century, an increase in urbanization worldwide has provided the scientific community with a unique opportunity for analysis of the response of an ecosystem to climate change outside of a laboratory or modeled environment, as established urban forests provide a possible proxy for observing said responses. Compared to rural areas, urban environments tend to have a few key differences that could affect plant growth: elevated temperatures, elevated CO_2 concentrations, and elevated atmospheric nitrogen deposition. Along with research settings in urban forests, dendroclimatology, the analysis of tree growth ring size in relation to environmental factors including temperature and precipitation levels, can give us insight into how trees in established forests are reacting to differences in climate caused by urbanization, and possibly by climate change as a whole. The goal of this research was to analyze how changes in climate from urbanization are affecting the growth patterns and overall health of plant life in the region and to eventually translate these data into a proxy for what will happen to established ecosystems given continued climate change. The results of this research show that the tree populations in urban environments show more disruptive growth patterns than those in rural ones.

Tooth Microwear Analysis of the Early Oligocene Fossil Canid *Hesperocyon*

Channing E. Cox
Dr. Michael O. Rischbieter, Ph.D.
Department of Biology

The White River Badlands in Wyoming are erosional remnants of a group of rocks that were deposited in the stream channels and associated floodplains of the ancient Platte River from the late Eocene to mid-Oligocene Epochs. These ancient floodplains were inhabited by a diverse fauna of mammals, reptiles, and invertebrates. With a variety of possible prey types, it has been assumed that the fox-sized canid *Hesperocyon* fed mostly on smaller mammals, but this has never been proven to be the case, and it is possible that *Hesperocyon* was also scavenging bony remains, and eating insects and plants. Dental microwear analysis, using high quality SEM micrographs of actual scratch and pit patterns on the well-preserved carnassial teeth were analyzed to better understand the likely food types this fossil animal was utilizing. Carnassial teeth from several *Hesperocyon* fossil specimens were prepared using standard SEM techniques, and images obtained were analyzed for overall number of scratches and pits. Overall high numbers of long, wide scratches, with lesser numbers of narrow scratches, and both large and small pits, indicate that *Hesperocyon* was eating meat, but smaller numbers of the other microwear markers indicate that invertebrates, plants and bones were also being processed. These results support the idea that fossil *Hesperocyon* (now extinct) was likely filling the niche that the modern red fox (*Vulpes*) occupies in modern ecosystems.

Production of Bioethanol through the Fermentation of Kudzu Using *S. Cerevisiae*

Alexis D. Dabney
Dr. Evelyn J. Swain, Ph.D.
Department of Chemistry and Biochemistry

With the growing population, there has been an increasing demand for fossil fuels, causing the escalation of environmental problems including greenhouse gas emission. To meet these growing energy needs a search for sustainable energy is happening throughout the research community. This effort has led to the finding of renewable and sustainable energy sources that are better for the environment. Priority has been given to liquid biofuels, which make up 40% of total world energy consumption. The creation of liquid biofuels has led to a reduction in greenhouse gas emissions, the creation of jobs, and fuel supply security. This experiment looked at creating bioethanol, the most common biofuel in transport, due to its significant contributions to the reduction of crude oil consumption and environmental pollution. The focus of this experiment was to produce bioethanol from the fermentation of kudzu. Kudzu is the most invasive plant species in the southeastern United States, covering an estimated 2 million acres of land. Introduced in 1876, Kudzu was deemed a pest species by the USDA in 1953 and is now listed as a Category I invasive species. Our hypothesis is the production of bioethanol using kudzu as a feedstock can be made efficient enough to be considered a new alternative process to produce bioethanol, as well as a method to reduce an invasive species. Growing at a rapid rate of one foot per day, kudzu is an ideal lignocellulosic feedstock, as production costs are kept low by the need to only harvest the plant. The kudzu for this research was harvested from the Clinton, South Carolina.

Experimental Setup for the Mathematical Analysis of Rope Braiding

Brandt B. Cameron and Zachary R. Darst
Dr. Chad L. Rodekohr, Ph.D.
Department of Physics and Computer Science

In the field of braiding, the relationship between braiding machine parameters and the material qualities of the produced rope is not well-defined. Therefore, rope braiding is more of an art than a science, thus braid materials are typically wasted. The purpose of this project is to build a braiding lab with the long-term goal of shedding light on the field of braiding. We constructed a mount for and existing Maypole-braiding machine to braid horizontally, the capstan, and the drivers therein. A mandrel in this system can be fed through the base of the braiding machine allowing for complex braid production. We also designed an Arduino based electrical driver for the servo motor that drives the horn gears on the braiding machine. This Arduino based electrical driver will be used to customize future braiding experiments. We focused on the basic workings of a Maypole-braiding machine to improve understanding of the braiding process.

The Epigenetic Role of Rrp1 in *Drosophila melanogaster*

Justin W. Davidson
Dr. Payal Ray, Ph.D.
Department of Biology

During development, selective silencing of homeotic genes allows for the specialization needed in the formation of segments of the fly body. In *Drosophila melanogaster*, Polycomb group proteins (PcG) are responsible for the selective silencing of different homeotic genes through the formation of Polycomb Response Complexes (PRCs), which are recruited to specific elements (PREs) on the genome where they regulate transcription through histone modification. The exact mechanism of recruitment of the PRCs to PREs is unknown. To identify the DNA-binding proteins essential for the function of a single PRE from the *Drosophila* engrailed gene, a previous study performed a DNA oligomer-based affinity pull down coupled with mass spectrometry (MS), using a fragment of the PRE which identified 25 candidate proteins to the PRE, the most abundant being Repair Recombination Protein 1 (Rrp1). Rrp1 acts as an endonuclease and has been shown to be involved in the DNA repair pathway of *Drosophila*. If it was found that Rrp1 acts in both pathways, it would demonstrate a possible interaction between the mechanisms of gene silencing and DNA repair. Our study has found through the use of polytene chromosome staining that there is a colocalization of Rrp1 and known PRE associated protein Pho which suggests its involvement with PcG recruitment. ChIP and bioinformatic work was also completed to further demonstrate Rrp1's involvement, however, results of these studies have not supported this hypothesis.

Where Are All the Republican Women? The Puzzling Gap Between Democratic and Republican Women Within the U.S. Congress

Amber B. Davis
Dr. Justin E. Lance, Ph.D.
Department of Political Science

In the U.S. Congress, Democratic female representatives have continuously increased their presence while the number of Republican female representatives has stagnated. This paper argues fewer Republican females choose to run for Congressional office, which increases the significant gap between Democratic Congresswomen and Republican Congresswomen. A quantitative study was conducted using the Center for American Women and Politics 2008 Recruitment Study. Using the responses of women from the survey, this study looks to see if there is a correlation between party identification and an expressed level of political ambition. The results of this study concluded that women that identify as Republican, possess lower levels of political ambition, which helps explain why fewer Republican women choose to run for higher elective office in the U.S. Congress.

U.S. Airstrikes in Libya during 1986: Legal or a Folly of a Failed Foreign Policy

Samuel S. Doster
Dr. Roy B. Campbell, Ph.D.
Department of History

This research focuses on the U.S. airstrikes against Libya in April of 1986, seeking to answer the questions of why Reagan decided to use such extreme means of "persuasion," were the airstrikes in fact a legal and reasonable response to Libyan sponsorship of terrorism abroad, and were the effects of these strikes successful in dissuading Qaddafi from furthering his support of international terror. The conclusion of this research is stated as thus: U.S. airstrikes in response to terror attacks sponsored by Libya were an unfortunate response that led to many civilian deaths and did not prevent Qaddafi from engaging in further acts of state sponsored terror. It did, however, set an important new precedent in U.S. policy that would no longer tolerate terror attacks on its citizens abroad without a military response.

Multivariate Comparison of DNA Methylation Events in Breast Cancert Stem Cells

Caroline E. Dyar
Dr. C. Clinton Harshaw, Ph.D.
Department of Mathematics

Breast cancer is the second most common type of cancer diagnosed among women. Recent evidence suggests that breast cancer aggressiveness is associated with a cell subpopulation known as cancer stem cells (CSCs), which are understood to have different epigenomic patterns. This project analyzed DNA methylation genome wide across 19 breast cancer samples to determine if DNA methylation events are associated with enriched CSC populations. Unsupervised PCA and matrix dissimilarity analysis revealed three distinct groups which clustered independently based on CSC enrichment. We determined that methylation events in the gene body more closely corresponded with CSC enrichment compared to promoter DNA methylation events. Differential methylation analysis was used to determine which methylation events defined the 3 identified clusters. Differentially methylated promoter probes tended to be hypermethylated in the CSC-enriched cluster, but hypomethylated in the gene body. Data from the TCGA Cancer Genome Atlas database were analyzed using K-means clustering and Kaplan-Meier survival analysis. The TCGA data showed that lower methylation levels in the gene body corresponded with increased cancer aggressiveness, including earlier age of diagnosis and worse case of recurrent-free survival. Fisher's Exact Test was used to determine differences within tumor composition. These results could help clinicians with earlier prognosis through sequential tracking of gene body methylation events.

The American Failure: Armenian Genocide

Samantha J. Fink
Dr. Roy B. Campbell, Ph.D.
Department of History

American political interests and foreign affairs policy have shaped the way in which the United States justifies its inability to respond to the Armenian Genocide. From 1915 to present day, America has never officially acknowledged that the killings of 1.5 million Armenians took place despite the fact that it was well documented. This project examines how American interests and foreign policies have evolved over time into the reasons why the United States does not formally acknowledge the genocide today. This paper also explores how it became possible for the genocide to be forgotten over time.

IL32 Expression is Epigenetically Regulated in Basal-like Breast Cancer Stem Cells

Emma V. Gray
Dr. Austin Y. Shull, Ph.D.
Department of Biology

Basal-like breast cancer is an aggressive breast cancer subtype and is defined by an increased presence of cancer stem cells (CSCs) as well as tumor-associated inflammation. However, the details of how cancer stem cells and inflammation play a complementary role in breast cancer is not fully understood. In addressing the interplay between these characteristics, we performed differential promoter methylation analysis between CSCs and non-CSC cell lines to discover that the inflammatory gene IL32 was hypomethylated in CSCs, a result which corresponded with increased expression in CSCs. To determine if IL32 methylation and expression was reflected in breast cancer patients, we analyzed the status of IL32 across 1101 breast cancer patients from the TCGA database and confirmed that IL32 is hypomethylated and overexpressed in basal-like breast cancer patients. Gene set enrichment analysis (GSEA) of genes co-expressed with IL32 demonstrated that IL32 significantly correlated with genes involved in inflammatory pathways, specifically the NF-kappa-B pathway. As well, publicly available ChIPseq data revealed that the IL32 promoter in the basal-like breast cancer cell line SUM159 contains high H3K27 acetylation, a histone mark typically associated with gene activation. In conclusion, IL32 expression appears to be regulated through epigenetic mechanisms in breast cancer stem cells and perhaps contributes to the inflammatory phenotype of basal-like breast cancer cells.

Beirut Bombing of 1983: How the Media's Coverage Shifted Our Mindset Towards the Middle East

Trevor E. Kay
Dr. Roy B. Campbell, Ph.D.
Department of History

My topic will be related to the Marine Corps Barracks attack in Beirut, Lebanon, in 1983. I will explore how that was a defining moment in our country's war on terror and could be seen as the official start. I will look deeply into how the media's coverage of this significantly shifted our mindset and mental approach of the Middle East as a whole.

Genetic Influence of Methionine: A Study with Yeast Mutants

Andrew F. King
Dr. Evelyn Swain, Ph.D.
Department of Chemistry and Biochemistry

This study will focus on the essential amino acid, methionine, and its genetic realm of influence within living organisms. The wild type yeast strain *Saccharomyces cerevisiae* and several genetic mutants will serve as the model for testing methionine's effects. The yeast mutants will be used to determine the pathways that are affected by methionine. The restriction of methionine has been shown to produce varying effects across species, including the extension of lifespan in yeast. This leads to the hypothesis that if a reduction in methionine leads to an extension of lifespan, then there will a corresponding limitation of the yeast cell's normal ability in some other pathway or cellular function. During the course of this study, the goal is to identify additional pathways that are affected when methionine levels are manipulated.

The Effects of Resveratrol on Mitochondrial Function in *Saccharomyces cerevisiae* and Its Applications in the Treatment of Autism Spectrum Disorder

Gabe R. Knight
Dr. Evelyn J. Swain, Ph.D.
Department of Chemistry and Biochemistry

Autism Spectrum Disorder (ASD) is a group of complex neurological developmental disorders that exhibit characteristic symptoms. Numerous research teams have found that this and other neurological disorders can arise from damaged mitochondria leading to the over-production of reactive oxygen species (ROS). These naturally occurring radicals are generated during mitochondrial oxygen metabolism and can lead to the damage of nucleic acids, proteins and lipids. This can upset biological processes and be detrimental to one's health. Resveratrol is a polyphenolic stillbenoid that is produced naturally in a variety of plants as a defense mechanism against pathogens like bacteria and fungi. It has been shown to have many beneficial effects for health and on the molecular mechanisms of mitochondria that are exhibiting oxidative stress. These findings support the hypothesis that if resveratrol reduces oxidative stress by acting on the electron transport chain complexes in the mitochondria, then ASD symptoms will be reduced or halted. *Saccharomyces cerevisiae* will be used as the model organism throughout this research, as it is an efficient and comparable model to its mammalian counterparts. To induce oxidative stress, yeast will be subjected to varying concentrations of ethanol and light microscopy is utilized to identify how different concentrations of resveratrol affect mitochondrial production of ROS. This could lead to the elucidation of the mechanism by which resveratrol acts on mitochondria and help in future ASD research.

The Coup of Muhammad Mossadegh: How Did We Get Here?

Zariya M. Lagroon
Dr. Roy B. Campbell, Ph.D
Department of History

This paper explores the coup d'etat of the prime minister of Iran, Muhammad Mossadegh, in 1953. This coup was conducted by the CIA during the presidency of Dwight Eisenhower but was the product of the Anglo-Iranian Oil Crisis, which started during the Truman presidency. When the crisis started in 1951, the Truman Administration took the role of mediator between Britain and Iran with no plans of a coup, but only eight months into the Eisenhower Administration, the CIA facilitated the coup. What caused this shift in policy between the two administrations? Many scholars have suggested the Cold War and the ideological differences of two administration caused the shift, but this paper argues the main cause of this shift was time.

Mass Media: The Racial Deception You May or May Not See

Francois Lewis
Dr. Carla H. Alphonso, Ph.D.
Department of Sociology

Media coverage of violence can cause different stigmas placed on minorities. Throughout this study, we will see the effects that implicit bias has on media coverage when it comes to random violence in the United States. Using data from the General Social Survey (GSS), we will conduct a study that relates to the different variables that contribute to how people perceive the news media and how it affects their understanding of what they are viewing.

Yeast as a Model for Type 2 Diabetes: Localization of Glucose Transporters in Pre-Culture Conditions

Sidney M. Littleton
Dr. Evelyn J. Swain, Ph.D.
Department of Chemistry and Biochemistry

The proposed research explores the regulation of glucose metabolism in *Saccharomyces cerevisiae*. By exploring these studies through biochemistry, the regulation of transporter function and localization will be studied to uncover mechanisms for maintaining glucose homeostasis. It is not fully understood how eukaryotic cells sense glucose and transmit signals to maintain glucose homeostasis. Investigating this area is important because studies involving glucose transporter localization and function in yeast are applicable in elucidating fundamental cellular processes known to be aberrant in type 2 diabetes. Yeast share similar components of glucose signaling and glucose transporter pathways with mammalian counterparts making it a useful model system for glucose transporter biology studies. Preliminary studies will be carried out in *S. cerevisiae* yeast cells with abnormal localization of glucose transporters. Therefore, these studies of pre-culture conditions will shed light on common cellular processes.

Does Straight Ticket Voting Cause Polarized Representation

Franklin B. Long
Dr. Justin E. Lance, Ph.D.
Department of Political Science

This presentation examines whether straight ticket voting leads to polarized representation in the United States. I hypothesize that states with straight ticket voting options elect more polarized representatives to the United States Congress. This presentation examines this relationship using state level data for the 114th, 115th, and 116th Congresses.

Sir Gawain and the Green Knight and the Exploration of the Green Girdle

Julia E. Marsh
Dr. Justin Brent, Ph.D.
Department of English

Sir Gawain and the Green Knight, is a celebrated work of Medieval Literature because of its sophisticated exploration of courage, shame, and honor. The Green Girdle comes to represent so many things throughout the story such as a lovers token, a chance of survival and broken knightly honor. It comes to mean something different to each character in the story helping to shape the story into what it is. My research mainly focuses on adaptations of *Sir Gawain and the Green Knight*, whether that be adaptations in film or other works of literature, and how those adaptations chose to portray the Green Girdle and how it affects the story. For instance, some adaptations portray a completely different narrative than what is told through the original story, and some go as far as to completely eliminate the Green Girdle in its entirety. The Green Girdle plays a significant role in the story of *Sir Gawain and the Green Knight*, and together we will explore its associated courage, shame, and honor regardless of an adaptation's usage of the Green Girdle.

Creating an Autism-Friendly Classroom

Rebekah L. Martin
Julia Wilkins, Ph.D.
Department of Education

According to the Centers for Disease Control (2018), about 1 in 59 children in the United States has Autism Spectrum Disorder (ASD). While the likelihood of teaching a student with ASD has steadily increased over the past two decades, the practical information about working with students with ASD has not increased at a similar rate. Because of the prevalence of students with ASD in the Nation's classrooms, the purpose of this research was to determine what type of classroom environment would be most beneficial for students with ASD while also benefiting other students. I conducted a review of 11 empirical studies to identify the sensory factors that affect the concentration and learning of students with ASD. I then compiled information based on laboratory experiments and observational studies to determine how elementary teachers can create classroom environments that meet the needs of students with ASD while also benefiting all students. Based on my review of previous research, I found that students with ASD rely on vision to gather information more than any other sense. This indicates that teachers need to be aware of environmental factors related to the lighting and physical layout of the classroom, and they should create visual displays that relate to the lesson to decrease the likelihood that students will be distracted by visual stimuli in the classroom. Based on my findings, I provided images of classroom settings that meet the needs of students with ASD.

Does Perceived Parenting Affect Behavioral Conduct in CHAMPS Students?

Leah K. McNeil
Dr. Brooke C. Spatta, Ph.D.
Department of Psychology

In this study, the effects of perceived parenting on behavioral conduct were examined longitudinally from 7th to 9th grade in a sample of 29 academically promising students. Participants were part of the CHAMPS program (Communities Helping, Assisting, and Motivating Promising Students), a local student support program hosted by Presbyterian College. Students' responses to questionnaires assessing their perceptions of their parents and their self-reported behavioral conduct were analyzed across 3 years. Harsh parents were those perceived as being overbearing, intrusive, and frightening; whereas overprotective parents were perceived as fearful, overly protective, and as inhibiting their teens' autonomy. A stepwise hierarchical regression analysis revealed that students who reported higher levels of harsh parenting at grade 7 exhibited significantly worse behavioral conduct at grade 9. This relationship remained significant when controlling for behavioral conduct at grade 7 and when data from 8th grade were included in the model. Overprotective parenting did not have any significant effect on students' 9th grade behavioral conduct. Overall, harsh parenting in 7th grade predicted approximately 56.5% of students' 9th grade behavioral conduct. Results from this research provide insight into one possible cause of the decreased behavioral conduct reported within this sample.

Effects of Dietary Iron on the Zebrafish Gut Microbiome Composition

Kristin N. Miller
Dr. Stuart G. Gordon, Ph.D.
Department of Biology

Iron is an important, tightly regulated, component of the diet. The regulation of iron metabolism is critical for a range of biological functions and prevention of oxidative stress. Certain Antarctic icefish lack hemoglobin and myoglobin function, resulting in the need for less dietary iron, yet they still consume significant amounts of iron. It is thought that their gut microbiomes (commensal microorganisms) play a role in modulating the effects of their iron-rich diets and low physiological iron requirements. Microbiome research on these fish is lacking; thus, the effects of dietary iron need to be examined in model organisms. We report preliminary results on the effects of dietary iron on the gut microbiome composition of a model organism, *Danio rerio*. We hypothesized that taxonomic composition of the *D. rerio* gut microbiome would be significantly altered by an increase in dietary iron. To test this hypothesis, metagenomic sequencing was performed on the digestive tracts and gut contents of *D. rerio* fed either an iron (ferrous sulfate) enriched diet or a standard diet for four weeks. These sequences were classified into operational taxonomic groups using 16s amplicons and analyzed using the analysis program QIIME. Based on our analysis, an increase in dietary iron does not appear to alter the *D. rerio* gut microbiome as significantly as hypothesized, but a larger study must be conducted to confirm these preliminary findings.

Kinetics of Tin Whisker Growth

Emily K. Mitchell
Dr. Chad L. Rodekohr, Ph.D.
Department of Physics

Tin whiskers are single-crystalline structures that grow out of tin-rich surfaces over time. Whiskers are found to grow most notably on thin tin surfaces, such as those deposited via electroplating or sputtering. Tin whiskers are highly conductive and pose a threat to many electronic systems, specifically those in computer systems. Whiskers have the ability to cause short circuits and bring about malfunctions in products ranging from satellites to pacemakers. Though the tin whisker growth mechanism is not well understood, many researchers agree that stress is a necessary factor. This research aims to evaluate the necessary components of tin whisker growth. We hypothesize that stress and nucleation points are the critical features that must be present for whiskers to form. Previous research has found that etching stimulates whisker growth and we hypothesize that chemical etching introduces nucleation points. The mathematical kinetics is an extension of previous work and describes an energetically favorable argument for proposed mechanisms. Through better understanding of why whiskers grow, we hope to control the location, orientation, and time of whisker growth. This research should provide insight into how tin whisker growth can be inhibited as well as the promoted for applications such as in the MEMS field.

Legal Disenfranchisement: The Effect of Voter Suppression Tactics on Black Americans from 2002 to 2014

Zoe L. Montague
Dr. Justin E. Lance, Ph.D.
Department of Political Science

Voter suppression has been a tactic used by politicians since the founding of America. In recent years, these tactics have changed from overtly biased practices to covertly disguised discriminatory law-making. The goal of these tactics is to disenfranchise a group of voters, in order to encourage their decreased participation in the electoral system. Voter ID laws are the worst and most prevalent offender of these measures. By using quantitative data methods, I will examine the relationship between strict voter ID laws and the changes in black American voter turnout.

Improving Human Papillomavirus Vaccination Rates through Better Communication between Health Care Professionals and Patients

Tai Navalle, Angela Winkler, Natasha Edwards, Missouri Jenkins, & Laura Richardson
Dr. Eileen Ward, Pharm.D., PCACP
Dr. Amy Messersmith, Ph.D.

South Carolina has lower vaccination rates, especially for human papillomavirus (HPV), compared to national averages. In order to stop the spread of vaccine-preventable diseases, healthcare professionals, such as pharmacists, should target obstacles that interfere with patients accepting or being offered vaccinations. The goal of our research was to increase confidence and willingness of pharmacists and pharmacy students to discuss and recommend the HPV vaccination to patients and ultimately administer the vaccine. In order to accomplish this goal, our research team created a curriculum covering SC and National statistics concerning HPV infections and related health consequences, facts and recommendations about the vaccine, and how to discuss the vaccine with both teens and their parents, including tips for addressing those who may be vaccine hesitant. A pre-test was administered prior to a lecture to assess baseline knowledge and comfort with discussing or recommending vaccination. A post-test was administered following the lecture. Our results indicated over 30 people attended our first training session. We hope our efforts to educate healthcare professionals, will improve confidence and willingness to discuss the HPV vaccine which ultimately can improve patient acceptance of the vaccine and vaccination rates.

Analysis of the 2016 Presidential Primary Election: Effects of Campaign Visits by Presidential Candidates

Colton J. Patterson
Dr. Justin E. Lance, Ph.D.
Department of Political Science

This paper examines whether campaign visits by Presidential candidates to the early Primary Voting States have an effect on how people vote for a candidate during the Presidential Primary Election in those states. I hypothesize that the more a candidate visits a county/state, he/she will receive more votes in that county/state. This will be analyzed through multiple analyses conducted by an original dataset which measures each county of both New Hampshire and South Carolina to the number of vote shares for each candidate, while controlling for population, income per capita, and education levels.

A Ribbon Around A Bomb: Frida Kahlo's Radical Politics

Katie M. Penny
Dr. Jaclyn A. Sumner, Ph.D.
Department of History

In this paper, I examine the popular representation of Mexican artist and feminist icon, Frida Kahlo. Since her death in 1954, Kahlo has achieved cult-like celebrity status around the world. While she gained some recognition as an artist during her lifetime, she never came close to reaching the level of fame she has had in the last thirty years. My research tackles a problem that has accompanied her post-mortem rise to fame: misrepresentation. Modern portrayal of Kahlo as a primarily feminist artist has led to a troubling singular representation of her motivations. My research asserts that Kahlo's true intentions behind her art were overwhelmingly political. While the overarching term "political" does include Kahlo's feminist endeavors, this paper aims to dispel the belief that gender expression was the artist's primary focus. I argue that there are multiple facets of Frida Kahlo's personality that have been ignored or overlooked in the mainstream narrative of her life.

Human Rights Protections and the Impact on Economies

Marshall R. Perkins
Dr. Justin E. Lance, Ph.D.
Department of Political Science

This paper examines the effects of several human rights violations on countries' economic growth in Africa, the Americas (North America, Latin America, and the Caribbean), Asia, Europe, and the Middle East. I hypothesize that countries offering maximum protections for human rights benefit from positive and consistent economic growth. Relying on data from the CIRI Human rights index and the World Bank from the years 1981-2011, there will be an examination of the effects of certain human rights protections and economic growth percentage. This research will hopefully create higher interest in the protection of human rights.

A Survey of Female Composers

Haley B. Pye
Dr. Karen W. Buckland, D.M.A.
Department of Music

My research is focused on the comprehensive survey of the lives and work of six composers: Francesca Caccini, Barbara Strozzi, Élisabeth-Claude Jacquet de la Guerre, Marianna Martines, Fanny Mendelssohn Hensel, and Amy Beach. These composers were chosen because they each built a career, and they collectively span across three major periods in Western music. This research includes two major sections dedicated to each composer; one focused on a biographical account, including their experiences dealing with social, cultural, and gender norms; and the second focused on musical analysis of a few compositions including extant manuscripts. This paper aims to provide an accurate and current account of each of their lives and musical output. With limited research in existence for most of the composers in this study, exposure to both their work and their lives is important for the preservation of these six female composers.

Le Succès de Marine Le Pen: une comparaison des différences de leadership entre Marine et Jean-Marie le Pen

Regan A. Reed
Dr. Patrick D. Kiley, Ph.D.
Department of Modern Foreign

The rise of nationalist movements around the world has led to the success of controversial candidates, and in France, this rise in nationalism bolstered the campaign of Marine le Pen. The Front National has been in France for decades, founded and led by Jean-Marie le Pen since 1972. Although the Front National received wavering support under Jean-Marie le Pen, since the rise of his daughter, Marine le Pen, the Front National has become a mainstream political party. What specific actions have distinguished Marine le Pen's rise to the top? How has Marine le Pen transformed the far-right political party run by her father to capture the votes of moderate French citizens? By comparing the language in speeches and social media posts, identifying the shifts in rhetoric through campaign slogans, and analyzing how Marine has distanced her political image from that of her father, this paper seeks to explain how Marine le Pen succeeded in capturing the votes of the French people in the 2017 presidential election.

The Most Effective Third-Party Intervention in Ending and Instituting Stable Resolutions to Ethnic Conflicts

Regan A. Reed
Dr. Justin E. Lance, Ph.D.
Department of Political Science

In the modern world, intra-state conflicts have become increasingly common, with ethnic conflicts constituting some of the most violent and deadly fighting. Due to the brutality and the polarizing nature of these types of conflicts, help from third-party actors is often necessary in finding peaceful resolutions. Multilateral action plans, the generally supported method of intervention, have historically faced setbacks which led to criticism. Considering the failures in some cases of a multilateral approach, is it possible that unilateral intervention is more likely to institute an end and a stable resolution to violent ethnic conflicts? Through a qualitative case study, I will examine (1) the benefits and limitations of both multilateral and unilateral approaches to ending violent ethnic conflicts and determine which method is most effective in producing an outcome in which there was no reemergence of ethnic violence and (2) the case countries made progress towards improving their protections of human rights following the resolution of conflict.

Section 8 Housing Voucher Program and Its Impact on Low-Income Americans

James G. Revelle IV
Dr. Justin E. Lance, Ph.D.
Department of Political Science

This work will examine the Section 8 housing voucher and try to determine whether it traps low income Americans in a poverty cycle. The research uses data dealing with the section 8 housing voucher program from Data Lumos and poverty statistics from the U.S. Census Bureau to examine this relationship. The hypothesis is that there is a direct correlation between the number of people in a county in the section 8 housing voucher program and the amount of poverty the county has.

Determination of Yeast as a Model for Type II Diabetes: The Effects of GPR1 in Yeast as a Model of Long-Term Blood Glucose Control in Diabetics

Aaron A. Reynolds
Dr. Evelyn J. Swain, Ph.D.
Department of Chemistry and Biochemistry

There are a variety of medications for Type II Diabetes that help with reducing the speed at which sugars are processed in the body, resulting in a slower increase of glucose levels. The specific area of focus for this research will be on the effectiveness of exogenous mGLP-1 expression in yeast on regulating glucose levels. By testing the effectiveness of expression of mGLP-1 in yeast, it can be determined whether or not GPR1 in yeast can be used as an accurate representation of mGLP-1R in humans and if gene delivery is a viable treatment. The experiment will contain a two-prong approach, only one of which will actually be tested in a wet-lab setting. The first part of the experiment will involve measuring the oxidation and growth responses of various yeast mutants in the presence of differing levels of glucose. Secondly, an mGLP-1 plasmid vector will be created and introduced into the yeast cell via DNA transformation. Hypothetically, when a GPR1 deletion occurs in yeast cells, glucose levels in the cell should rise. Based on this hypothesis, if yeast glucose levels go up with a GPR1 delete, it is possible that they would go down with expression of mGLP-1R. If this is the case, the experiment may indicate gene delivery and expression of GLP-1R (modeled by GPR1) can, over a longer period of time, more effectively decrease blood glucose concentration in a diabetic organism than any current medication.

Myoelectric Control of Prosthetics and Robotics

Preston K. Robinette & Katherine A. Crosby
Dr. Eli T. Owens, Ph.D.
Department of Physics and Computer Science

Prosthetic limbs improve mobility and give people the power to perform otherwise arduous tasks. In our research, we have developed a functional, 3D printed prosthetic hand. This hand detects and interprets the myoelectric signal from healthy muscles to control motors that move the prosthetic fingers and wrist, mimicking the functionality of a true hand. Prior work has accomplished basic movements, but due to the processing power needed to interpret the myoelectric signal, prosthetic hand movements are far from the fluidity and quickness of a human hand. The focus of our project is to decrease the signal processing response time in order to increase the speed of the prosthetic hand. To detect a myoelectric signal, we use three electrodes attached to the arm--two across the muscle of interest and another on the elbow acting as a ground reference. The signal from the two electrodes on the arm is sent into circuit elements which subtract, filter, and amplify the signal. The signal is then sent into a microcontroller, which uses a threshold algorithm to decide if the hand should be opened or closed. The open and close action is accomplished via servos attached to the prosthetic fingers. In conclusion, we were able to create a functional, low cost 3D printed prosthetic hand controlled via myoelectric sensing and interpretation. We have significantly improved the signal to noise ratio thereby increasing the speed of operation, an important step forward for open source prosthetics.

Are Cameras a Weapon? The Effect of Recording on Memory

Christian N. Sanders
Dr. Sarah C. Burns, Ph.D.
Department of Psychology

Memory is vital for the human species. Humans rely on memory for a myriad of events spanning from daily activities to identifying a crime suspect. Eyewitness testimony is utilized in courtroom settings. However, if a weapon is present during the crime, the witness is less able to accurately encode or recall details of the perpetrator. This phenomenon is known as the weapon focus effect. We think that in the modern era, recording devices such as a phone might trigger a response like the weapons focus effect. In this experiment, the weapon focus effect will be tested using a phone as a proxy for a weapon. Participants will complete a simple card task to assess memory in the presence of a phone versus no phone.

Resegregation of Schools in Charlotte Mecklenburg-County due to Charter Schools

Sarah E. Shetley
Dr. Kirk J. Nolan, Ph.D.
Department of Religion & Philosophy

With the passing of House Bill 514 in June of 2018, Charlotte-Mecklenburg County allowed four different Charter Schools to be developed in this area. Because of this development, I posed the question, does the creation of charter schools in this area unfairly advantage students from largely white, upper-middle class and upper class households? Through exploration of academic articles, both peer-reviewed and nonpeer-reviewed, paired with the study of Brown v. Board of Education, the Family Choice Plan, and House Bill 514, I was able to reach a conclusion in my research. I found that because of school zoning, predominately white, upper-middle class students are provided a greater chance of attending a charter school. In light of this finding, I took a deeper look at the way in which school zoning patterns are developed. I found that in the area examined, school zoning patterns could be developed to encompass a more diverse group of students simply by changing the way in which the school zoning lines are set.

Truncation Synthesis and Analysis of HXT1 Glucose Transporter Structure and Function in *Saccharomyces cerevisiae*

Douglas J. Smith
Dr. Evelyn J. Swain, Ph.D.
Department of Chemistry and Biochemistry

Diabetes mellitus, specifically Type 2 Diabetes, is one of the most prevalent diseases in America today. The Centers for Disease Control and Prevention (CDC) estimate over 30 million Americans are affected by some form of diabetes. Type 2 Diabetes is specifically characterized by an individual's body being resistant to insulin, the hormone responsible for glucose uptake in the body, and its effects. *Saccharomyces cerevisiae* provides a useful tool in studying diabetes through the family of hexose transporters, HXTs, which share high sequence similarity with those of humans, or GLUT transporters. This study looks at the non-conserved terminal domains of HXT1, a low affinity glucose transporter in an effort to understand the role of these domains. It is currently unknown whether these domains are responsible for glucose signaling or uptake in *S. cerevisiae*. The first step in determining the role of the HXT1 terminal domains is creating various truncations of the protein using specifically designed primers with PCR and transforming the synthesized proteins into a "null" strain containing no active hexose transporters. Additionally, experiments were performed to study the growth of various strains with genes encoding HXTs deleted from the strain. Testing plate viability, fluorescence microscopy, and pre-culture conditions, we were able to determine optimal growth conditions for specific HXTs and their interactions with other hexose transporters.

The Influence of Social Factors on Little League Baseball

Colton R. Springs
Dr. Carla Alphonso, Ph.D.
Department of Sociology

The relationship between social factors and how they influence the success of youth competitive baseball has recently become a topic for debate and research. However, the relationship between these two general variables has not yet been clearly stated. I used secondary data analysis to discover the effects of social factors on youth baseball over the last 5 years. An investigation was made by collecting statistical data during the years of 2013 through 2017. The classification of different social factors indicates how competitive youth baseball can actually become. Race, class, geography, cost, and community do show significant evidence of impact on youth competitive baseball. These findings may give some insight into the social factors that may have some effect on baseball little leaguers.

The Middleman: Ralph Bunche

Chad A. Stevens
Dr. Roy B. Campbell, Ph.D.
Department of History

This paper examines why Ralph Bunche was worthy of earning a Nobel Peace Prize. Ralph Bunche was known for his successful mediation of the Arab-Israeli conflict in 1949. The United Nations stepped in to resolve the conflict by appointing Bunche as a lead mediator. Bunche ultimately negotiated armistice agreements with Israel and Egypt, Lebanon, Jordan and Syria, and his efforts forever impacted international diplomacy. Historians have examined Bunche's tactics and strategies as they relate to resolving the conflict, and have offered varying perspectives on why he was successful. This paper considers these perspectives, while offering a fresh look at what made Bunche's resolution of the conflict such a remarkable accomplishment.

Iranian Hostage Crisis: Impacts on American Politics

Joshua D. Urwick
Dr. Roy B. Campbell, Ph.D.
Department of History

This research explores the 1979 Iranian Hostage Crisis and the possible effects the crisis had on the 1980 United States Presidential Election. This research examines how the hostage crisis impacted Jimmy Carter's presidency and how President Carter responded directly to the crisis. Some of the main questions this research addresses are: Was the crisis a direct attempt by Iran to manipulate a certain outcome from the United States, how did this crisis affect the United States Presidency, and did the Iranian hostage crisis directly affect the election of President Ronald Reagan? This paper will demonstrate that although it is true that the hostage crisis today is looked at as one of the greatest blunders in American presidential history, the handling of the crisis was not the sole factor in Ronald Reagan winning the 1980 Presidential election. In fact, Jimmy Carter's presidency was filled with a plethora of significant blunders and mistakes, and these alone would have led to a Reagan presidency, regardless of how President Carter handled the Iranian Hostage Crisis in 1979.

DNA-modified Cadmium Sulfide Quantum Dot Nanoparticles

Morgan H. Wilson
Dr. Latha A. Gearheart, Ph.D.
Department of Chemistry and Biochemistry

Nanoparticles are a trending topic in the scientific community due to their numerous practical applications in fields such as biology, medicine, and optics. Specifically, cadmium sulfide (CdS) nanoparticles are of interest for their photophysical properties and the ease in which they can be synthesized. Unfortunately, biological applications using CdS nanoparticles have been limited due to cadmium's carcinogenic and cytotoxic affects on organisms. In this research, uniform CdS nanoparticles (approximately 4.5 nm in diameter) were synthesized through slow precipitation of Cd^{2+} and S^{2-} ions in the presence of a polyphosphate stabilizer and under basic pH conditions. The nanoparticles were then exposed to varying concentrations of plasmid DNA to determine DNA-nanoparticle binding efficiency. Photoluminescence spectroscopy was used to monitor DNA-nanoparticle binding since DNA adsorption results in decreasing nanoparticle luminescence. This research will hopefully provide insight into concurrent research on CdS biocompatibility in yeast cells.

Size Control of Gold Nanoparticles

Salem C. Wright
Dr. Latha A. Gearheart, Ph.D.
Department of Chemistry and Biochemistry

The Turkevich synthesis of gold nanoparticles involves the reduction of a gold salt in the presence of an aqueous reducing agent and is widely used because of its simplicity and ability to reliably produce uniform nanoparticles. Unfortunately, the Turkevich reaction mechanism is still not fully understood and thus is not fully utilized. Though debated, evidence indicates the formation of a few small gold seeds early in the reaction catalyzes a burst of gold nucleation sites available for nanoparticle growth. In this research, gold nanoparticles were prepared two ways: (1) with the standard Turkevich method and (2) with a modified "seeded" approach, spiking each reaction mixture with small amount of gold nanoparticle seeds prior to the synthesis. The reactions were repeated at different temperatures. Transmission electron microscopy and UV-Vis spectroscopy were used to characterize nanoparticle morphology. These results may provide insight into the gold nanoparticle reaction mechanism and consequently, improve nanoparticle size and shape control during synthesis.

Senior Art Exhibition

Lauren Adkins
Mark R. Anderson, M.F.A.
Department of Art

Artist Statement

Creating art exercises my physical, mental, and emotional states and challenges me to push myself. I strive to portray my connection to the world around me and am open to using a variety of media, but usually focusing on acrylic paint on canvas. By exploring the nature of art materials, following the silent guidance arising from the physical qualities like the viscosity, thickness, and fluidity of each medium, I have discovered how to project a significant message within each piece.

I feel most inspired by the works of Vincent Van Gogh, Mark Rothko, and Salvador Dalí, and so my art emerges as an amalgam of Surrealist, Abstract Expressionist, and Post-Impressionist concerns.

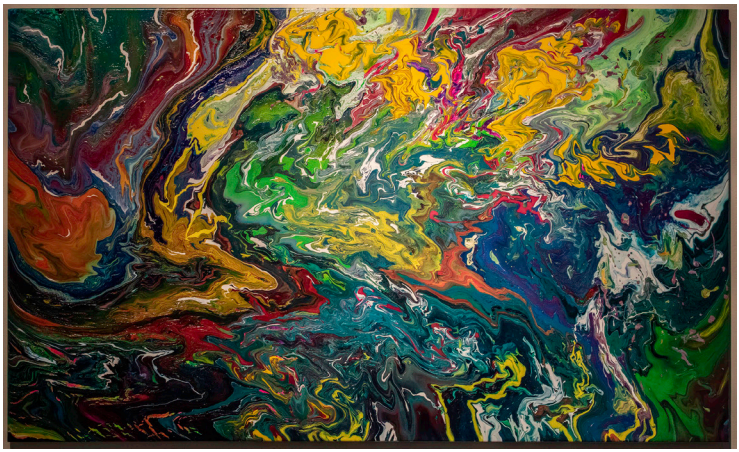
Constant fascination with the unconscious human mind, spiritual beliefs, and psychology experience has led me to focus on semiabstract depictions of what it might look like if we could see our silent thoughts, shifting emotions, and unconscious dreams. Growing up in the age of technology, witnessing advancements especially in the visual and graphic arts like digital special effects in film and video, I have developed an idea that, if we could see them, these psychic phenomena would probably appear to be liquified;

as when Harry Potter pulls memories out of his head to explore within the Pensieve in Harry Potter and the Half-Blood Prince. In a similar way, our thoughts and dreams could also be seen as wispy, ethereal streams of psychic substance.

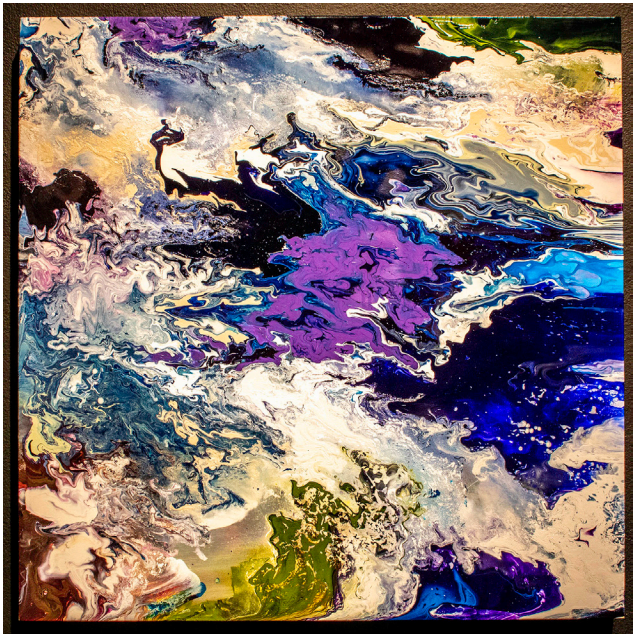
My art is more about self-expression than mere academic design, due to wanting to challenge my viewers to look deeper into their own inner processes in order to contemplate what my work tells them about themselves as unique individuals. My works are sometimes simplified in order to allow each viewer to contemplate their own impressions, while at the same time, trying to express my own psychological state and beliefs through each piece as a reflection of my inner self.

Art for me has helped promote personal growth and I hope, through observing my art and following my artistic journey, viewers will also be affected in a similar way.

Genesis 30”x30”



Oneirology 30”x30”



Fluid Dreams 36”x60”

Mongolian Nights 24”x36”

Department of Music Honors Recital Participants

Student performers:

Amy Wortkoetter, organ	Class of 2019
Harris Banks, cello	Class of 2020
Haley Pye, soprano	Class of 2019
Bobby Azevedo, clarinet	Class of 2019
Collin McKinnon, cello	Class of 2019
Paul Peart II, violin	Class of 2020
Jarvernique Tinsley, violin	Class of 2020

Collaborative pianists (accompanists):

Ms. Sharalynn Hicks

Mr. Andrew Sheffield