

2019

ABSTRACTS

HIGHLIGHTS OF STUDENT RESEARCH
AND CREATIVE ENDEAVORS



HONORS COLLEGE
COLUMBUS STATE UNIVERSITY

Abstracts 2019: Highlights of Student Research and Creative Endeavors

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Designed by eDarci Burdett, 2014 Honors College graduate

Cover Art: Ainsley Steeves, Sophomore Art Major and
Honors College Student

Comprised of four pieces, *Connection* is approximately 18 inches in length and is made of 18 gauge steel and spray paint. A subtle divide exists between the forms that references the dynamics of the “group” and the “individual.” This speaks of the connection, along with the potential isolation, that can occur based on perspective and initiative.

Abstracts 2019

Highlights of Student Research and Creative Endeavors

What follows is a collection of abstracts summarizing the scholarship conducted by undergraduates at Columbus State University during the 2018-2019 academic year. These projects highlight undergraduates research in a variety of disciplines, ranging from literary analysis to laboratory based sciences. The abstracts represent many ongoing projects on our campus and catalog those that have been published or presented.

This volume begins with projects that have been selected for presentations at international, national, regional and statewide disciplinary conferences. Among them are several that have garnered awards for outstanding undergraduate scholarship. Projects that have received competitive research grants, including our campus Student Research and Creative Endeavor (SRACE) Grants, are also featured.

Many undergraduates have presented their work with our local community, either through the dissemination of best practices in nursing to regional hospitals, colloquium presentations of lecture-recitals at the RiverCenter for the Performing Arts, or at Columbus State University's Tower Day held in April 2019.

Together these abstracts demonstrate the commitment of our faculty to engage students in their disciplines and represent outstanding mentorship that occurs on and off our campus throughout the year. Our students have amassed an impressive collection of projects that contributes to both academia and our local community, and these abstracts will hopefully inspire others to delve into scientific and creative inquiry.

Presented at International & National Conferences

Software Assurance of Smart Contracts

*Gabriel Bello and
Gavin Kerr*

Smart contracts reduce human overhead on blockchain operations through automation and have often been used to process financial transactions. Blockchain as a technology is designed for immutability, and as such, the code of a smart contract is intended to be unchangeable. Smart contract code is susceptible to bugs, for the development process is often communal and lacks a centralized form of accountability, the code can have bugs. Throughout the lifetime of blockchains and smart contracts, many bugs have been documented, such as the DAO Parity bug, which resulted in over 300 million dollars' worth of lost cryptocurrency. This paper documents seven classes of bugs that occur in smart contracts with a focus on cross-platform bugs, succinctly listing the properties and effects of each. Based on similarities to well-known software bugs, this paper categorizes the smart contract bugs based on Common Weakness Enumeration (CWE), an established software assurance bug repository, that aids in determining the causes, effects, and properties of each bug. By documenting, explaining,

*Faculty Mentor:
Dr. Yesem Peker,
TSYS School of
Computer Science*

Presented: National Conference of Undergraduate Research 2019
Member of the Honors College

Abigail Dickson

Dignity and Resistance: Fredrick Douglass and the Arts in America

Faculty Mentors: Frederick Douglass is a monumental figure in the history of civil rights in the United States. His influence over his contemporaries and every generation since has shaped the centuries long struggle for the civil rights of the African-American community. Much of the research on Douglass has focused on his influence on other civil rights leaders, like W.E.B. DuBois, Marcus Garvey, Martin Luther King Jr., and Malcolm X. In this paper, I will examine how this giant of American history has specifically shaped the arts in America. Beginning with his own efforts to curate African-American art and his use of the artistic medium photography, and continuing to present day efforts of Jazz artist Ruth Naomi Floyd to marry his writings with the artistic medium of Jazz, I will examine how his devotion to the cause of the freedom and dignity of the enslaved African-American community has been echoed in the arts. I will present a paper that demonstrates the timelessness of Douglass's commitment to the cause of the dignity and freedom of his people.

Christopher Reichmeier,
Schwob School of Music

Cayce Van Horn,
Department of English

Presented: National Conference of Undergraduate Research 2019
Member of the Honors College

Synthesis and biological activity of *N,N'*-bis-substituted-triazolium salts as potential antimicrobial agents

ZiJie Lin

Triazoles have been researched extensively for their medicinal properties as a scaffold for the development of drug therapeutics. However, *N,N'*-bis-substituted triazolium salts, a class of compounds synthesized from triazoles, have yet to be investigated for their structure-activity relationship (SAR) between substituents and antimicrobial activities. Similar in structure, imidazolium and benzimidazolium salt compounds have been extensively utilized due to their promising biological activities. However, the non-water soluble nature of these two classes of compounds has substantially decreased their viability in the clinical atmosphere. A preliminary SAR study of a substituted class of compounds has corroborated the claim that triazole rings would provide the greatest water solubility. To further the understanding of triazolium salts as antimicrobial agents, we present a SAR study of *N,N'*-bis-substituted triazolium salts synthesized from 1,2,3- and 1,2,4-triazole rings. The SAR study of triazolium salts will explore the variation of antimicrobial activities of substituents on 1,2,3-triazole and 1,2,4-triazole rings.

Faculty Mentors:
Dr. Kerri Taylor,
Dr. Jonathan Meyers
Department of Chemistry

Dr. Lauren King,
Department of Biology

Contributor:
Julie Wilson

Presented: American Chemical Society National Meeting
Funded: SRACE: ZiJie Lin (\$450), Julie Wilson (\$225); Flora Clark Research Grant: Julie Wilson (\$300); South East Persons with Disabilities in STEM/ INCLUDES: Julie Wilson (\$450)
Member of the Honors College

*Elijah B Neundorfer
and Ramon P.
Medina*

Using Logic Bombs to Exploit the Android Permission Model and a Module Based Solution

*Faculty Mentors:
Dr. Radhouane
Chouchane and
Dr. Alfredo Perez,
TSYS School of
Computer Science*

Android security implements a permission model to protect a user's most sensitive data. These permissions regulate an app's access to different aspects of the device, however, a fatal flaw of Android's permission model is that it relies on the discretion of the user to determine which apps are granted permissions and which are not with limited assistance in their choice from the device. As a result, a specialized type of malware known as a logic bomb has affected Android devices. These logic bombs are designed to execute malicious code when activated by triggers, and can be designed to take advantage of users who poorly vet their applications or even hide themselves inside applications that appear to be benign. On Android, logic bombs usually carry out malicious intent by violating permissions, using a permission for some activity the user never intended. We have found 18 different permissions that applications can violate to carry out some form of malicious intent, and have developed an app, called HyenaDroid, to violate each of these permissions and create logic bombs. This provides evidence that the current Android security revolving around permissions is in need of either an update to the permissions model, or an additional system to assist the user with navigating the Android permissions model. Our research also proposes such a system, PRAST. PRAST is designed as a modular system, combining a level of efficiency that can be run during the download on an Android device, along with the effectiveness and accuracy of external analysis systems.

Presented: The 2018 13th International Conference on Malicious and Unwanted Software (MALCON 2018)
Funded: SRACE, \$1095, Honors Educational Activity Grant, \$200, NSF/DoD Research Experiences for Undergraduates Grant \$14,891
Member of the Honors College

Synthesis and anti-proliferative activity of N,N'-bis-substituted triazolium salts with lipophilic and hydrophilic substituents

Thong Ta

The accelerated of fatalities among cancer patients has urged many researchers and scientists to investigate and explore for more novel cancer therapeutics with fewer side effects. Literature has shown promising anti-tumor activities among triazole-based compounds and its derivatives. Though, there is very few research focused on the biological properties among the classes of N,N'-bis-substituted 1,2,3- and 1,2,4- triazolium salts. The Taylor group, in particular, has executed a preliminary review of the effect on anti-tumor activity due to the placement of the substituent groups on the nitrogen positions in N,N'-bis-substituted-1,2,4- triazolium salts. Initial work has shown 1,2,4-bis(arylmethyl)triazolium salts as an effective cancer-killing agent. A novel series of N,N'-bis-substituted 1,2,3- and 1,2,4- triazolium salts will be synthesized and characterized to aid in the investigation of a structure-activity relationship (SAR), as well as determine their biological activity against prostate and breast cancer cell lines.

*Faculty Mentor:
Dr. Kerri Taylor,
Department of
Chemistry*

Presented: American Chemical Society National Meeting; CSU Tower Day 2019
Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), \$450

Nicholas Wilson **The Interaction of Metal Ions on L-Histidine and the Resultant Antibacterial Effect**

Faculty Mentors: L-Histidine is an essential amino acid that is utilized for several
Dr. Floyd Jackson biochemical metabolic pathways within the human body. Upon
and interaction with metals, the pyrrole hydrogen of the imidazole
Dr. Jonathan moiety on histidine can be affected. As of yet, the literature is not
Meyers, definitive in terms of the rationale in the pKa changes caused by
Department of these metal ions. Work by Hoq and Shepherd (1983) suggests that
Chemistry these pKa changes can be caused by sigma induction and sigma
withdrawal; yet, this explanation does not account for varying
bond lengths. As such, this study aims to provide an overview of
the interaction between metal ions and histidine by binding nickel
(II), cobalt (III), and zinc (II) to a histidine ligand in aqueous solution
with chloride used as a counterion. Through the observation of
ultraviolet-visible (UV-Vis) spectra and hydrogen nuclear magnetic
resonance (HNMR), the electron transitions within the d orbitals
can be observed. Further, ligand to metal charge transfers (LMCT)
and the back donation of electrons are present in the complexes
which accounts for the acidity changes. Further, the complexes have
been incubated with *Escherichia coli* to observe the antibacterial
properties of the metals or bound histidine. Applications for this
study include future directions for drug synthesis involving metals.

Presented: American National Society Conference
Funded: \$200 SRACE \$200 Honors Activity Grant
Member of the Honors College

Presented at Regional & State Conferences

Histological techniques reveal differences in intersex occurrence and severity in Largemouth bass (*Micropterus salmoides*) and Spotted bass (*Micropterus punctulatus*)

Abigail Abernathy

*Faculty Mentors:
Prof. Elizabeth Klar
and
Dr. Michael
Newbrey,
Department of
Biology*

Previous studies have not adequately quantified the severity of feminization between cross versus longitudinal sections of testes. A high occurrence of severe intersex could affect the long term reproductive success of a fish population. Intersex is characterized by the presence of one or more oocytes in the gonads of a male fish and the severity is dependent on the number and arrangement of these oocytes. Our goal was to compare the occurrence and severity of intersex between two sampling techniques, cross and longitudinal sections of testes; the most informative technique should provide the highest severity. Using boat electrofishing, we collected Largemouth bass (*Micropterus salmoides*) (n = 18) and Spotted bass (*Micropterus punctulatus*) (n = 25) from Lake Oliver, a reservoir of the Chattahoochee River, Columbus GA. Testes from each fish were removed, weighed, and preserved in 10% neutral buffered formalin. For each fish, one testis was cut into three cross sections, while the other was cut longitudinally. The tissues were processed, embedded in paraffin, and sectioned with a microtome at 5 μ m, mounted to a glass slide, and stained using hematoxylin and eosin. In our initial assessment, we found that the two sectioning techniques gave different percentages of intersex and intersex severity. When the method of longitudinal sectioning was used, 78% of the Largemouth bass were found to have intersex with an average severity index of 1.67. In contrast, the method of cross sectioning identified the occurrence of intersex to be 53% with an average severity index of 0.87. The most common sampling technique to assess intersex is cross sectioning, but our data suggests that longitudinal sectioning may be a more accurate method to use.

Presented: Association of Southeastern Biologists Annual Meeting

Funded: SRACE, \$200

Member of the Honors College

Gabriel Bello

Adapting Financial Technology Standards to Blockchain Platforms

Faculty Mentor: Traditional payment systems have standards designed to keep transaction data secure, but blockchain systems are not in scope for such security standards. We compare the Payment Application Data Security Standard's (PA-DSS) applicability towards transaction-supported blockchain platforms to test the standard's applicability. By highlighting the differences in implementation on traditional and decentralized transaction platforms, we critique and adapt the standards to fit the decentralized model. In two case studies, we analyze the QTUM and Ethereum blockchain platforms' industry compliance, as their payment platforms support transactions equivalent to that of applications governed by the PA-DSS. We determine QTUM's and Ethereum's capabilities to properly ensure secure data handling with respect to current security standards. After adapting the PA-DSS and analyzing the QTUM and Ethereum platforms, we revise the new set of standards to create a set of best-practices for ensuring data security on both traditional and blockchain payment systems. We report the security gaps identified on each platform based on the final revision of the standards, presenting a conclusive perspective that neither platform is suitable for business adoption based on the PA-DSS standard's results.

Presented: ACMSE 2019
Member of the Honors College

Ana Mendieta and Blackness: When the Other Consumes the Other *Amber Edmond*

Ana Mendieta is known for her performances and earthworks that advanced body art in the 1970s. I argue that Blackness is paramount to Mendieta's conception of her identity and by extension her work, despite being a white Cuban woman. In her early work, she used imagery from Afro-Cuban religions like Santería and from caricatures of African Americans to explore her displacement from Cuba, anti-Black racism she experienced growing up in the Midwest, and the magic in "primitive" cultures.

*Faculty Mentor:
Dr. Claire McCoy,
Department of Art*

Presented: University of Alabama 24th Annual Graduate Student Symposium in Art History
Awarded: 2nd Place in the Harrison Award for Research, University of Alabama, Tuscaloosa

Amber Edmond

Exhibitions during the Spectacle of Black Death

Faculty Mentor: In this project, I explore how art research functions in freedom struggles, particularly in a world during #blacklivesmatter when racism is at its most visible. I'm interested in how museums respond to this visibility through the shows they choose to fund and display. To do this I look at three specific exhibitions - *Posing Modernity: The Black Model from Manet and Matisse to Today* at Columbia's Wallach Gallery, *Charles White: A Retrospective* at MoMA and *Soul of a Nation: Art in the Age of Black Power* at the Brooklyn Museum. All three deal with Blackness in distinct ways. The first looks at the change in representation of Black female models as paramount to the definition of modern art; the second looks at the career of an artist that insisted on art being an agent of liberation; and the third looks at Black artistic production during the Black Power age. I place these shows in the context of the spectacle of extrajudicial murders of Black people.

Funded: SRACE, \$550 and Art Department Funds, \$100

The effect of a thermal gradient on age and growth characteristics of Largemouth Bass (*Micropterus salmoides*)

Mary Halbrook

Climate change has become a growing concern in the world of environmental research. Climate change can refer to any number of different statistical changes in weather patterns, but temperature change is a key component of climate change. These global temperature changes can have a large impact on species whose characteristics are thermally dependent. Our goal is to examine the relationships between mean annual temperature and variation in Largemouth Bass (*Micropterus salmoides*) longevity and size at age 3. We expect Largemouth Bass to live longer but grow smaller in cooler temperatures than in warmer temperatures. Previously published data on this species has been collected from across the United States and Canada. Our preliminary results show there is a significant negative relationship between latitude and total length at age 3 as has been previously reported in the literature. There is no relationship using least squares regression between latitude and longevity; however, the data are arranged in a vertical parabola that opens upward. Nonlinear relationships between temperature and longevity have been previously reported in other taxa, such as the pikes, *Esox*. Using a high-resolution temperature dataset developed for climatological research, we will perform an analyses based on measured temperature and compare that analysis to the latitudinal analysis. This study aims to explore the effects of temperature changes on Largemouth Bass in order to determine the future possible effects that climate change will have on this species.

Faculty Mentors:

Dr. Michael

Newbrey,

Department of

Biology

Dr. Scott Gunter,

Department of Earth

and Space Sciences

Presented: Association of Southeastern Biologists Annual Meeting

Funded: \$400

Meenal Joshi

Histological analysis reveals background levels of intersex in Largemouth bass of the Chattahoochee River

Faculty Mentors:
Prof. Elizabeth Klar
and Dr. Michael
Newbrey,
Department of
Biology

There are no published studies explicitly identifying the background levels of intersex in male Largemouth bass (*Micropterus salmoides*), and this lack of knowledge limits our understanding of species-specific severity of intersex. We hypothesized the occurrence and prevalence of intersex should be the same in the Chattahoochee River and two of its tributaries. We collected Largemouth bass using backpack and boat electrofishing techniques from Lindsey and Heiferhorn Creeks, and Lake Oliver of the Chattahoochee River. Gonads were collected and studied using histological techniques. Largemouth bass from Lake Oliver (n=18 males) exhibited intersex in 75% of the males. However, in the two creeks, there were no oocytes present in the gonadal tissue; therefore, each of these creeks has 0% intersex. Through this information, we have preliminarily concluded that the background levels of intersex in Largemouth bass is zero. Conversely, Lake Oliver has a higher level of intersex with oocytes present in most of the males examined. This evaluation reveals that no intersex is possible in Largemouth bass and showcases the comparison of intersex among connected rivers.

Presented: Association of Southeastern Biologists Annual Meeting
Member of the Honors College

Archaeology and the SEC: Using Football as a Medium for Archaeology

Valerie Parker

For archaeology to thrive, it must have a symbiotic relationship with the communities they serve. States such as Florida and Colorado, boast rich public archaeology programs, and have received overwhelming support from their community because of their choice to actively engage the public. This, in turn, has led to their community's greater understanding and appreciation for their past. This past spring anthropology students at Columbus State University chose to connect with students through a major southern past time, SEC football. Students redesigned the Anthropology Department's display case and selected artifacts from different SEC states. In the past, the display case received very little attention, but has since received a positive response from within the university.

*Faculty Mentor:
Danielle Cook,
Department of Earth
& Space Sciences*

Presented: The Southeastern Archaeological Conference

Rosamaria Smith

Sor Juana Inés de la Cruz

Faculty Mentor: This is a project to present in English and in Spanish a glimpse of the Tenth Muse, Sor Juana Inés de la Cruz. Sor Juana has caused an explosion of reactions in the world, on a lot of people such as writers, artists, philosophers, theologians, and thinkers of all kinds young and old to consider the basic tenets of life and what living is about.

Dr. Susan Hrach,
Department of
Modern & Classical
Languages

Presented: History and Practice of Translation final presentation.

Estimating taxonomic diversity using growth profiles and stinger morphology of 34 million year old stingrays from North Dakota

Persia Tillman

Freshwater stingrays used to inhabit the United States and Canada during very warm times in the geologic record. No stingray material has been recorded from the northern part of the United States for the last 33 million years. We are interested in the freshwater stingrays that lived just prior to the climatic cooling that changed the area of what is now the Great Plains 33 million years ago. Our goal was to estimate alpha diversity of stingrays from a fluvial fossil deposit that existed 34 million years ago. Fossil elements of stingrays are represented by their individual vertebral centra, stingers, and teeth. No complete specimens have been identified. We examined 36 isolated vertebral centra and estimated the number of growth cessation marks on each centrum. Centrum radial distance (mm) was measured from the notochord foramen to each annulus and plotted. Stingers were described morphologically and stinger thickness and median ridge thickness (mm) was measured for each specimen. Chronological ages for individual specimens ranged from 0 to 8 years old with two significantly distinct growth profiles; small and large profiles. Three stinger morphotypes were recognized. Measurements of stinger median ridge thickness indicated there were two small morphotypes and one significantly larger morphotype. Our data suggest there were three taxa of stingrays that lived in the river channels of North Dakota 36 million years ago. Two taxa were small and one taxon was somewhat larger. Our next goal is to determine whether there are three distinct morphologies in the vertebral centra. Our research indicates that diversity of freshwater stingrays was higher than expected. Climatic cooling may have caused regional extinctions of freshwater stingrays because freshwater stingrays are found in tropical and subtropical areas today.

*Faculty Mentor:
Dr. Michael
Newbrey,
Department of
Biology*

Funded Research Projects

Preparation and activity of heterogeneous catalysts for methane combustion

Methane is a known greenhouse gas that has a negative effect on the environment. A large source of methane is from the exhaust pipes of cars. The goal of this study is to reduce methane emissions from automobiles at lower temperatures. Two heterogeneous catalysts were prepared by Vortex Method. The method involved very slow addition of a precursor solution to the support while vortexing at 900 rpm until a 'Dough' was formed. The solid was dried and then calcined at two different temperatures. The catalysts contained 5% Pd on silica support and 1% Pd/4% Ni on gamma alumina support. The activities of the catalysts were tested in a temperature-controlled horizontal fixed-bed catalytic reactor by passing a mixed gas containing methane, oxygen and balance nitrogen/helium at 250-350 degrees Celsius. The methods of preparation and activity studies along with temperature-conversion data will be presented.

*Jasmine Bohannon
and Domenica
Fertal*

*Faculty Mentor:
Dr. Anil Banerjee,
Department of
Chemistry*

Funded: \$350 from Student Research and Creative Endeavors Grant

Abby Grace Moore

New fossil material of the bowfin, *Amia*, from the Sentinel Butte Formation (Paleocene), Medora, North Dakota

Faculty Mentor: The species, *Amia calva*, is the only living member of the ancient
Dr. Michael family Amiidae. *Amia calva* is an icon in the field of comparative
Newbrey, osteology, yet we have a poor understanding of the evolution of the
Department of genus because many fossil amiid bones have gone unidentified. Here
Biology we identify new material of the genus, *Amia*. Previously, the oldest

known material identifiable as *Amia* cf. *A. pattersoni*, was a specimen from the Paleocene epoch of Alberta, Canada approximately 58 million years in age. Fossils of an unidentified species of *Amia* were found in the Sentinel Butte Formation, a geologic formation of Paleocene age (~ 60 million years ago) near the town of Medora, North Dakota. The specimens are classified as *Amia* because the coronoid tooth plates exhibit conical teeth and the parasphenoid exhibits a long tooth patch that extends anteriorly past the ascending rami of the bone. A sister taxon, *Cyclurus*, is also found in the same formation but has flattened coronoid teeth and a short, heart-shaped tooth patch on the parasphenoid. This new material of *Amia* is distinguished from other species based on three criteria. First, the parasphenoid tooth patch is extremely wide posteriorly, reaching the lateral margins of the bone, but very long and narrow anteriorly. Second, the gular plate is uniquely shaped, not being truncated posteriorly but rather tapering both anteriorly and posteriorly. Third, the teeth of coronoid tooth plates are robust, unlike those of other species of *Amia* which are thinner and more elongated. These fossils represent a taxon that could attain a large size with a total length well in excess of 1 m and highlight the necessity to document other taxa to flesh out the evolutionary history of this long and important lineage.

Funded: SRACE - \$115.50
Member of the Honors College

The Impact of Honey and Caffeic Acid on Oxidative Stress as a Protective Agent for Human Nephrons in a Hyperglycemic Environment

Chad Reynolds

Diabetic nephropathy is a common complication in diabetic patients due to the damage hyperglycemia does to the vasculature of the kidneys. At the molecular level, diabetic nephropathy can be attributed to oxidative stress in a hyperglycemic environment which can lead to Chronic Kidney Disease (CKD), renal failure, and End Stage Renal Disease (ESRD) (An et al., 2017). Oxidative stress is a term used to describe the shift in equilibrium from clearing reactive oxygen species (ROS) to the build up of those species (Pizzino et al., 2017).

*Faculty Mentor:
Dr. Kathleen
Hughes,
Department of
Biology*

Funded: SRACE, \$125. CSU department funds, \$1,007
Member of the Honors College

Corey Stewart,
Ethan Baber

Wind Gusts around the Chattahoochee Valley

Faculty Mentors: Under the mentorship of Dr. Guihong Fan and Dr. Scott Gunter, our group investigated wind damage reports spanning the last 10 years in an area from Columbus, GA to Auburn, AL. We used data supplied by the National Oceanic and Atmospheric Administration to analyze severe wind occurrences by time of day, meteorological season, and locale within our region. By studying this data, we attempted to develop a better understanding of the conditions surrounding severe wind gusts, which are brief increases in wind speed that can cause unexpected damage.

Dr. Guihong Fan,
Department of
Mathematics &
Philosophy

Dr. Scott Gunter,
Department of
Earth and Space
Sciences

Funded: Department of Mathematics & Philosophy, Unknown

Raspberry Pi Home Security System

Corey Stewart

Under the mentorship of Dr. Suk Lee, I used a raspberry pi – a relatively small and cheap computer – and its camera module to act as a simple home security system. It's possible to get information about the system and manage it from a phone app or a website. Depending on the user's settings, they'll get email notifications for certain events that are controlled by the various sensors and switches in the system.

*Faculty Mentor:
Dr. Suk Lee,
TSYS School of
Computer Science*

Funded: CPSC, \$70.00, SRACE, \$210.00

*Julia Vroman,
Rebekah Medina,
Katelyn deBrabant*

*Faculty Mentors:
Dr. Diana Riser and
Dr. Brandt Smith
Department of
Psychology*

Dehumanization of Children

Dehumanization is the attribution of less human qualities to a person or group by someone who views themselves as superior (Martínez et al., 2017). There is a dearth of literature on dehumanization by age, this research study will explore if dehumanization occurs with children more than with adults. It has been shown that adults will view children as warm, but not competent, which could be used to justify continuing to treat children as property (Starmans & Friedman, 2016). In this study we will examine participant responses to images of people of various ages on a warmth and competence scale, familiarity with children, and attitudes towards corporal punishment. We will analyze these factors to examine the role of dehumanization in attitudes toward different age groups. We expect to find that participants with less experience with children or a higher approval for corporal punishment will be more prone to dehumanize children. We also expect to see a decrease in dehumanization around the age of 15 in the images as this is the age where children are thought to be more independent. We plan to use the results of this study to further research into the topic of dehumanization of children as it is a small subgroup of research, as well as to discover any patterns in attitudes towards violence that could be predictors of dehumanization of children.

Funded: SRACE

Response of Particulate Matter Concentrations to Atmospheric Conditions *Luke Wright*

We are currently in an era where we rely heavily on industrialized processes. A nasty by-product of these processes is air pollution, a problem that blights urbanized areas. One form of air pollution that is of interest is fine particulate matter ($PM_{2.5}$). $PM_{2.5}$ is a general term given to harmful particles in the air with a diameter of 2.5 micrometers or less. $PM_{2.5}$ is formed primarily through combustion and is a by-product of industrial processes. Problems associated with breathing in fine- $PM_{2.5}$ include respiratory problems, birth defects, and cancer. Very little research has been done in the United States on the diurnal cycles and behaviours of particulate matter. I am especially interested in the response of $PM_{2.5}$ concentrations in response to atmospheric variables. I accomplished this by comparing air quality data from a handheld air quality monitor to data collected by a research-grade weather station. I used this data to compare changes in $PM_{2.5}$ concentrations to changes in temperature, relative humidity, pressure, and precipitation. I was also able to utilize wind speed and wind direction to determine the direction that the air pollution originated from. By evaluating the diurnal cycles, I can determine when people experience the greatest exposure to $PM_{2.5}$. My study allows people to become aware of the air pollution they are exposed to daily and change behavioral patterns to reduce exposure.

*Faculty Mentor:
Dr. Scott Gunter,
Department of Earth
& Space Sciences*

Funded: SRACE, \$250

Presented at Tower Day 2019

Modes of Convection for Severe Wind Events in North-Western Texas

Sophia Bartell

Strong winds are a familiar hazard to north-western Texas, but that doesn't stop them from being costly and even deadly. Before any severe weather event, it's imperative that people in the afflicted area have as much time as possible to mitigate their risk. This project observes years of severe wind measurements recorded by 11 high resolution weather stations in midwestern to northwestern Texas in order to observe types of convection that were associated with severe wind gusts (defined as a wind gust > 58 mph). Radar data were gathered from the Amarillo, Lubbock, and Midland radar stations using the NOAA's NEXRAD database. From these radar stations, files from an hour preceding to an hour following the weather stations recorded time period of the severe wind event were collected. The images in these radar files were generated using GR2Analyst. With this visual, it was first determined whether or not the event was convective. If the event was convective, it was then determined what type of convection it was associated with. In this project, modes of convection will be discussed and accompanied by three cases studies portraying the three main categories of convection.

*Faculty Mentor:
Dr. Scott Gunter,
Department of
Earth & Space
Sciences*

Member of the Honors College

James Tyler Bass **Studying ancient rocks (~355-335 Million years old): the Fort Payne Chert and Tuscumbia Limestone in the subsurface**

Faculty Mentor: The Tuscumbia Limestone and Ft. Payne Chert were deposited in a shallow marine shelf in the Black Warrior Basin in western Alabama.
Dr. Diana Ortega-Ariza, The Ft. Payne is a cherty limestone that reflects deposition in a tectonically quiet shallow marine shelf. The Tuscumbia is a carbonate shelf facies of light-gray micrite and bioclastic limestone. Some of the Tuscumbia contains thin layers of ooids. Both formations have thin interbedded shale. This study aims to refine our understanding of how these environments were distributed in the southeastern United States during Mississippian time (~360-325 Million years ago). To accomplish our goal we will study subsurface data (well logs and rock cores) from central Alabama. Petroleum companies gather well logs by passing a sonde down the borehole and recording various geophysical data including: electric resistivity, sonic, gamma ray, and neutron density. We have strategically selected 35 well logs from across the Black Warrior Basin to gain a regional picture of the subsurface. Geophysical data from the logs will be compared to a rock core taken from one of the wells in order to calibrate the well log data to the actual rock. This step is vital for correctly interpreting the well log data. To complete our regional paleoenvironment interpretation our subsurface data will be correlated to a recent study of rock exposures in northern Alabama.

Comparing Antiviral Methodologies in Biological and Technological Settings

Gabriel Bello

Biological viruses and computer malware are identified, prevented, and remediated in the human body and on a computer, respectively; there are seemingly few intentional overlaps in the techniques used. Biological antivirals typically target a single virus or family of viruses based on specific criteria of the virus' characteristics or behavior. In some cases, antivirals are prone to evasion due to mutating viruses or evasive viral mechanisms. On a computer, next-generation antimalware solutions aim to target the underlying characteristics of malware to prevent it from damaging the host or executing unwanted tasks. This project compiles modern antiviral and antimalware practices and organizes them based on several qualifying characteristics, as well as abstracts the methodologies to propose new behavioral analysis techniques present in antimalware agents. By abstracting viral behaviors to "known bad" actions, we can target multiple viruses based on the actions they perform throughout the viral lifecycle. We target well-known viruses in both disciplines, documenting five biological viruses and five pieces of malware. After abstraction, we analyze the techniques used to prevent viruses and malware to produce a comparative work and identify overlaps and oversights to each methodology.

*Faculty Mentor:
Dr. Lauren King,
Department of
Biology*

Member of the Honors College

Elizabeth Biggs

A Statistical Investigation of Stock Market Activity and Incidences of Financial Crime

Faculty Mentors: This project aims to identify a possible statistical relationship between the stock market and incidences of financial crime within the United States through big data analysis techniques using data from the FBI's NIBRS database. By analyzing the occurrences of financial crime by location, year, and type in relation to the S&P 500's close price on the first of the calendar year and the change in close price from the prior year as well as other financial market indicators, it will be possible to determine if a statistical relationship exists between the two. In addition, regression analysis will be performed in order to predict financial crime incidence using stock market prices.

*Dr. Kristin Lilly and
Dr. Ronald Linton,
Department of
Mathematics &
Philosophy*

Member of the Honors College

Chattahoochee River Valley Hail Storm Analysis

This research looks at the occurrence and trends of hail storms over the past ten years in the area covered by WRBL weather broadcasting. It details the process used to acquire and clean the relevant data, including where the data comes from and the parameters applied to it to make it ready to be analyzed. Analysis of the data looks at trends in variables such as hail size and frequency based on things such as year, time of day, and season. It also looks at the difference in the results when considering every separate instance versus when they are grouped by storm. Other parts of the analysis are based on different weather phenomena such as the presence of significant hail and the potential effect of global weather such as El Nino and La Nina. The results of this research show a general trend of having fewer, but more severe storms in the early spring, but many more, less severe storms during the summer. It also shows a slight trend in a decrease in both size of hail and frequency of storms over the past ten years.

*Samantha Brewer
and Jacob Halbrook*

*Faculty Mentors:
Dr. Guihong Fan,
Department of
Mathematics &
Philosophy*

*Dr. Scott Gunter,
Department of
Earth and Space
Sciences*

Savannah Bridges,
Zoe Halloran, and
Mason Hale

Bacteriostatic Effects of Bush Medicine on Bacterial Pathogens

Faculty Mentor:
Dr. Lauren King,
Department of
Biology

Humanity would not exist without plants. They provide fuel for the body, shelter against the outside world, and more importantly, the oxygen we breathe. Plants are also used for their medicinal properties; the earliest known evidence of this dates to nearly five thousand years ago (Petrovska B. B. 2012). Though synthetic drugs have overtaken the use of strictly herbal medicine in western culture, residents of the Bahamas continue to rely on “bush medicine”, the use of plant materials and animal products to heal, treat, or prevent an illness, as their main source of medical care. A few plants that may treat bacterial related illnesses are Bay Lavender (*Argusia gnaphalodes*), Periwinkle (*Catharanthus roseus*), Gumbo Limbo (*Bursera simaruba*), Hurricane Weed (*Phyllanthus amarus*), and Arrowroot (*Maranta arundinacea*). These plants are the focus of our project; we aim to determine how effective medicinal plants inhibit bacterial growth, and thus elucidate the possible efficacy of these plants as medicinal treatments. After collecting plant matter samples, we will extract soluble compounds with water and acetone, and use this extract to impregnate paper discs. These discs will then be placed upon an agar plate inoculated with bacteria. We will compare the bacteriostatic effects of these plants to the common antibiotic penicillin. If the medicinal plants do show an inhibitory effect on bacterial growth, then it will likely be less effective than penicillin, which we will be using as a standard. Ultimately, this will give some evidence as to whether western, synthetic or natural, medicine is less, equal to, or as effective at treating bacterial illnesses.

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An Analysis of Tornado Data from 2008 - 2018

In recent years, as the number of tornadoes has increased, the amount of personal injury, property damage, crop damage, and loss of life has increased as well. In order to gain a better understanding of tornadoes in our local area, we collected data from 2008 - 2018 from the area contained within 31.5 to 33.5 degrees latitude and -86 to -84 degrees longitude. This data was analyzed from three perspectives: storm classification, mapping/charts/graphs, and statistical analysis with an emphasis on seasonal and topographical trends.

*Jason Brown,
Sophia Bartell, and
Charles Bogg*

*Faculty Mentors:
Dr. Guihong Fan,
Department of
Mathematics &
Philosophy*

*Dr. Scott Gunter,
Department of Earth
and Space Sciences*

Stephanie Clarke

The P3b Component as a Measure of Stimulus Evaluation Time and Cognitive Capacity

Faculty Mentor: The P3b wave is a component of event-related potential (ERP) which measures electrical activity of the brain using electroencephalography (EEG) while responses are made to specific stimuli. Previous research from the 1970s has supported that P3b latency is used to measure stimulus evaluation and categorization time. Focusing on the onset of P3b, Luck (2014) created a hypothetical example measuring the P3b latency testing three different “odd-ball” tasks: specific digit, odd/even digit, and odd/even sum of digits. It is hypothesized that the longer it takes the brain to recognize and categorize the stimulus, the slower the P3b latency we will see in each task. The purpose of this study was to verify that P3b latency reflects stimulus evaluation and categorization time in Luck’s (2014) example.

Dr. Mark Schmidt,
Department of
Psychology

Member of the Honors College

Management in Software Engineering Projects

Valencia Coleman

In software engineering, a team of developers must work together to create a product for a client. The client provides the requirements of the product, but it is up to the team to decide how the project should be created. In order to make a successful project, several different management styles must be used. In our Software Project class, our team must create an arcade game for our client. Through the development cycle, I found myself managing how the project could be divided among our team members. In order to be a successful team manager, I used three different types of management styles; transactional, transformational, and servant leadership.

*Faculty Mentor:
Dr. Yi Zhou,
TSYS School of
Computer Science*

Member of the Honors College

*Daniel Collins,
Brianna Dent,
Emily Larkin,
Suriyana Mahadeo,
and Adrian Starling*

*Faculty Mentor:
Dr. Basil Conway,
Department of
Teacher Education*

“Excel”ling @ Project Based Learning

Project-Based Learning is an inquiry-based teaching style focusing on seven major standards known as Gold Standards of PBL. The standards are Sustained Inquiry, Challenging Problem or Question, Authenticity, Student Voice and Choice, Reflection, Revision and Critique, and Public Product. Each standard plays a different role in the lesson and should be treated as such. Students in this poster will be demonstrating a project that connects all seven standards through the use of Microsoft Excel.

Victorian Culture and the Lady of Shalott

Amy Crawford

This presentation will discuss the artistic and literary traditions of Victorian England through the lens of a popular contemporary theme, the Arthurian legend of the Lady of Shalott. Arthurian legends gained massive popularity during the Victorian era following the publication of Alfred, Lord Tennyson's "Idylls of the King" in 1859, and readers instantly formed an appreciation for Arthurian legends due to a patriotic connection to who is considered the first true King of Britain. Heavily inspired by Sir Thomas Mallory's "Le Morte D'Arthur," Tennyson reimagined these legends through his poems in Idylls of the King, and one of his post well-read was a poem titled "The Lady of Shalott," or Elaine of Astolat as she is referred to in Malory's text. The Victorian attraction to The Lady of Shalott is a result of her tragic fate, combined with concepts of ideal Victorian womanhood, and the struggle in favor of private passions. This fascination carried throughout the artistic community as well, as many of the most prominent Victorian painters composed pieces directly influenced by Tennyson's work based on the Lady of Shalott. Artists such as John Williams Waterhouse and William Holman Hunt combine their practice of Pre-Raphaelite Victorian painting with Tennyson's prose in order to relay a unique perspective of the Lady of Shalott, and confirm her as one of Arthurian legends and Victorian culture's most beloved subjects.

*Faculty Mentor:
Dr. Shannon
Godlove,
Department of
English*

Member of the Honors College

Abigail Dickson

The Wife of Nabal: A Woman for the Ages

*Faculty Mentor:
Sergiu Schwartz,
Schwab School of
Music*

Abigail, The Wife of Nabal, is a figure as ancient as she is modern. 1 Samuel 25 tells us the story of a remarkable and courageous woman named Abigail, who through her wise intervention prevents the wholesale slaughter of her family. Abigail has inspired artists across centuries through her fearless devotion to honor, respect, and dignity. In this lecture recital, I will provide a detailed look at Abigail's depiction in the arts and examine and perform a contemporary composition by Venezuelan composer Icli Zitella titled, The Wife of Nabal.

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Rocks Can Talk: A Study of Our Ancient Environment

*Ivy Do and
Sara Lowery*

For many decades, geologists have used rocks preserved in the geologic record to uncover Earth's history. Qualities of the rocks, such as their composition, fossil content, and other unique characteristics, can tell us where they came from and help us interpret the depositional environment in which they formed. In this study, we focus on the Tuscaloosa Formation (~100-94 Million years old) exposed in Phenix City and Auburn, AL and the Providence Sand (~72-66 Million years old) of Providence Canyon near Lumpkin, GA. Previous researchers have defined the study area as part of a coastal plain environment, where the sea met the land, during Cretaceous time (~145-65 Million years ago). Our preliminary results agree with this interpretation. In the forty meters of section we have measured thus far, we see a reddish and gray iron-rich clay at the base of the exposure overlain by a fining upward package of cross-bedded conglomerates (coarser-grained), quartz-rich sandstones, and sandstones with mud inclusions. We interpret this succession of rocks as an ancient soil flooded by a high-energy river or delta-like environment. These features and our interpretation are consistent with environments that would form on a coastal plain. Our methodology includes measuring stratigraphic sections to describe and graphically represent characteristics of the rocks from the base to the top of the exposure in a stratigraphic column. These stratigraphic sections are measured using a Jacob staff and a Brunton compass to accurately measure thicknesses of rock layers. In addition, rock samples are collected for further laboratory analysis such as petrographic analysis for composition and fossil content identification, and sieving for grain size determination. These characteristics will help us to better interpret the environment in which these rocks formed. Future work includes measuring additional stratigraphic sections and collecting more samples in hopes of establishing a relationship between the three locations as well as interpreting a depositional history for the area during the Cretaceous.

*Faculty Mentor:
Dr. Diana Ortega-
Ariza,
Department of Earth
& Space Sciences*

*Astoria Doyle and
Kellie Edenfield*

Implementing the #ThankYOUInitiative: An Expression of Gratitude Toward Teachers

Faculty Mentors: A Teacher Education major at CSU designed and implemented an extracurricular service initiative for her classmates to show appreciation to their cooperating teachers at Double Churches Elementary School. The initiative consisted of two events: the Holi-YAY! Cards at the end of the Fall semester, and the Welcome Back Wednesday! to promote the midyear return of students to school. This research project describes the process of creating, assembling peers, and executing the events of the #ThankYOUInitiative without direct institutional support or funding. Findings include a discussion of obstacles faced and anecdotal evidence of impact. This project concludes with advice to future creators of student-led initiatives, reflective comments that can help improve future events, and a call for the continuation and expansion of the #ThankYOUInitiative.

*Dr. Mark McCarthy
and Dr. Heather
McKeen,
Department of
Teacher Education*

Canine External Parasites: Flea and Tick infestations in Bahamian Dogs

Carina Drexler

External parasites, especially fleas and ticks, live and thrive on the skin of dogs causing inflammation, anemia, and disease. On Andros Island in the Bahamas, veterinary care is limited and therefore there could be more cases of canine external parasite infection. The Bahamas is also currently considered an Ehrlichia endemic region and Ehrlichiosis is a tick-borne disease that can severely compromise the health of a dog. This project seeks to characterize the severity of flea and tick infestation on each dog brought to a spay/neuter clinic offered on Andros Island and determine whether there is a correlation between the dog's weight and the severity of flea/ tick infestation. To determine the severity of flea/ tick infestation, the damp paper towel test and veterinarian's examination will be considered. Ticks will be removed and counted from each dog, and then placed into a container to be killed with alcohol. The dogs will also be weighed. All data will be recorded, and each dog given an identifier. Larger dogs will have more fleas and ticks than smaller dogs based on weight.

*Faculty Mentor:
Dr. Lauren King,
Department of
Biology*

Member of the Honors College

Allissa Halderman

The Effects of Extracurricular Social Clubs on the Social Integration and Development on Special Needs Children without Social Cognitive Skills

Faculty Mentor: Children diagnosed with Fragile X Syndrome, Cerebral Palsy (CP),
Dr. Florence Autism Spectrum Disorder (ASD), Attention Deficit Hyperactivity Disorder
Wakoko, (ADHD), Downs Syndrome, even Premature Births can all have trouble
Department of with social skills development. There have been many studies done with
Criminal Justice & individual diagnosis and social activities helping with social growth.
Sociology This study will umbrella all different types of mental, learning and
other disabilities where the children lack the social cognitive abilities
to develop social skills. There have been studies around the world in
social development but, targeted towards individual disabilities, and in
all these studies there has been growth in the subject's social skills and
mainstream acceptance among their peers. This study will focus on
four disabilities for research in children ages ranging from 12-18 with,
ASD, ADHD, Downs Syndrome, and Dyslexia. This study will attempt to
show that the use of social activities, band for this studies purposes in
blending these children with mainstream kids not only in the classroom
but outside of it as well will help to develop their social cognitive abilities
and to support these children to become accepted by their mainstream
peers. The baseline test will be to see where the study subjects are
socially at the end of their sixth-grade year. Longitudinal case studies
will be used to collect quantitative and qualitative data. In doing an
extra-curricular activity, it may help these kids to see that just because
they are different does not mean they cannot participate in something
they would enjoy and that they cannot be a part of a social group.

Refining Orbits of Asteroids: Helping Future Astronomers

*Paul Halford and
Brendon O'Keefe*

The study of asteroids helps us to understand both the impact threat to Earth and the formation of the Solar System. However, in order to study them, their locations must be known with great accuracy. Data obtained from a one-meter Chilean telescope and other international observatories were used to refine the orbits of over a dozen asteroids that were in danger of becoming "lost." Targets were selected to have uncertainties large enough to need refinement, but small enough to fit within the telescope's field of view. Orbital predictions are extrapolated from the data obtained, so with more data points comes more accurate predictions in the target's position. Measurements were submitted to the Minor Planet Center and then published to the global community through the Minor Planet Circulars and other publications. Comparisons of the old and new orbit predictions demonstrate the reduction of uncertainty in both the orbital parameters and the predicted positions of these asteroids. This will help future astronomers to accurately locate these objects for future study.

*Faculty Mentor:
Dr. Andy Puckett,
Department of Earth
& Space Sciences*

Matt Hooper

Effects of Explicit Music on Teenagers

Faculty Mentor: Music is a fundamental component to everyday life. Ranging from different genres to different styles, one critical component to music is the diction level used, when songs provide lyrics. What stands out is how some words selected happen to have a negative connotation to them, which results in the song receiving an “explicit” tag. Sometimes, artists will create a “clean” version of the song to edit out the profane elements. The problem with the current system is how artists denote what classifies as “clean” versus “explicit”. By allowing artists to self-identify what constitutes which labelling, the audience and purchasers face difficulty with assessing if the song is suitable for personal preference or not. While this issue is something that has not been discussed quite often, the goal is to help narrow the definition of the label as well as ensure that an appropriate audience is for each mark. The sociological component behind the research is to analyze how teenagers will behave when listening to explicit music compared to edited versions.

The effects of sodium chloride concentration in the development of *Dictyostelium discoideum*

*Jesse Hunt and
Tracee Guthrie*

Dictyostelium discoideum has been studied in developmental biology for purposes of understanding multicellular evolution and cell fate specifications. *D. discoideum* is a cellular slime mold that lives in soil and leaf litter. When myxamoebae run out of bacteria to consume, they aggregate, migrate to light, and form fruiting bodies that will disperse their spores. The rate at which *D. discoideum* develops into fruiting bodies can indicate the effects of different environmental factors on the slime mold. This study is concerned with sodium chloride concentration because it has been shown that different salt concentrations affect the development of plant species and amoeba species. Our specific research goal is to understand how even very small amounts of NaCl affect the development of *D. discoideum*. We chose to use concentrations a thousand factor smaller than the concentrations used in previous studies. The results of this study show the extent of how sensitive the slime mold is to NaCl. Preliminary results show that slime molds are affected by sodium chloride and that higher concentrations delay the development of the slime mold.

*Faculty Mentor:
Dr. Brian Schwartz,
Department of
Biology*

Member of the Honors College

*Lesther Orellana
and Mariah Jackson*

Creativity with Constraints: Translating and Subtitling into English

Faculty Mentor: Translation can be said to require creativity within constraints; although correspondence between languages is rarely exact, audiences expect translations to adhere closely to the original composition. *Dr. Susan Hrach,* In the case of culturally specific references, translators must choose how to best represent the meaning of the original for its intended audience. *Modern & Classical Languages* Approaches to translation fall along a spectrum: some translators retain “foreign” elements of the original for audiences to recognize and embrace, while other translators “domesticate” all references into vocabulary that audiences will find familiar. When limitations of space and time are added to the ordinary constraints of language correspondence, translators must rely on an intentional set of priorities to guide their work. This session features course final projects, including student translations of illustrated books for children originally composed in Spanish and in Korean, and subtitling of a Spanish children’s educational video game. Presenters will highlight choices that required an informed approach to culturally specific references, and special constraints imposed by page layout (space) and video animation (time).

A Comparative Analysis of Vocal Music Settings of Robert Frost Poetry by American Composers

Thai Johnson

The purpose of this project is to compare the vocal music settings of Robert Frost's poetry by three composers across the 20th and 21st centuries. Three Poems of Robert Frost for Voice and Piano by Elliott Carter, Frostiana by Randall Thompson, and Robert Frost Songs for Voice and Piano by Bruce Trinkley are the three works which will be analyzed both in terms of harmonic structure and poetic settings. This project will offer musical analysis in the form of textual settings, imagery and text painting, meter comparisons, and partial harmonic analysis along with literary analysis of the same elements within the poetry. This analysis between the poetry and music will identify the relationship between themes of poetry and the different compositional methods for setting them.

*Faculty Mentor: Dr. Joshua May,
Schwab School of Music*

*Dr. Patrick Jackson,
Department of English*

Member of the Honors College

Gavin Kerr

BSP Game Engine with Free Look Capability

Faculty Mentor: Game Engines provide Game Developers with readymade tools for developing video games. When using a Game Engine, developers can focus more of their time on designing the specific aspects of their game rather than investing resources into developing the technical implementation. Rendering, audio, and physics are normally controlled by the engine while leaving the developers the option to customize the process. General purpose Game Engines are popular with “Indie Studios” as they mitigate costs and decrease development time while allowing for the development of various genre. Even larger studios will sometimes make use of pre-made game engines but much of the time they utilize an inhouse engine. The purpose of this project is to develop a minimalist game engine software package for developing a specific type of game similar to those developed by ID Software in the 1990’s.

Dr. Rodrigo Obando,
TSYS School of Computer Science

Member of the Honors College

Design of a House-Hold Refrigerator

Engineering Design is an integral part of an undergraduate courses in most engineering schools. In this article, a group of engineering students have utilized the principles of engineering thermodynamics to design a house-hold refrigerator based on a vapor compression cycle. Basic thermodynamics principles such as the first and second laws, isentropic efficiency, and the coefficient of performance(COP) are utilized in the design process. The refrigeration system is designed to maintain a temperature range of 15°C to -5°C , assuming an outside temperature range of 15°C to 25°C .

*Paul Lewis,
Rashaun Hinton,
Jaron Magana,
Rachel Osborne,
Steven Talley, and
Chan Chang*

*Faculty Mentor:
Dr. Abiye Seifu,
Department of Earth
& Space Sciences*

Erin Perry

DNA Barcoding the Orchid Flora of Ecuador

Faculty Mentor: The forests of Ecuador are known for their high levels of diversity and endemism, classifying the country as a biodiversity hotspot. *Dr. Kevin Burgess,* Ecuador has one of the greatest densities of species per area of any country on Earth: it occupies only 0.2% of the Earth's land mass but possesses 10% of its plant species (Rios et al. 2007). The *Department of* Andean montane forests, in particular, are richly populated with *Biology* tropical orchid species that, unfortunately, have been little studied.

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The Implications of 1980s American Novels on the Dominant Narrative of the Decade

Carly Smith

The 1980s: a decade of decadence and excess. While the 1980s is often romanticized and situated in historical memory as a prosperous period in American history, it was a difficult decade for members of America's more marginalized populations, namely women, people of color, and those belonging to the LGBTQIA+ community. The object of this poster presentation is to debunk the myths surrounding the 1980s by examining the literature produced throughout the decade, to include Alice Walker's *The Color Purple*, Sandra Cisneros's *The House on Mango Street*, and Bret Easton Ellis's *Less Than Zero*. While these novels seem diametrically opposed, they are all commenting on the nature of privilege in America, and it is by reading these novels together that we can wholly understand the ways in which race, class, and gender influence individual opportunities and life circumstances. This presentation ultimately seeks to demonstrate how nostalgia has obscured the more troubling realities of 1980s America.

*Faculty Mentor:
Dr. Courtney
George,
Department of
English*

Member of the Honors College

*John Waller and
Rhiana Flowers*

The effects of intestinal parasites on the overall health of dogs living on Andros Island

*Faculty Mentor:
Dr. Lauren King,
Department of
Biology*

Our research seeks to find a correlation between the intestinal parasite load and changes in the general health of dogs on Andros Island. To characterize general health, we will measure heart rate, respiration rate, and body temperature of the animals in the study. Data will be gathered by collecting fecal samples from dogs at a spay neuter clinic and recording the number of parasites present. We will then compare these measurements to known results from healthy dogs in the United States. This comparison will elucidate potential differences in the intestinal parasite load in Bahamian dogs vs. dogs in the United States. A Pearson's correlation will be used to determine the link between general health and intestinal parasites. Additionally, an analysis of variance will be used to determine the significance of differences in general health. We hypothesize that we will see a negative correlation between the health of the dogs and the intestinal parasite load and that the dogs on Andros will have a higher rate of infection than dogs in the United States.

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A Lighted Path: Thomas Tallis and the Protestant Reformation Journey *Faith West*

The Protestant Reformation in 1517 changed the world forever, and its waves of influence rippled throughout many different mediums of art, writing, and music. Its core concepts and principles produced strong substantive reform particularly in sacred choral and instrumental music of the time, both in musical and textual ways, and English court composer Thomas Tallis remains a remarkable artist whose works clearly showcase the reformative musical trends of his lifetime. In this essay, an analysis of Tallis' lifespan, artistic output, and political viewpoint reveals a multifaceted figure who undoubtedly deserves the legacy and title of the Father of English Church Music. Additionally, an examination of historical and musical expectations, various music journals' insight, and the structure of Tallis' musical masterpieces, specifically his Short Service, displays the correlation between the Protestant Reformation and the work of Tallis.

*Faculty Mentor:
Dr. Kristen Hansen,
Schwab School of
Music*



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