



Abstracts 2016

Highlights of Student Research and Creative Endeavors

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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 2015-2016 academic year. These projects highlight undergraduate research conducted in a wide 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 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 Endeavors (S-RACE) 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 2016.

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.

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PRESENTED AT NATIONAL AND STATE CONFERENCES

A Paleoenvironmental Analysis of the Eutaw Formation, at Ochillee Creek, Chattahoochee County, Georgia

The Eutaw Formation is a Santonian age coastal deposit with exposures ranging from northeastern Mississippi to western Georgia, with the type section in western Alabama. It ranges in thickness from 50 to 75m, and is largely composed of argillaceous and glauconitic silty sands, including the massive Tombigbee Sand facies within the upper portions of the Alabama exposures. The marine glauconitic sands thin towards the east, becoming absent within the Upatoi Creek and Ochillee Creek Valley outcrops in Fort Benning, Chatahoochee County, western Georgia. Within this region, they are instead replaced by diagenetic marl, subdivided into cyclical subfacies of highly fossiliferous beds interspersed amongst non-fossiliferous beds composed of carbonate cemented micaceous glauconite sands and silts.

These fossiliferous subfacies serve as valuable paleoenvironmental indicators, featuring abundant mollusks dominated by bivalves, along with diverse gastropods and ammonites. Rare, but well preserved vertebrate material includes teeth and jaw elements from lamniform sharks and osteichthyes, and phalanges and a metacarpal of a pterosaur. The sediment also includes abundant carbonaceous material, presumably from terrestrial plants. The assembled taxa and the state of their preservation, when matched with the lithology of the formation itself, points to this section of the Eutaw typifying a mostly quiet, back barrier marine deposit, with one exception. One of these fossiliferous layers, characterized by a large abundance of unidentified neogastropods of variable size, represents a range of energy environments, and is likely indicative of a catastrophic event.

*Mark Bair and
Dr. David Schwimmer*

*Faculty Mentor:
Dr. David Schwimmer
Earth & Space Science*

Presented: 2016 meeting of the Geological Society of America Southeastern Section

**Across-clutch variation of carotenoids in House Sparrow
(*Passer domesticus*) eggs**

Madison Williams, Female birds allocate high concentrations of carotenoids (i.e.,
Dr. Jennifer L. biologically-active yellow, orange, and red pigments) to their egg yolks,
Newbrey, and where the pigments protect sensitive embryonic tissues against
Dr. Michael G. damage from metabolic free radicals. Chicks that hatch from eggs with
Newbrey higher concentrations of yolk carotenoids tend to be larger and to grow
faster than chicks that hatch from eggs with lower concentrations.

Faculty Mentors: Laying-sequence variation in carotenoid allocation has been
Dr. Jennifer Newbrey documented in several bird species, with most females allocating higher
and concentrations of carotenoids to earlier-laid eggs than to later-laid eggs.
Dr. Michael Newbrey However, most work has been done on European bird species, with very
Biology little work done here in North America. Therefore, we
collected full clutches of eggs from House Sparrow (*Passer domesticus*)
nests to identify the yolk carotenoids of the species and to determine if
sparrows exhibit laying-sequence variation in carotenoid allocation.
Forty five nest boxes were checked regularly on the main campus of
Columbus State University in Columbus, Georgia. Eggs were marked on
the day they were laid and then were collected 24 hours later for each
egg until the full clutch was collected. Each collected egg was weighed,
measured for length and width, and then frozen until carotenoid
extraction. In the lab, the yolk of each egg was separated and weighed
and a subsample was removed for carotenoid extraction. Carotenoids
were identified and quantified using high performance liquid
chromatography. The results of this research will provide much-needed
data on the allocation of yolk carotenoids for birds in North America.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), CSU Department Funds,
External Funding

Presented: Association of Southeastern Biologists, Tower Day 2016

An Analysis of the Impact of the CSU Peer Leader Program on Student Performance in 2014-2015

A recurring problem within the U.S. has been student performance and retention in college STEM courses. In efforts to retain students and increase student performance, Columbus State implemented a peer instruction program. With access to archival data on the CSU Peer Instruction Program, the goal of this project was to determine if the program at CSU had a significant impact on students' performance.

Harrison Sharitt

Faculty Mentor:

Dr. Timothy Howard
Mathematics

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE)

Presented: Mathematical Association of America Southeastern Section Conference, Honors Thesis Defense, Tower Day 2016

**Biochemical and genetic characterization of mutants of yeast that
grow brown in the presence of copper**

Christopher Resch Certain mutants of yeast produce brown pigments when grown in the presence of copper. Two strains that have the brown phenotype, *brn1* and *brn2*, are likely deficient in sulfur amino acid synthesis. BRN1 and BRN2 gene products are thought to act in the pathway downstream of the production of hydrogen sulfide by the product of the *MET5* gene. One idea is that because of these metabolic deficiencies, hydrogen sulfide accumulates in mutant cells and combines with copper to produce a brown pigment. Our research addresses the roles of copper and hydrogen sulfide in the production of the brown pigment. The brown phenotype was present when the mutants were grown on either BiSO₄, CuSO₄, or CuCl₂, but not MgSO₄, indicating that the mutant phenotype depends on metals that produce dark pigments with sulfide but does not depend on sulfate. The brown phenotype was never associated with *MET5* deletion, but some white colonies with *MET5* deletion produced brown segregates. This result supports the idea that the brown phenotype depends on accumulation of excess hydrogen sulfide due to disruption of the sulfur amino acid synthesis pathway downstream of sulfide production by *MET5*.

Faculty Mentors:
Dr. Brian Schwartz
and
Dr. Monica Frazier
Biology

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), Flora M. Clark Foundation , CSU
Department of Biology
Presented: Beta Beta Beta National Biological Honor Society District II Convention

Building a Bridge between Students and Professors: Using History to Cross-Examine Expectations and Miscommunications

Contributing to the scholarship on writing across the disciplines, this presentation offered a new tool to be implemented in university writing centers to lessen the miscommunications of expectations between students and professors in lower division courses, those courses that fit within the general education requirements for all majors' curricula.

Abby Gibbons

Faculty Mentor:

Dr. Eliot Rendleman
English

Gerald Nelms and Rhonda Dively, two scholars who are referenced often in the research findings of this presentation, offered useful survey questions, which those in this study were based. There was a form of miscommunication of expectations represented in the data, just as Nelms and Dively found a problem in the transfer of knowledge from freshman year composition to other disciplines. Understanding that miscommunication exists allowed for the potential remedying of it through the writing center, who acted as a middle man between the students and professors.

This presentation outlined the causes of miscommunication, presented results of qualitative data based on surveys and interviews with students and professors, and laid out a planned method to alleviate the miscommunications of expectations in writing in specific disciplines. Writing centers possess the potential to host what professors in different disciplines expect in student writing and accommodate the students who come to the center confused about what exactly the professor expects of them.

Provided in this presentation was a handout of a sample tool that writing centers could implement. The handout synthesized what four different professors said were the greatest problems in student writing. The goal of this tool was to give professors a presence and ability to help students, even when they are not physically present. Students who come to tutoring centers will be able to receive a handout that outlines the main concerns professors have with writing, explains how to find these errors, and offers a solution to these errors, which will hopefully alleviate the professors' and students' frustration and miscommunications. While this was specific to the professors' opinions at a regional state university, the study can be adapted to all writing centers and all disciplines.

Presented: Southeastern Writing Center Association Conference

**Estimating biomass of island apple snails (*Pomacea maculata*) using
shell metrics**

Taylor Ledford

Faculty Mentor:

Dr. Clifton B. Ruehl

Biology

Length-mass regressions are important for quickly estimating biomass (g), standing stock (g/m²) and production (g/m²/d) of species for comparative purposes among ecosystems. Once regressions are established future individuals do not need to be sacrificed. These measures are important for assessing population size structure, calculating energy flux among trophic levels, estimating ecosystem health, and supporting conservation efforts. Developing regressions on introduced species can help to control the spread of the invasion and preserve biodiversity in ecological systems by using estimated standing stock to assess their impact on native flora and fauna. In this study, we established length-mass regressions using multiple shell metrics and measurements of mass for the apple snail, *Pomacea maculata*, (island apple snail) that has been introduced throughout the southeastern United States. We developed separate regressions for males, females, and juveniles. In most cases including multiple shell metrics improved estimates of mass better than single measures. We illustrate their use by estimating standing stock of apple snails in a population introduced to a small retention pond. These regressions will provide an important tool for quantifying the effect of apple snails in ecosystems where they have been introduced.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE)

Presented: Association of Southeastern Biologists

An Optimized FPGA Implementation of AES Encryption

The Advanced Encryption Standard (AES) is an encryption algorithm that is widely used by the information security industry. AES uses the Rijndael cipher to scramble information to improve its security. The encryption has four transformations: SubBytes, ShiftRows, MixColumns, and AddRoundKey. Ordinarily, encryption is done using software implementations of the cipher. However, in certain cases, a hardware implementation is ideal. This project seeks to create an optimized circuit board that performs the functions as prescribed in the official AES publication. The design of the circuit was designed and tested using the Altera Quartus circuit design software. Efficacy of the design was tested against a program written to perform the same task in the Assembly programming language for ARM processors.

Joshua Staples

*Faculty Mentor:
Dr. Angkul
Kongmunvattana
TSYS School of
Computer Science*

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE)
Presented: NCHC National Conference Chicago, IL, Tower Day 2016

**Pathways of neutrophil cell death in response to nontypeable
*Haemophilus influenzae***

*Rachel Pearson and
Dr. Lauren King
Faculty Mentor:
Dr. Lauren King
Biology*

Nontypeable *Haemophilus influenzae* (NTHi) is a commensal gram-negative bacterium that inhabits the human nasopharynx in up to 80% of people. In a healthy individual, NTHi is usually asymptomatic, but with improper mucosal clearance can cause infections like rhinosinusitis, bronchitis, pharyngitis, and otitis media despite significant white blood cell infiltration to the site of infection. Our project focuses on characterizing this ineffective clearance within the host. Neutrophils combat bacterial infections primarily through phagocytosis and the formation of neutrophil extracellular traps (NETs) with varying degrees of efficacy, both ultimately leading to neutrophil cell death and death of the pathogen. This study aims to elucidate the process of cell death in response to NTHi infection by examining viability of neutrophils exposed to the bacteria. Human peripheral neutrophils were isolated from healthy volunteers, infected with NTHi, and tested for viability using a trypan blue assay and determining DNA fragmentation. Upon exposure to NTHi in vitro, neutrophils rapidly lost membrane integrity, suggesting that *H. influenzae* may damage these immune cells in vivo as well, offering a possible explanation for ineffective clearance.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE),
Tri-Beta Research Grant, Flora M. Clark Foundation
Presented: Beta Beta Beta District II Annual Regional Meeting, Tower Day 2016

**Retrospective study of birds of prey treated at the Southeastern
Raptor Center in Auburn, Alabama**

Raptor rehabilitation programs treat and release thousands of birds of prey each year that otherwise would have likely perished. Although research results vary greatly across species and age groups, researchers agree that raptor rehabilitation is an important part of raptor conservation. North American studies show that physical trauma tends to be the primary cause of admittance to raptor rehabilitation centers. However, birds are also admitted for a variety of other reasons including emaciation, orphaning, gunshot wounds, and electrocution. We investigated morbidity and mortality rates, release rates, and survivability across species and age groups in raptors admitted to the Southeastern Raptor Center in Auburn, Alabama in order to identify age-related and species-specific trends. Medical records from 2010 to 2014 ($n = 1,225$) were compiled and analyzed in order to identify species-specific, age-related, and trauma-related trends in injuries and release rates. Data for each species was analyzed separately, as well as within groups for nocturnal and diurnal raptors. To determine the effects of raptor age on injuries and release rates, birds were categorized as adults, immatures, fledglings, or nestlings. The conclusions generated from this research will be very helpful for informing and improving current raptor conservation efforts in the region.

Cecilia Hernandez

Faculty Mentors:

*Dr. Jennifer Newbrey
and*

*Dr. John Barone
Biology*

*Dr. Seth Oster,
Southeastern Raptor
Center,
Auburn University*

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), George Stanton Foundation
Presented: Association of Southeastern Biologists, Tower Day 2016

Zircon Separation from Metamorphosed Basalts in the Southern Appalachians

*Anna Sartell, James
Kee, Jenna Bowman,
Jason Neale, and
Ryan Lloyd*

*Faculty Mentor:
Dr. Clint Barineau
Earth & Space Science*

The geology of the southern Appalachians has not been studied as extensively as the northern Appalachians. Importantly, a lack of radiometric dating of igneous rocks has hampered tectonic models critical for understanding the geologic history of this portion of North America. Zircon, one of the more important minerals for determining crystallization ages in igneous and metaigneous rocks, is present as trace amounts (<1%) in some igneous rocks, but is difficult to separate from the dominant minerals. In this project, we attempted to separate zircon from metamorphosed basalts (amphibolites) to unravel the igneous history and age of magmatism in the southern Appalachians. Very little work, to date, has been aimed at extracting zircon from metabasalts and success in this project has the potential to dramatically advance our ability to date a wider array of rock samples. Once enough zircons (ca. 50-100 grains) have been extracted, they will be isotopically analyzed via laser ablation ion microprobe at a geochemical lab as part of a larger project focused on the geological evolution of the southern Appalachians. Although the cost of analytical equipment capable of trace element analysis is beyond the resources available at Columbus State University, the price of equipment used for processing samples for dateable minerals is affordable for an institution of our size. Faculty and students in the Department of Earth and Space Sciences have developed and improved techniques for extracting zircon in our rock processing lab, which coupled with analytical tools at large research institutions, will make it easier to conduct radiometric dating research.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), CSU Department Funds
Presented: The Geological Society of America's Annual Meeting 2015, Tower Day 2016

When Size Matters: Deviations of the Glass Transition Temperature of Polystyrene Nanoparticles

The effect of confinement on the glass transition temperature (T_g) has been studied heavily in the last 30 years. Two main effects alter the T_g of confined systems: interfacial effects and size effects. Thin films are a popular system to study due to their many practical applications; however understanding other systems is crucial to understanding the fundamental effects of confinement. Polymer nanoparticles are quickly becoming a popular system to study due to their potential as rational drug delivery agents, yet the studies on them are limited and the results are in poor agreement. The one thing researchers seem to agree on is that, to at least some degree, size matters. However the current literature on the subject lacks significant research into nanoparticles below 50 nm. Here temperature-varied fluorescence spectroscopy was used to study the glass transition temperature of polystyrene nanospheres of varying sizes (including down to 10 nm) and anomalous size independent T_g for particles below a certain size was found. In addition, three unique size regimes of T_g behavior were found and characterized.

Nicole Sikes

*Faculty Mentor:
Dr. Wade Holley
Chemistry*

Awarded: Natural Sciences Paper Competition, First
Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), CSU Honors Educational Activity Grant
Presented: Georgia Collegiate Honors Council, Tower Day 2016

Funded Projects

[A.LO(N/V)E]

Cheree Bailey My work explores the way in which “masculine and feminine” archetypes influence a person’s individual gender niche in society and culture. Moreover, how these archetypes direct the development of a person’s individual identity and gender, how it shapes one’s own self-perception and how one views others. My concentration is centered on ebony gender ambiguous people, who neglect consensual archetypes of gender assignment, as a way of shaping their own gender and role.

Faculty Mentors:
Prof. Orion Wertz
and Prof. Hannah
Israel
Art

Working from old and current sketchbook documentation I have recorded of surrounding cultures and genders, both familiar and unfamiliar. Using, mixed media, oil paint and oil stick, and sculpture in a range of both traditional and non-traditional using painting and sculptural found object installation as a vehicle into a dialog of the individual and the collective.

Awarded: Dean Senior Choice Award, Columbus State University
Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), CSU Department Funds
Presented: "Apprehension" Senior Thesis, Tower Day 2016

Bluetooth Security, Then and Now

This presentation includes a timeline of attacks against Bluetooth Technology and our efforts to sniff the Bluetooth traffic to analyze the inner workings of the security protocols in place.

*Christopher
Lamberson*

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

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), CSU TSYS School of Computer Science
Presented: Tower Day 2016

Building a Stress Monitoring System Using Wearable Sensors and Smartphones

Sneha Gogineni

Faculty Mentors:

Dr. Lydia Ray,

Dr. Hoda

Mehrpouyan, and

Dr. Alfredo Perez

TSYS School of

Computer Science

The goal of this project is to build a computing system for obtaining data related to physiological markers for stress in humans via wearable sensors. The computing system will consist of the following:

- A galvanic skin response (GSR) sensor: Strong emotions can stimulate the human sympathetic nervous system. As a result, sweat glands secrete more sweat as a physiological response to emotional stimuli. The GSR sensor can detect such strong emotions by measuring the electrical conductance of the skin.
- An Arduino microcontroller: a small computer that can collect and analyze the data obtained from the GSR sensor.
- A Bluetooth device: This device can exchange data over short distances with a mobile device..

This project aims at combining all three devices together to build a system that will collect stress markers from humans and will send that data to a smartphone. The project will also build a smartphone app for collecting and analyzing the data obtain from the system.

This project is interdisciplinary and will be conducted jointly by TSYS School of Computer Science and the department of Psychology.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE)

Presented: Tower Day 2016

Cellular Uptake of Polyphenols in a Bacterial Protein Expression System

The biosynthesis of single chain insulin analogs is prohibitively inefficient due to their propensity to form non-specific aggregates and ordered fibrils. It is well recognized that certain polyphenol compounds are inhibitors of fibril formation in vitro and in eukaryotic cells. However, there has been no systematic exploration of their effect in bacterial expression systems. It was determined that *Escherichia coli* (BL21) cells do not absorb phenol red (PR) under normal culture conditions. Additionally, it was observed that both heat shocking competent cells in the presence of PR, and treatment of bacterial cell pellets with a dimethyl sulfoxide (DMSO)/PR solution produced cell lysates that strongly absorbed light at 555 nm. This is indicative of PR uptake.

B. Kameron Griffin

*Faculty Mentor:
Dr. Jonathan Meyers
Chemistry*

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE)
Presented: Honors Thesis Defense

Cocaine in Ancient Hair

*Emily Fairchild and
Jessica Parks*

*Faculty Mentor:
Dr. Jonathan Meyers
Chemistry*

The nexus of medicinal cocaine use by indigenous peoples of Peru is still being investigated. Gas chromatography-mass spectrometry was used to test for the presence of cocaine and cocaine metabolites in ancient hair samples (~5,000-7,000 years old) from Paloma, Peru. The analysis was inconclusive as very high concentrations of modern plasticizers were detected in the hair samples. This unexpected result has called into question current methods used for storing and preserving these ancient remains. Analysis is ongoing.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), CSU Department of Chemistry

Contemporary Figures in Oil Painting

My artwork is an investigation in a way of seeing through both acrylic and oil paint. My subjects range from still life materials to portraits, however my way of depicting these various objects remains the same. Much like artists Jasper Johns and Giorgio Morandi, I take my subject and cool it down to a point where narrative, mood, and deeper meaning fade away and only the object itself is left for the viewer's interpretation. While I focus on keeping a Naturalistic approach to my way of depicting, my unique hand remains identifiable.

Ashlee Burgess

*Faculty Mentor:
Prof. Hannah Israel
Art*

I believe that the most valuable asset to any artist is the way they see the world and the way they illustrate their inimitable view. My work is simply an exploration into the way I personally experience the world. For this reason, the subject matter and composition are kept as simple and as close to life as possible, so that the viewer can experience the work on a different level. I hope to engage my viewers not with flashy subject matter or confusing symbolism, but in a way that makes them question and explore their own take on the world around them.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), CSU Department of Art
Presented: Tower Day 2016

Contemporary Figures in Oil Painting

Ashley Colbert

Faculty Mentor:
Prof. Hannah Israel
Art

My artwork critically interprets social, political and cultural issues as well as personal struggles of the archetypal human being. I deconstruct personal experiences and the American dream that are part of everyday conversation and turn them into an experience for the viewer. I have engaged in subjects as diverse as political and cultural issues concerning planned parenthood all the way to the effects insight and age have on personal memories. I take everyday objects and themes that are otherwise unimportant and transform them into insightful works of art.

While I use a variety of materials and processes, my methodology and subject matter remains consistent. I often use bright, welcoming, and familiar colors in my work which I believe creates a connection with the viewer and provides clues to content and interpretation. Through my work I hope to encourage both inner reflection and dialogue among her audience.

I am currently attending Columbus State University as a Studio Art Major striving toward a Bachelor's Degree. I am an active member of the CSU Art Club, director of the first student-led mural project on main campus, and have been the featured artist of the First Friday Artwalk. An active member in the local community, I have volunteered hundreds of hours designing and creating art for non-profit organizations like the SPARK Art project and ColumbusMakesIT!

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), CSU Department of Art
Presented: Tower Day 2016

CSU Cyber Security Module

As academic institutions endeavor to provide cyber security awareness and training to their student bodies, they may find themselves seeking the best teaching platforms to teach cyber security. This project aims to examine the effectiveness of cyber security awareness web application known as the Columbus State University Cyber Security Awareness Module (CSU CSAM or CSAM for short). The module will be a pedagogical tool developed to teach security fundamentals. While there exists modules of similar purpose, those module typically only focus on telling the user what to do, not why they should do something. CSAM, on the other hand, will give a more “behind-the-scenes” look while helping the user to see things from a malicious attacker's point of view. For example, other modules may tell you to have a long, complicated password because it's more secure while CSAM will show just how long it takes to crack a weak password, why it was done so quickly, and why it is important to increase the strength of weaker passwords. The project will study a group of students who will be given a pre-test, will learn through components of CSAM, and finally be given a post-test in order to determine the effectiveness of this kind of learning platform.

*Christopher
Lamberson and
Nathaniel Gibson*

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

*Dr. Stephanie
da Silva
Psychology*

Funded: Interdisciplinary Initiative Grant
Presented: Tower Day 2016

Degradation of musk ketone by *Pleurotus ostreatus*

Sarah Darville

*Faculty Mentors:
Dr. John Davis and
Dr. Jennifer Newbrey
Biology*

Many nitro-musks are structural analogs of trinitrotoluene like TNT, and can break down into dangerous metabolites in the environment. Due to the lipophilic nature of musk ketone, it has the ability to enter the human body via the skin. Much concern over this issue stems from the concentration of nitro-musks in breast milk. Despite the fact that nitro-musks have been banned in several countries, they are still commonly used in personal care products and cleaning solutions. This project will be an investigation of the potential of *Pleurotus ostreatus* to degrade musk ketone, a bio accumulative nitro-musk. Being a white-rot fungus means *P. ostreatus* produces enzymes that indiscriminately attack macromolecules. *P. ostreatus* has been successfully used for remediation of several chemical toxins like oil hydrocarbons and polycyclic aromatic hydrocarbons. Based on this information, *P. ostreatus* should have the ability to degrade musk ketone. To test this, the fungus will be grown in a liquid medium and the musk ketone will be added after a substantial culture has been established. Controls will be used to ensure the degradation is a result of the fungal strain. High-performance liquid chromatography will be used to determine if the musk has metabolized or degraded.

Special thanks to Dr. Marin Brewer, Assistant Professor of Plant Pathology, University of Georgia.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), George Stanton Foundation
Presented: Tower Day 2016

Developing Mathematical and Algorithmic Thinking Skills in Children using an Adaptive Augmented Reality Game

The modern education system prioritizes building mathematical and algorithmic thinking skills in children. This project aims to develop a game that addresses the growth of these skills in our target age group (8-11 years old) using fractions and algorithmic instructions in a unique and adaptive augmented reality environment. The application of augmented reality in serious games creates a more immersive and entertaining environment for the user, while a pedagogical agent provides feedback and prompts the student with hints at given points to guide them in their own learning experience. The agent along with the augmented reality environment gives room for ever-changing gameplay in a “cooking” scenario, where the student must use the correct combination of tools, ingredients, and fractions to create a successful dish. The game is designed to engage students in mathematical learning and let them create their own unique solutions to the provided problem, while tracking and evaluating the student’s performance to change the way the agent provides hints and prompts, as well as alter the difficulty level based on user performance.

*Kristen Wright and
Marko Maksimovic*

*Faculty Mentor:
Dr. Rania Hodhod,
TSYS School of
Computer Science*

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE)
Presented: Tower Day 2016

**An Examination of Carotenoid-based Selectivity in the Diet of the
Eastern Bluebird (*Sialia sialis*)**

Walker Rogers

Faculty Mentor:

Dr. Jennifer Newbrey

Biology

My senior research will focus on determining if spiders are an important source of carotenoids for Eastern Bluebirds (*Sialia sialis*) and other insectivorous birds. Carotenoids are biologically-active pigments that are enhancers of the immune system and colorants of the feathers of many bird species. Although previous studies have identified the composition of the Eastern Bluebird's diet, we do not know why they prefer certain invertebrates over others. Important factors in the diet selectivity of bluebirds may include the availability and nutritional values of their food. This project will examine the carotenoid content of the major families of spiders that are available to Eastern Bluebirds during the breeding season. I will collect spiders from Oxbow Meadows in Columbus, Georgia and Callaway Gardens in Pine Mountain, Georgia. I will use HPLC to determine the concentration of various carotenoids in a range of spider families. My research is important because the carotenoid content of most arachnids are currently unknown and thus we know very little about their importance as carotenoid resources for birds.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE)

Presented: Tower Day 2016

An Experimental Study of Various Medicinal Plants Utilized by Uncontacted Tribes on Astrocytes

Previous studies describe alternative approaches in treating various types of dementia. This research focuses on certain indigenous tribes of Central and South America and Asia who utilize plants to treat this mental illness. The researchers suggest that these plants could slow or reverse the progression of dementia-related illnesses. The goals of this experiment include treating astrocytes with various plant extracts in order to record the possible growth of cells after treatment and to survey the effects on dementia. Overall, this is a proposal to conduct research in observing the survival rate and possible proliferation of astrocytes under stress.

Tatyana Foster

*Faculty Mentors:
Dr. Kathleen Hughes
and Dr. Kevin
Burgess
Biology*

Funded: Flora M. Clark Foundation
Presented: Tower Day 2016

Experiment using low melting temperature metals

Charles Cowsert

Faculty Mentor:

Prof. Yuichiro

Komatsu

Art

Highly inspired by the minimalist art gallery, "Into the Sublime," hosted by the Department of Art at Columbus State University in 2014; My personal artwork and thought process behind making the art has entirely changed. A ceramics focus at heart, the exhibition and the class that went along with it, has inspired me to branch out into different mediums and practices. One medium in which I have become increasingly interested in is metal, which was also a popular choice for installations during the minimalism movement. However, my interest differs in that I want to apply the metal to a canvas as a sort of paint, rather than using it to fabricate a structure. I believe that by experimenting with this material I will enhance my artistic practice to a new level. My project goal is to create several pieces that defies the grounds of painting and sculpture. The outcome of this project will be presented at the Tower Day Exhibition curated by Professor Israel. It is in my belief that this broadening of horizons for myself, and metal as an artistic medium, will prove to be a beneficial in my studies as an artist and my future career.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), CSU Department of Art
Presented: Tower Day 2016

Identification of tree species using DNA barcoding for nature interpretation at the Columbus Botanical Garden

DNA barcoding has become a widely used and innovative method for identifying unknown species throughout the world. This technique works for any biological specimen and has substantially reduced errors in identification that have been historically based on morphological features alone. Plant DNA barcoding, in particular, involves the DNA sequencing of a short DNA segment from a standard part of a chloroplast genome. In collaboration with Trees Columbus and the Columbus Botanical Garden, the goal of this Honors contract was to DNA barcode trees species along hiking trails located in the Botanic Gardens. In total, leaves from 10 plant species were sampled along trails located at the garden and DNA was isolated using a FastDNA Spin Kit. Following the protocols outlined in Burgess et al. 2011, DNA was amplified via PCR using forward and reverse primers for the *rbcl* gene region of the chloroplast genome. Sequence editing and coding assembly was conducted in the Codon Code Aligner and genetic identities were confirmed in Genius Pro 6.0. Ultimately results of this research contributed to a series of information kiosks that will be linked to tree species targeted identified by Trees Columbus for nature interpretation programs at the Botanic Garden. This research has provided knowledge about the specific techniques involved in DNA barcoding while facilitating my involvement in a local community service project. After completion of this contract, plans are set to evolve this project into a fourth year research study.

Anisha Patel

*Faculty Mentor:
Dr. Kevin Burgess
Biology*

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE)
Presented: Tower Day 2016

Indoor Navigation Using Bluetooth Low Energy Beacons

Justin Sewell

Faculty Mentor:

Dr. Alfredo Perez

*TSYS School of
Computer Science*

Due to the weaknesses of GPS signals indoors, a successful method of indoor navigation is an important research topic. An indoor navigation application running on a mobile device has numerous uses. The application could help new students locate their classes or professors and it would especially benefit disabled students by directing the student in the right direction while taking the shortest route. This project presents a prototype of an indoor navigation system using Bluetooth Low Energy beacon devices and mobile phones. Bluetooth Low Energy (BLE) beacons provide a way of locating a mobile device within doors. The mobile device has the capability to receive Bluetooth signals sent out by the beacons. A mathematical model is then used to approximate the distance between the mobile device and the beacon by using the transmitted power level and received signal strength of the Bluetooth signal. A grid can then be used to model a floor of a building with a beacon in each quadrant. Methods of increasing the accuracy of the application include using a density algorithm on a sample of received signals and also a probabilistic algorithm that implements a variation of Bayes theorem.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), CSU Department Funds
Presented: Tower Day 2016

Principles of Biology Tutorial Videos

This summarizes a project completed as part a summer internship for Columbus Region Academy of Future Teachers of Science, Technology, Engineering, and Mathematics, a Robert Noyce Teacher Scholarship program. This program is funded by an award from the National Science Foundation (DUE 1136356). The goal of this project was to create videos that will help students enrolled in the Principles of Biology course to achieve a higher level of success in that class. The videos are targeted towards students who are unable to attend tutorial sessions or students who miss a lecture meeting. Also, the videos were intended to aid with students with hearing impairments. In total, 48 Camtasia videos were created spanning 12 chapters of material and amounting to over 180 sections within the textbook

Brandi Fine

*Faculty Mentor:
Dr. Timothy Howard
Mathematics*

*Prof. Amy Sandy
Biology*

Awarded: Outstanding Poster at Tower Day 2016

Funded: National Science Foundation CRAFT-STEM Internship - Award Number 1136356

Presented: Tower Day 2016

Threshold: a collection of poetry regarding crossed spaces

Leah Vahjen

Faculty Mentor:
Dr. Nick Norwood
English

As academics, we study great works of art produced over hundreds of years, and trace the influence they have had upon one another. The holy has become a source for rebellion; the certain has been deconstructed; the post-modern movement we are now a part of is difficult to define with precision. We become knowledgeable of the crafts that have come before us, and we study their evolution much in the way that science studies man. We are able to see—via art—how the human mind has functioned, grown, and reacted over a significant period of time. Throughout my efforts to contribute to these long conversations with the dead and the living, I have been particularly interested in and influenced by the works and minds of Robert Penn Warren and Seamus Heaney, and especially the sounds and ideas therein. The collection of poetry yielded by this project attempts to analyze minute moments with incredible impacts; microscopic bursts after which we are not who we were a split second before. A relationship changes; our outlook is different; a friend becomes an enemy; a loved one dies; we are fooled. It is overwhelming to examine what is on either side of a threshold: the life before and the life after. Understanding this process mentally and emotionally has highlighted how much we imagine “control”—an idea very hard to forge a tentative peace with.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE)

A serious game to foster social skills for autistic students.

The number of students with an autism spectrum disorder is increasing in STEM colleges. Autistic students might suffer from social behavior disorder which can make it hard for them to get along with others easily because of the expected social norms. Educational games have proven to be a safe learning environment for students with disabilities. The aim of this project is to develop an educational game to foster social skills at our autistic young adult students. This will be done through several interactions during each level of the game in which the student is required to perform small tasks and achieve certain objectives to move on to the next level. The game will track the student's performance and provide guidance at run time to help the student focus on the task in hand and stay on track. The game will be tested in accordance of the Center of Disability Services in CSU.

*Terrance Maxwell
and James Sanders*

*Faculty Mentor:
Dr. Rania Hodhod
TSYS School of
Computer Science*

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE)
Presented: Tower Day 2016

**Were Torture and Execution Methods During the English Renaissance
Determined by Gender and Rank?**

Kara Jackson
Faculty Mentor:
Dr. Susan Hrach
English

The purpose of my research is to discover whether or not execution and torture methods were chosen in accordance with crimes committed during the renaissance in England. This project will be conducted while I am abroad in Oxford, England for my Honors English and Music courses. I will be travelling to some of the most well-known execution spots (namely Oxford Castle and the Tower of London) to see first hand, the settings from the research I will be conducting. I will be specifically be looking into differences between men and women's sentences, famous people (like royals) treatment, and famous locations for these torturings and executions. My case study examples will include Anne Boleyn, Anne Green, Anne Askew, Sir Walter Raleigh, Priest Ridley, and Guy Fawkes.

Funded: CSU Honors Educational Activity Grant
Presented: Tower Day 2016

Why Undergrads Leave STEM

The purpose of this project is to determine why undergraduate students who initially declare a science, technology, engineering or mathematics (STEM) major leave their field of study, as well as investigating potential means to improve retention rates in STEM majors. After conducting multiple one-on-one interviews with students at both Columbus State University and Kennesaw State University, data was analyzed from the recordings by researchers to find common factors among students who chose to remain a STEM major, or among those that chose to change to a non-STEM major. Potential solutions for increasing the STEM retention rates were formulated for possible use by these programs in the years to come.

Chloe Chambers

*Faculty Mentor:
Dr. Kimberly Shaw
Earth & Space
Science*

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE)
Presented: Tower Day 2016

Community Presentations

Evidence Based Approach to Negative Pressure Wound Therapy

*Jorge Borboa,
Brandon Skiles, and
Giovanni Lewis*

*Faculty Mentors:
Dr. Gail Jones,
Dr. Cheryl Smith, and
Dr. Dell Miller
School of Nursing*

Negative pressure wound therapy (NPWT) has been the premier wound closing technique in the United States since its introduction in 1997 for complex and chronic wounds that cannot otherwise be closed with sutures, staples, or bandages. While approaching research, the question was asked: In surgical wound patients, will the use of NPWT versus standard gauze dressings decrease the incidence of infections? Critical appraisals of current research found evidence that was significant, reliable and valid. Evidence shows NPWT minimizes infection via negative pressure by creating an environment free of oxygen, draining the buildup of fluid, and forcing the wound edges together. Also, findings showed whatever the wound type, NPWT proved to be better for wound healing, the process was also notably shorter, and it was a more economical option. NPWT is ideal treatment for complex and chronic wounds as well as post-surgical wounds.

Presented: Evidence Based Practice Presentations at Midtown Medical Conference Center, Tower Day 2016

Exceedance Probability of *E. coli* in Weracoba Creek's Watersheds

Watersheds are areas of high elevation that carry water to a common area of low elevation. In Columbus, GA's case, the common area is the Chattahoochee River. Weracoba Creek is a highly channelized creek located around Lakebottom Park in Midtown Columbus. This creek has a reputation for being high in bacteria due to urban runoff and sewage leaks from old pipes in the area. The tendency for the creek to exceed safe bacteria levels does not stop people from going into the creek, possibly due to there being no signs around the area displaying the hazard. Chattahoochee RiverWarden is a non-profit organization that samples the local watersheds, including Weracoba Creek, to ensure that the water going into the river is meeting Georgia Adopt-A-Stream protocols. After gathering Chattahoochee RiverWarden's bacterial data for *E. coli*, I calculated the exceedance probability for Weracoba Creek; therefore determining what the chance is of sampling bacteria at the Weracoba Creek sites and the sites being above protocol or above 1000 CFU for Georgia Adopt-A-Stream standards. I found that Weracoba Creek has a high chance of being above protocol with *E. coli*, and is therefore unsafe.

Amanda Hall

Faculty Mentors:

Dr. Brad Huff

History & Geography

Dr. Troy Keller

Earth and Space

Science

Presented: Chattahoochee RiverWarden: Seasonality effects and Exceedance Probability of *E.coli* in Columbus and Phenix City Watersheds, Tower Day 2016

Fecal Microbiota Transplantation for the Treatment of C. Difficile

*Travis Fite, Kristina
Delpesche, Rayonna
Phillips, Jordan
Mercer, and Kyara
Washington*

*Faculty Mentor:
Dr. Dell Miller
School of Nursing*

Clostridium difficile (C. difficile) is a common healthcare associated infection, causing an estimated 80,400 hospital-onset infections and costing hospitals up to \$4.8 billion. Current antibiotics used to treat this bacteria have been shown to be ineffective with only a 30%- 80% success rate. As a result, C. difficile has an increasing prevalence and a recurrent rate of 15%-30%. In determining a better treatment option, the research question is: "Is fecal microbiota transplantation (FMT) the preferred treatment in patients with recurrent *Clostridium difficile*?" Significant, valid and reliable evidence revealed that the use of fecal microbiota transplantation has been successful at reducing the rate of recurrent *Clostridium difficile* with few adverse events and is the highly preferred treatment method in recurrent *Clostridium difficile* infections. Incorporation in hospitals' standard protocols reduces further recurrences of the infection, improves patient outcomes, and has a major impact on hospital costs.

Presented: Evidence Based Practice Presentations at Chattahoochee Valley
Community College, Tower Day 2016

Implementation of a Patient Discharge Time-Out to Decrease Medication Discrepancies in the Elderly

Elderly patients are at an increased risk for medication discrepancies after hospitalization due to the multiple medications required to treat their co-morbidities. Medication discrepancies are costly to the health care industry and adversely affect the health of the elderly patient. While researching ways to decrease medication discrepancies in the elderly, the following question was asked: Does the implementation of a patient discharge time-out decrease the amount of medication discrepancies in the elderly? Current, significant, valid and reliable interventions were identified. Patient discharge time-out was the most efficient and cost effective method in reducing medication discrepancies at discharge for the elderly patient. This process required nurses to conduct a medication reconciliation check and cross compare the patient's medication records for discrepancies prior to discharge. The patient discharge time-out process reduced medication discrepancies prior to discharge by 40%, thus reducing the risk for adverse drug events. This process required no additional staffing or funding and could be used in all clinical areas.

*Darryl Nichols,
Patricia Waller,
Emma Gibson, Kriss
Maroko, Janeka
Moody, and Elisha
Germain*

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Increasing Family Based Teaching to Reduce the Prevalence of Childhood Obesity

*Joshua Copeland,
Chamaine Bjornson,
Shannon Dempster,
Sadie Tollberg, and
Emily Anders*

*Faculty Mentor:
Dr. Cheryl Smith
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Rising obesity rates in children have created a multitude of health disparities and increased risks, which persist over the course of a lifetime. Prevention and awareness of childhood obesity is a multifaceted problem, which requires intervention on several levels. Pediatric nurses in particular are well placed to provide early lifestyle education to a wide variation of families, inhibiting the development of unhealthy habits, which contribute to rising obesity rates. The research question is: Does whole family teaching about health management and healthy lifestyles at every well-child checkup have an impact on the incidence of obesity in children? Significant, valid and reliable evidence shows that families who receive early interventional health education as a unit had overall lowered body mass indexes and maintained healthy choices over time. The presenters propose improving the quality of well-child visits through the teaching of healthy lifestyles and habits to families from birth, with the expectation of reducing the overall incidence of obesity and minimizing its effects significantly. Current implementations of the suggested guidelines are undeniably beneficial and can be easily incorporated into pediatric nursing practice.

Presented: Evidence Based Practice Presentations at Chattahoochee Valley
Community College, Tower Day 2016

Interventions to address Childhood Obesity

When it comes to the pediatric demographic, the prevalence of childhood obesity and increased BMI is snowballing due to the commonality of poor lifestyle choices, eating habits, and families that are not familiar with healthy behaviors that are necessary to maintain an acceptable weight. The clinical question is: in children with obesity and high BMIs, will interventions performed in the home and school environment help to decrease their BMI? The data collected consisted of two randomized controlled trials and one cross-sectional trial, which contained evidence based practice and legitimacy that supports the value of said interventions. Based on this review of current literature, the best practice guidelines that were developed proved most effective when they started at the faculty and familial level, because in order to get the kids on board, they must be guided by superiors so as to provide structure and motivation. Healthy behaviors can be positively reinforced using school wide reward systems for activities such as eating all of their vegetables during lunch, or completing a mile run at gym. Students will receive education on healthier lifestyle choices using age appropriate interventions in the classroom setting. Studies show that increased parental and school faculty involvement increased the efficiency of interventions and education geared towards life-long management of overall BMI. The many implementations described throughout the research obtained support healthy weights in school-aged children, and with the involvement of parental and educational figures will aid to decrease the occurrence of childhood obesity.

*Roderick Cabey,
Meagan Harrison,
Charisse Crute, and
Leon Manville*

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Presented: Evidence Based Practice Presentations at Midtown Medical Center, Tower Day 2016

Kangaroo Care for Reducing Procedural Pain in the Preterm Infant

*Chikilia Parks, Judith
Ospina, Ann Harber,
Michelle Woodruff,
and Jennifer
Alexander*

*Faculty Mentor:
Dr. Cheryl Smith
School of Nursing*

In the preterm infant, procedural pain is often unmanaged due to the increased risks associated with the use of pharmacological methods. However, unmanaged pain is a huge concern due to its negative impacts on physical and neurological development. Kangaroo care, or skin-to-skin, is the process in which the mother, father, or other caretaker holds the infant on his or her bare-skinned chest at a 30 degree angle for a period of at least 15 minutes to decrease pain in the preterm infant. In light of this, the research question was, "What are the benefits of implementing kangaroo care to reduce pain in the preterm infant?" Significant, valid, and reliable evidence was collected which showed that kangaroo care was more successful than the use of sucking with sucrose or pharmacological methods in reducing procedural pain. In addition, kangaroo care promoted physiological and neurobiological stability in the preterm infant, as evidenced by several indicators including: oxygen saturation, heart rate, and the Premature Infant Pain Profile (PIPP). Overall, kangaroo care was associated with a reduction in the number and severity of complications and a decreased length of hospital stays. Kangaroo care best practices can be easily incorporated into nursing practice and can ultimately result in reducing the cost of preterm infant care, increasing revenue for hospitals, promoting effective mother-infant bonding, and improving patient outcomes.

Presented: Evidence Based Practice Presentations at Midtown Medical Center, Tower Day 2016

Kangaroo Care in the Neonatal Intensive Care Unit

Skin to skin contact in the neonatal intensive care unit is a crucial part of a new baby's first few months of life. Although this method has proved to be incredibly beneficial, the consistent application of this method is interrupted due to a number of factors. The research question is: For neonates in the neonatal intensive care unit (NICU), will implementation of kangaroo care improve babies' stability, oxygenation needs, vital signs, and promote normal growth and development? Research of randomized control trials and peer reviewed nursing journals show that bonding time is essential for stability and overall health. The nurse's role is to educate mothers and fathers about kangaroo care, as well as the need to set aside time during routine care to incorporate skin-to-skin contact. Time spent in the NICU is not always anticipated, and the transition is made smoother with kangaroo care and the ability of the parents to be present. In encouraging parents and nurses to implement this vital skin-to-skin contact at least four times daily and no less than an hour each time, we are positive that babies will spend less time in the NICU and begin to grow rapidly and with fewer complications.

*Ellyse Tyree, Taylor
Chasteen , Hannah
Ritter, Mary
Wheeler, and Ryan
Lang*

*Faculty Mentors:
Dr. Cheryl Smith,
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Presented: Evidence Based Practice Presentations at Midtown Medical Center, Tower Day 2016

The Management and Treatment of Preeclampsia

*Bailey Lenz, Rachel
Byrne, Haley Luttrell,
Regina Shoemaker,
and Jung Lee*

*Faculty Mentor:
Dr. Cheryl Smith
School of Nursing*

Preeclampsia is a condition that is spoken about quite frequently in nursing. Many women are affected by preeclampsia, and the current options to treat it are rather limited. The research question is; "What methods have been proven to prevent, manage, and treat preeclampsia?" There have been many efforts over the years to expand the treatment options for preeclampsia. After searching for the latest evidence on different treatment options, folic acid, immediate cesarean section, and magnesium sulfate can be best used to manage preeclampsia. A decrease in mortality rate has been noted with the use of magnesium sulfate, and folic acid has been proven in clinical trials to decrease the incidence of preeclampsia. Lastly, immediate cesarean section upon diagnosis in the late preterm infant has proven to be effective, as well as decreased health risks for the fetus and the mother. These different treatment options can be implemented in daily maternity nursing care, and improve the morbidity and mortality rates that are associated with preeclampsia.

Medication Non-Compliance in the Elderly

Medication non-compliance is a growing issue in the elderly population increasing the financial burden placed on healthcare facilities and decreasing the quality of life for the patient. Evidence shows that the use of medication reconciliation at every patient encounter and patient teaching about the expected side effects versus adverse effects increases medication compliance.

*Mansi Patel, Taylor
Jenkins, Shauna
Travis, Amanda
Hutchinson, and
Karen Higgenbotham
Norman*

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Overcrowding in the Emergency Department

*Keyla Fudge, Kerry
McKenzie, Tiffany
Jones, and Stephanie
Villadamigo*

*Faculty Mentors:
Dr. Dell Miller, Dr.
Cheryl Smith, and Dr.
Gail Jones
School of Nursing*

In order to alleviate overcrowding in the emergency department the use of various assessment tools must be utilized. Overcrowding in the emergency department leads to an increase in morbidity and mortality rates and decreased patient satisfaction. This presentation will describe a nursing guideline that was developed after a review of literature. The research question that was asked, does the use of acuity scales and handoff report at bedside lead to reduction in the effects of overcrowding in the emergency department? Valid, reliable, and significant evidence was collected and suggest that the use of the physician-nurse supplementary triage assistance teams (MDRNSTAT) greatly decreased wait times, physician initial assessment time, and left without being seen rates of discharged patients. The Emergency Severity Index improved patient flow, and decreases in both the ED total length of stay and door-to-provider time. Bedside handoff reports showed positive patient outcomes when privacy and confidentiality was maintained. The implications of these findings can be implemented into nursing practice standards thus reducing overcrowding in the emergency department.

Postpartum Post-Traumatic Stress Symptoms: Implementing Change in Clinical Practice

In postpartum women, the incidence of developing post traumatic stress (PTS) symptoms is on the rise. PTS symptoms in new mothers have the potential to cause issues with mother -baby bonding and have even led to mothers causing harm to their babies and themselves. The research question is: Are early detection and interventions beneficial in reducing effects of postpartum post- traumatic stress symptoms in mothers with traumatic birth experiences? With extensive research, we found many studies related to our question and used critical appraisals to verify all evidence as significant, valid, and reliable. Acknowledgment of symptoms and immediate interventions are key in preventing the worsening of PTS symptoms. Nurses can use evidence-based questionnaires as a basic screening tool to facilitate more conversation concerning the various emotions a mother is experiencing. Nurses should also give all patients tangible resources with the discharge papers to help promote patient safety and mental health after leaving the hospital. These resources include information on PTS symptoms and a list of websites that patients can utilize at home. Nurses will be able to use these resources to initiate conversation with their patients and hopefully see a decline in the complications that may occur following postpartum post- traumatic stress.

*Chandler Padgett,
Haley Love, Meghan
Jones, Amanda
Miller, and Jessica
Howell*

*Faculty Mentor:
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School of Nursing*

Presented: Evidence Based Practice Presentations at Chattahoochee Valley Community College, Tower Day 2016

Preventing Medication Errors by Nursing Students

*Moensania Phillips,
Nashia Heard,
Myesha Wagner, and
Marquita Williams*

*Faculty Mentor:
Dr. Gail Jones
School of Nursing*

Medication administration is a tedious task in the hospital environment. Nursing students may make medication errors during their clinical rotations leading to unwanted adverse effects. While researching the incidence of medication errors made by nursing students the question, How to prevent medication errors by nursing student? evolved. Data was collected from randomized control trials and quantitative research. All evidence was proven to be significant, valid and reliable. The results of these trials proved that simulation methods are effective in decreasing medication errors made by nursing students. The implementations of simulation labs throughout nursing school were shown to enhance medication administration practice while decreasing the risk of adverse effects to patients. The finding of this research is essential to prevent medication errors made by nursing students.

Presented: Evidence Based Practice Presentations at Chattahoochee Valley Community
College, Tower Day 2016

The Use of Pitocin and its Effects on Postpartum Hemorrhage

Despite advances in technology and medicine in the past 200 years, the mortality rate of women who die from postpartum hemorrhage is almost double today than it was twenty years ago. At this point we have to ask ourselves: Why? A group of Columbus State University Senior Nursing students conducted a search of related research findings on how the use of Pitocin affected postpartum hemorrhage in laboring women. Pitocin is a synthetic version of the naturally occurring hormone Oxytocin that is released by the body to stimulate labor. We evaluated findings from randomized controlled trials (RCTs) that compared the data of women who used Pitocin during labor versus women who did not use Pitocin during labor. Significant, valid, and reliable evidence from these RCTs confirmed our theory that the overuse of Pitocin results in uterine atony, the number one reason of postpartum hemorrhage. The overuse of Pitocin in laboring women with no medical indication has led us to propose an end to the use of Pitocin for non-medically indicated women, and to allow labor to happen on its own as naturally as possible.

*Fawn Miller, Xandria
Vo, Colby Nicholson,
Abigail Goins, and
Jazmine White*

*Faculty Mentor:
Dr. Cheryl Smith
School of Nursing*

Presented: Evidence Based Practice Presentations at Chattahoochee Valley Community College, Tower Day 2016

Twelve-step Program for Mothers Diagnosed with Neonatal Abstinence Syndrome

*Myranda Harbuck,
Natalie Permenter,
Brandy Harbuck,
Morgan Brooks, and
Kaitlynn Dervan*

*Faculty Mentor:
Dr. Cheryl Smith
School of Nursing*

Neonatal abstinence syndrome (NAS) is a syndrome that occurs in a neonate when the mother participates in illicit drug use during her pregnancy. Based upon a review of current literature, best practice guidelines were developed to answer the research question “Does the use of a twelve-step detoxification and rehabilitation program in substance abusing pregnant women results in reducing effects on neonatal abstinence syndrome?” Research has shown that roughly 225,000 infants are exposed to illicit drugs in utero in the United States per year and the number steadily increasing. Currently there is not a standard treatment plan in place for the mother and baby to bond during detoxification and treatment. Effective interventions proposed include creation of a treatment program that screens pregnant women for drug use. If positive for drugs, the woman would be enrolled in a multi-disciplinary program that addresses rehabilitation of the mother-baby dyad. The emphasis on preserving the relationship and enhancing bonding between the two would lead to more successful recovery. Mothers would begin a program involving several medical professions to ensure rehabilitation without the fear of losing their child to the state. By ensuring the mothers would not lose their children, it would increase the odds of them seeking help to recover and live a healthy life.

Presented: Evidence Based Practice Presentations at Chattahoochee Valley
Community College, Tower Day 2016

Projects Presented at CSU's Tower Day

Are Morally Responsible Investors' Returns Penalized?

An increasing number of investors have begun to embrace the concept of Responsible Investing (RI); from 1995 to 2014, RI strategies increased by 929 percent, including an increase of 76 percent from 2012 to 2014 (US SIF, 2014). According to the Forum for Sustainable and Responsible Investment in 2014, \$6.57 trillion-over 18% of the assets under management in the U.S.-as tracked by Cerulli Associates, were invested based on ethical, environmental, and/or sustainable criteria (US SIF, 2014). RI uses a combination of investment strategies that employ nonfinancial factors when making investment decisions. Morally Responsible Investing (MRI) is a sub-set of RI, with the main distinction between the two being that MRI is a faith-based investing strategy, in which the investor chooses to invest in firms that have products or services and policies that are in alignment with their religious or moral values. Despite investors' increasing interest in RI, little research has been conducted. We bridge this gap by measuring the risk adjusted performance of a portfolio of "violating" firms and comparing them to the market risk premium and to the risk adjusted performance of an "alternative" portfolio, which is composed of "alternative" companies in the same industry. The categories we take into consideration are pornography, entertainment (violence, sex, drugs, etc.), human rights, abortion, and "social vices," i.e. alcohol, gambling, and tobacco. Results suggests that U.S. public equity markets are efficient in that investor returns are not financially penalized by applying moral or ethical filters.

Jamila Porter

*Faculty Mentor:
Dr. Owen Alan
Tidwell
Accounting &
Finance*

Presented: Tower Day 2016

Cache In, Trash Out: How Geocaching is Cleaning Up Columbus

Kaitlynn Howard

Faculty Mentors:

Dr. Becky Becker

International Studies

Prof. Chris Robinson

Communication

Geocaching is a high-tech outdoor treasure hunt using GPS devices that takes place in locations all over the world. With over 2.8 million geocaches and 15 million geocachers worldwide, there is a great opportunity to have a positive effect on the environment and local communities. In 2002, Geocaching.com began an initiative known as Cache In, Trash Out, in which geocachers come together and help clean up their local communities. Produced by Kaity Howard, the film follows the story of some local geocachers as they clean up a Columbus park. In addition to educating audiences on the international impact of geocaching, the film aims to bring awareness to the geocaching community's efforts to make the outdoors a cleaner place to enjoy. "Cache In, Trash Out: How Geocaching is Cleaning Up Columbus" is a Capstone Project for the CSU International Studies Certificate.

Presented: Tower Day 2016

Checking Up On The Past: An analysis of the Mayan skeletal population at Tipu, Belize using secondary age indicators

Dated as early as the Late Preclassic period (300BC), the Tipu site is located on the west bank of the Macal River in Belize, south of modern day San Ignacio. During Spanish Colonial occupation, roughly 1544-1707AD, Tipu served as a refuge for the Yacatec, Maya and eventually was used as a Spanish base until the forcible removal of its population in 1707. Original excavations conducted by Grant Jones and Robert Kautz identified a mission church and associated church yard during the 1980 field season. In addition to the church, this area also produced 631 Mayan skeletons. Since their excavation, these skeletons have undergone a variety of standardized tests to determine the age of individuals interred. Even after extensive testing, it is believed that all standard methodology have produced ages too young for this particular population, which does not contain anyone over the age of 50 and only a few (n=9) over the age of 41. It is therefore the purpose of this study to use secondary age indicators to further test the age of individuals found at the Tipu site. These secondary age indicators include the observation of vertebral epiphyseal unions, outlined by Midori Albert, first rib sternal end observations by Charles Kunos, as well as the ADBOU transition analysis software (version 2.1.044), provided by Mercyhurst Archaeological Institute. This study focused on the 339 adults, since these individuals prove to be the most challenging to age. These techniques combined will add to previous research and provide a more up to date population demographic.

Jane Mader, Malina Miller, and Mike Powers

*Faculty Mentor:
Prof. Danielle Cook
Earth & Space
Science*

Completing the Puzzle: Exploring Possible Antecedents to Rape Myth Acceptance

Skye Geeslin
Faculty Mentor:
Dr. Diana Riser
Psychology

Rape myths are commonly accepted, but usually false, attitudes and beliefs about the act of rape, the perpetrators, and most often the victims (Aronowitz, Lambert, & Davidoff, 2012). Studies have shown that the endorsement of rape myth attitudes influences not only the likelihood of a sexual assault occurring, but also whether or not the incident is reported, and how the victims view themselves and their experiences afterwards (Burnett et al., 2009). The present study surveyed college students to assess their levels of social competence, semantic knowledge of sex, bystander attitudes, and rape myth acceptance (RMA). The purpose of this study was to explore various factors that could be used to predict RMA levels. It was hypothesized that bystander attitudes, social competence, and sexual knowledge would all be negatively correlated with RMA. Participants were asked to complete four scales of measurement to assess the levels of RMA, bystander attitudes, social competence, and sexual knowledge of participants, as well as a demographics survey. Results indicated that RMA was negatively correlated with both bystander attitudes and sexual health knowledge, and both were significant predictors of RMA. Though no relation was detected between RMA and social competence, future research should further explore the possibility of mediation due to the findings that social competence significantly predicted bystander attitudes and, as mentioned above, bystander attitudes significantly predicted RMA. The findings indicated that awareness programs could be more successful in lowering RMA by introducing elements designed to increase a person's bystander attitudes and knowledge about sex.

Presented: Honors Thesis Defense, Tower Day 2016

Creating Dynamic Role Playing Games using AstroStory

Storytelling has been a staple of mankind for as long as anyone can remember. Because of this, seeing and hearing different types of stories is a fundamental element in a person's everyday life. AstroStory was created on the premise of continuing this tradition and applying it to new and unique subject matter. Using ConceptNet—a semantic network of concepts and ideas that a computer can use to gain knowledge, AstroStory can blend together multiple stories to create new ones. With this in mind, AstroStory's first implementation in a video game has been a major work in progress, and the integration fits perfectly with the platform. The game titled: AstroStory: Breakpoint, features an RPG turn based style game in which players must strategically use the resources given to them in order to conquer a battle and continue the quest. Using the storytelling feature of AstroStory, however, the plot can change based on many factors such as a player's status (Health, Magic, etc.), decisions (choosing to end a battle quickly or dragging it out), and characters (if the character is inherently good or evil). By creating this type of environment, it is possible to engage a player in a unique fashion—one that cannot be achieved with traditional means. This presentation aims to convey the significance of AstroStory and provide insight into how it can improve the current storytelling paradigm.

Dominique Tillman

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TSYS School of
Computer Science*

Developing Computational Thinking and Problem-Solving Skills in Children Using Augmented Reality Video Game

*Jonathan Vered and
Valencia Coleman*

*Faculty Mentor:
Dr. Rania Hodhod
TSYS School of
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In a world that is constantly developing and advancing towards a more computerized, technological environment, it is essential for the next generation to acquire the necessary skills that allow us to keep up with this phenomenon. For us to maintain this technological momentum, we need to emphasize the significance of understanding how to communicate with the computer. In order for us to achieve this, we must encourage children to enhance their computational thinking and problem solving abilities, and possibly look into the field of computer science, the common thread between humans and the machine itself. Our project aims to tackle this challenge by using a 3d learning environment and augmented reality technology in addition to incorporating elements of computational thinking into a simple game accessible to young children. Within the game, the player will experience different kinds of objectives that require certain levels of computational thinking skills. Only after the players have completed the objective, will they find out that the thinking process they've used to solve the problem, involved computational thinking. We're hoping this creates a sense of intrigue in at least some of the children.

Presented: Tower Day 2016

The Demise of Anne Boleyn

In 1533, Anne Boleyn married King Henry VIII and was crowned queen of England. A mere three years later, in 1536, Anne Boleyn was imprisoned in the Tower of London and subsequently beheaded. At her execution, Anne delivered a haunting speech in which she seems to accept the judgement given to her, asks for the onlooker's prayers, and surprisingly, praises King Henry VIII, her ultimate executor. In this research project, which includes a study abroad component to England, I analyze Anne Boleyn's execution speech and the events that resulted in her execution at the Tower of London. I investigate how Anne Boleyn came to marry Henry VIII and what brought about Henry VIII's decision to execute her only three years after their wedding. Additionally, I explore what Anne Boleyn was like and what might have inspired her final words. Although often overlooked, Anne Boleyn is one of the most significant queen consorts in history.

Andrea Shaver

*Faculty Mentor:
Dr. Susan Hrach
English*

Evaluating educational games: A case study to evaluate AreaKids (an Educational Game to Foster Mathematical Thinking at Young Children)

*Kristen Wright,
Valencia Coleman,
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Counseling,
Foundations and
Leadership*

Children in elementary education benefit from further development in their skills in area calculation and conservation. In our game (AreaKids) the user is prompted to collect animals and materials on an island to build a farm. They use area calculation to determine the most efficient way to contain their animals. The goal of this game is not only to aid children in learning about math and area, but to provide information on their reception of area-based games and ways to improve the game environment to suit their needs. AreaKids was evaluated by a group of children and the results will be shared through this presentation.

Awarded: Best Presentation Award
Presented: Tower Day 2016

Explaining Nazism: A Study of Culture and Historiography

After World War II and the toppling of the National Socialist regime, historians began immediately to attempt to understand and explain Nazism. Three primary theories emerged during the post-war period, classifying Nazism as a form of fascism, an extreme brand of totalitarianism, or as a “unique phenomenon.” This paper seeks to understand how a historian's interpretation of Nazism as either fascist, totalitarian, or a “phenomenon” was influenced by his/her culture and will do so by examining three historians from different cultures (the United States, Great Britain, and the Federal Republic of Germany, respectively) who have contrasting theories about Nazism. By examining the historians' culture and contemporary theories regarding Nazism, this paper will evaluate the impact that varying cultural, social, and political climates had on said interpretations.

Cailee Davis

Faculty Mentors:
Dr. Neal McCrillis
History & Geography

Dr. Becky Becker
International Studies

An Exploration of the Roles of Music in Shakespeare's Plays

Jordan Walsh

*Faculty Mentors:
Dr. Andree Martin
Schwab School of
Music*

*Dr. Susan Hrach
English*

All of William Shakespeare's plays include incidental music, and all but a few of his plays include music in the narrative. There is obviously significance in the inclusion of these songs, but they are often overlooked in literary analysis. In this presentation I plan to look at the music of Shakespeare in several ways. The first is a comparison of the roles of music in *The Tempest* and *A Winter's Tale*. This will include a look at the placement of songs within the narrative, what purposes they serve, and how incidental music is used to build atmosphere. Second, I plan to speak about modern interpretation of music in Shakespeare. I have secured tickets to both of the above-mentioned plays at the Globe Theater in London, and will use these viewings to compare modern interpretations of the music to how they would have been performed at the time. This comparison will cover intonation systems and instrument choice, and I will discuss the positives and negatives of how the musicians chose to modernize the music.

Presented: Tower Day 2016

Fitness Changes in Female Gymnasts Using the Gymnastics Functional Measurement Tool

The Gymnastics Functional Measurement Tool (GFMT) was created to determine the fitness of competitive female gymnasts using a series of sport specific tests. Research has demonstrated the GFMT to be valid and reliable; however, no data have been reported utilizing the GFMT as a tool to determine changes in fitness during the competition year of female gymnasts. PURPOSE: The purpose of this study was to utilize the GFMT to determine if differences in female gymnasts' fitness exist at the pre-season (PS) and beginning-season (BS) time points.

Amber Holmes

Faculty Mentor:

Dr. Brian Tyo

*Health & Physical
Education and
Exercise Science*

METHODS: Ten female gymnasts (age= 11.7 + 2.4 yrs.) ranging in skill from level 4-7 (based on USA Gymnastics classification) completed all tests. Using familiar techniques and equipment found in their gym, gymnasts completed the GFMT. The assessment consisted of ten sport-specific fitness tests which measured endurance, speed, flexibility, strength and power. The ten tests included agility, 20-yard sprint, push up, rope climb, vertical jump, hanging pike, over-grip pull up, timed handstand, shoulder flexibility, and split tests. Pre-season and mid-season measurements were taken six weeks apart. Paired T-tests were used to determine if there were differences between PS and S for all 10 fitness tests and total GFMT scores calculated from the individual tests. RESULTS: Vertical jump, hanging pike, and agility tests were the only fitness measurements that were significantly different ($p < 0.05$). Vertical jump increased from 31.9 + 3.22 cm to 36.3 + 2.49 cm, hanging pikes increased from 13.0 + 1.45 to 15.2 + 1.55, and the agility test increased from 21.4 + .341 sec to 22.3 + .351 sec. There was no significant change in the total GFMT score (PS= 31.2 + 2.10 and BS=31.3 + 2.36 out of 100 possible points). CONCLUSIONS: According to the GFMT, total fitness did not significantly change in this cohort despite fitness training in preparation for the season. Training strategies were successful at increasing vertical jump height and hanging pikes. However, training strategies were not successful at improving the athlete's speed for the agility test. These results may be due to their specific fitness and gymnastic training strategies.

**French Baroque Performance Practice in Jean-Marie Leclair's Sonata
for Flute or Violin Op. 9 No. 2**

<i>Ty Gable</i>	The contents of this presentation serve as an intersection of research carried out in both my applied flute lessons and the Honors in Oxford:
<i>Faculty Mentors:</i>	Exploring the Renaissance study abroad course. My flute lesson re-
<i>Dr. Andree Martin</i>	search pertains to my exploration of French baroque performance prac-
<i>Schwob School of</i>	tice in Jean-Marie Leclair's (1697-1764) Sonata for Flute or Violin in E
<i>Music</i>	minor Op. 9 No. 2. Drawing information from a multitude of past and
	modern sources, I have compiled a clear set of principles describing
<i>Dr. Susan Hrach</i>	how the components of the sonata should be performed in a historical-
<i>English</i>	ly-informed manner. These aspects include, but are not limited to: or-
	nammentation, over-dotting, notes inégales, tempi, vibrato, and articula-
	tion. To link the research done in my flute lessons with the English-
	Renaissance-specific research requirement of my study abroad course, I
	will then compare, contrast, as well as trace the development of these
	musical details to those found in the English renaissance. Furthermore,
	the excursion to England has presented me with a prime opportunity to
	take a private lesson with esteemed early flutist Rachel Brown. This
	lesson not only enhances my research and performance of the Leclair
	specifically, but also gives me a chance to learn from a living source and
	reproduce the newfound knowledge regarding the performance prac-
	tices of the French Baroque and English Renaissance in my research.
	The presentation will be accompanied by excerpts from the score, as
	well as relevant musical examples.

Presented: Tower Day 2016

A Geographical-based Visual Analysis of Botnet Attacks

Analyzing security of the Internet has become an important task for cyber security experts around the world. One of the approaches is collecting raw data from each attack that takes place every second of the day. Therefore, tremendous amount of data needs to be analyzed to be useful. Past approaches include statistical and data analyses. While these approaches are well understood by researchers, they are difficult to explain to public at large. Visual analysis is a new approach that bridges a technical gap between general users and data scientists. Specifically, it presents complex data points in a user-friendly graphical format. In this work, our group depicts data points from botnet attacks showing geographical locations of targeted sites.

*Josef Chua, Raul
Esteras, Robert King,
and Aaron
Anecchiarico*

*Faculty Mentor:
Dr. Angkul
Kongmunvattana,
TSYS School of
Computer Science*

**Impact of a diesel spill on macroinvertebrate communities in ponds
in S.E. Alabama**

Katie Winkles

Faculty Mentors:

Dr. Jeffrey

Zuiderveen and

Dr. Harlan Hendricks

Biology

On the western boundary of a wetlands property in S.E. Alabama, a train derailed in the spring of 2012, and at least 30,000 gallons of diesel fuel leached into the adjacent pond. Even after emergency cleanup, significant levels of polycyclic aromatic hydrocarbons remained in the soil and groundwater right along the property line of the wetlands. Therefore, there is major concern that the contamination spread down the watershed through the wetlands. In this study, macroinvertebrate communities were studied to determine an indication of the water quality in ponds on the wetlands property after the diesel spill. Macroinvertebrates are very sensitive to changes in the environment, and as such are useful in water quality studies. In fall of 2014, Hester-Dendy multiplate samplers were placed in ponds for approximately 22 weeks to allow macroinvertebrate specimens to colonize on the artificial substrate. The specimens were identified to a reasonable specificity in order to compare taxonomic groups at increasing distances from the affected pond. However, there was not enough data to conduct statistical analysis. The samplers may not have been placed out early enough to allow for colonization. Additionally, not all of the samplers were recovered because the connecting fishing lines were cut, chewed, or broken. In the current study, 19 samplers were placed out earlier in fall of 2015, compared to the previous data collected, in an attempt to allow enough time for colonization to occur. Also, more samplers were used, stronger fishing line was utilized, and three samplers were placed in a pond that was disconnected from the other set of ponds. The new collection of macroinvertebrate specimens will be identified, and the resulting taxonomic groups will be analyzed with a Chi-square Test of Independence.

Presented: Tower Day 2016

Improvisation with Max/MSP: Exploring Sound Possibilities using Live Audio Processing

Over the past sixty years, contemporary art music has begun to integrate live audio processing into standard repertoire, beginning with Karlhienz Stockhausen's *Mikrophonie I*. Live processing allows composers to break the confines of the instrument they are writing for, and to explore completely new ideas that would not be possible strictly acoustically. In this presentation, I plan to give a brief outline of the history of live electronics in contemporary music, with a focus on pieces written for percussion. Following this, I plan to give the audience a brief explanation of one of my own audio processing programs, which is written in Max/MSP. This explanation will be supplemented by live demonstrations of each part of the program, and will provide the audience with a better understanding of how the sounds they are hearing are being changed by the software. Once I have explained how the program works, I will perform a short, structured non-tonal improvisation, which will explore several categories of sounds and processing. These categories will be separated by both processing type (pitch shifting, delay, distortion, and reverb) and instrument types (wooden, metallic, drum, and miscellaneous). Overall, I hope to provide the audience with a better understanding of both how live audio processing works and of the extensive sound possibilities of percussion instruments when enhanced by Max/MSP.

Jordan Walsh

*Faculty Mentors:
Dr. Matthew McCabe
and Dr. Paul
Vaillancourt
Schwab School of
Music*

Italian Influence on English Life

*Rain Williams-
Twolions*

*Faculty Mentors:
Dr. Andree Martin
Schwab School of
Music*

*Dr. Susan Hrach
English*

Almost everything in the world has adopted an idea from some other area or person. From music, literature, and architecture, nothing seems original during the Renaissance period. There was a great deal of Italian influence on English life as a whole. When it comes to music, many people enjoyed the feel and flow of the music. When listening to English music of the time, it was quite evident the Italian background. Not only with the sound but also with the instruments that were played such as the Gamba that was brought by Italian and Flemish players. Now, when looking at the literature, we view Petrarch in particular. Petrarch was an Italian poet who inspired many writers. Petrarch set the standard on how to write a dramatic sonnet. Even Queen Elizabeth I wrote a Petrarchan poem during the period. Shakespeare along with many other poets, by the name of Phillip Sydney, Thomas Wyatt, and Mary Worth, were intrigued by the formation and depth of Petrarchan poems. Lastly with architecture the influence is evident throughout England. Architects by the name of Palladio, Inigo Jones and many others brought about the Italian style to buildings. With this one must remember that both the English and the Italians were trying to recreate the Greek and Roman style when designing. One wonders whether the Italian influence was authentic or had some hint of the Roman and Greek style. The Italians put their stamp on English life in a way that must be acknowledged and appreciated.

Presented: Tower Day 2016

Japan's Style: Ancient through the late 19th Century

Ink Paintings of Japan have a centuries long tradition of educating complicated subjects using repressed color and essential lines. The intention of this project was to inquire how that tradition modified over time. Particularly focusing on landscape and scenic works, the examination of paintings and historical texts flowed with the same ease as a Fude brush. During this inspection, it was seen that to better obtain an understanding of where landscape ink painting began one needed to look even beyond its origin. This expanded the initial timeline from just a couple of centuries to covering the Asuka Period all the way to the Meiji Period, or around thirteen centuries. This topic was chosen because theater relies on upon exploration to enhance the quality and precision of the pieces that it presents, just as it was found that the Japanese would visit different countries to precisely delineate them in their works.

Jobie-Leigh Snyder

*Faculty Mentor:
Prof. Sam Renner
Theatre*

Losing the Night: A Survey of Light Pollution in Columbus, GA

*Brendon O'Keeffe
and Ryan Hutto*

*Faculty Mentors:
Dr. Rosa Williams
Earth & Space
Science*

*Dr. Brad Huff
Department of
History and
Geography*

The night sky in Columbus, Georgia for past generations was an object of fascination and wonder, but over the years the growth of the city has forced the night sky to slowly fade away into obscurity. The increase of population in this city has driven an increase in outdoor illumination throughout the years. This increased amount of illumination has contributed to one of the least addressed forms of environmental pollution: light pollution. Light pollution may not be a major concern for many as an environmental threat, but it does have observable effects. The most noticeable is the disappearing night sky. The increasing amount of light scattered in the atmosphere has the negative effect of reducing the number of stars visible in the sky. This is especially important to astronomers as it has a negative impact on research conducted at ground based observatories such as the WestRock Observatory. The purpose of this study is to assess the current state of light pollution in Columbus, Georgia by measuring the sky brightness using a Sky Quality Meter and geographically plotting the data with ArcGIS. The primary focus of the study will be Columbus State University's main campus and the Coca-Cola Space Science Center's WestRock Observatory. This assessment will enable future studies to compare their results to the baseline established by this research. This will ensure that any changes to the way the outdoors are illuminated and their effects can be accurately measured.

Presented: Tower Day 2016

**"Moved by fear": The United States and the Jewish Refugee Crisis
(1933-1945)**

During the violent years of Germany's Nazi regime (1933-1945), marginalized peoples fled *en masse* to escape the looming shadow of war and persecution. The largest of these groups were the Jews of Europe, many of whom sought refuge thousands of miles away from the influence of the Third Reich in the cities and towns of the United States. However, popular opinion and political knowledge diverged when Americans were confronted with a massive exodus of desperate refugees. A Gallup poll conducted in January of 1939 found that 61% of Americans surveyed were against accepting children from areas within the Nazi sphere of power. Yet, President Franklin Roosevelt, along with his wife Eleanor, actively called for the acceptance of refugees fleeing what soon became a war-ravaged continent, pleading with American citizens in 1939 to "not let ourselves be moved by fear." Anti-Semitism existed across the western world, but only accounted for a part of what drove so many to shun the idea of admitting refugees. Many feared the new ideologies that these refugees may have brought -- especially communism, which had gained a chokehold on the newly-formed Soviet Union. Other still feared the violence of potential anarchists, who had instigated numerous fatal bombings in American cities early in the twentieth century. However, even as stories of violent persecution in Germany filtered back to the United States, many remained opposed to admitted those who were attempting to flee from the crisis. This paper is not a political narrative; rather, it is an assessment of what the United State did -- and did not -- do to address one of the worst humanitarian crises in history, the goal of which is to challenge the audience to assess the country's involvement in similar crises, as well as to reevaluate the way in which we have shaped our own narrative of the Second World War.

Taylor Langevin

*Faculty Mentor:
Dr. Daniel Crosswell
History & Geography*

Presented: Tower Day 2016

Multi-theoretical Approach to Democratization in Saudi Arabia

Elizabeth Nelson

Faculty Mentor:

Dr. Troy Vidal

Political Science

Saudi Arabia's position within international relations and international economy has made the state a unique and pivotal player in a growing international community. As their role grows so do concerns about violent Islam, oil production, and relations with the economically liberal West. It is possible that a shift from a monarchy to a democracy could help Saudi Arabia improve relations with the West. This paper aims to explain the following: the problem of defining democracy, the core theories within democratization, Saudi's political and economic history and how those democratization theories can be applied to understand the prospects of democratization in present day Saudi Arabia. Only after understanding these factors can we realize Saudi Arabia's prospects of democratic transition and how those prospects could influence international relations. Through modernization, Boix's inequality, and actor center theory, we find that even though wealth usually trends toward democratization the prospects of democratization overall in Saudi Arabia are low.

Presented: Tower Day 2016

Nihilism in America

This paper argues that modern American society has fallen into nihilism and if action is not sought then the very foundations of American society could devolve into a form of democratic or administrative despotism described by Alexis de Tocqueville in the 19th century. Furthermore, the problem is not the United States alone, but will ultimately spread to the entire west. This argument is based upon several flaws dealing with capitalism and technology, namely the lack of interconnection between local governments and its constituents coupled with the arbitrary monetary value on absolutely everything, including human life. Ultimately the 2008-09 financial crises will be used as a vessel for the main argument into modern America's nihilistic tendencies.

Diego Castellanos

Faculty Mentor:

Dr. Troy Vidal

Political Science

On the Page and On the Stage: What Qualifies a Text as Postcolonial?

Cailee Davis

Faculty Mentors:
Dr. Patrick Jackson
English

Dr. Cindy Ticknor
Honors College

Chinua Achebe's novel *Things Fall Apart* (1958) and Wole Soyinka's play *Death and the King's Horsemen* (1975) bear striking similarities. Both texts are written by Nigerian authors into the English language (suggesting that their intended audiences were Western, English-speaking people). Both texts take place during and confront issues of British Imperialism in Nigeria in the early-twentieth century. Both texts explore the concept of suicide and the interpretation of native Nigerians (the Igbo in Achebe and the Yoruba in Soyinka) as "savage" by the British colonizers. Yet, where Achebe fully intended his novel to be read as a postcolonial text (that is, a text that responds to or is a product of colonization) that would challenge Western preconceptions about African primitivism, Soyinka was adamant that his play should not be considered a postcolonial text. This essay seeks to analyze the two texts, their similarities and their differences, in order to answer the question: "What qualifies a text as 'postcolonial'?" Is it the author's intentions, the text's content/context, or the reader's interpretation?

Presented: Tower Day 2016

Oxford Castle

The Oxford Castle in Oxford, England, has a vast history. To date, it has not only been a castle for defense, but also a prison. Like Oxford Castle, the Tower of London was both a stronghold for defense and a prison. The pasts of both places are gruesome and dark, though each presents their histories in different manners, which leaves the tourists with differing responses and thoughts regarding each landmark.

As a tourist in England, my visit to each location suggests that the Tower of London encourages visitors to identify with the past and present royalty, while Oxford Castle draws visitors' attention to the experiences of its former prisoners. Oxford Castle displays its gruesome past and exposes each dark detail, whether it is about prisoner abuse or inefficient executions. In comparison, the Tower of London, another English prison, also has a violent and brutal history, though the history divulged at the Tower of London is not shared in a gruesome manner. At the Tower of London, the main attraction is the Crown Jewels, whereas at Oxford Castle, the focus is prisoners' cells, which is significantly fouler than gems. Though the two places have similar histories, the manner in which the history is presented changes the perspective of the audience.

Elizabeth Biggs

*Faculty Mentors:
Dr. Susan Hrach
English*

*Dr. Andree Martin
Schwob School of
Music*

**Patient Subjective Pain Rating and Duration of Action of 0.5% Ropiv-
icaine and 0.25% Bupivacaine in Brachial Plexus Nerve Blockade.**

Joshua Rogers

Faculty Mentor:

Dr. Kathleen Hughes

Biology

Anesthetic agents are a valued tool used in a variety of settings to reduce or eliminate sensation in order to facilitate successful surgery outcomes. Many factors affect the duration of any given anesthetic, to include concentration, injection site, and the physical/chemical properties of the anesthetic used. Throughout this study we surveyed patients scheduled for a variety of upper extremity surgeries to be performed at St. Francis Hospital in Columbus GA. Pre-surgical anesthetics included 0.5% Ropivacaine or 0.25% Bupivacaine in a 25cc isotonic solution injected in the interscalene region through ultrasound guidance. In this study we hypothesized that an increased length of analgesia will lead to decreased patient subjective pain rating upon return of full sensory/motor control. Our results revealed 0.25% bupivacaine (n=18) had a complete analgesic duration of 1119.28 +/- 271.62 (min) and a subjective pain rating of 6.44 +/- 2.77, whereas 0.5% ropivacaine (n=39) had a complete analgesic duration of 802.77 +/- 316.35 (min) and a subjective pain rating of 6.77 +/- 2.82. The One-way ANOVA showed that statistically, the mean differences between these two groups was not significant and our hypothesis was not supported with these findings. Further analysis of the collected data has allowed for comparisons of relative toxicity of the above stated anesthetics along with patient preference in regards to affective analgesic duration.

Presented: Tower Day 2016

Poetry in the Classroom

Today, teachers often see poetry as an unnecessary element in their classroom; they see it as an afterthought or a supplement, not as something to be taught on throughout the year, because they feel confined by standards and testing (Seale, 2015, p. 12). Since most standardized tests (including the Georgia Milestones test and AP literature test) tend to focus on analyzing informational texts or excerpts from short stories or novels, teachers may feel confined to studying these texts in the classroom and not place as much emphasis on the study of poetry. This aversion to poetry often impacts students' perception of poetry and leaves them feeling anxious about the study of poetry (Duncan, 2012, p. 1). However, poetry holds a richness, depth, passion, and access to figurative language that nothing else quite holds and nothing else can replace. I completed research to find out how to best engage students with poetry in the classroom, while still covering standards. First, I invited in a poet into an eighth grade classroom, I taught before and after about poetry--hers, specifically, I interviewed the poet, the teacher, the students and my poetry professor. I collected and analyzed this data. Then, I visited various classroom teachers who teach poetry, by all accounts, with excellence. I also did my own research to discover the best ways to guide students as they experience and analyze poetry.

Rachel Funk

*Faculty Mentors:
Dr. Erinn Bentley
Teacher Education*

*Dr. Nick Norwood
English*

Prenatal Care: Life's Most Critical Step

Jodi Fraser

Faculty Mentors:
Dr. Kathleen Hughes
Biology

Dr. Curtrina Strozier

The importance of prenatal care will be examined throughout this presentation of a literature review. Prenatal care is the medical care given to pregnant women or women trying to become pregnant. Women should visit their doctor regularly, regardless of whether they feel sick or not. These visits help both the mother and the baby remain healthy throughout the pregnancy. There are several techniques used in prenatal tests, ranging from ultrasound imaging, blood draws, and amniocentesis, that can detect abnormalities throughout pregnancy. Doctors advise patients on best practices to improve the chances of carrying a healthy baby to term. For example, expectant mothers may not be aware to avoid cleaning a cat's litter box because it can contain a parasite that can cause toxoplasmosis. According to the Office on Women's Health, babies of mothers who do not get prenatal care are three times more likely to have a low birth weight and five times more likely to die than those born to mothers who do get care. Prenatal care can be the difference between delivering a healthy baby and not carrying the baby to full term. The American Congress of Obstetricians and Gynecologists reported that about two-thirds of all infant deaths are among preterm infants. Women are advised to have regular prenatal medical care as soon as they conceive or, if possible, even before they conceive. Through the findings of this presentation, people will gain an awareness for the importance of prenatal care and will gain additional knowledge about prenatal care.

Presented: Tower Day 2016

Preserving Periods: English Manor Home

Religion was a source of conflict during the Renaissance in England. Sir William Petre was a Catholic who served as a secretary to multiple kings and queens of England. While religious shifts were taking place, Sir Petre was able to remain a part of the court and his Catholic religion was not a major issue. He was involved in the Dissolution of Monasteries under Henry VIII where Church property was confiscated by the king. The Abbey had a lot of land which included the control of a number of manors including Ingatestone, which was purchased by Sir Petre. The house has been in the Petre family ever since. Sir William Petre married Anne Browne, who was also Catholic. The family was able to maintain a social presence and a Catholic identity while living in a Puritan county. Sir Petre retired from the court of Queen Elizabeth I because of his health. Many Catholics were punished throughout the Reformation, which could also explain the retirement of Sir Petre and his relocation to Ingatestone as a permanent residence. A chapel was listed on the property of Ingatestone where Anne secretly heard mass. After the death of her husband, Anne allegedly harbored priests in her home. Blenheim Palace, another example of a manor home of a prominent English family, was the home of Winston Churchill, who was a protestant. Research of Ingatestone Hall and Blenheim Palace will explore more about the role that religion played in the history of both establishments.

Colleen Gottfried

*Faculty Mentors:
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*Dr. Andree Martin
Schwab School of
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A Public Relations Approach to Greek Life

Mark Yanoschik

Faculty Mentor:

Dr. Mariko Izumi

Communication

Dr. Gina Sheeks

Student Affairs

This thesis examines the incident of SAE as a case study to analyze the rhetorical strategies that seek to restore an organization's public image in the face of grave public offense. This thesis argues that not many studies have been done on Apologia's use in apologies used by the Greek life community after acts of misconduct. This thesis will serve as a case study to review how apologia tactics are utilized both well and poorly. If used correctly across the board, the public relations stance for Greek life national headquarters will vastly improve. These organizations are prominent because they incorporate members from every demographic. It also represents a culture that has been prevalent in our society for over one hundred years. Despite this, Greek life has held a culture that has thrived off many acts of misconduct such as racism and alcohol abuse. The intent of this thesis paper is to analyze public relations strategies using best practices and principles of public relations. The thesis includes historical analysis, literature review, and rhetorical analysis to show that proper apologia tactics can be utilized to improve the current public relations stance that Greek life currently holds with many communities across the country.

Presented: Honors Thesis Defense, Tower Day 2016

Rapid Orbit Refinement of Potential Near-Earth Objects and Recovery of Nearly Lost Asteroids

The Minor Planet Center alerts researchers about potential Near-Earth-Objects (NEOs) on their NEO Confirmation Page (NEOCP) which are usually previously unstudied objects. As such, data collection for these objects is very rapid. My thesis project will include observing these bodies and submitting observations to the MPC within a few hours. Data will be obtained using the WestRock Observatory at the Coca-Cola Space Science Center and Yerkes Observatory in Williams Bay, Wisconsin. In addition to NEOCP hunting, I will use similar methods to recover previously discovered objects whose predicted positions are becoming so uncertain that without new observations, they will become effectively lost.

Austin Caughey

*Faculty Mentors:
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Earth & Space
Science*

*Vivian Hoette
Yerkes Observatory,
University of Chicago*

Presented: Honors Thesis Defense, Tower Day 2016

Published: 5 Different Minor Planet Electronic Circulars: MPEC 2016-C124, MPEC 2016-C120, MPEC 2016-C129, MPEC 2016-C160, MPEC 2016-D46, MPEC 2016-C40

Robots Teaching Emotions to ASD Children

*Sarah Hays and
Crystal Chase*

*Faculty Mentor:
Dr. Hoda
Mehrpooyan
TSYS School of
Computer Science*

Autism Spectrum Disorders (ASD) encompass a set of serious neuro-developmental disorders that impair a child's ability to interact with others. One of the primary symptoms is the inability to empathize with others through the expression and recognition of emotions and feelings. Current treatment options include behavior and communication therapies, educational therapies, family therapies, and various interactive computer programs. Thus far, technology has provided an accommodating platform that provides the predictability, repetition, and one-on-one structure in which children with ASD find comfort. Computer-based training eliminates the complexities of social interaction and allows users to learn at their own pace. Technological solutions such as web based instruction, virtual peers, games, video modeling, and activity scheduling have already been developed. Many are concerned that these treatment options may not translate to offline environments, will further isolate the children, and that they may become the focus of obsessive compulsive behaviors. When parents of children with ASD were surveyed, they wanted technology that would engage their children to communicate more, teach social skills, utilize familiar vocabulary, and help them develop organizational and critical thinking skills. In this research, emotional behaviors and postures will be used to teach children with ASD the appearance of emotions. By creating a game on the NAO robot using Choregraphe, students with ASD can be taught how to recognize and empathize with emotions. In the future, NAO's vision API, capable of isolating 31 points on a face, in addition to supervised learning will allow the NAO robot to recognize facial emotions.

Presented: Tower Day 2016

Scientific Justification of Neo-Impressionist Color Theory

The purpose of this paper is to discuss the impact scientists Michel Eugène Chevreul and Ogden Rood had on the lead neo-impressionist artists Georges Seurat, Paul Signac, and Camille Pissarro. Through the analysis of Eugène Chevreul's *The Law of Simultaneous Contrast and Harmonization of Colors* (1885) and Ogden Rood's *Modern Chromatics* (1879), conclusions can be drawn on how their principles impacted the neo-impressionists' paintings. Writings relating to the artists including Camille Pissarro: *Letters to His Son Lucien* (1972) and *From Eugène Delacroix to neo-impressionism* (1899) by Paul Signac give direct insight to how the neo-impressionist artists thought about the scientific essays they were reading. They used the scientific principles of color to develop the painting method known as divisionism. This is the dividing and recomposing of color using dots of chromatic analogous and complementary colors to create the optical impression of the intended color based loosely upon Chevreul's law of simultaneous contrast, successive contrast, and mixed contrast. Ogden Rood's writing and color diagrams impacted artist's understanding of additive color mixing versus subtractive color mixing. At first, it was assumed that the neo-impressionist paintings actually reflected the principles perfectly, but later in 1987, historians such as Alan Lee and John Gage began to disagree because of the subjectivity of the artists. It can be argued that the artists did not adhere directly to these scientific formulas and maybe did not even fully understand the principles or that the representation of these principles in the paintings is incorrect and exaggerated, but the scientific essays gave them inspiration and understanding to create the painting technique of divisionism. The scientific justification of the technique allowed it to transcend style and become a movement.

Julianna Wells

Faculty Mentor:
Prof. Michele
McCrillis
Art

Presented: Tower Day 2016

The Sound of Black Internationalism

Mickell Carter

Faculty Mentor:

Dr. Ilaria Scaglia

History & Geography

During the 1980s, South Africa faced an oppressive government which established a system of legalized racism known as Apartheid. This system disenfranchised the Black majority in South Africa allowing the white minority to act as their oppressors. In the midst of Apartheid, international movements emerged to protest for change in South Africa. In 1985, fifty-four artists collaborated to produce a musical record that would raise global awareness and oppose the Apartheid system in South Africa. By analyzing this record, this study demonstrates that Black internationalism as a set of ideas and practices played a major role in affecting the anti-Apartheid movement. As an ideology, movement, or organization that seeks to modify the essence of interactions between nations through transnational cooperation, Black internationalism represented a form of consciousness amongst persons of African descent who became interconnected beyond borders through a shared struggle. Indeed, this movement changed the face of the Anti-Apartheid movement by uniting people of all colors in a common struggle against oppression.

Presented: Tower Day 2016

Teaching Empathy in Social Studies

Teaching a social studies lesson not merely made up of names, dates, and regions can be difficult. If students do not learn to connect with, empathize with, and understand the historical events and people, so much so that they feel as if the events could have happened to them, then they lose the true value of social studies. My goal in this research, which was based on my experience in and outside the classroom, was to figure out how to help students connect the information with an event that could have easily happened to them. I wrote a teaching philosophy based on this idea and then taught a series of lessons based to a classroom of students in a low-economic, Title I school. I then analyzed these lessons and the data I collected, along with the research I completed. My goal is to present something to show to teachers how to make social studies come alive for their students and to facilitate empathy.

Rachel Funk

*Faculty Mentors:
Dr. Victor Salazar
Teacher Education*

*Dr. Becky Becker
International
Studies*

The Translation of the Bible During the Renaissance

Courtney Fields

Faculty Mentors:

Dr. Susan Hrach

English

Dr. Andree Martin

Schwob School of

Music

While in Oxford, England, the sites at which a number of the translators' (Daniel Featley, John Rainolds, Richard Fairclough, and Thomas Holland) universities (Magdalen College, Merton College, Oxford University) of study and profession will be visited during independent study. The portraits of these men will also be seen at The Portrait Gallery. I will also visit the Bodleian Library in Oxford, which has held a King James Bible Exhibit in the past, to observe resources, notes, and a copy of a Bible from the Renaissance. The translators listed previously also have graves and monuments within Oxford that I hope to visit. These experiences are vital in answering the questions of how the process of the translation occurred and about the impact that the translation and its translators left on the country.

Presented: Tower Day 2016

Tying Knots: An exploration of mental disorders

Tying Knots is a one act that explores the very real situation of medical stigmas, understandings and beliefs that surround mental disorders in modern American society. Through the character James Cash, a schizophrenic man who wants to propose to his girlfriend Ariel Finnik, this play puts all of these conflicting ideas against each other.

Cassidy Richards

*Faculty Mentor:
Prof. Joseph Miller
English*

In writing this play I had to do a lot of research to build authentic characters. At the time I was writing this I was enrolled in a survey psychology class and was troubled to learn that many psychologists and psychiatrists don't fully understand the disorder they are treating. I learned that a lot of psychiatrists use the *Diagnostic and Statistical Manual of Mental Disorders* to diagnose symptoms on their surface instead of spending time with patients to see how their symptoms work together to create disorders. This leads to misdiagnosis of serious diseases and among those most misdiagnosed is schizophrenia.

Schizophrenia, in the public mind, is often viewed as individuals who have hallucinations, talk to themselves, and argue with inanimate objects and cannot function. This isn't true. Schizophrenia, like many mental disorders, presents itself in a variety of ways which and appear as anxiety, bi-polar disorder, and even depression. But because the misdiagnosis happens so often the only types of schizophrenia we view as "authentic" are "non-functioning" types. What we don't realize is that much of this inability to function is linked to misdiagnosis of disorder and the mistreatment of symptoms. All of these issues lend themselves to the social stigmas we have come to understand about all mental disorders. It is the reason why many employers will not hire individuals who openly have mental disorders regardless of discrimination policies, why we are ok with turning a blind eye to homeless individuals who are clearly ill and need help. This play explores all of these stigmas and works through the consequences of ignorance and misunderstanding in society and medicine and works to put real, gritty and unsettling perspectives on mental disabilities through schizophrenia and the character of James Cash.

Special thanks to performers David McCray, Nathan Petty, Brianna Mitchell, and Amanda Black.

Presented: Tower Day 2016

Using Augmented Reality Mobile Games to Teach the Java Programming Language

Richard Myers
Faculty Mentor:
Dr. Rania Hodhod
TSYS School of
Computer Science

As programming courses become more widespread, a variety of teaching tools designed to make learning the fundamental aspects of programming more enjoyable are being created. This project aims to create one such tool, a mobile game designed to teach the Java programming language via augmented reality problem solving challenges. Technologies involved include the Unity game engine and Qualcomm's Vuforia augmented reality software development kit.

Presented: Tower Day 2016

Utilizing OpenSSL for Personal Cybersecurity Protection

Cybersecurity is one of the most important research and study areas because of the number of Internet users. To safeguard personal data and information, many security protocols and data encryption algorithms have been designed and implemented. However, it is difficult for general users without technical background to understand these protocols and algorithms to develop their own security software and/or tools. OpenSSL is an open-source software available for free to everyone. This work's aim is to present a simple set of examples on the usage of OpenSSL for safeguard personal data and information, ranging from symmetric encryption like the AES to asymmetric encryption like the RSA.

Dakota Reyes

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Visualization of Cybersecurity Attacks with Gephi

*Solomon Jones,
Shekail Ashbury, and
John Johnson*

*Faculty Mentor:
Dr. Angkul
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Cybersecurity has become the most important area of study and research in the past decade because of the proliferation of computing devices on the Internet. The number of Internet users has been growing steadily. Criminals and rouge nations aimed to exploit the Internet for their advantages. Researchers and scientists have collected voluminous amount of data on the cybersecurity attacks. These datasets contain useful information, but they must be analyzed to be useful. While there are several approaches for analyzing these datasets, the most attractive technique is through visualization. In this work, a Gephi toolkit was used to visualize cybersecurity attack datasets. The visualization allows users in the general audiences to understand the implication of cybersecurity attacks with ease.

Presented: Tower Day 2016

Who was the true Guy Fawkes? What is the Meaning of Bonfire Day in England?

In England, on November 5th, there is a holiday called Bonfire Night. The historical significance of this holiday is, the failed Gunpowder Plot, which was an attempt by Guy Fawkes and twelve other conspirators, to bomb Parliament and assassinate King James I. The holiday is celebrated by lighting fireworks and bonfires labeled with replicas of Guy Fawkes. This project's goal is to analyze the modern idea of Bonfire Night, investigate the true life of Guy Fawkes, and how he became the face of the Gunpowder Plot. The combination of scholarly sources and the study abroad experience to Oxford, which included: a visit to The Dungeon of London and Parliament, provide additional insight into the life of Guy Fawkes and the failed Gunpowder Plot. These resources showed that the modern celebration has evolved into an opportunity for civilians to express their frustrations toward the government through political stands, along with annual traditions to commemorate the experience. In addition, research revealed that ironically, Guy Fawkes was not the mastermind behind the Gunpowder Plot, but just an explosive expert who was the first to be captured.

Care Bacon

*Faculty Mentor:
Dr. Susan Hrach
English*

Why the Glass Transition is Far from Clear

Nicole Sikes

Faculty Mentor:
Dr. Anil Banerjee
Chemistry

A popular, if disturbing, thought in the field of glass physics has historically been that it must be a kinetic phenomenon as it is obviously not an equilibrium thermodynamic phenomenon. There is not proof of any equilibrium glass state nor any respected theoretical conjecture of such a thing, instead it is well-accepted that the glasses are fundamentally nonequilibrium in nature. Fortuitously work out of Europe in the last few years has begun to argue the point that the glass transition may in fact be explainable through the lens of nonequilibrium thermodynamics. Here the glass transition is viewed through the lens of nonequilibrium thermodynamics in an attempt to gain better understanding into one of the great unsolved problems in condensed matter physics.

Presented: Tower Day 2016

Additional Research Projects

Charlie and His Orchestra: An Instrument of Preservation

This paper examines the Third Reich's Ministry of Public Enlightenment and Propaganda establishment of Charlie and his Orchestra, designed with the intent of spreading Nazi ideology to North America and Britain through doctored transcriptions of popular American swing music. I used two major research strategies. Firstly, the collection of data through translated interviews, newspapers, academic journals, and books. Secondly, the comparison of style and lyrics between the recordings of Charlie and his Orchestra and the original big bands. Through researching the Nazi's use of American style big band music, I will argue that the spread of Third Reich's ideology through the band was unsuccessful; however, Charlie and his Orchestra successfully preserved and progressed the art of jazz within the Third Reich in a time of heavy censorship. Thus affecting the future of jazz in Europe in the mid-20th century.

Jessica Griggs

*Faculty Mentor:
Dr. Kevin Whalen
Schwab School of
Music*

**Enhancing Student Interest and Learning in Organic Chemistry:
Connections, Analogies, and Demonstrations**

Jared Bies
Faculty Mentor:
Dr. James Schreck
Chemistry

The focus of this project is to enhance student understanding by incorporating material from print and electronic sources not commonly included in textbooks that would alleviate stress and make learning organic chemistry enjoyable. This information was compiled into three sections: analogies, connections, and demonstrations. The information collected can illustrate concepts in the textbook, but in a fun and entertaining way. Analogies include concepts of resonance, IUPAC nomenclature, videos demonstrating stereochemistry. Connections include chemical humor, organic chemistry on postage stamps, and chemistry behind everyday products. Demonstrations include visual results of many organic chemistry reactions and 3D printing. In practice, 3D printing can be very helpful to blind and visually impaired students.

Parental and Educator Assessment on the Influence of Video Games for Children with Autism Spectrum Disorder

Purpose: This study examined the attitudes of both parents and educators in regards to the influence of video games on their children/students with Autism Spectrum Disorder (ASD). Method: Parents and educators completed an online survey regarding children with ASD between ages 5-18 years old. The finalized data included 73 participants (48 parents and 25 teachers). Results: Results showed that video games are ubiquitous within the lives of children with ASD. Both parents and educators had positive attitudes in regards to video game play. In other words, video games can be seen as intrinsically motivating to the child/student and improve personal development. Conclusion: With support from both parents and educators, video games could become an important tool for children with ASD in regards to learning in classroom settings. Observational research needs to be completed in schools to learn about benefits of video game play for children with ASD.

Shelby Rolling

*Faculty Mentor:
Dr. Joy Thomas
Health & Physical
Education and
Exercise Science*

Planted Motif Search Optimization

Kevin Knapp

Faculty Mentor:

Dr. Angkul

Kongmunvattana

TSYS School of

Computer Science

The ability to find motifs in DNA sequences plays a huge role in biological data analytics and by extension the beneficial inferences made from such data. The Planted Motif Search (PMS) problem has been well researched in computer science. In this study we compare a PMS algorithm written in Java to a optimized algorithm written in Assembly. Through the use of a machine level language you give yourself a vast improvement in run-time operations. Various optimization techniques such as maximizing register usage, eliminating unnecessary compare instructions, avoiding dependencies, and using pointer calculations instead of indexes are just a few ways to improve run-time efficiency over higher level language. In our testing environment some instances where the algorithm in Java would take hours, the algorithm in Assembly would take seconds.

PostFix Questing

Data Structures is an important topic in computer science that focuses on particular ways of organizing data in a computer so that it can be used efficiently. Evaluating postfix expressions is one technique students usually struggle with when they study data structures. This presentation introduces an educational game environment that supports the player's learning experience and got them to practice evaluating postfix expressions. The game provides a fun and interactive quest line through out the time the players play the game in which they have to collect different objects and perform postfix expressions evaluation correctly, on those objects, to achieve the goals of the game.

James Sanders

*Faculty Mentor:
Dr. Rania Hodhod
TSYS School of
Computer Science*

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Submissions for *Abstracts 2017*

Undergraduates at Columbus State University who engage in research, critique and scholarship during the academic year of 2016-17 are invited to publish an abstract of their work in next year's annual. Abstracts from all disciplines which have been published or presented at local, regional, national or international conferences during the Summer 2016, Fall 2016, and Spring 2017 will be included.

Abstracts that are approved by faculty mentors may be submitted electronically at <http://honors.columbusstate.edu/abstracts.php>. Interested students are encouraged to visit the site to review the full list of information required when submitting their abstracts.

Cover Art

One of my favorite things about Columbus State University is the energy of the campus. Everyone is constantly working to better themselves as well as their surrounding environment. I wanted to represent that feeling of activity with the turbulent flowing lines around the clock tower. No matter what season, our students are constantly striving for greatness.

Julianna Wells,
Art Major, Honors College



HONORS COLLEGE

COLUMBUS STATE UNIVERSITY