2018

Abstracts 2018: Highlights of Student Research and Creative Endeavors

Columbus State University

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ABOUT THE ARTIST: Angela Pham (born 1998) is an artist from Columbus, based in Franklin, GA. She currently attends Columbus State University as a Sophomore to attain both a Studio Art (BFA) and Spanish (BA) degree. Angela works primarily with painting but is also interested in drawing and photography. She desires to paint realistically in order to show others the forms and colors seen from her perspective. However, she hopes to be able to develop a more personal style and interest while attending CSU.

Abstracts 2018
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 2017-2018 academic year. These projects highlight undergraduates research in a variety of disciplines, ranging from literary analysis to laboratory-based sciences. The abstracts represent many ongoing projects on our campus and catalog those that have been published or presented.

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

Many undergraduates have presented their work to 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 2018.

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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Abstracts 2019

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https://aa.columbusstate.edu/research/undergrad/abstracts.php

Presented at National & State Conferences

Cross-Generational Effects of Workplace Spirituality on Job and Life Satisfaction

Bobbie Bannerman

Faculty Mentor:
Dr. Robin L. Snipes,
Management

Dr. Phillip C. Bryant

The nature of work in the twenty-first century has changed substantially from that of the twentieth century. Distant and online work makes today's workforce feel more isolated and disconnected from coworkers, while constant access to work technologies such as email, text messaging, and file sharing platforms may also lead workers to feel less connected at home as well. Workplace spirituality (including work-related opportunities to develop one's inner life, higher senses of meaning and purpose, and interconnectedness) can serve to ameliorate the isolation and disconnection often experienced in today's workplace. The literature reveals that workplace spirituality leads to greater job satisfaction and maybe even life satisfaction. But, is this effect constant across generations? This study tested the hypothesis that the positive effects of workplace spirituality on both job and life satisfaction are experienced differently among Millennials as compared to older generations. Specifically, in a survey of 224 participants, we found that while workplace spirituality has a positive effect on both job and life satisfaction for all age groups, the impact of workplace spirituality is stronger for Millennials on at least one facet of job satisfaction compared to older generations.

Presented: Georgia Collegiate Honors Council Conference 2018
Member of the Honors College

A Bluetooth LE Security Investigation

Gabriel Bello

Faculty Mentor:
Dr. Yesem Peker,
Computer Science

In this paper, we analyze the architecture and security features available to Bluetooth LE developers and observe the network traffic of LE devices to analyze their security features. Some research has been conducted, and much of it focuses on the security protocols that allow Bluetooth to be broken and exploited; such work is referenced in this paper to provide context in which our research is based. We establish a standardized experiment to capture and collect network traffic for all devices used, ensuring that the data is structured and organized for analysis. Upon investigation, we find drastically differing results, as one manufacturer provides security mechanisms and other developers provide none. The severe lack of security has implications for users; device tracking is trivial without proper address security and data interception is elementary, making user privacy nonexistent. These security features, or lack thereof, are present in widely available commercial devices that transmit personal information, such as heart rate, geolocation, or even keyboard strokes. We discuss the impact on users that a security-absent manufacturing practice has. As the technology stands, Bluetooth Low Energy (LE) severely falters with regards to security in commercial implementations, and private user data is at risk.

Presented: Georgia Collegiate Honors Council Conference 2018;
CSU Tower Day 2018; CISSE 2018
Awarded: Best Paper in Natural Science (GCHC 2018);
Tower Day Highest Award for Oral Presentation
Funded: $700 SRACE funding; GCHC 2018 travel funding from Honors College
Member of the Honors College

CompuTrain: Using Educational Games to Teach Computational Thinking Skills

Valencia Coleman

Faculty Mentor: Dr. Rania Hodhod, Computer Science

CompuTrain is an augmented reality educational game to teach computational thinking skills to young children. Augmented reality uses the person's environment as a background for the game through the device's camera and add the game's objects to it. This feature is used to keep the player engaged in the game. CompuTrain is aimed to be used in the classroom for elementary and middle schools in the local community. Computational thinking is a problem-solving process that involves being able to take problems and solving them using patterns and algorithms. The three parts of computational thinking are problem decomposition, pattern recognition, and algorithm design. Problem decomposition is taking a large problem and breaking in down into different parts. Pattern recognition is the ability to see patterns in different situations. Algorithm design is creating a function to solve similar problems. The game uses these concepts in different puzzles and problems to test a children's ability to use computational thinking. The puzzles involve using pattern recognition and problem decomposition to solve each situation. Each puzzle uses a feature called adaptive gameplay. Adaptive gameplay is the game's environment changing based on the player's input. In CompuTrain, the game's difficulty changes based on the player's performance on the previous level. The game has been tested in local non-profit organization and is getting ready to be tested in a local school.

Presented: Georgia Undergraduate Research Conference 2016,
ACM Mid-Southeast 2016-2017,
Georgia Collegiate Honors Council Conference 2018
Awarded: GURC 2016: Best Science Paper
Funded: $145
Member of the Honors College

Bo Bartlett, Realist Painter's Sense of Place: Analyzing the Impact of Four Studio Locations on an Oeuvre

Christofer Gass

Faculty Mentor:
Dr. Amanda Rees,
History & Geography

Bo Bartlett (1955-), an American realist painter, is known for his large-scale contemporary paintings. The art historian and critic David Houston (2016) wrote a majority of Bartlett's new book and often describes the play of landscape and light in the painter's work. The following is a sentence describing Bartlett's influences while in Maine, "The isolation from everyday life, the different sense of time, the clear intense light, but above all, the dominant presence of the sea quickly filters into Bartlett's new work." Additionally, Carter Ratcliff (2016), who also wrote in Bartlett's book, has also noticed these trends in the artist's work, "Focusing on an object, he conveys its texture and its weight. Zooming out, he immerses us in enveloping qualities of light. Because we recognize at once whatever Bartlett shows us, we call him a realist. Yet he does not limit himself to precise renderings of the world's appearances." In working to characterize the relationship between Bartlett's work and the impact of place in his art, I identified four primary locations where the artist established studios: Philadelphia (1975-2003); Seattle (2005-2012); Columbus, GA (2012-present); and summers in Maine (1998-present). Having surveyed Bartlett's oeuvre, I identified over 300 paintings of both landscapes and interiors, 130 of which are solely landscape paintings. There are five themes inspired by place informing his work. Having chosen four images that capture the prevailing themes, I then used ArcGIS to plot Bartlett's studio sites and added a representative work for each location.

Presented: American Association of Geographers Conference

The Effects of Title 11 and 111 and Section 504 and Section 508 of the Rehabilitation act of 1973 on Distance Learning at USG Institutions

Joslin Hobbs

Faculty Mentor: Dr. Richard Newtson, Criminal Justice & Sociology

The Rehabilitation Act of 1973 is a Federal law that under Section 504 and Section 508, and Title III of the Social Security Act, include the provision that "reasonable accommodations" be provided to adults with disabilities in education including electronic and information technology. This research will outline the current status of USG institutions that have identified departments tasked with online course accessibility, and resources for training staff and faculty in issues of online course accessibility.

Presented: Georgia Sociological Conference

Accessibility of Visual Aids in the General Music Classroom

Katherine Holbrook

Faculty Mentor:
Dr. Michelle Folta, Music

This research focuses on visual aid accessibility for students with disabilities, students from poverty, and culturally diverse students. Each of these facets are explored, defined, and reflected on in regard to how visual aids could be more accessible for each community of students. Posters have been developed based on this research to practically apply the findings to visuals that could be used in a music classroom. When considering the accessibility for students with disabilities, it is crucial to review legislation such as the Individuals with Disabilities Education Act (1990, 2004, 2013) which mandates services to children with disabilities throughout the nation. This research specifically focused on cognitive disabilities, language disorders, autism spectrum disorders, and vision loss, or those that would be hindering when using visual aids. Another community of students that are discussed in this research is the students in poverty. Classroom structure may be one of the largest influences on any student's learning abilities, which includes visual aids. There are many types of poverty that are to be acknowledged in any classroom environment, and some students may even be considered in multiple subcategories of poverty (Payne, 1996). These subcategories include situational, generational, absolute, relative, urban, and rural (Jensen, 2009). Visual aids help students in poverty with availability of instructional resources, dedication to diversity and equity, and emphasis on reading skills. Cultural diversity is an additional factor of differentiation when defining a community of students and their accessibility in the classroom. Culture is currently viewed as shared patterns of behavior and interaction, as well as cognitive constructs and understanding learned through socialization (Pratt, 2016). It is crucial that a culture not be essentialized (making generalizations about a culture that would blur their unique distinctions) in the representation of that culture. Cultures can be explored through songs, choral works, instrumental selections, and listening experiences while making musical connections to a culture's art, dance, literature, drama, and social studies. Practical applications of creating visual aids that are more accessible are then discussed. Each group of students have specific accommodations that are needed to promote accessibility to the learning environment, including visual aids.

Presented: Georgia Music Educators Association In-Service Conference Poster
Funded: Honors College, Travel Grant $250
Member of the Honors College

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

ZiJie Lin
Jared Bies

Faculty Mentor:
Dr. Kerri Taylor,
Chemistry

Dr. Jonathan Meyers,
Dr. Monica Frazier

Cancer is one of the leading causes of death in the United States reinforcing the need for improved anti-cancer therapeutics. Recent exploration of two organic salts (imidazolium and benzimidazolium salts) has shown that they possess anti-proliferative activities comparable to an FDA approved drug, cisplatin. Despite the success of these salts, a class of closely-related compounds (triazolium salts) has received little attention. We report the synthesis, characterization, solubility, and anti-proliferative activity of a series of N,N'-bis-substituted triazolium salts with various substituents.

Presented: 2018 Annual Meeting of Georgia Academy of Science, CSU Tower Day 2018, 255th National Meeting of American Chemical Society
Awarded: 1st Place, Best Paper Award in the Chemistry Division, 2018 Annual Meeting of Georgia Academy of Science
Funded: SRACE Travel Grant (Spring 2018), $263; Honors Educational Activity Grant (Spring 2018), $250; SRACE Research Grant (Fall of 2017), $450
Member of the Honors College

ConceptNet Extender & Explorer: A Better Way Of Interacting With ConceptNet

Loran Shaver

Faculty Mentor: Hillary Fleenor, Computer Science

ConceptNet is a semantic network based around the relationships between words and the concepts that can be derived from them. This makes ConceptNet a useful utility for machine learning and natural language processing, but the large knowledge base that makes it useful also makes it difficult to navigate. Any application that aspires to use ConceptNet must contain extra code dedicated to querying, parsing, and interpreting ConceptNet's information, not all of which is immediately useful. This project is a multi-faceted approach to making ConceptNet an easier resource to use by providing means to query and store information from ConceptNet without need for project-specific code. At the lowest level, this takes the form of a lightweight Python API for performing queries and storing the results. Built upon this is a small collection of tools, in both text and graphical format, for visualization, exploration, and storage of ConceptNet relationships, as well as information related to them.

Presented: ACM Mid-Southeast

The Effects of Antimicrobial Peptides WAM-1 and LL-37 on Multidrug Resistant *Acinetobacter baumannii*

John Spencer

Faculty Mentor: Dr. Lauren King, Biology

Increasing multi-drug resistance (MDR) in Acinetobacter baumannii warrants therapeutic alternatives, and the bactericidal nature of antimicrobial peptides offers a possible approach. In this study, we examined the interaction of cathelicidin antimicrobial peptides (AMPs) WAM-1, a marsupial AMP, and LL-37, a human AMP, with *A. baumannii* clinical isolates. We characterized the antibiotic resistance of the isolates, the bacteriostatic and bactericidal effects of these AMPs, synergistic activity with antibiotics, and their effects on biofilm formation and dispersal. All clinical isolates were resistant to commonly prescribed antibiotics, with four of seven isolates showing multidrug resistance. WAM-1 and LL-37 showed variable activity in clinical isolates, with WAM-1 having a stronger bacteriostatic effect than LL-37 and showing rapid bactericidal activity against clinical isolates. Furthermore, synergistic bactericidal activity was observed with WAM-1 and commonly prescribed antibiotics. Both peptides were able to inhibit biofilm formation in all clinical isolates at some concentrations, and WAM-1 dispersed mature biofilm in most isolates. LL-37 was unable to disperse mature biofilms in any strains. Further studies must be done to elucidate the true value of these alternative treatments, but these results suggest that multidrug resistant *A. baumannii*'s susceptibility to AMPs may result in innovative therapeutics to prevent or treat these infections.

Presented: Association of Southeastern Biologists Conference
Funded: SRACE, $300

Relations between Measures of Media Consumption and Fat Phobia

Allison Stallworth, Emma McPeters

Faculty Mentor: Dr. Diana Riser, Psychology

Fat-phobic attitudes and behaviors have been reported in numerous settings and are associated with both physical and psychological consequences for those affected. While past research points to media being predictive of fat-phobic beliefs and behavior, studies using a comprehensive, non-weight-specific media variable are still needed. Identifying media's role in fat phobia is important in better informing interventions targeting this problem. In the present study, we hypothesized that the amount of media people consume predicts their level of fat phobia. A sample of 105 college students completed a survey including four media subscales and five full or partial outcome measures. While there were three correlations that were both significant and between a predictor and criterion, regression analyses were not performed due to the predictors being irrelevant to our hypotheses. The lack of findings in support of our research hypotheses suggests that media may only be predictive of fat phobia when the content is specifically body- or weight-related. Consumers are encouraged to be mindful of the impact body-specific media messages may have on their perceptions of others.

Presented: Georgia Undergraduate Research in Psychology Conference 2018

Three-Dimensionally Printed Models for Blind and Visually Impaired Chemistry Students

Candice Tate

Faculty Mentor: Dr. Rajeev Dabke, Chemistry

Dr. Cindy Ticknor

While the use of visual aids in textbooks is becoming increasingly more important in science courses at the high school and undergraduate levels, blind and visually-impaired (BVI) students are often led away from STEM-based majors or occupations. Science courses appear to be too challenging to BVI students who lack the ability to benefit from available illustrations and diagrams, which help to make the understanding of a concept more concrete. Using Tinkercad, a browser-based 3D design and modeling tool, I have developed and 3D-printed models for BVI students to use as learning tools in their high school or undergraduate introductory chemistry courses. These models represent and illustrate trends in atomic radii of the periodic table, trends in electronegativity of the periodic table, radii of atoms and their cations, as well as the effect of electronegativity on bond type. Plans are in place to take these models to Georgia Academy of the Blind in Macon, Ga after receiving IRB approval. Through this study, we gained insight into what BVI students think about the use of three-dimensional tactile teaching tools in their classrooms and discovered ways to improve our current models.

Presented: Georgia Collegiate Honors Council Conference 2018
Awarded: Barry Goldwater Honorable Mention
Funded: SRACE, $150
Member of the Honors College

Comparison of age and growth biology of 34 million year old stingrays from North Dakota to the extant *Dasyatis pastinaca*

Persia Tillman

Faculty Mentor: Dr. Michael Newbrey, Biology

Stingrays are a diverse and popular group of vertebrates; however, nothing is known about the relationships between growth biology and climate change. Our goals were to provide a synopsis about the age and growth of freshwater stingrays and compare them to 34 million year old freshwater stingrays that were living during a cooling climate in North Dakota. The Earth's climate cooled from 50 to 33 million year ago when many warm adapted organisms were relegated to warmer, southern latitudes in North America. Today, freshwater stingrays only inhabit subtropical and tropical environments. We predicted the fossil stingrays from North Dakota to grow very slow compared to their modern counterparts. We examined 36 isolated vertebral centra from the riverine fossil locality in North Dakota. Age (years) was estimated from the number of growth cessation marks on each centrum. Centrum radial distance (mm) was measured from the notochord foramen to each annulus and plotted. Chronological ages ranged from 0 to 5 years old and centrum radial distances ranged up to 1.7 mm. We could not find any published data on age and growth of extant freshwater stingrays for comparison. The growth profiles were compared to marine *Dasyatis pastinaca*, Common Stingray, which are found in Northeastern Atlantic Ocean. There is complete overlap in the von Bertalanffy growth curves and parameters of the two datasets with no evidence for slow growth rates from ages 1-7 years old. There is no evidence of old individuals in the fossil dataset suggesting two hypotheses; 1) older individuals did not exist in the population, and 2) older individuals lived in another habitat (habitat partitioning). The use of fossils stands to provide great insight into the effects of climate change on the age and growth biology of fishes.

Presented: Association of Southeastern Biologists Conference
Funded: Honors Educational Activity Grant- $250; SRACE- $328
Member of the Honors College

An Analysis of Mental Health Perception and Usage in the Adult African American Community

Nicholas Wilson

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

A cross-sectional study on the usage and perception of mental health services in the adult African American community was performed by survey analysis. Current literature on the topic is directed towards defined factors limiting the use of mental health services in the specified demographic, but the literature scarcely addresses the topic holistically. Few, if any, of the current studies detail the conventional mistrust between the African American community and mental health services; fewer studies correlate the perception of mental health in a contemporary setting as well as estimate the actual usage of different forms of mental health services. This study possesses the goal of surveying different populations of African Americans through measurement of their personal impression of mental health services as well as any hindrances in accessing these services. Surveys were administered to the target demographic and contained both open-ended and dichotomous questions that consisted of either a Yes or No response. Results were analyzed and forty participants between the ages of 18-65 years were grouped based on gender, education level, income level, and employment status to allow for comparison amongst different groups. Preliminary data suggests that with younger adults between the ages of 18 to 30 years, mental health is held in higher regard compared to older participants; younger participants have also expressed significantly higher rates of exposure to mental health in the form of therapy than the older audience. With that, further analyses will be performed and the data will be treated to provide information on each demographic.

Presented: Annual Biomedical Research Conference for Minority Students
Member of the Honors College

Comparison of age-registering structures in coelacanths

Frances Woolfolk

Faculty Mentors:
Dr. Michael Newbrey, Biology

Dr. Hugo Martin-Abad

There is little in the published literature on age assignments of coelacanths. From previous literature, coelacanth scales were used to measure age, suggesting different hypotheses of longevity: 20 years old and 40 years old. A recent hypothesis suggests a 100-year life span from a 21-year in situ study where larger individuals had little to no growth. Previous studies also suggest 3 years gestation period based on the study of embryos found in a *Latimeria chalumnae* female. The largest known individuals grow to 1.8 m TL, which is their maximum size. Our objective is to determine the number of years it takes to attain maximum size. Previous studies have failed to describe growth cessation marks adequately. We used new criteria to identify growth cessation marks on scales of extant (*Latimeria chalumnae*) and extinct (*Axelrodichthys araripensis*) individuals. New age assignments for *L. chalumnae* resulted in higher individual ages than previously noted in the literature. We compared chronological ages of scales and bones in *A. araripensis* and found that they agree. Our age assignments suggest a life span that exceeds 40 years, but we cannot refute the 100 year life span hypothesis. The results suggest that coelacanths grow much more slowly than previously reported. This study provides new numerical data that supports the idea of low metabolic rate and slow growth.

Presented: Association of Southeastern Biologists Conference
Member of the Honors College

Funded Research Projects

Visual Arts Exhibition: Pieces from Nature's Prototypes

Taylor Bardon

Faculty Mentor: Dr. Hannah Israel, Art

Nature's Prototypes is an ongoing science fictional, narrative series by Taylor Bardon, both a digital illustrator and a sequential artist based in Columbus, Georgia. This original, narrative series emphasizes worldbuilding and character design. Through a narrative mode that blends realism and fiction, Bardon uses various biological fields, such as ecology, pathology, and bioengineering, to imagine action-centric vignettes, where animalistic to monstrous characters become the predominant actors in a post-dystopian worldscape. In the series' larger scope, these vignettes are sequential events within a larger timeline and an original mythos that delve into the implications and the intrigue surrounding the idea of synthetic organisms (both in their natural and artificial aspects). Conceptual in nature, this series functions as a continual framework for exploring and deducing the often eclectic relationships found between the aforementioned fields. In physical form, character designs/concepts are primarily illustrated within a body of work entitled the *Theatre Tapestry* series. This body is focused on rendering its source material's core subjects and factions as dramatic, symbolic, and vector-based illustrations. These figural subjects are rendered with varying degrees of conflation, abstraction, and ornamentation. Aesthetically, the unifying, stylistic elements within this body are the erasure between overlapping visual elements and sparse, textural renderings among flat, black-tone shape groups. Conceptually, these illustrations' stark flatness and organic shapes function as eventual, interchangeable symbols within the scope of the overall narrative.

Presented: Portmanteau, Illges Gallery and Bay Gallery, Columbus, GA
Funded: SRACE grant, $300
Member of the Honors College

The Visual Takes of FaustFall

Steven Bardon

Faculty Mentor:
Dr. Hannah Israel, Art

FaustFall is an ongoing dark fantasy comic series by Steven Bardon, a traditional illustrator and sequential artist based in Columbus, Georgia. The series originated in mid-May 2016 after he created a prototype comic entitled *Herald to Herne*. Shifting from a vignette-based methodology, Bardon borrowed from an array of characters and ideas conceptualized throughout his early years as an artist, and combined them with spiritualistic elements found in Christianity and Paganism. *FaustFall* thereon became a focal point of his work, whereby its overarching narrative incorporated its inspirations into an original series focused on character-driven plots within a grander storyline. Set in a dystopia known as the Countryside, humanity is twisted into Faustian horrors through pacts with god-like entities known as Titans. They war against each other on behalf of two opposing Titans known as Valdmane and Langseeth. *FaustFall*'s world is unveiled through the struggles of its young cast of characters, such Lucifer the orphan, and protagonist, seeking the truth behind his abandonment. The series also follows other secondary characters such as Shalla the witch and her escort Floyd in their series *Wolf and Witch*. Through these characters, *FaustFall* explores companionship and family as cornerstones to surviving in an unforgiving world. *FaustFall*'s visual style utilizes traditional ink pen and brush to create texturally deranged imagery. Its body horror elements are emphasized through its intricate, organic textures, whereby fleshy and floral forms become one within Bosch-esque hellscapes. Even so, the turmoil of these otherworldly inhabitants is conveyed with a brutal honesty.

Presented: Senior Thesis Exhibtion
Funded: SRACE, Department of Art, $333
Member of the Honors College

Biological index of tolerance and macroinvertebrate richness to assess ecological structure and function of abandoned mine ponds at CSU Oxbow Environmental Learning Center

Sydney Barker
Caroline Humphries

Faculty Mentor:
Dr. Stacey Blersch,
Earth & Space Science

The freshwater habitats at Oxbow Meadows Environmental Learning Center were not historically present, but are the result of sand and clay mining activities from 1900's through the 1980's. For the past 35 years, these pits have been allowed to self-organize, with little management or intervention, resulting in the formation of 8.6 ha of wetlands and 25.8 ha of fringe wetland/open water habitat. This independent study (ENVS5555) builds upon efforts in ENVS 5405: Topics in Conservation class from Fall 2017, which studied the restoration potential of the aquatic systems at Oxbow Meadows. This study will focus on assessing the health of these emerging wetlands using aquatic macroinvertebrates as indicators of biologic integrity. Macroinvertebrates are frequently used to determine the health of an aquatic ecosystem, as their abundance and diversity are directly linked to water quality. Samples of macroinvertebrates were taken from each pond, and identified in the lab down to family level. The individuals were then ranked, using an index of biological integrity (IBI) based on level of tolerance to poor water quality conditions . More intolerant species found in a system shows a healthier environment, and fewer intolerant species in a system shows an environment that is disturbed. Using the Shannon's Richness Index, biodiversity was also calculated. This research will provide more data to determine the restoration potential of emerging wetland ecosystems of Oxbow Meadows and potential restoration of natural infrastructure in significantly modified landscapes.

Funded: CSU Department Funds

Avocation for Early Post-Caesarean Kangaroo Care

Hunter Bowling
Morgan Barton
Sumer Culberson
Tori Hood
Mary Poole

Faculty Mentor:
Dr. Cheryl Smith,
School of Nursing

Direct, skin-to-skin contact (SSC) immediately succeeding birth between the mother and her newborn baby has been proven to provide numerous benefits to the baby. Specifically, the baby is able to better regulate their internal temperature, stabilize their own cardiovascular function more quickly, as well maintain their oxygenation more effectively than babies that are immediately separated from their mothers postpartum for extrauterine care. However, this practice has not been accepted by many obstetrical professionals - especially following caesarean delivery, where SSC has also been proven to increase particular circulating hormones absent with this surgical form of delivery, while normally present with the labor process. A research question was then formulated: Can immediate skin-to-skin contact, following caesarean delivery, become the new standard of care? Both qualitative and quantitative randomized control trials were reviewed with evidence that showed successful implementation. Reports came from hospitals around the United States that had already made SSC after caesarean delivery their protocol denoting both the improved newborn vital signs, and the gratitude exhibited by mothers after having time with their babies immediately after birth. Other articles explored benefits such as improved, healthy breastfeeding techniques; decreased maternal and newborn pain; as well as the overall feeling of confidence experienced by mothers after SSC was implemented. No direct correlation was found between pain levels and SSC, but all other studies reported improved statistics in their respective investigations. Babies were seen as healthier feeders - including both the ability to maintain oxygen saturation while feeding, as well as being more obligate breastfeeders by discharge from the hospital. Mothers also reported a higher level of confidence in providing care for their newborns.

Presented: Annual Evidence Based Practice Student Presentations:
Columbus Technical College
Funded: School of Nursing

Long-Term Opiate Addiction Treatment

Charles Brand
Melissa Acton
Gregory Carlisle
James Conley
William Woodward

Faculty Mentor:
Dr. Cheryl Smith,
School of Nursing

The opioid addiction crisis in the United States is one of the largest health care issues that impacts many. An examination of the research to identify the best treatment for this growing problem. We analyzed long-term treatments of buprenorphine and methadone to opioid addicted patients to determine the statistics of patients that abstained from opiate drug abuse during the first year of treatment. We received treatment data from the United States Department of Health and Human Services and the Journal of Food and Drug Analysis among other sources. The data shows Buprenorphine having a decreased risk of overdose compared to Methadone, Buprenorphine being a more cost-effective treatment and Buprenorphine patients are more likely to stop illicit drug use on average compared to Methadone patients. The data shows Buprenorphine of being a superior opioid addiction treatment compared to Methadone at this time, but further research on this subject is necessary.

Presented: Annual Evidence Based Practice Student Presentations:
Columbus Technical College
Funded: School of Nursing

The Effect of Disturbance on Vegetative Community Structure and Diversity: A Comparative Survey

Ashley Desensi

Faculty Mentor:
Dr. Julie Ballenger, Biology

Dr. Brian Schwartz

Disturbances, human or natural, are known to have adverse effects on community diversity and stability. In order to assess the effects of disturbance (and other possible factors which contribute to the health of an area), researchers use ecological surveys. These surveys provide important information about the overall health of a community. This study proposes to characterize the flora of two predominantly hardwood forests located in Harris County, Georgia. The study sites were selected based on their close proximity, and vast differences in community structure. The collected data was analyzed and assessed to provide a full picture of the conditions of each habitat. Results revealed variations in relative abundance of selected species and differences in overall community structure between the two sites. Tree species diversity and age distributions also varied greatly between sites.

Presented: Senior Research Presentations (Fall 2017)
Funded: 300.00 (SRACE), 400.00 (George Stanton Scholarship), 413.00 (Tri-Beta)

Spectral Theory of Ordinary Differential Operators

Bao Do
Christopher Sinkule

Faculty Mentor:
Dr. Almada,
Mathematics & Philosophy

In mathematics, the spectral theory of ordinary differential equations is the part of spectral theory concerned with the determination of the spectrum and eigenfunction expansion associated with a linear ordinary differential equation. Second order ordinary differential operators have a wide range of applications in mathematics and physics, especially in the areas of electromagnetism and in quantum mechanics, where the time evolution of a quantum state is described by the Schrodinger equation, a second order differential operator. In this paper we show how to transform a self-adjoint ordinary differential operator into a self-adjoint compact integral operator by explicitly constructing its Green's function. We then show how to find the eigenvalues and eigenfunctions of a self-adjoint compact operator and establish their relationship to the original differential operator. We also show the connection between the method of expansion in eigenfunctions and the Green's function method.

Funded: $330
Member of the Honors College

3D Navigation with Microsatellites

Kristopher Fitch
Sarah Lowery
Lonnie Morris

Faculty Mentor:
Michael Johnson,
Earth & Space Science

LiDAR stands for laser imaging, detection, and ranging, which uses a laser in place of radio waves in the tradition RADAR. The laser is able to produce a 3D scan of its surroundings and relay it in real time. LiDAR can be paired with a cubesat, which is a miniature satellite that can be utilized for Space research. One example is that NASA is investigating 3D navigation with LiDAR acting as an autopilot to help repair satellites currently in orbit. We are currently undergoing development of a LiDAR 3D navigation system prototype that will allow multiple cubesats to adjust their orientation in orbit. The changes in orientation are to help optimize the sensors for a specific mission profile. Missions could include search and rescue, natural disasters, and better topological remote sensing. Our poster will present the current status of the prototype systems and future planning for system design.

Funded: Coca Cola Space and Science Center

Decreasing Suicide in Adolescence in a School Setting

Addison Frasch
Trishina Lewis
Olivia Henderson
Mindy Hightower
Tracy Meyer
Ruth Stewart

Faculty Mentor:
Dr. Gail Jones,
School of Nursing

Adolescent suicide is not only a pressing issue today, but also a growing one. In 2011 alone, 39,000 people in the United States completed the act of suicide. Approximately one out of six high school students seriously consider suicide while one out of thirteen attempted suicide. An examination of recent research findings found that nurses play an important role in identifying and decreasing the risk for suicide in adolescents in the school setting. Evidence-based strategies are used by nurses in their roles of educator and mentor. These include bringing awareness to the issue as well as educating on the ways of recognizing at risk adolescents, specifically targeting teachers and counselors/mentors. Due to the important role that teachers and counselors/mentors play in the lives of every adolescent, it is important that these individuals be equipped with the knowledge and screening tools necessary to identify adolescents that may be at risk for suicide. A suicide risk assessment tool could be eventually implemented in school districts on a large scale to make sure that at risk individuals are being properly identified and referred to appropriate resources. It is the hope, that in bringing awareness to this issue, the overall rates of suicide will decrease in the United States.

Presented: Annual Evidence Based Practice Student Presentations:
Piedmont Columbus Regional
Funded: School of Nursing

Multithreading to Determine Stepping Stone Intrusion

Kendrick Gholston
Brian Lockerbie
Andrew Lesh

Faculty Mentor:
Dr. Jianhua Yang,
Computer Science

Dr. Lixin Wang,
Dr. Aurelia Smith

To aid in students' comprehension and study of cybersecurity, we developed an intrusion detection system to monitor for stepping stone usage. The system acts as a listener at a point in a chain of connections and collects all the data travelling in either direction. The process of capturing and storing packets while at the same time displaying them in the program window upon capture; otherwise known as multithreading, was essential part of this program. Multithreading is a process of executing multiple processes (threads of execution) simultaneously; use of this technique can be potentially problematic should two threads request a resource or a value that one thread is currently using and you do not wish for that to occur. This scenario is called a deadlock, but within the scope of our project this is not an issue that could happen when running the program. Originally, the program was only able to capture the packets and then upon the completion of capturing would the packets be displayed. However, this allowed correlation between the capturing packets process and the window of the program very nicely. While the program is capturing packets, that thread of execution will communicate to the other thread containing the window of the program the formatted information regarding those packets. The main thread of execution is the thread running the main window form; upon clicking the start button, a new thread of execution is created which will run the function used for capturing packets and the information from the packets is relayed to the main window.

Funded: External Funding

Saving Lives by Preventing Medication Errors

Megan Harris
Christin Slocumb,
Kayla McNair
Nadine Boakye
Soo Kyoung Kim

Faculty Mentor:
Dr. Gail Jones,
School of Nursing

Drug related injuries occur an estimate of 1.5 million times annually and cost hospitals $3.5 billion in the United States alone. The clinical question proposed was "Does the implementation of enhanced medication teaching during discharge from the hospital reduce the risk of patient injury or death associated with medication errors?" Data was collected from two quantitative randomized controlled trials and one descriptive quantitative research study. The results from the research showed a significant need for enhanced medication teaching and reconciliation. With individual nurse assessment of patient understanding of in home medication administration showed a decrease in medication errors related to incorrect measuring and dosing. Following the use of enhanced medication plan instead of the standard medication plan results showed patients knowledge of drugs increased by 23.2%. The presentation will present strategies to prevent medication injury or death by educating patients about proper administration of prescribed drugs and the importance of medication reconciliation.

Presented: Annual Evidence Based Practice Student Presentations:
Columbus Technical College
Funded: School of Nursing

Development of a Micro Satellite Technology Testing Platform at CSU's Coca-Cola Space Science Center

Ross Hodge
Dalton Batastini,
Nathan Sandberg,
Bradley Lloyd

Faculty Mentor:
Dr. Shawn Cruzen,
Earth & Space Science

Mr. Michael Johnson

Students at the CCSSC are currently developing a Micro Satellite Technology Testing Platform (MiSTT), in order to move forward in the process of developing launching and support of cube sat missions. Cube sats are small satellites that weigh roughly 1 Kg and are 10cm X 10cm X 10cm in size. These satellites help provide quick and economical missions to students and researchers. This presentation will show the current process on the MiSTT Platform and future plans of integrating systems and testing possible payloads.

Presented: CSU Tower Day 2018
Funded: Coca-Cola Space Science Center

Evaluating Detritus Decomposition Rates of Abandoned Pit Mines at CSU Oxbow Meadows Environmental Learning Center

Jack Hovey

Faculty Mentor: Dr. Stacey Sloan Blersch, Earth & Space Science

For an Independent Study course during the Spring 2018 semester at Columbus State University, I will be assisting in the collection and measuring techniques of detritus decomposition rates to understand the cycling of carbon for multiple impaired ponds at the Oxbow Meadows Environmental Learning Center in Columbus, GA. Decomposition is an important ecosystem process, providing the basis for food webs and trophic interactions in aquatic ecosystems. This work is part of a larger study that will determine the degree to which abandoned pit mines have evolved over time on this property and to what degree ecosystem function and structure has established naturally without intervention. Data collection consists of field work at three impaired sites and one reference site - a remnant oxbow lake of the Chattahoochee River. I hypothesize that the rates of decomposition of carbon within the impaired ponds will be significantly higher from the reference because they are more anaerobic systems and greatly affected by interventions. The results of this study will be used to assist in additional restoration planning efforts at the Oxbow Meadows Environmental Learning Center in conjunction with Columbus Water Works. Lessons learned will also be valuable for restoration of other mining sites nearby, which are still being actively mined for clay, sand and gravel.

Funded: CSU Department Funds

Solar Observation at The WestRock Observatory

Stacy Hults
Ivy Do
Bradley Lloyd
Lonnie Morris III

Faculty Mentor:
Dr. Rosa Williams,
Earth & Space Science

Michael Johnson

The WestRock Observatory in Columbus State University's Coca-Cola Space Science Center began solar observations in 2001. Since then the observatory has made many upgrades in equipment. These upgrades include new telescopes, new cameras, various other upgrades to hardware and software that afford much better solar observations than we could have achieved otherwise. The new solar equipment and techniques will increase our understanding of the nearest star, our Sun, through frequent student observations of solar activity. During this presentation we will highlight past images and information, particularly the WestRock Observatory's coverage of the 2017 solar eclipse. In conclusion, the future holds new upgrades and new images that we would not have the opportunity without the support of Columbus State University and the NASA Space Grant Program.

Funded: Georgia Space Grant Consortium

Violence Against Emergency Department Nurses in the Workplace

Alexys Lawrence
Amber Johnson
Arica Robinson
Mohini Patel
Staria Quarshie
Mary Bankole

Faculty Mentor:
Dr. Gail Jones,
School of Nursing

Dr. Cheryl Smith

Violence has become an endemic problem-affecting healthcare workers in many hospitals. The workplace violence is prevalent specifically towards nurses in the emergency department. This type of workplace violence decreases productivity, increases stress, and decreases longevity of nurses who work in the department. Early intervention against violence is key to providing a safe working environment some of these interventions include engaging the local police department, de-escalation training, and metal detector installation. A search of the literature found some evidence-based strategies to address violence in the ED. They include ensuring that registered nurses have means of communication; developing a policy to determine when a buddy system should be implemented, assembling a rapid response team at the beginning of shifts in case of violent emergencies, and specialized training for security personnel.

Presented: Annual Evidence Based Practice Student Presentations:
Piedmont Columbus Regional
Funded: School of Nursing

Filtering Captured Packets to Detect Stepping Stone Intrusion

Andrew Lesh
Brian Lockerbie,
Kendrick Gholston

Faculty Mentor:
Dr. Jianhua Yang,
Computer Science

Dr. Lixin Wang,
Dr. Aurelia Smith

To aid in college students' comprehension and the study of cyber-security, we developed a system to monitor network traffic for stepping-stone detection usage. The system acts as a listener at a point in a chain of connections and collects all data traveling in either direction. The process of sorting through captured packets to detect certain attributes fitting a desired description; otherwise known as filtering, was quintessential. This allows correlation between the packets captured at the monitoring link and their proximity to the victim computer. As well as being designed around stepping-stone detection, the application is specifically laid out to ensure students are focused on the data captured and not how to correctly apply a filter like in other capture software. Areas to enter desired IP addresses and port numbers are easily identifiable, as well as, several options allowing students to determine what logical operators should be used to describe the captures' overall characteristic. For more experienced users, a field is available for entry of- more complex filters, even those not necessary to the detection of stepping-stones. This accommodates any extra properties that users may desire to further restrict their search. A correct filter is the most important part of any capture as any data captured becomes moot if it does not follow the appropriate criteria.

Funded: External Funding

GUI and Ease of Use for Stepping-Stone Intrusion Detection

Brian Lockerbie
Andrew Lesh
Kendrick Gholston

Faculty Mentor:
Dr. Jianhua Yang,
Computer Science

Dr. Lixin Wang,
Dr. Aurelia Smith

The goal is to easily demonstrate the process of stepping-stone intrusion detection. We found it most pertinent to design a user interface that was intuitive, simple to follow, and difficult (if not impossible) to mismanage. The most direct way to achieve this is in using a rapid GUI prototyping platform such as Visual C#. To capture packets in detecting a stepping stone, instead of being required to enter long and complicated filter strings, users can simply select the capture interface, click the protocol on which they wish to filter, enter IP addresses, check whether each IP is a source or destination (along with the appropriate conjunctions), and click capture. Captured packets are displayed containing various packet header fields. Raw packet data is displayed both in hexadecimal and ANSI form. To easily allow the user to filter connection chains out of a network capture, we employ 'save incoming connection' and 'save outgoing connection' buttons. These will allow the user to easily extract packets pertaining to a particular connection chain from the primary capture file and place them into their own individual file for later analysis. There are also additional options to extract individual connection streams within each connection. We believe that eliminating the need to memorize complex filter syntax allows the user to focus on the primary objective: detecting stepping-stone intrusions.

Funded: NSA

Current Progress of the Small Radio Telescope (SRT) at the Coca-Cola Space Science Center

Sara Lowery
Lonnie Morris

Faculty Mentor:
Dr. Rosa Williams,
Earth & Space Science

Mr. Michael Johnson

The Small Radio Telescope (SRT) was modeled and constructed after the SRT at the MIT Haystack Observatory. Previously, the telescope resided on top of Lenoir Hall; however, it was transported to the Coca-Cola Space Science Center (CCSSC), for the purpose of furthering future research goals. From past semesters until present, certain components of the Radio Telescope, which had ceased to function properly, were repaired. Using equipment provided by interns and mentors, we have tested those parts to ensure that they function properly. With this particular telescope, research can be done to look at celestial objects that emit radio waves, such as the sun, and black holes. As we continue with our progress, once completed, research at the CCSSC will take place. In order to accomplish that, we will first erect and test at least one of the two telescope systems. In this poster, we summarize the current status of the Small Radio Telescope and its future prospects.

Funded: External Funding

The Use of Complementary and Alternative Medicine (CAM) to Manage Chemotherapy Side Effects

Tia Montoto
Noreen Gordon
Chelsea Felix
Sasha Hernandez

Faculty Mentor: Dr. Cheryl Smith, School of Nursing

Oncology patients receiving chemotherapy typically have an array of side effects following treatment. Integrating complementary and alternative medicinal (CAM) interventions can significantly reduce the side effects of chemotherapy. The main objective is to educate healthcare professionals in utilizing non-pharmacological means of treatments to improve the quality of life for oncology patients. Side effects can be considerably reduced for chemotherapy patients through education of healthcare professionals via biannual seminars, web-based training, continuing education courses, and customization of current practices. Patient education is also essential for clients to lead an optimal life. CAM methods that are useful in decreasing chemotherapy side effects were identified after an examination of current quantitative and qualitative research. Evidence-based CAM methods such as reflexology, acupuncture and yoga are effective in relieving side effects in oncology patients. Oncology patients taking advantage of reflexology reported fewer incidences of fatigue, nausea and vomiting in comparison to the control group. In addition, patients receiving chemotherapy stated that yoga improved their quality of life. Acupuncture is considered safe and effective in ameliorating side effects of chemotherapy such as diminished appetite and weight loss. Patients experiencing chemotherapy-induced side effects have a variety of CAM methods as an option to alleviate symptoms.

Presented: Annual Evidence Based Practice Student Presentations: Piedmont Columbus Regional
Funded: School of Nursing

Watching Stars Grow: The adaptation and creation of instructional material for the acquisition, reduction, and analysis of data using photometry tools at the WestRock Observatory

Brendon O'Keeffe

Faculty Mentor:
Michael Johnson,
Earth & Space Science

Dr. Rosa Williams

The WestRock observatory at Columbus State University provides laboratory and research opportunities to earth and space science students specializing in astrophysics and planetary geology. Through continuing improvements, the observatory has been expanding the types of research carried out by undergraduates. Photometric measurements are an essential tool for observational research, especially for objects of variable brightness. Using the American Association of Variable Star Observers (AAVSO) database, students choose variable star targets for observation. Students then perform observations to develop the ability to properly record, calibrate, and interpret the data. Results are then submitted to a large database of observations through the AAVSO. Standardized observation procedures will be developed in the form of manuals and instructional videos specific to the equipment housed in the WestRock Observatory. This procedure will be used by students conducting laboratory exercises and undergraduate research projects that utilize photometry. Such hands-on, direct observational experience will help to familiarize the students with observational techniques and contribute to an active dataset, which in turn will prepare them for future research in their field. In addition, this set of procedures and the data resulting from them will be used in the wider outreach programs of the WestRock Observatory, so that students and interested public nationwide can learn about both the process and importance of photometry in astronomical research." A continuation of this presentation will be presented with added data and information at the 232nd meeting of the American Astronomical Society in June 2018.

Funded: Space Grant, $333.33

Management of Pregnancy Beyond Full-Term

Cassidy Partain
Devyn Sizemore
Casey Marshall
Michael Stone
Gail Peck
Mindy Williams

Faculty Mentor:
Dr. Cheryl Smith,
School of Nursing

This examination of literature was conducted to look at the complications of post-term pregnancy, and if induction before 42 weeks helps reduce those complications. Complications of post-term labor include macrosomia, still births, meconium aspiration, postpartum hemorrhage, and placental insufficiency. We reviewed many literature pieces that included a retrospective cohort study and a randomized controlled trial study. In the retrospective cohort study of expectant mothers, it was found that stillbirths increased by 6-folds during post-term pregnancy. In the randomized control study, it was found that meconium aspiration, still births, and caesarean rates were all decreased when elective induction was used before 42 weeks. Other studies supported the conclusion that elective induction before 42 weeks was effective at reducing the complications. Recommendations to promote elective induction include educating healthcare professionals on the dangers of post-term pregnancy, providing classes on complications that can occur during post-term pregnancy, and providing brochures and pamphlets to the healthcare providers and their clinics on complications and what can be done to prevent the complications. By choosing elective induction before 42 weeks, mother and baby safety can be improved by the prevention of these complications.

Presented: Annual Evidence Based Practice Student Presentations:
Piedmont Columbus Regional
Funded: School of Nursing

Positive Aspect of Breastfeeding for Mother & Newborn

Veronica Reynolds
Joslin Buckner
Module Banjoh
Dionysia Ross

Faculty Mentor:
Dr. Cheryl Smith,
School of Nursing

Breast milk is comprised of the essential nutrients that an infant need in the first six months of life. Timely initiation of breastfeeding guarantees that infants receive the colostrum, 'the first breastmilk', which contains antibodies that protect the newborn against diseases. An examination of current literature was conducted to identify what are the positive outcomes of breastfeeding vs bottle feeding in the first three to four months for both the mother and newborn. Breastfeeding within the first hour of life prevents many communicable diseases throughout childhood. Studies show that breastfeeding has positive effects on both the mother and infant. Infants who are breastfed have fewer hospital visits because they will be less likely to have ear infections or respiratory illnesses. Researchers calculated that if 90% of infants were exclusively breastfed for 6 months, more than 911 deaths would be prevented. Furthermore, American women were able to meet the healthy people 2010 goal for 75% of new mothers to initiate breastfeeding. However, the duration of breastfeeding remains below national goals. Conclusion: Initiation of breastmilk to newborn infants were high. Public healthcare officials and health care providers should consider interventions to promote and support early initiation of breastfeeding. Breastmilk is the most optimal form of nutrition for an infant.

Presented: Annual Evidence Based Practice Student Presentations:
Piedmont Columbus Regional
Funded: School of Nursing

Otoliths versus centra: comparing number of annuli in age registering structures of Micropterus salmoides

Malina Rollins
Jeramy Belt

Faculty Mentor:
Dr. Michael Newbrey, Biology

Dr. Elizabeth Klar

Studies of age and growth provide information about fish population structure, sexual maturity, growth rate, longevity, and mortality, which should be known for proper conservation and management. Fish age can be determined by several methods; however, the most common methods include using hard parts, preferably otoliths (ear bones). Otoliths are commonly used because they continue to grow throughout the lifetime of the individual. However, vertebral centra, which are commonly overlooked as a simple structure to extract and age, also continue to grow throughout the lifetime of the individual. Both of these structures record growth cessation marks (annuli), which can be counted to estimate the age of the fish. This study compared chronological ages of otoliths and vertebral centra in *Micropterus salmoides*. Largemouth bass were sampled from Lindsey Creek (n =20), Heifferhorn Creek (n =8), and the Chattahoochee River (n =1) in west central Georgia. Otoliths and precaudal vertebral centra were extracted were extracted from individuals ranging in size from 8 cm to 38 cm TL. Translucent rings were counted and compared between otoliths and vertebral centra. Ages of individuals ranged from 0 to 6. The outcome shows a ratio that is close to a 1:1 ratio between the otoliths and centra.

Funded: $439

Opioid Abuse

Madison Sauls
Abby Blair
Shelby Rolling
Brittany Spiering
Caroline Weed
Janai Yelverton

Faculty Mentor:
Dr. Cheryl Smith,
School of Nursing

Opioid addiction has caused an epidemic across our country that is negatively impacting communities, healthcare systems, and economies around the world. Unfortunately, statistics have reported that 91 Americans die a day from opioid use. Registered nurses (RNs) play an important role in identifying these possible abusers. In order to decrease the prevalence of opioid addiction, proper trainings and access to the right tools in identifying opioid abuse should be initiated. This research will support the question: Do educational opportunities for RNs regarding opioid drug abuse increase the identification of patients at risk for opioid drug abuse? Supporting evidence from peer-reviewed nursing journals and interviews of current RNs showed that numerous nurses do not have sufficient knowledge in identifying opioid abusers. It has been shown that there is a significant increase in nurse's knowledge after a 40 minute teaching course. Therefore, mandatory quarterly trainings for RNs will increase recognition of opioid abuse and decrease the prevalence. The quarterly trainings will teach a variety of signs and symptoms along with the use of identification tools that will help identify opioid abusers. Incorporating educational trainings on opioid abuse for RNs into their nursing practice can positively impact our society and decrease the current public health problem.

Presented: Annual Evidence Based Practice Student Presentations:
Columbus Technical College
Funded: School of Nursing

Modifiable Risk Factors of Preterm Labor

Tyler Sheffel
McKenzie Fagioli
Karen Norton
Dorothy Cross
Angel Whitley
Daniela Martinez-Rodriguez

Faculty Mentor:
Dr. Cheryl Smith, School of Nursing

Dr. Gail Jones

Preterm labor is defined as labor that begins before 37 weeks of gestation. It is a global health concern that results in maternal and infant mortality and leads to attention and intellectual deficits as a child becomes school age. According to the World Health Organization (WHO) (2016), prematurity is the leading cause of death in children younger than five due to the many complications that develop. There are many causes of preterm labor with some being unmodifiable such as a shortened cervix and some modifiable such as diet, substance abuse and socioeconomic status. Proper education on modifiable risk factors is not being adequately done throughout a pregnant woman's prenatal care. The research question is whether education on modifiable risk factors in pregnancy reduces the incidence of preterm labor? Evidence based strategies were identified after an examination of current peer-reviewed research. These strategies include educating pregnant women on smoking cessation, signs and symptoms of infection and the importance of going to all prenatal appointments, a healthy diet and regular exercise. In order to educate pregnant women on these modifiable risk factors nurses need to make individual care plans for each pregnant woman, provide resources and information on how to modify identified risk factors and have classes that educate pregnant women on the risk factors that provide incentives to motivate women of low socioeconomic status to attend.

Presented: Annual Evidence Based Practice Student Presentations: Columbus Technical College
Funded: $60.00 provided by School of Nursing

The Effectiveness and Risks of HPV Vaccination

Robert Shreve
Christopher Murphy
Nikki Kenyon
Bethany Degollado
Emily Christein

Faculty Mentor:
Dr. Cheryl Smith,
School of Nursing

A search of current literature was conducted to identify evidence-based recommendations to create a greater awareness related the human papillomavirus (HPV) vaccine. The literature reviewed uncovered how to better engage parents of adolescent patients and young adult patients in preventing HPV infections, a precursor to many forms of cancer. A web-based search provided current recommendations and guidelines accepted by the American Academy of Pediatrics. A literature review described current efficacy of vaccines available, factors related to vaccine uptake, and knowledge possessed by college-aged students in regards to the HPV vaccine. Data was also collected pertaining to the three vaccines available. Strategic education and marketing, focused on the attitudes of parents and young adults, is needed to increase awareness of the vaccine's benefits and proper completion of the series.

Presented: Annual Evidence Based Practice Student Presentations:
Piedmont Columbus Regional
Funded: $60.00

The Mystery of the Red Tape: A Study of Nancy Drew in Film and Television 1937-1976.

Matthias Smith

Faculty Mentor: Dr. Ryan Lynch, History & Geography

Since her first appearance in 1930, Nancy Drew has appeared in over seven-hundred books, thirty best-selling video games, and has become a popular euphemism for an inquisitive woman. Despite her popularity, her appearances in film and television has been a story of unrealized potential. By examining the publisher's archives at the New York Public Library Manuscript and Archives Division as well as examining unpublished studio records, my research has shed new light on a complicated web of legal issues that continues to dog the property. By signing a contract with Warner Bros. Studios in 1938, CEO Harriet Adams would inadvertently begin a nearly four decade dispute over who actually owned the film rights to the character.

Awarded: SRACE Grant; Columbus, GA
Funded: 441, SRACE

Reducing Sentinel Events in Surgical Patients

Kayla Tew
English Guthrie
Aaren Aut
Kinsey Stovall
Laney Wilson

Faculty Mentor:
Dr. Cheryl Smith,
School of Nursing

The purpose of our research was to find the most current evidenced-based strategies to prevent the occurrence of sentential events. Our research showed that implementing a pre-surgical checklist would reduce the occurrence of sentinel events. Sentinel events are adverse events that unexpectedly occur and result in harm or even death of a patient. Performing an operation on the wrong patient, the wrong procedure on the right patient, operating on the wrong site, or leaving foreign items in the patient are all types of sentinel events in surgery that can cause harm to the patient. However, these events are completely preventable if appropriate preventative measures are taken. The World Health Organization's pre-surgical checklist combines evidence-based protocols in effort to prevent sentinel events. This check list includes a "time-out" before the procedure which takes approximately one to four minutes to complete. Both mortality rates and complications related to adverse events in surgical patients has decreased significantly by using this checklist. However, human error can play a large role in sentinel events. In order to decrease the occurrence of sentinel events and eliminate human error, our group suggested mandatory training on the pre-surgical checklist for all health care staff members working in surgical environments. Our research suggests that mandatory training and adherence to following the pre-surgical check list can be prevent sentinel events when staff are motivated to change, are given the appropriate materials and knowledge to change, and when permanent protocols are set in place.

Presented: Annual Evidence Based Practice Student Presentations:
Columbus Technical College
Funded: $60 provided by School of Nursing

Changing the Outcome of Opioid Overdose

Melissa Wells
Katherine Alito
Jessica Burns
Quinten Rogers
Laney Patterson
Zach Roving

Faculty Mentor:
Dr. Cheryl Smith,
School of Nursing

Dr. Jones

The opioid epidemic is rapidly spreading across the United States with deadly outcomes. The purpose of this project was to review peer-reviewed research in order to prevent evidence to establish if there is a correlation with an increase in education and accessibility to Narcan (naloxone) will improve the outcome of opioid overdoses. A compilation of current research was reviewed to determine how the effects of education and accessibility to would alter the outcome of persons experiencing opioid overdose. The research consisted of questionnaires from studies of substance abusers who were given rescue kits containing Narcan, focus groups containing healthcare personnel and a meta-analysis of education and administration of Narcan of bystanders. Although further research should be completed for a more conclusive result, the current findings deduce that with education and availability, Narcan does decrease the likelihood of death of overdose victims. We propose education on the administration of Narcan be available at the local health department, as well as, education be incorporated into the Drug Abuse Resistance Education (DARE) programs at local schools.

Presented: Annual Evidence Based Practice Student Presentations:
Columbus Technical College
Funded: School of Nursing

Community Presentations

Silent Cities: Sensationalism and Removed Populations within Fourteenth Century Western Christian and Muslim Travel Accounts of Baghdad and Jerusalem

Abby Gibbons

Faculty Mentor:
Dr. Ryan Lynch,
History & Geography

This research explores the removal of surrounding populations within fourteenth century travel literature in the cities of Baghdad and Jerusalem. I analyze two Christian travelers, Marco Polo and John Mandeville, and one Muslim traveler, Ibn Battuta. As a basis of comparison, I discuss the twelfth century Muslim traveler, Ibn Jubayr. I specifically analyze Baghdad and Jerusalem due to the fact that they represent cities of centrality for Muslims and Christians, respectively, within medieval geographic understanding. I argue that fourteenth century travel literature presents a paradigm based in sensationalism and population removal due to their focus on entertainment and wonder, rather than education and dissemination of knowledge.

Presented: Senior Research Seminar Presentations for the History and Geography
Member of the Honors College

Presented at CSU's Tower Day 2018

My Chinese Experience

Bobbie Bannerman

Faculty Mentor: Dr. Cindy Ticknor, Honors College

I decided to use two lenses to analyze my study abroad experience. My major is Psychology so naturally psychology/sociology is the first lens I chose to use for this experience. I decided to combine both fields because there is much of overlap between the two. This means that I focused my observations on individual's mental characteristics and attitudes, their culture, how individuals thought and behaved. The second lens I chose to view my experience through is a business lens. I chose this lens for three major reasons. The first reason is because the psychological field I would like to go into is Organizational-Industrial psychology, which is focused on businesses and workplace productivity. The second and third reason is because my minor is Business Administration, and because the study abroad was a business internship. Therefore, in addition to examining my Chinese experience by focusing on the psychological/sociological viewpoint. Also, I am examining it by focusing on how business was conducted, how productivity was maintained in the businesses, and employee behaviors.

Member of the Honors College

How the Potcakes of Andros Compare to the Dogs of the U.S.

Amanda Cruz

Faculty Mentor: Dr. Lauren King, Biology

Dog populations have grown tremendously throughout history. We, as humans, have combated this issue with preventative measures such as rehoming, spay and neuter. In the United States, most people have full access to veterinary care unlike on a small, rural island such as Andros Island, Bahamas. The lack of access to veterinarian care, along with misinformed views on what these preventative measures do to the dogs, or what they call potcakes, populations grow larger each year. With such high populations, the social stigma and health of these dogs is compromised. We will be interviewing a few locals to gain more insight into how the Bahamian culture deals with these potcake communities. We will be checking vitals and recording data during a free spay and neuter clinic to see if the isolation of the dog population has affected their health, as well. When we are back in the states, we will reevaluate these same questions with a local veterinary office and collect data from reputable, online veterinarian services.

Member of the Honors College

The Life and Work of Henry McNeal Turner During Reconstruction

Justice Elijah

Faculty Mentor: Dr. Sarah Bowman, History & Geography

This poster examined Reverend Henry McNeal Turner's work during Reconstruction after the U.S. Civil War. Henry McNeal Turner was an African American born in 1834 in South Carolina. Turner served in the Legislative Body after the Civil War. Turner's perception of his position inside the African American community affected his decisions made in government. The poster provides the context necessary for understanding Turner's viewpoints. This poster focused on Turner's perspective on how to create a better life for African Americans, and how he used religion to address various audiences. It also examined the division among African Americans during this time period. Turner's speeches and sermons demonstrated his involvement in politics and religion. Turner felt he was a prophet that would lead his people (African Americans) to freedom. As he stated, "Let us love the white, and let bygones, neither taunt nor insult them for past grievances, respect them; honor them; work for them, but still let us be men. Let us show them we can be a people, respectable, virtuous, honest, and industrious, and soon their prejudice will melt away, and with God for our father, we will all be brothers."

Characterization in Different Age Ranges

Amanda Ellenburg

Faculty Mentor:
Brenda May Ito,
Theatre

Dr. Cindy Ticknor

I will be conducting interviews with all the cast of Junie B. Jones Is Not a Crook where I ask each actor their major, what acting training they have, how they applied their training, how they worked on developing a character that is older/younger than them, how they switch between different characters, what research they did for their characters, and what helped them the most throughout the process to connect. Also, I will be asking how they take their homework into the performance and what kind of mindset they have to prepare for themselves. I will talk about my experience and answer the questions myself, as well. In total, I will have 7 interviews I will have to conduct. Then, I will compare and analyze the results. I want to see if the same majors have the same process and what are some new ways I can prepare for a character. Then, I will compare the results by mainly comparing training, major, and characterization work. In MLA format, I will include a summary of each interview and a comparison of the different majors, class levels, training, and the individual's process for characterization work. As a Theatre Performance major, I learn one technique of acting: Meisner. However, that is one tool in the toolbox. The purpose of this study is to get behind the intellectual process as an actor in order to help other actors get expand their character work. Many different styles of acting work for different people. I would love to see everyone's process to draw inspiration from and make me a stronger actor. If I am able to become stronger as an actor through this process, my future will be greatly impacted. Not only will I be learning new techniques, I will be more confident in my abilities. Confidence is key in the theatre business.

Member of the Honors College

The Role of Photographic Portraiture in Cultural Demonstration: Memory in Columbus Families during the Late Nineteenth and Early Twentieth Centuries

Abby Gibbons

Faculty Mentor: Dr. Sarah Bowman, History & Geography

This research examines that transition from the production of the daguerreotype to cabinet cards from 1839 to 1901. This study hypothesizes that photographic trends in portraiture indicated an initial movement to conspicuous consumption, the purchase of materials for the purpose of public display. As time went on, however, these photographs moved further into the vernacular and private memory of families due to more widespread reproduction of photographs as well as greater cultural familiarity with the medium. This paper highlights the photographic practices of prominent Columbus families--Goetchius, Joseph, and Blackmar, by examining their portraits, housed in the CSU Archives. An early Goetchius daguerreotype revealed rigidity in its subjects' posture that suggests an unfamiliarity with the medium. Yet, the production and presentation of the photograph itself illustrates an engagement with conspicuous consumption. The Josephs often had their children's photographs mounted onto cabinet cards, which were meant to be displayed on top of their cabinets. Often, such portraits advertised the name of the photographer who had taken the image. The Blackmars used formal portraits as a way to portray their prominence in society. However, later photographs do not display the same formality. One of the later Joseph photographs, dated 1900, revealed a casual posture, no formalized background, and no display of the photography studio on the image itself. As such images suggest, individuals began to take part in more casual photographs, those that did not follow the traditional characteristics of cabinet cards that were not bound in formal portraiture, illustrating the transition from formal portraiture as a part of conspicuous consumption to vernacular memory that do not take part in consumer culture.

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John F. Kennedy: An American Icon

What are American presidents most remembered for? Their policies? Their personal lives? Their scandals? This presentation explores the leadership, legacy, and lasting impacts that the 35th President of United States, John F. Kennedy, had on American politics and pop culture during his time in the oval office and beyond.

Gabriel Hart
Logan Ragan
Valencia Coleman

Faculty Mentor:
Dr. Sarah Bowman,
History & Geography

Ms. Laura Pate

Member of the Honors College

Collecting and Correcting the Past: A Cross Disciplinary Analysis of the Abercrombie Archaeological Site (1RU61) found in Russell County Alabama

Gabriel Hart
Valerie Parker
Emma McCabe

Faculty Mentor: Professor Danielle Cook, Earth & Space Science

The Abercrombie Collection, 1RU61, is a Native American Graves Protection and Repatriation Act (NAGPRA) eligible archaeological site that was unearthed in what is currently Russell County Alabama. The Abercrombie site is located about eight miles south of Columbus, Georgia on the fall line of the Chattahoochee River and is believed to have been home to Late Mississippian – Historic era Native Americans, even though some evidence found has suggested an even earlier settlement. This site was first discovered in 1797 by Benjamin Hawkins and first excavated in 1890 by George McKnight. For more than two centuries this site has been disturbed by many people – from anthropologists to boy scouts, and many artifacts and human remains have been misplaced, sold, or repatriated over the years. However, what is left of the collection made its way from a storage room in the Columbus Museum to Professor Danielle Cook in the summer of 2016 in the form of 80+ cardboard boxes. At Columbus State, the collection is currently being professionally sorted through for sixth time. The objects are being washed and examined by Professor Cook and her students with the intent of repatriating any human remains and funerary goods as well as gathering new information on the site and restoring as many artifacts as possible. The goal of our project is to assist with the sorting, cleaning, and cataloging of the Abercrombie site in order to more accurately attempt to piece together those people's lives and hopefully string together a more accurate timeline and history for them.

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Intrusion Detection Using System Calls

Duane Hawkins
Khalil Harris
Jessica Butenhof

Faculty Mentor:
Dr. Jianhua Yang,
Computer Science

Intrusion detection systems are used to detect normal and abnormal behavior in a system. The abnormal behavior is then flagged and used to determine if an intrusion of the system has taken place. In this paper we are looking at one intrusion detection system by observing the sequence of system calls and looking for any anomalous behavior. We first have to build a database of normal behavior derived from the normal sequence of system calls. This gives us something to compare the anomalous behavior against in order to determine where, what, how, and who attacked our system. Understanding what is normal and abnormal will help us better understand if the system was attacked and how it was attacked.

The effects of environmental conditions on species distribution of nerites in the tidal zones on Andros Island

Jesse Hunt
Brittany Monreal
Kendra Henthorn
Caroline Murphy

Faculty Mentor:
Dr. Julie Ballenger, Biology

Dr. Daniel Holt

Nerites are small snails that can be found in freshwater or saltwater environments. The most common nerites on Andros Island are the four-toothed, blood-tooth, and checkered nerites. We will investigate if species distribution is correlated with tidal zones, dissolved O2, temperature, and salinity in the tidal pools along a rocky coast on Andros. We hypothesize that each nerite species will prefer a certain set of conditions. For example we think that the blood-tooth nerite prefers high salinity, low-dissolved oxygen, and high temperature, but may tolerate slight variation. We hypothesize that there will be many species in the intertidal zone, and one predominant species in the high tidal zone and the low tidal zone. Each tidal zone will be sampled by assessing species diversity and richness in pools along a 25-meter transect placed through the middle of each intertidal zone. Nerite abundance and type in each pool will be recorded, along with the O2, temperature, and salinity of the pools they are found in.

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Shades of Good Character

Carlton Jonica

Faculty Mentor: Dr. Brandt Smith, Psychology

Human beings have innate behaviors when interacting with other people such as pro-social behavior, altruism, and social values orientation. Although these are different types of behaviors, they are considered positive behavioral traits. With all being positive behavioral traits, all are likely to correlated among a sample. To test whether the three items were correlated, surveys measuring each behavior were administered to test subjects. These scales included the Altruistic Personality Scale for pro-social behavior, Social Values Orientation Scale, and the Philosophies of Human Nature Altruism Scale. Upon completion of data collection, graphs of altruism and pro-social behavior appeared normal while the graph of social values orientation appeared skewed. This data fails to support the idea that altruism, pro-social behavior, and social values orientation were all correlated; however, the data adds knowledge to debated topics in psychology such as altruism.

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Hypertension, Diabetes, and Heart Disease in the Bahamas vs. United States and the Treatments used to help control these diseases

Meenal Joshi
Drew Fidler
JeAsian Bailey

Faculty Mentor:
Dr. Lauren King,
Biology

Healthcare in America is considered to be the best in the world. Some of the best doctors are trained here and some of the best research is created here. However, with all of this access to medicine and knowledge, America has above-average rates of diabetes, hypertension, and heart disease. One of the main causes of these problems is the diet and exercise. The greasy, salty food served at fast food restaurants combined with Americans partaking in a more sedentary lifestyles are the lead causes of this epidemic. In the Bahamas, the same epidemic is taking over the country. Diabetes, hypertension, and heart disease are some of the leading causes of death in the country as well. Even though the Bahamas might not have as many fast food restaurants, it is interesting to find that they have a high mortality rate from these diseases. In America, the access to medication for these diseases is common and readily available, however, in the Bahamas, these medications are not as common due to the rural nature of some of the islands and the restricted accessibility on the islands prevents the residents from getting access to the medications. With the reduced access to medication, Bahamians on Andros Island use various natural remedies to help cure numerous diseases. Bush medicine is used to heal a wide range of diseases and was used by our ancestors all over the world. We would like to see differences in the effects of the two forms of medicine and the mortality rates of the people with these diseases by examining the different methods used by the clinics and the locals in regulating diabetes, hypertension, and heart disease.

A World Without Art

This project explores the role of art in the contemporary world through a series of creative narratives, each of which contemplates a society or a world without art. The strategy is to use the ironic crux of a fictional world devoid of art to make a positive argument for the importance of art in the actual world. The narratives deploy a variety of techniques to illustrate the basic thesis that art is essential to the life of the individual, the flourishing of communities, and, in some sense, the survival of the world itself.

Zachary Lamb
Justin Briley
Lauren Miley
Rachael Mockalis

Faculty Mentor:
Prof. C. Scott Wilkerson, English

DNA Barcoding and Ecological Studies of Plant Species in Ecuador

ZiJie Lin
Jaleesa DeJesus
Rhiana Flowers
Brooke Thomson
Alexis Warthen
Nicholas Wilson

Faculty Mentor:
Dr. Kevin Burgess, Biology

Samantha Worthy, Graduate Student, University of Maryland

The forests of Ecuador are known for their high levels of diversity and endemism, classifying the country as a biodiversity hotspot. Both the western Amazon and Andean montane forests are richly populated with tropical tree species that, unfortunately, have been little studied. DNA barcoding has been widely used to address questions in ecology, evolution, and conservation biology. Currently, the Burgess Lab at CSU is working on five projects in both Amazonian and Andean Ecuador that involve diverse flora from woody species and orchids to traditional uses of plants by indigenous people. Outcomes from these projects will vastly increase global plant biodiversity knowledge and encourage researchers to combine multiple fields of study including taxonomic, phylogenetic, and ethnobotanical information in order to provide new perspectives to these fields. These research projects will also facilitate the building of a DNA barcode sequence library that will enable future barcoding applications not only for the Burgess Lab but for researchers worldwide. These include: (1) phylogenetic analyses of Andean tree communities along an elevational gradient in Ecuador, (2) 30-year shift in the uses of plants by the Waorani people of the Yasuni Rainforest of the Ecuadorian Amazon, (3) DNA barcoding the flora of the Yasuni River in Ecuador, (4) community structure analysis of the Yasuni mega-transect plots using DNA barcoding, (5) evaluating the evolutionary and genetic relationships of the Andean Orchids of Northwestern Ecuador. Collectively, these projects represent CSU's long-term commitment in collaboration with researchers in Ecuador, to DNA barcode the flora of Ecuador.

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The Study of Character Distribution in an Encrypted TCP Session

Christopher Lockhart
Jacob Worthington
Rebecca Green

Faculty Mentor:
Dr. Jianhua Yang,
Computer Science

When a TCP session is encrypted, it's impossible to obtain the content thumbprint and examine the cleartext contents of the packets transmitted through the session. However, through studying their contents' hex code before and after being encrypted as well as the encryption process itself, it's possible to gain insight or even determine a packet's cleartext. The purpose of this project is to study the frequency and distribution of characters in encrypted SSH sessions to determine if any relation can be detected between plaintext and encrypted characters. The project will be carried out by establishing an SSH connection chain consisting of three machines and analyzing the incoming and outgoing TCP packets at the host in between. Characteristics such as packet length, character frequency, and character encrypted payload can be considered when examining packets sent though this connection. The discovery of a relation between unencrypted and encrypted characters could provide headway into designing thumbprints for detecting stepping-stones.

Diabetes Disparities in Chattahoochee Valley: An analysis of Quality of Care

Arnold McKenna

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

Dr. Grant Scarborough

The purpose of this study is to improve MercyMed's overall quality of care by analyzing exactly how we are addressing health problems when they arise and whether or not we are bringing down barriers to healthcare for the low income in our community. The intent of the data collected is to analyze how effective our treatment methods are in terms of decreasing glucose levels in the bloodstream. The lower income community of the Chattahoochee Valley faces a lack of healthcare. MercyMed of Columbus seeks to provide that healthcare by offering affordable and quality care. The aim of this study was to explore whether or not MercyMed is helping at least 20% of the diabetic population of the Chattahoochee Valley by the current treatment regimes being offered. The method used was secondary analysis, which involves the use of existing data, in order to pursue a research interest, which is distinct from that of the original work. In this research study, various factors were pulled from the Electronic Medical Record at MercyMed of Columbus. All patients were assigned a number, but patient names and sensitive information were left out of the data collected. Providers of MercyMed originally entered the data in order to contribute information to a patient's chart. Based on the results of the graph noting the treatment for all patients, it can be observed that Metformin brought down the HBA1C level by 13% of 21 different patients. The Metformin-Glipizide combination brought down 10% of 14 different patients glucose levels, for men and women taking Metformin and Glipizide, women's glucose levels went up 12.8%, and men's glucose levels went down by 20.3%, for men taking Metformin and Insulin, the HBA1C level went down by 19.2 %, for women taking Glipizide and Insulin, the HBA1C level went down by 20.8%, for men taking Metformin, the Creatinine level went down by 3.7%. As a result of this study, it can be seen that Insulin is not a very good treatment option for treating high glucose levels and instead pairing Metformin and Glipizde works better. Insulin brought Creatinine levels up by 7%, and not taking a medication was the best treatment option for bringing down Creatinine levels.

Using Time Thumbprint to detect Stepping-Stone Intrusion

Eduardo Medina
Benjamin Sullivan,
Ulysses Holman

Faculty Mentor:
Dr. Jianhua Yang,
Computer Science

A large problem facing network security these days is stepping-stone intrusions. This is when an attacker gains access to a system and hides their identity by connecting through multiple other systems or "hosts". When detecting if a host is being used as a stepping-stone, it can be made more difficult if the connections are made using secure protocols, such as SSH, as much of the data for packets going into and out of the host is encrypted. To combat this problem, we will research the use of a "time thumbprint" comparison to tell if the host is being used as a stepping-stone. Since timestamps are not encrypted along with other data in secure packets, we can use these to create a time thumbprint. We will take all incoming connections' timestamps and obtain a time gap between them, that is, the amount of time between when they were received by the host. This will then be turned into a "time gap sequence" which will be our thumbprint. We will then do the same with the outgoing connection. When we compare these two thumbprints, if they are the same or very similar, the host is most likely being used as a stepping-stone. We will run the experiment 50 times to obtain a rate for false positive and false negative errors. This approach would give network security professionals a useful tool in detecting attackers that might use their system as a stepping-stone through encrypted connections.

The Distribution and Host Preference of Cassytha filiformis (Love Vine) of Andros Island, Bahamas

Abby Grace Moore
Ashley Murphy,
Jaleesa DeJesus,
Jack Hovey

Faculty Mentor:
Dr. Julie Ballenger,
Biology

Dr. Daniel Holt

The distribution and abundance of a parasitic plant, *Cassytha filiformis* (Love Vine), was determined on Andros Island, Bahamas. The presence or absence of Love Vine was noted at each site visited. Many data variables were collected and include growth location, light requirements, favorable soil properties, and favorable hosts. When present, we recorded its location using a GPS device, observed the available light using the "Light Meter app", visually assessed the level of disturbance, and recorded how many woody and herbaceous plants were being parasitized by Love Vine. We determined if there was a significant difference in host preference and correlation of occurrence with disturbance and available light. The use of GPS allowed us to map the distribution of Love Vine on the island. We predict that Love Vine prefers woody plants and opposes herbaceous plants, is found in disturbed areas rather than undisturbed areas, is found more frequently along roadsides, requires well-lit areas with more sunlight to survive, and has effective parasitic activity among hosts. These predictions are based upon past sightings from other research groups.

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Medicinal Plants and Herbs of Andros Island, Bahamas

Abby Grace Moore

Faculty Mentor:
Dr. Julie Ballenger, Biology

Dr. Daniel Holt

Because of the lack of medical clinics around the island, many natives use the medicinal value of certain plants and herbs through creating a tea to help alleviate minor physical pains such as headaches, sunburn, fever, or upset stomach. Bush medicine, the common name for all the plants with medical benefits, is frequently used in Andros Island and was observed at particular places on the island like Red Bays. The project focused on identifying regularly utilized plants, finding their medicinal values, and analyzing the cultural importance. The information was obtained by asking Bahamian natives on Andros Island who depend on these medicinal plants about what they personally use and what illness each plant relieved.

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Baskets of Culture

Caroline Murphy

Faculty Mentor: Dr. Daniel Holt, Biology

Dr. Julie Ballenger

The method of basket weaving on in Red Bay on Andros Island is unlike any other in the Bahamas. It is derived from African techniques brought to the island by those escaping slavery. The little town of Red Bay was settled by a mix of Native Americans from the Seminole tribe fleeing Florida and escaping slaves in the early 1800s. This blending of cultures gives the town a history. While on Andros I will talk to the basket weavers to find out what materials they use to make the baskets and how they tie into the history and culture of the area. For such a little town, there is a lot to be learned.

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Rising Social Anxiety in Students - Causes and Solutions

Elijah Neundorfer

Faculty Mentor:
Dr. Stephanie da Silva, Psychology

Social anxiety has risen dramatically among university and college students since over the past decade. This project analyzes the potential causes of rising social anxiety in the university and college student population and some possible solutions to mitigate the effects of those causes. Social anxiety itself is the effects of social stressors that are placed on an individual due to their environment. Typically, how receptive someone is to these social stressors is dependent on their self-esteem levels. Some common causes of social anxiety include peer victimization, changes in environment, loneliness, and usage of the internet. Two of these have increased in recent years, showing a possible correlation between rising social anxiety and these causes. Some suggested solutions are raising self-esteem levels, avoiding/limiting peer victimization, becoming more socially/culturally aware before environmental shifts, and decreasing your loneliness and use of the internet.

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Using Packet Thumbprint to Detect Stepping-Stone Intrusion

Lisa Roy
Brian Lockerbie
Jermaine Clifford

Faculty Mentor:
Dr. Jianhua Yang,
Computer Science

Using stepping stones is a widely-used technique that hackers use to decrease the chance of being detected. The attackers do not use their own computers for malicious usage, but from intermediary hosts that have been compromised by the attacker. One way to identify a stepping-stone is using the packet content thumbprint, which can be used to detect a relayed connection pair by comparing the connections that are incoming and outgoing from the host. The approach we will be using is in a non-encrypted session so that we can access the content of the packets. We will be exploring two types of thumbprints: the count of characters and the frequency of the characters that appear in the unencrypted session. Tcpdump will be used to analyze the traffic between the two hosts to collect the content of the thumbprints. We will be examining the thumbprints to see if they are matched, which will give us a false negative error. Conversely, we also want to analyze the thumbprints to see if they are not matched, which will provide us with a false positive error. The final result will be reached by the false positive and false negative rates obtained from our experiment.

Developing Nigeria in the Context of Institutions

Gracie Schrecengost
Cloyee Harrison
Victoria Libaak

Faculty Mentor:
Dr. Fady Manosur, Business

Nigeria is Africa's largest and the sixth largest oil producer in the world; nevertheless, the country is experiencing a low Gross Domestic Product (GDP) per capita and a lack of economic development. This study investigates the reasons behind the slowing economic growth in the light of the absence of positive institutions in Nigeria. The study suggests that implementing policies which eliminate the negative institutions and promote positive institutions will lead to a strong and sustainable economic growth.

An Archaeological Approach to the Abercrombie Mound Remains (1RU61), Russell County, Alabama

Chance Seckinger
Emma Mccabe,
Gabriel Hart,
Michaela Mallett,
Sabrina Rodgers,
Valerie Parker

Faculty Mentor:
Professor Danielle Neale, Earth & Space Science

Culture can be defined by a population's tools, clothing, buildings, food, religion, politics, economics or other domains of cognitive organization. One archaeological site, which has produced a wealth of cultural material, is the Abercrombie site (1RU61), located in Phenix City, Alabama. This site consists of a small mound and adjacent village and has undergone multiple excavation episodes including, a series done by the Columbus Museum. Despite multiple excavations of the Lower Chattahoochee Valley, little has been done to organize and document these remains. The purpose of this research is to analyze the ceramics, lithic fragments, stratigraphy, historic artifacts, and human remains of the area while organizing and documenting our collection. Our findings of burial remains, artifacts, biofacts, and geofacts give us a significantly better understanding of the occupational history of the Abercrombie Mound and cultural morphology of the Chattahoochee Valley prehistoric populations.

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Competition of nerite species found in Andros, Bahamas due to zonation in coastal tidal pools

John Spencer
Jimmy Cisneros
Nina Rollins
Chikodinaka Okiyie

Faculty Mentor:
Dr. Julie Ballenger, Biology

Dr. Daniel Holt

Andros island is the largest land mass in the Bahamas. It's ecology is diverse, with plants and animal species each taking part in the utilization of resources. We can observe competition for these resources among species, which can be divided into two categories: interspecific and intraspecific competition. We will be examining interspecific competition between different species of nerites found in low and high tidal pools along the coastal shores of Andros. Size and placement of these nerites will be recorded, as well as the species found. We believe that size and competition have a direct correlation with one another, in which nerites found in their ideal zonation will be larger than same species nerites found along different zones in the same tidal zone.

Traffic Fatalities Data Analytics and Visualization with Python

Hannah Turner

Faculty Mentor:
Dr. Paramjit Kahai,
Management
Information Systems

Around the world every day, data is collected and stored for future analysis. In this research project, we utilize Python, a high-level object-oriented programming language, and its various libraries to analyze and visualize traffic fatalities data. We integrate the fields of computer science, information systems, and statistics in the research of government data, Python libraries, and means of creating visual representations of large amounts of data. This project also sets the stage for future research regarding traffic fatalities and the prevention thereof.

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Detecting Stepping-stone Intrusion via Packet Matching

Vinhcent Vu
Muhammad-Kashif Lodhi
Brian Poole

Faculty Mentor:
Dr. Jianhua Yang,
Computer Science

Most cyberattacks today involve the use of stepping-stone hosts, which are compromised hosts in between the victim and the attacker. Generally, the connection chain is comprised of 3+ hosts which helps to mask the intruder's identity. Detecting intrusion via detecting a stepping-stone can introduce more false positive errors due to the fact that normal applications also use a stepping-stone. However, by estimating the length of a connection chain, false positives can be reduced. A non-malicious connection may not consist of more than 3 hosts. Therefore, we introduce packet matching, which can be used to reduce false positives, by calculating the length of the connection chain via the length of time between a send and an echo packets of a connection chain, which is called a round-trip time (RTT). We can use the sequence and acknowledgement numbers of send and echo packets to match them. If we are able to capture such packets, we would be able to see that for each connection, there is a cluster of similar RTTs. By counting the clusters, it is possible to determine the length of the connection chain beyond the current host.

The Effects of Acetone and Histidine on the Viability of Astrocytes

Nicholas Wilson

Faculty Mentor:
Dr. Kathleen Hughes, Biology

Astrocytes, star-shaped glial cells located in the central nervous system, account for around 20-40% of glial cells in the CNS (Butt, A. et al. 2004). Current research is focused on the relation between these glial cells and diseases, specifically Parkinson's Disease. Parkinson's Disease, a neurodegenerative disorder that is characterized by its impact on loss of motor functions in over 6.2 million people worldwide, is strongly believed to be caused by astrocytes (Halliday, G. et al. 2011). The blood-brain barrier is maintained and GDNF produced by astrocytes. In Parkinson's patients, the blood-brain barrier has been disturbed and dopaminergic receptors have been significantly reduced possibly due to the lack of GDNF (Gray, M. et al. 2015). Using acetone, ketoacidosis can be simulated in vitro; studies have linked ketoacidosis to the development of cerebral edema and eventually to Parkinson's disease. With this study, acetone in 1% and 5% concentrations will be exposed to astrocytes to simulate ketoacidosis and observe if those conditions can cause Parkinson's disease based on cell viability measured with trypan blue and a hemocytometer. Further, histidine was used in 1% and 5% concentration to observe its neuroprotection of astrocytes. Results from the study were yielded as insignificant based on a two-way ANOVA test performed on IBM SPSS. Improvements to the study would include a larger sample size.

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The Roses' of Guinea

Eliza Wright

Faculty Mentor: Dr. Fady Mansour, Business

The rich in natural resource Guinea is an African country that is situated on the Atlantic Ocean on the west coast of Africa. Despite the abundant resources, the country failed to achieve a sustainable economic growth. This study sheds light on the role that human capital plays through the positive institutions in promoting economic growth. The study investigates the disproportionate women labor supply in Guinea and suggests solutions through founding a community program "Roses of Guinea." The program will provide free education to women on a variety of subjects and life aspects. Women will participate in psychoeducational groups where neighbors or elders teach artwork, dance, and playing musical instruments. The program will facilitate nursing home service provided for elderly members at their homes. Considering that women comprise 71% of the agricultural labor force, the program will include a variety of workshops on fertilizing and soiling vegetation grounds, farming, and marketing for agricultural products. This study suggests that promoting programs such as "Roses of Guinea" will develop human capital, encourage investment, and increase economic growth.

Porosity and Permeability of Miocene (Puerto Rico), Pennsylvanian (Kansas), and Mississippian (Alabama) Carbonate Rocks

Chance Seckinger

Faculty Mentor: Dr. Diana Ortega-Ariza, Earth & Space Science

This on-going research project focuses on characterizing porosity and permeability trends in samples from Miocene (Puerto Rico), Pennsylvanian (Kansas), and Mississippian (Alabama) carbonate rocks. Petrophysical properties of carbonate rocks are especially significant in the oil industry because hydrocarbon reservoirs are largely dependent on a rock's ability to allow fluid (oil or natural gas) to pass through and fill its pores. Porosity and permeability trends of these rocks are determined through a review of previous data, core plug (Alabama only), and thin section analysis. Point counting and image analysis with JMicroVision software is used to build a database of pore area, size, and shape for the three study areas. This database not only allows for porosity estimates but also provides insight into whether or not pores are interconnected and can transmit fluids (i.e., permeability). Select samples (50) will be sent to Weatherford Lab for more accurate (~2% error) porosity and permeability measurements to calibrate JMicrovision porosity and permeability estimates. By placing my results in the geologic context established by previous workers (e.g. Fairchild, 2012; Ortega-Ariza, 2016; Caughey and Ortega-Ariza, 2018), I have achieved a better understanding of the trend distribution of porosity and permeability in similar-aged producing rock facies in the subsurface (e.g., Perla field, Venezuela; Kansas City Group, western Kansas; Black Warrior Basin, Alabama). With the research and thin section analysis I have completed so far, I observe that older carbonates (Mississippian and Pennsylvanian) tend to have lower porosity and permeability than younger carbonates (Miocene).

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), $500

The Effect of Imidacloprid on Crayfish Nerve Activity

Natasha Jenkins

Faculty Mentor:
Dr. Kathleen Hughes, Biology

Dr. Jennifer Newbrey

Improper disposal of insecticides including dumping them into waterways and into landfills located near water sources, has led to water pollution and harmful exposure to humans. Pollution of these bodies of water can cause harm to aquatic environments and to invertebrates that live there. Imidacloprid has caused excessive damage to organisms in their natural environment including lowered immune function, low reproductive success, and reduced growth. The aim of this study was to measure the effects of acute exposure of Imidacloprid on crayfish nerve activity events. We found that the nerve activity events measured for our Imidacloprid treatment solutions were not significantly different from our baseline measurements. However, the averages of nerve activity events for the 0.5 μM and the 1.0 μM Imidacloprid solution treatments were statistically different from one another. The 1.0 Imidacloprid solution treatment was significantly higher than the 0.5 Imidacloprid solution treatment, despite Imidacloprid concentrations varying by 0.5 μM. In our study, we predicted that 1.0 μ M of Imidacloprid would increase the number of crayfish nerve activity events. Our results seemed to support these predictions, but we found that there were no significant differences between the baseline control solution treatment and the 0.5 μM and 1.0 μM Imidacloprid solution treatments. With increasing concentrations of Imidacloprid there is a direct correlation in crayfish nerve activity events. As crayfish sense the chemical signature in their habitat, they undergo stress which may cause an increase in nerve activity events.

Funded: SRACE $160

Additional Research Projects

The Effects of Communication Apprehension on Teenagers' and Traditional College Students' Ability to Develop Relationships

Cortland Ellis

Faculty Mentor: Dr. Alison Slade, Communications

This study examines the effect of communication apprehension on high school and college-age students' ability to develop relationships. After examining a variety of research studies about anxiety and electronically-mediated communication, the researcher sent out two surveys to a population of 186 high school and college-age students. The first of these surveys (the PRCA-24) measured the students' level of communication apprehension, and the second survey measured the students' level of comfort with electronic communication. The researcher collected surveys from a sample of 61 students. With the results of these surveys, the researcher utilized the Pearson product-moment correlation coefficient to determine the existence of a relationship between communication apprehension and the daily amount of electronic communication. The researcher found a weak, negative correlation between these variables, meaning that as communication apprehension increased, the daily amount of face-to-face interaction decreased. Future researchers should explore this relationship in more depth by including students with a wider variety of cultural and demographic backgrounds. They should also identify more survey items to measure students' ability to develop relationships.

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