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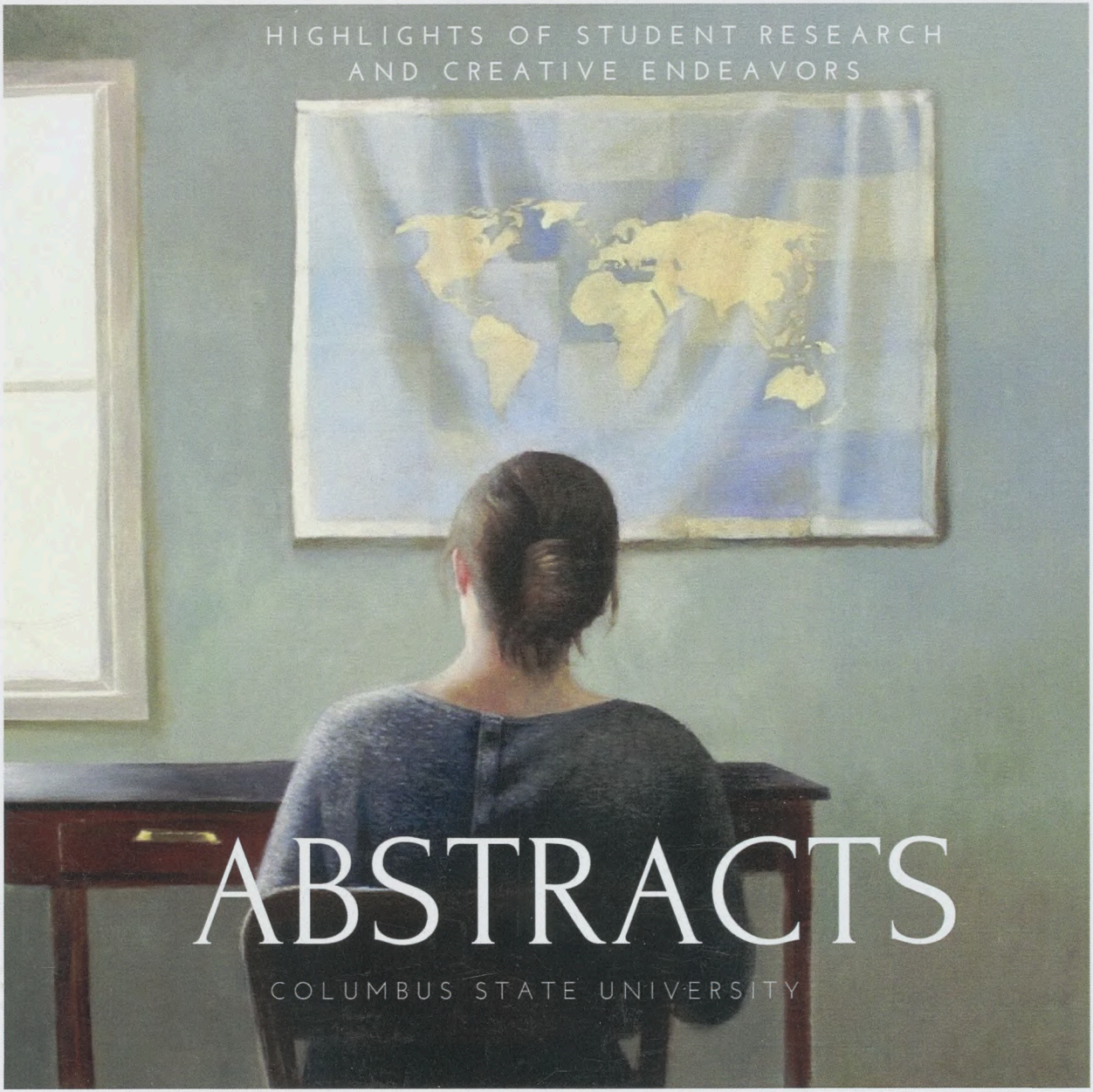
Abstracts 2017: Highlights of Student Research and Creative Endeavors

Columbus State University


HIGHLIGHTS OF STUDENT RESEARCH
AND CREATIVE ENDEAVORS
ABSTRACTS
COLUMBUS STATE UNIVERSITY

Abstracts 2017: Highlights of Student Research and Creative Endeavors

Cover by Julianna Wells
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Abstracts 2017
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 2016-2017 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 (S-RACE) Grants, are also featured.

Many undergraduates have presented their work with our local community, either through the dissemination of best practices in nursing to regional hospitals, colloquium presentations of lecture-recitals at the RiverCenter for the Performing Arts, or at Columbus State University's Tower Day held in April 2017.

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

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PRESENTED AT REGIONAL CONFERENCES

Valencia Coleman

Faculty Mentor:
Dr. Rania Hodhod,
Computer Science

CompuTrain: Augmented Reality Educational Game to Teach Computational Skills

Computational thinking is a way of solving problems, designing systems, and understanding human behavior that draws on concepts fundamental to computer science. People usually experience problems that require computational thinking skills. Therefore, computational thinking has to be a fundamental part of the way people think and understand the world. One way to achieve this is by developing computational thinking skills at young children.

Today's modern world has a heavy reliance on technology. Many interventions have been used to incorporate technology into teaching, such as educational games. Educational games have proven to be a useful tool for teaching and developing various skills as they engage and motivate the player. Children can learn at higher rate through playing a game because they are motivated to complete the task or mission given in a game. Adaptive educational games allow the game to progress based on the player's current skills; the next presented task is at level for their current skills.

This research project aims to develop an adaptive educational game for children between 6 and 9. The game uses Unity game engine and Vuforia software. The game uses augmented reality as the background of the game to give the player different perspectives on each level. The augmented reality uses the device's camera to format the game on a specialized game mat and the background shows the player's surroundings. Each game level is designed as a puzzle that can be solved through problem decomposition and logical thinking, two of the main computational thinking skills. The developed game tracks the player's performance and uses Unity analytics to analyze the player's behavior and skills. The analytics is used to decide on the next 'appropriate' task to present to the player. The game has been tested for adequacy of user interface. The game will be tested using a focus group of children (ages 7-10 years).

Awarded: Best Science Paper at Georgia Undergraduate Research Conference 2016
Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), CSU Department Funds
Presented: Tower Day 2016, Georgia Undergraduate Research Conference 2016, ACM-MidSoutheast 2016, Georgia Collegiate Honors Conference 2017
Published: Abstracts 2016

"They insist on Authenticity!!!" Defining the 'Authentic' in Georgia Tourism

Malynda Corbin,
Bertram Melix

Faculty Mentor:
Dr. Amanda Rees,
History & Geography

In spring 2016 Marion County Chamber of Commerce partnered with CSU's Cultural Geography class to create a heritage tour and map for the community. The community had previously been visited by the Tourism Product Development Team from the Georgia Department of Economic Development (GDED). They had prepared a tourism report recommending a focus on nature-based and heritage tourism. The team indicated that heritage tourists expected an 'authentic' experience: "Show them the real thing...They insist on Authenticity!!!" (Green 2015, 10) As we began the historical research process we began to recognize that our interpretation was very different from the GDED). We began to ask the question: what is authenticity? While some sites had supporting evidence verifying their authenticity, the community also wanted to include folklore with little basis in fact. After the class, we wanted to better understand our different approaches. Using Wang's (1999) four distinct approaches to authenticity in tourism experience (objectivism, constructivism, postmodernism, and existentialism, we analyzed text, images and emails from the GDED personnel, as well as the classes' evolving understanding of authenticity. In assessing this process, we concluded that the GDED used both the objectivist and constructivist approaches. While the classes' evolving understanding of authenticity moved from objective (at the beginning of the process), through to an existential approach as we worked to connect a broader audience to the sites on the tour. We concluded that neither the GDED or the class drew on a postmodern approach.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE)
Presented: SouthEastern Division of the Association of American Geographers

Studying the Light Pollution around Urban Observatories: Columbus State University's WestRock Observatory

Brendon O'Keeffe

Faculty Mentor: Michael Johnson, Earth & Space Science

Light pollution plays an ever increasing role in the operations of observatories across the world. This is especially true in urban environments like Columbus, GA, where Columbus State University's WestRock Observatory is located. Light pollution's effects on an observatory include high background levels, which results in a lower signal to noise ratio. Overall, this will limit what the telescope can detect, and therefore limit the capabilities of the observatory as a whole. Light pollution has been mapped in Columbus before using VIIRS DNB composites. However, this approach did not provide the detailed resolution required to narrow down the problem areas around the vicinity of the observatory. The purpose of this study is to assess the current state of light pollution surrounding the WestRock observatory by measuring and mapping the brightness of the sky due to light pollution using light meters and geographic information system (GIS) software. Compared to VIIRS data this study allows for an improved spatial resolution and a direct measurement of the sky background. This assessment will enable future studies to compare their results to the baseline established here, ensuring that any changes to the way the outdoors are illuminated and their effects can be accurately measured, and counterbalanced.

Presented: 228th Meeting of the American Astronomical Society

Intracellular survival of *Acinetobacter baumannii* in human neutrophils

Rowan Pitts

Faculty Mentor: Dr. Lauren King, Biology

The emergent pathogen *Acinetobacter baumannii* is responsible for a significant proportion of nosocomial infections. Due to multidrug-resistance (MDR), common antibiotic treatment of *A. baumannii* is often ineffective and infection associated mortality is high. *A. baumannii* adheres to biological and abiotic surfaces by forming biofilms which contributes to drug resistance and evasion of the host immune system. Neutrophils have been demonstrated to play a key role in in vivo clearance, as these cells play a critical role in our immune system, protecting against pathogenic bacteria by concentrating at sites of infection in order to eliminate bacteria by phagocytosis. Understanding how *A. baumannii* interacts with our innate immune system could help elucidate its pathogenesis. We characterized antibiotic resistance in seven clinical isolates of *A. baumannii* and examined their intracellular survival following neutrophil phagocytosis. We found that all clinical isolates were MDR. When examining phagocytosis, we found a significant variation in intracellular survival. Three of seven clinical isolates did not survive phagocytosis, whereas four strains survived. The pathogen's ability to evade the natural host defense and survive neutrophil phagocytosis demonstrates the severity of *A. baumannii* infections and furthers the understanding of the host-pathogen interaction.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), CSU Department Funds, Tri-Beta Biological Honors Society
Presented: Association of Southeastern Biologists, Concord, NC

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

Candice Tate

Faculty Mentor:
Dr. Cindy Ticknor,
Dr. Rajeev Dabke

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 will gain insight into what BVI students think about the use of three-dimensional tactile teaching tools in their classrooms and discover ways to improve our current models.

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

Gastronomía mexicana en relación a la cultura y la identidad: lo que aprendí durante un estudio en el extranjero

Alaina Whitmore

Faculty Mentor: Dr. Alyce Cook, Modern & Classical Languages

In June, I studied abroad at Universidad International (UNITER) located in Cuernavaca, México. During this time, I completed three Spanish courses and studied gastronomy with my professor, who shared with me academic lessons and her own personal experiences in México. As a class, we visited many historically significant sites, such as Teotihuacán, Taxco, and Tepotzlán. My research (in Spanish) is an analysis of Mexican gastronomy through interviews conducted with professors and students from the university, published sources, artwork, and my own experiences living with two different families during my stay. Although specifically linked to the gender roles of women, Mexican gastronomy has a daily significance to many citizens and plays an important role in their history; the most popular ingredients in Mexican dishes are cactus, cheese, and pepper, but the most culturally and historically significant are corn and pulque, an alcoholic, Aztec beverage.

Funded: CSU Honors Educational Activity Grant
Presented: 20th Annual Conference on the Americas

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

Kristen Wright

Faculty Mentor:
Dr. Rania Hodhod,
Computer Science

Every year the modern education system puts more and more pressure on harnessing math, science, technology, and engineering (STEM) core subjects. In an ever-industrializing world the United States is losing its competitive edge; the National Math and Science Initiative reports that as recently as 2013, only 44% of high school graduates were ready for college-level math. Beginning in elementary school students struggle with the concepts of visualizing and understanding mathematical concepts. With growing pressure to build algorithmic and mathematical skills in children, this project aims to develop an artificial intelligence-driven game that addresses the growth of these skills in our target age group (8-11 years old) using fractions and algorithmic instructions in a unique and adaptive augmented reality environment. The game tackles two major learning styles by using the user's response to the game environment to determine which technique to apply between cognitive apprenticeship or guided discovery. Using cognitive apprenticeship, the game takes on the role of "master" and shows the user through animations and indicators how to complete a certain task. The student, in an "apprenticeship" role, learns through the guidance of the agent. Should the game operate under the guided discovery mode, the agent provides prompts and indications that promote critical thinking rather than direct instructions, guiding the user to come up with the answer on their own. The game is designed in such a way to engage students in mathematical learning and let them create their own unique solutions to the provided problem while tracking and evaluating the student's performance to change the style of guidance as well as alter the difficulty level based on user performance, creating a challenging and engaging environment using adaptive artificial intelligence systems.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE)
Presented: Tower Day 2016, ACM Mid-SE Conference 2016

FUNDED PROJECTS

Seasonal Variability of Female Sex Cells in Gonads of Male Largemouth Bass *(Micropterus salmoides)* from Chattahoochee River System, Georgia

Amy Adams

Faculty Mentor:
Elizabeth Klar,
Dr. Michael Newbrey
Biology

Intersex, the occurrence of oocytes in male testes, has been studied among many fishes in the United States and abroad, but seasonal variability is nearly unknown. Intersex was previously documented in Largemouth bass, a top tier predator and a popular sport fish, of the Chattahoochee River. However, we tested the hypothesis that Largemouth bass exhibit seasonal variability in two tributaries of the Chattahoochee River. Fish from the polluted, highly altered, urban Lindsey Creek and the pristine, rural Heiferhorn Creek in Columbus, GA were collected using backpack electrofishers and were transported in aerated live wells for tissue collection. Male gonadal tissues were prepared using histological techniques and stained with hematoxylin and eosin. For each testis, multiple sections were taken and examined microscopically for incidence of oocytes. No oocytes were visualized (n = 6); therefore, no relationship between seasonal variance and intersex prevalence could be determined. The presence of intersex in fishes has been previously linked to endocrine-disrupting chemicals found in agricultural runoff and waste-water effluent, which in this urban creek may not have been major contaminants. Since intersex has previously been found in the Chattahoochee River, we plan to add samples from various locations on the river itself. The source of the endocrine disrupting chemicals in the river may be from upstream of Columbus, GA rather than from the two creeks examined.

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

Synthesis and Characterization of Poly(styrene-alt-maleic-anhydride)

Jessica Barkhouse, Tehgan Anguilm

Faculty Mentor: Dr. Daniel Holley, Chemistry

Polymers are an essential part of daily life and, as such, are an important area of research. Our polymer research is focused on the synthesis and characterization of a polymer called poly(styrene-alt-maleic-anhydride). This polymer is unique in its structure as it is completely alternating with a 1:1 ratio of styrene to maleic anhydride. This polymer is a precursor to a target material that we anticipate will allow the polymer to conduct electricity. Synthesizing this polymer has proven to be challenging due to the vast amount of variables that can be manipulated to produce polymers of different molecular weights and structures. To understand what variables we need to modify, we must characterize and analyze each polymer to determine which variables produced desirable characteristics. We have characterized our polymers using gel permeation chromatography (GPC), nuclear magnetic resonance spectroscopy (NMR), and infrared radiation (IR). The variables that we have been manipulating include the ratio of styrene to maleic anhydride, the temperature of the reaction, and the ratio of TEMPO (an additive that controls the length of the polymer's chains) to BPO (an initiator to start the polymerization).

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

Chroological age and the occurance of intersex within Largemouth bass *(Micropterus salmoides),* of the lower Chattahoochee River watershed, Georgia.

Jeramy Belt

Faculty Mentor:
Mrs. Elizabeth Klar,
Dr. Michael Newbrey
Biology

Previous work has shown intersex to be present in Largemouth bass (*Micropterus salmoides*) of the Chattahoochee River, however, the potential relationship between the age of Largemouth bass and prevalence of intersex is unknown. Intersex is a phenomenon where an organism of one sex shows characteristics of the opposing sex within its gonadal tissue. We hypothesize there is a positive relationship between age and the prevalence of female oocytes because the longer fish are exposed to endocrine disrupting compounds the more likely they might exhibit intersex. Male Largemouth bass were sampled from Lindsey Creek, a tributary of the Chattahoochee River. Lindsey Creek is a highly-altered channel with a poor riparian area that is subjected to industrial, commercial, and urban runoff. Electrofishing was used to collect fish, and gonadal tissue was removed, thin sectioned, stained, and examined for female oocytes. Age was determined from otoliths. Water quality was assessed at each sampling locality. Of 21 Largemouth bass, six males were collected and none of them had female oocytes within their gonadal tissue. The oldest bass was five years old. Despite Lindsey Creek's appearance, water quality data has thus far shown that chemical levels have been in the acceptable range for human consumption.

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

Kelli Bertke, Rachel Nack, LeighEllen McCormick, Haley Floyd, Jean Van Gooden, Matthew Littlefield

Faculty Mentor: Dr. Gail Jone , School of Nursing

Delirium is a problem across many intensive care units in this country. It is a subject that has been overlooked and undertreated for a long time. Without the implementation of screening tools, delirium is often undetected. The goal of the evidence based project was to answer the question: Does the use of a delirium-screening tool identify and prevent delirium in ICU patients? The use of three screening tools was implemented: The Confusion Assessment Method of ICU, NEECHAM Confusion Scale, and Intensive Care Delirium Screening Checklist. A search of current literature of randomized controlled trial research found the effectiveness of each screening tool when compared to not utilizing a screening tool at all when trying to decrease the occurrence of ICU delirium. Findings suggested that the longer the hospitalization, the increased risk of developing delirium. Early detection of delirium leads to lower healthcare costs for the hospital and patient as well as improved patient outcomes. 21% of patients screened were CAM positive at some point during their stay (Shaughnessy). The proportion of nurses who agreed that the ICDSC made it easier to identify delirium, went from 57.9% to 89.5% (Gesin). NEECHAM Confusion Scale (unlike CAM-ICU) allowed for the evaluation of physiological changes, which could indicate the earliest signs of confusion, especially in older adults (Matarese). The utilization of a delirium screening tool, especially the CAM-ICU, proved to be effective in detecting delirium early in ICU patients, thus improving their outcomes.

Funded: CSU Department Funds
Presented: Chattahoochee Valley Community College

A Nursing Approach to Preventing Preterm Labor in Underserved Communities

Carmen Bradshaw, Alyssa Brown, A'lea Hathcock, Mary Olive, Brittney Curry,

Faculty Mentor: Dr. Cheryl Smith, School of Nursing

Many women are at risk for preterm labor, especially women living in underserved communities. Nurses can help reduce the risk of preterm labor for this particular population by identifying at risk women and providing them with education and support. The research question is: does the identification of at risk women reduce the incidence of preterm labor in women living in underserved communities? Significant evidence was gathered from various peer reviewed nursing research articles of randomized controlled trials, some trials being randomized and some being controlled. After analyzing the evidence, education was the primary source of reducing the risk of preterm labor. However, despite the educational level of the mother, it is ultimately her level of motivation that will play a role in the prognosis of her pregnancy. Nurses have the responsibility to not only educate, but to encourage and support pregnant women in their efforts to seek help. Also, it is important to educate the nurses about the ways to properly care for the at-risk pregnant woman.

Funded: CSU Department Funds
Presented: Evidence Based Practice Presentations at Chattahoochee Valley Community College

Fitting a circular arc to the curved corner of a two-dimensional profile composed of data points

Bao Do, John Hetzel, Samantha Sadler

Faculty Mentor: Guihong Fan, Nehal Shukla
Mathematics

We are focused on improving Starrett Bytewise's Profile360 machine, which is a laser and camera-based optical scanning tool used for quality control measures in the production of various materials, including rubber, ceramic, and plastic. The Profile360's specification analysis reduces scrap pieces and human error by quickly catching discrepancies and alerting the user so they can attend to the problem; ultimately this saves industries thousands of dollars in production costs. The tool uses an optical system to rapidly assess the product and output a three-dimensional graphical model. Our aim is to improve the way in which the Profile360 analyzes data in corner regions.

Optical measurement systems have inherent incorporation of data noise, usually from objects that have shiny or irregular surfaces; this presents a difficulty in the analysis of certain object regions that require sharply defined boundaries, like the distinction between a corner and an edge. To accurately determine the radius of an object's corner, the output data must be organized into definite regions, such that data which constitutes an edge is not included in the dimensional analysis of a corner. Should the data from the edge be used in the curve-fitting for a corner, the radius of that corner will be skewed, and it will not accurately represent the object.

To solve this problem, we are developing a program in MATLAB that will isolate these regions by indexing the data into overlapping intervals and determining the slope and angle difference for each sequential interval. Sequence will be determined by order of increasing angle in polar coordinates with respect to the center of mass for the data. Once the angle difference exceeds the mean angle difference for the figure, we have isolated the critical point of the corner. We will then fit a circular arc to that corner and determine the radial measurement.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), Mathematics Association of America, Quality Enhancement Plan.

The Effects of *Moringa Oleifera Aqueous* Extract on the Proliferation of Breast Cancer Cells

Andrew Dorbu

Faculty Mentor:
Dr. Monica Frazier,
Biology

Cancer is a disease that can affect anyone no matter the gender, ethnicity, or socioeconomic background. It is considered the second most common cancer amongst women in the United States with thousands diagnosed every year. In recent years, there has been a growing interest in novel ways to treat cancer. One such novel way has been the use *Moringa Oleifera* (MO). MO has previously been shown to stop the proliferation of pancreatic and colorectal cancers. In this study, we exposed breast cancer (MDA-MB- 468) to MO extract at varying concentration over a 72-hour period, to observe the effects on both proliferation and viability. We observed a downward trend in both viability and proliferation due to exposure, however there was no significant difference between treatment options.

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

Vaccination of School-Aged Children

Brooke Foster, Cora Hudgins, Olivia Masterson, Airel Slinker, Vivian Kpea, Brent Grantham

Faculty Mentor: Dr. Cheryl Smith, School of Nursing

Vaccination of school-aged children is a controversial topic in today's society. Proper education of nurses can play a vital role in the education of parents regarding vaccinations. School-aged children who receive standard vaccinations are significantly less likely to develop preventable diseases, which consequently reduces the number of health care trips and lowers health care costs. In this evidence based project, we found that by implementing a two-part plan, these outcomes can be achieved. Our research question that guided our project is: In school-aged children, does the use of vaccinations to prevent disease decrease the amount of money spent on health care compared to non-use of vaccines? We analyzed data from peer reviewed journals that included randomized controlled trials with concise, measurable results. According to research, vaccinations are cheaper overall than the health care cost of treating communicable diseases. Also, there is an inconsistency in the number of parents who are able to correctly relay the safety of vaccinations to the health care professional via the teach back method. This indicates the need to further to assess how best to assist parents in increasing their vaccine knowledge and vaccine communication skills. Lastly, brief educational interventions for vaccine-hesitant parents are associated with an increase in parental attitudes toward vaccines.

Funded: CSU Department Funds
Presented: Evidence Based Practice Presentations at Columbus Technical College

Length-mass regressions affected by phenotypic plasticity in gastropods

Megan Frame

Faculty Mentor: Dr. Clifton Ruehl, Biology

We explored the accuracy of length-to-mass regressions in the freshwater snail *Physa acuta*. Standing stock offers insight into the ecological significance of populations in an ecosystem to better understand how nature works. Length-to-mass regressions provide a rapid way to get good estimates of standing stock. Environmental cues like threats of predation can cause organisms to change their morphology, which will likely affect the accuracy of length-mass regressions. Physid snails are known to alter shell morphology in response to the threat of predation. Their shells range in shape from elongated in response to entry-based predators like crayfish to rotund in response to crushing predators like sunfish. Elongated shells produce a narrow aperture that protects the snail body by making it difficult to reach, but this leaves the shell less crush resistant. Rotund shells disperse the crushing force, but increase aperture size and increase the vulnerability to shell-entry predators. I hypothesized that changes in shell morphology will alter length-to-mass regressions and affect estimates of biomass and standing stock. Snails were raised under the threat of crayfish (*Procambarus spp.*) and fish (*Lepomis microlophus*) predation. Snail shell length, aperture width, and aperture length were measured using digital images of shells placed aperture side down. Shell outlines were also digitized with nine landmarks to obtain more shell shape information. Results will be discussed in light of variation in standing stock estimates for ecosystems.

Funded: CSU Department Funds

Strategies to Improve Contraception Use Among Adolescents

Jake Gaddis, Micah Chandler, Adam Roebuck, Dorsey Spencer, Morgan Robinette, Ashley Childree

Faculty Mentor: Dr. Cheryl Smith, School of Nursing

Forty-three percent of sexually active high school students in the United States do not use any form of contraception. This is leading to an increase in teen pregnancy among teen females from ages 15 to 19 in 2014, totaling 250,000 (Center for Disease Control [CDC], 2016). The research question is: Do education strategies used in clinics, schools, and health departments improve contraception use in adolescents compared to adolescents that have received no education? Several studies were evaluated for effectiveness of educational programs designed to educate adolescents about anatomy, sexual health including sexually transmitted infections, risky behaviors, and effective contraceptive measures. The results show that education about sexual health and contraception is an effective method that can help reduce the occurrences of pregnancy in the adolescent population. Education beginning in the seventh and eighth grades will greatly decrease the occurrence of sexual encounters without contraception. Supplementing education with various methods though social media can improve this as well. Forums, like the Facebook page "Caryn Forya," provide education for adolescents that wish to ask questions about contraception and keep anonymity. The research suggests that programs that involve adolescents and parents/guardians are the most effective methods in reducing the number of teen pregnancies. Nurses should also be prepared to provide education to adolescents and family members in order to increase the use of contraceptive methods and reduce the number of teen pregnancies.

Funded: CSU Department Funds

Presented: Evidence Based Practice Presentation at Chattahoochee Valley Community College

Therapeutic Hypothermia

Brittany Hall, Taylor Welchel, Taylor Iversen, Lena Burkey, Justine Brewer, Nicole Odum

Faculty Mentor: Dr. Cheryl Smith, School of Nursing

The use of induced therapeutic hypothermia is an accepted procedure in treating post cardiac arrest patients due to evidence indicating a decrease in mortality and morbidity rates due to this procedure. The therapeutic hypothermia process takes place in four stages that results in cooling of the brain. After reviewing peer reviewed research the evidence shows that therapeutic hypothermia decreases cell death in the brain after a cardiac incident. The therapy stabilizes the blood brain barrier and suppresses the inflammatory response, reducing cerebral edema. Cerebral metabolism decreases by 6-10% for every degrees Celsius that the body temperature drops. As cerebral metabolism declines, the brain requires less oxygen. In essence, hypothermia stops many of the destructive mechanisms of the body by letting the brain reset itself to normal functioning. Therapeutic hypothermia achieves return of spontaneous circulation quickly, which in turn improves survival rates and neurological outcomes in cardiac arrest patients.

Funded: CSU Department Funds
Presented: Columbus Technical College

Sensory-Friendly Theatre Performances

Darby High

Faculty Mentor:
Ms. Molly Claassen,
Theatre

The world of the play can be a scary place for individuals with disabilities, especially if that disability effects their sensory perception. Many theatre companies are becoming equipped to perform at least one sensory-friendly showing of their regularly scheduled performances. This gives individuals with disabilities, like those on the Autism Spectrum, a chance to experience theatre that would not have been able to otherwise. This not only requires careful consideration for the audience, it requires careful planning by the cast and crew of the production - especially if they're used to performing for a typical audience. Opportunities to see, and participate in, performing arts do not come often for those with sensitivities - but when they do, they can be life changing. It allows for individuals to develop their social skills, and their physical movements in a safe place. Things that are required to live in today's society that they may not be able to find anywhere else. Adapting a children's script for a sensory sensitive audience is just one way to provide these opportunities in our communities.

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

Non-Pharmocological Methods for Chronic Pain

Rachel Lowe, Milaika Pickard, Kiara King, Victoria Rogers, Hyon Cary, JaKeiria Weston

Faculty Mentor: Dr. Cheryl Smith, School of Nursing

Chronic pain is an on-going issue for many patients due to a variety of different disease processes requiring a large expenditure of health care dollars to treat. The use of opiates and other drug therapies produces risks and side effects that are detrimental to the health of the patient. Evidence shows that the use of non-pharmacological methods of pain relief, such as exercise, guided imagery, acupuncture, and TENS are effective without the accompanying side effects from pain medications. The research question is, "What are some effective non-pharmacological methods for chronic pain?" Research shows that there is emerging evidence of the benefits of physical and psychological non-pharmacological methods for chronic pain. We examined randomized control trial studies to identify the most effective methods of non-pharmacological pain relief. We recommend the use of exercise, acupuncture and TENS.

Funded: CSU Department Funds
Presented: Evidence Based Practice Presentation at Chattahoochee Valley Community College

Prevention and Treatment of Central Line Bloodstream Infections

Taylor Marks, Lauren Hodge, Artesia Huff, Joseph Nwaobi, Nicole Corcione, Emelia Amissah

Faculty Mentor: Dr. Cheryl Smith, School of Nursing

A central line-associated bloodstream infection (CLABSI) is a serious infection that occurs when bacteria or viruses enter the bloodstream through the central line and circulate throughout the body. These infections are serious because once in the blood stream, it can quickly infect all organs and tissues causing sepsis. While researching the ways to decrease central line bloodstream infections, the following research question was asked: In critically ill patients, do central line-associated bloodstream infections significantly decrease using Central line bundles compared to patient's treatment without the utilization of Central line bundles? Significant, reliable, and valid evidence from randomized control studies and cross-sectional studies showed that health care costs and mortality are increased due to central line-associated bloodstream infections, and interventions were identified to help lower the rate of infections. Central line bundles were the most efficient method of reducing the bloodstream infections, and they can easily be incorporated into nursing practice. These bundles are groupings of evidence-based practices that individually improve care, but when applied together result in substantially greater improvement. Elements of the bundles include hand hygiene, use of barriers, cleansing the insertion site with chlorhexidine, and prompt removal of unnecessary catheters. These bundles greatly reduced the number of central-line associated bloodstream infections. Therefore, by implementing the use of the catheter bundles health care costs and mortality are significantly reduced as well.

Funded: CSU Department Funds
Presented: Evidence Based Practice Presentations at Columbus Tech

Using and Augmented Reality Mobile Game to Teach the Java Programming Language

Richard Myers

Faculty Mentor:
Dr. Rania Hodhod,
Computer Science

Video games can be incredibly engaging, and augmented reality offers a chance for these video games to be interacted with in a more tangible and personal way. By using the Unity game engine and Vuforia augmented reality software development kit, this game is meant to teach the Java programming language to students by allowing them to write Java code that controls the gameplay. The user interface allows the player to write Java code within the game itself, which allows them to control different aspects of the game to solve challenges involving a number of programming concepts commonly taught to beginners. The game will consist of puzzles that necessitate the use of variables, flow control, methods, arrays, and basic object oriented programming concepts. The game itself uses the back-facing camera of the mobile device it is installed on to render the game on an "augmented reality marker" in the real world, which allows the user to physically move the puzzles to gain further insight into the challenges. These spatial reasoning challenges will give the user a more tangible environment in which to learn these programming concepts, and will allow them to more easily identify bugs in their code as they see it execute within the game, line by line, in real time.

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

A Correlation Between Obesity and Depression in the Adolescents

Cortney Nelson, Alicia'le Abosede, Mackenzie McManious, Richard Sianoya, Kayla Stewart

Faculty Mentor: Dr. Cheryl Smith, School of Nursing

Early recognition is key to preventing the occurrence of obesity and depression as well as the link between the two. Research studies have found that the increased occurrence of depression and obesity as well as the association between the two among adolescents are becoming a public health concern. The research question is: What risk factors can be identified in the early detection of depression in obese adolescents? Research of randomized control trials and peer reviewed nursing journals shows that there is a correlation between depression and obesity. The nurse's role is to ensure proper identification of obese adolescents through screening tools, demographics, and interviews. Based on the results, Caucasian and African American adolescents hold differing perceptions on what is considered to be overweight, there is a greater occurrence of depression in obese females in comparison to obese males and obese adolescents are more susceptible to peer victimization and have higher odds of suffering from mental health issues. Implementing early interventions in adolescents suffering from obesity and depression can lead to prevention, recognition and progression of the problem.

Funded: CSU Department Funds
Presented: Evidence Based Practice Presentation at Chattahoochee Valley Community College

Identifying Risk Factors in MetroPower Projects through Statistical Analysis

This is a project about analyzing Job Cost Summary Reports for the years 2013 to 2016 of the electrical contracting company. The goal is to figure out the patterns in the data to predict projects that might be "at–risk" and find the factors to minimize that risk and maximize returns.

Isabella Nunez,
elena Pierce

Faculty Mentor:
Dr. Nehal Shukla and
Dr. Guihong Fan,
Mathematics

Funded: External Funding

Perceived Stress and Coping Strategies Related to Personality Types

Madelyn Ovedenk, Thinh Nguyen, Olivia Burgess, Thomas Logan Jenkins, Julia Kimbell,

Faculty Mentor: Dr. Cheryl Smith, School of Nursing

The phenomenon of stress is well-known among nursing students as they navigate the multiple academic, psycho-social, emotional, and physical demands of preparing for professional practice. The researchers examined the perceived stressors, types of coping strategies, and the association of these with the individual's personality types among pre-licensure BSN students. A review of relevant literature revealed three valid instruments: the Perceived Stress Scale-10 (PSS-10) (Cohen and Williamson, 1988), the Brief COPE (Carver, 1997), and the Keirsey Temperament Sorter-II (Keirsey, 1978; 1984). Study participants completed the instruments anonymously and the responses were compiled. Data from these surveys were analyzed to determine what relationships exist between personality type and stressors, and which coping strategies each personality type used. The researchers found that the Keirsey Temperament Sorter-II revealed that 83% of respondents were Guardian types. The median perceived stress score was 15.5, which is higher than the national average of 13 (Cohen, 1983). The highest perceived stress score was associated with decreased use of positive coping behaviors. The researchers will present these findings and offer suggestions for both nursing students and faculty to help students understand and use stress management strategies based on personality types. Recommendations for future study include replication of this study with a larger sample size. In addition, other studies have shown that this problem can be managed through the utilization of coping strategy education, workshops, and mentor programs that emphasize problem-based coping, self-efficacy, and personal or social-cultural differences.

Funded: CSU Department Funds
Presented: Evidence Based Practice Presentation at Columbus Technical College

The Effects of Curcumin and Ibuprofen on The Mortality of *Caenorhabditis elegans*

Caenorhabditis elegans or *C. elegans* while not susceptible to inflammation still face negative effects due to oxidative stress. The progression of oxidative stress without repair will inevitably lead to the death of an organism. Curcumin is prized for its anti-inflammatory properties and its use as an antioxidant. Ibuprofen has been shown to be effective in its reduction of inflammation by means of combating oxidative stress. Dimethyl sulfoxide or DMSO can cause oxidative stress due to it being a protic solvent and having the ability to strip hydrogen atoms from endogenous structures leading to the destabilization of membranes and DNA damage. The antioxidant properties of ibuprofen and curcumin may protect against cellular damage and death, thus decreasing mortality rates.

Aneesa Said

Faculty Mentor:
Dr. Jeffrey Zuiderveen , Dr. John Davis
Biology

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), CSU Department Funds
Presented: Senior Research Presentations

BlueNavi: An Indoor Positioning System

Justin Sewell

Faculty Mentor:
Dr. Alfredo Perez,
Computer Science

Due to the weaknesses of GPS signals indoors, alternative methods must be developed to provide systems to navigate inside buildings. Indoor navigation can assist people with physical and cognitive challenges in locating a specific room and guiding them around buildings on campus. In this project we present BlueNavi, an indoor location and navigation system based on Bluetooth Low Energy (BLE) beacons, and Inertial Measurement Unit (IMU) sensors available in a mobile device. BlueNavi utilizes an extended Kalman filter to combine the data collected from the BLE and IMU sensors to provide an estimate of the users' location indoors. We present the architecture, implementation and results of testing BlueNavi in an experimental setting at a Center for Commerce and Technology (CCT) building at CSU.

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

Free Text Analysis and Decision Making Using GenSim

Loran Shaver

Faculty Mentor:
Hillary Fleenor,
Dr. Rania Hodhod
Computer Science

Effective learning and teaching requires appropriate assessment to gauge current abilities and understanding. While there are many methods of assessment, each with different benefits, they all have some form of tradeoff inherent to them. A multiple-choice test, for instance, is easy to administer and grade, but possesses a limited amount of answers which may be guessed or inferred from a poorly worded question, decreasing the accuracy of the resulting assessment. A more accurate method of determining understanding is through free text assessment, where answers are given in a participant's own words. Such an assessment allows the participant to more clearly express his or her knowledge, allowing the assessor to more accurately evaluate them. However, due to the open-ended nature of responses, free text assessments generally require a human to score them, which is a time-consuming process depending on answer size and number of participants, and is subject to the scorer's interpretation of answers. The focus of this project is on creating an AI module capable of taking free text input and making decisions based on previously used data, for use by the United States Army in scenario assessments for officer training. As a first step, we will be using Microsoft's Azure Machine Learning Studio to produce Latent Semantic Analysis and Latent Dirichlet Allocation models, which will be created using a Python module known as GenSim and will be trained using Wikipedia.

Funded: External Funding

Synthesis of Conjugated Styrene-alt-Maleic Anhydride Copolymer

Nicole Sikes

Faculty Mentor:
Dr. Wade Holley,
Chemistry

Polymer-based solar cells offer the potential of cheap, flexible, and readily customizable alternatives to silicon-based solar cells. However, reaching high power conversion efficiencies in polymer solar cells has proven to be problematic. To reach higher power conversion efficiencies, a low bandgap polymer capable of absorbing higher proportions of solar irradiation is ideal. Bandgap is influenced by factors such as conjugation length, aromaticity, and substituent effects. Here styrene-alt-maleic anhydride is synthesized and then brominated at the α-carbonyl position to allow for elimination and the formation of a fully conjugated polymer. This material will then be characterized with regard to both molecular properties and potential as a photovoltaic polymer.

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

Family Presence during Cardiac Resuscitation

LeeAnne Stein,
Danielle Montes,
Lindsay Wright,
Xavier Caldwell,
Brittany Yates,
Baylee Radney

Faculty Mentor:
Dr. Jones,
School of Nursing

Family presence during cardiac resuscitation is often not considered due to the negative presumptions that accompany the topic. However, a large amount of evidence suggests that family presence is in fact beneficial. The research question is: Should family members be encouraged and permitted to be present during cardiac resuscitation? Significant, valid evidence collected from peer reviewed nursing journals show that families who were given the option to be present during cardiac resuscitation of a loved one had more positive outcomes than those families who were not given the option. The evidence suggests that families who were present during the resuscitation efforts had decreased anxiety. Additionally, the families also felt that being present helped them maintain a sense of control and that their presence helped to commence the grieving process if a loss occurred. Research shows that family presence during resuscitation efforts also helped the medical team gain a deeper appreciation of the crisis. Overall, it is vital to educate medical professionals regarding the importance of providing the family the opportunity to be present during cardiac resuscitation. Families deserve the right to be involved and make knowledgeable decisions during emergency situations involving loved ones.

Funded: CSU Department Funds
Presented: Columbus Technical College

Incivility and Bullying Towards New Graduate Nurses

Trina Strawder, Jasmine Murphy , Brandy Thigpen-Johnson, Rachanda Gotell , Tashia Dingle , Jennifer Powell

Faculty Mentor: Dr. Gail Jones, School of Nursing

Incivility and bullying is the state of being uncivil and using superior influence to intimidate others. Statistical data reveals incivility in the workplace has added to decreased nurse retention rates, loss of productivity, increase in hospital costs, medication errors and impaired patient safety. A group of Columbus State University nursing students conducted a search of the evidence related to the research question, "Do new graduate nurse orientation programs, with an emphasis on bullying, increase or decrease the retention rates of new graduate nurses? After reviewing the literature, several evidence based practice interventions were found. These key interventions focused on the implementation of authentic leadership, programs to assist new nurses to transition into their role and education to increase awareness of nurse-to- nurse lateral violence.

Funded: CSU Department Funds
Presented: Evidence Based Practice Presentations at Columbus Tech

Effects of *Belostoma* on Behavioral Responses in Freshwater Snails

Predation plays a central role in structuring ecological communities through their effects on each other and on prey populations. In this study, I observed behavioral responses of prey to different threats of predation in order to better understand the evolution of anti-predator behaviors. I used freshwater snails (*Physa acuta*) as prey and *Belostoma flumineum* as predators. The experiment consisted of five treatments, replicated three times that separated how chemical cues emitted from a predator (kairomones) and chemical cues emitted from injured conspecific snails (alarm cues) affect snail behavior. Interestingly, *Belostoma* predators fed damselfly larvae, a heterospecific prey, induced snails to exhibit the highest degree of anti-predator behavior. A general trend for snails to crawl out of the water in response to both conspecific and heterospecific prey was supported by my results.

Mary Kathryn Wright

Faculty Mentor:
Dr. Clifton Ruehl, Dr. Mark Schmidt
Biology

Awarded: Best Research Presentation and Judge Recommendation for Special Award
Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), CSU Department Funds
Presented: Senior Research Presentations and Tower Day 2017 at Columbus State University

COMMUNITY PRESENTATIONS

Amber Colberg,

Faculty Mentor:
Dr. Michelle Herring,
Music

Music Education for Future "Mathews": Down Syndrome in General Music Education

This paper will begin with the history of special education and how legislation has shaped its implementation in the school system. The definitions and types of Down syndrome will then be discussed. Next, modifications for individuals with Down syndrome in the regular classroom and music classroom will be examined. Additionally, music therapy strategies will be included as it relates to music education. The paper will conclude with a description of curriculum adaptations for individuals with Down syndrome in the general music classroom. Following the paper, practical applications of research strategies are provided through four lesson plans. The purpose of this project is to explore Down syndrome in the general music classroom and provide practical instructional strategies for inclusion of individuals with Down syndrome in the general music classroom.

Presented: Alternative to Honors Thesis Presentation, Mathews Elementary

PRESENTED AT CSU TOWER DAY

Application of Linear Algebra to predict future wind patterns

Troy Allen, Joshua Evans, D'Angela Webb, Jack Zeller, Mitchell Cavanaugh,

Faculty Mentor: Dr. Ben Kamau, Mathematics

One common way that linear algebra is used is in predicting weather. Being able to predict the weather both long and short term can save lives and money. This project serves as an example of how one could utilize linear algebra to predict future weather occurrences, with respect to wind, and the implications of being able to do so.

Presented: CSU Tower Day 2017

Barometric Pressure and Weather Prediction

Bradford Allen, Jason Brown, Charles Carter, Denise Holm

Faculty Mentor: Dr. Ben Kamau, Mathematics

Barometric pressure and how it changes over time affects all other elements in the weather. We have collected a significant amount of historical weather data and applied techniques from linear algebra to conduct an analysis of this phenomenon. We have also derived a method to use this information to make short term weather predictions.

Presented: CSU Tower Day 2017

Narrative in One Scene

In this paper I examine basic film theory as it relates to creating effective narratives through cinematography. I synthesize theory pulled from film instructors and scholars such as Jeff Rust, Tricia Welsch, Marylyn Fabe, Long Mai et al, Todd Berliner and Dale J. Cohen. In this paper I analyze shot motivation, look, feel, sequencing, overall story progression, and narrative styles and techniques used by Charlie Chaplin, Akira Kurosawa, and in The Impossible (2012) directed by Juan Antonio Bayona. I chose one technique from each movie and director to recreate and to use as a guide in my original scene. I also capture the process I used to create a narrative in one scene. In the "Narrative in One Scene", I used the elements of a narrative to conceptualize the story of a young woman's struggle with depression and with restructuring the happiness that was destroyed when her parents divorced during her childhood.

Aliyah Anglin

Faculty Mentor: Christopher Robinson, Communications

Presented: CSU Tower Day 2017

A Test of Operant Blocking in Rats

Jacqueline Barragan, Erin Chalmers, Lindi Taylor, Zoie Zimmerman

Faculty Mentor: Dr. Stephanie da Silva, Psychology

Blocking can be defined as hindered learning, specifically about novel stimuli, due to previous learning of other stimuli in the same context. An example of this is children being taught sight words using flashcards that have a picture and a corresponding word. The child might fail to learn the words when the pictures were already known. The purpose of our study was to create an animal model of the blocking phenomenon to allow for controlled experimental tests of fundamental processes involved. Discrimination of auditory and visual stimuli was measured in laboratory rats based on lever pressing in a Med Associates operant chamber. Rats then were introduced to a second stimulus (either visual or auditory) in addition to the first before finally removing the first stimulus to see if the rats had learned to discriminate the second stimulus. Discrimination ratios were calculated daily to represent how well the rats were discriminating when to press the lever and when to engage in other behavior. If discrimination decreased when the initial stimulus was removed, blocking of the second stimulus was said to have occurred. The findings are important for understanding blocking, why and when it occurs. Further research could help redefine how we educate and which methods are most effective in teaching.

Presented: CSU Tower Day 2017

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

Jared Bies

Faculty Mentor: Dr. James Schreck, Chemistry

The focus of this project is to enhance student understanding by incorporating material from print and electronic sources not commonly included in organic chemistry textbooks that could alleviate stress and make learning organic chemistry enjoyable. Over 85+ references were reviewed and compiled into three sections: analogies, connections, and demonstrations. The information collected illustrates concepts in a textbook, but in a fun and entertaining way. Analogies include concepts of resonance, IUPAC nomenclature, and stereochemistry videos. Connections include chemical humor, organic chemistry on postage stamps, and chemistry of everyday products. Demonstrations include visualization of organic chemistry reactions and mechanisms and 3D printed molecular models.

Presented: Georgia Collegiate Honors Council Conference 2017, CSU Tower Day 2017

Real-Time Vowel Determination/Evaluation for Singers: An Education Resource for Vocal teachers and students.

Jonathan Burns

Faculty Mentor:
Dr. Debruyn,
Dr. Hodhod
Music

Computer-based tutoring systems have been successfully used in different domains, such as math, science, and history. This research work aims to develop a computer application to help students identify the International Phonetic Alphabet (IPA) vowels [a, ɛ, e, i, o, ɔ, u] used in diction for singing. Proper identification of these vowels is a responsibility of singing instructors. A given voice teacher acts as an educated listener of proper diction and technique . This application acts as a pedagogical tool for these teachers by giving instant feedback with regard to the vowel being produced. This allows the student to practice and receive feedback on their vowel production in the absence of the professor. This is needed during early development of the learning singer's diction skills. The work involves two major research strategies, the first being the collection of academic journals and books on machine learning approaches as well as methods for vowel identification. The second is the data acquisition and cleaning for proper artificial intelligence training. Machine learning approaches are commonly used for speech recognition but have yet to be used for singing.

Presented: CSU Tower Day 2017

An Examination of Eating Disorder Risks

Erin Chalmers

Faculty Mentor:
Dr. Diana Riser,
Psychology

This paper explores the varying risk factors that contribute to the development and perpetuation of eating disorders. Journal articles and studies from the past ten years are used to define eating disorders, describe various types of eating disorders and to determine common risk factors for eating disorders. Risk factors for eating disorders are assessed for potential impact and with particular attention given to their impact on adolescents. Adolescents are a focus because they are at a higher risk for developing an eating disorder than adults. The role of mass media and social media in the development of a negative body image and disordered eating symptoms is also investigated within this paper. Studies show that social media acts as a new platform for peers to compete against each other or to receive societal messages of body image ideals (Ferguson, Muñoz, Garza, & Galindo, 2014). Because eating disorders are a secretive illness which can be easily hidden, it is essential that signs and symptoms are able to be interpreted by peers, family members, educators, and counselors so that those suffering from eating disorders may receive better support.

Presented: CSU Tower Day 2017

Using brainwaves to measure stimulus evaluation time

Michelle Chavarria

Faculty Mentor:
Dr. Mark Schmidt,
Psychology

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

Presented: CSU Tower Day 2017

Operant Blocking of Japanese Symbols or Words

Michelle Chavarria,
Heather Whitaker

Faculty Mentor:
Dr. Stephanie da Silva,
Psychology

Operant blocking is defined as the inability to acquire new information secondary to previously learned information. Participants learned correct vocal responses to a set of 20 stimuli that were presented across trials on a computer screen. They first mastered identification of either Japanese words or symbols (Stimulus A presented alone) in the first session. During the second session participants identified the words and symbols (Stimulus A + Stimulus B) as they were presented as a compound stimulus on the screen, and then participants' identification of the second stimuli of the compound (Stimulus B, either the word or symbol not initially learned) was tested. The purpose of this study is to determine if participants can learn the second stimulus after previously learning the first stimulus.

For this particular experiment, the size of the reinforcer for correct responses/identifications was changed from the first session to the second session (in this case, a change from 1 penny per answer to 2 pennies per answer) to understand whether Rescorla-Wagner explanations of respondent blocking can be extended to operant blocking. If blocking, as defined by less accurate identification during the Stimulus B test compared to the compound stimulus test, occurs despite changes in reinforcement contingencies, Rescorla-Wagner theory does not adequately explain operant blocking. In previous studies, stimuli were enhanced causing the results to be unclear. This experiment used same-size stimuli in order to determine whether the results were from blocking or not.

Presented: CSU Tower Day 2017

Psychological Mythbusting

Hannah Eubanks,
Noah Churchwell,
Charlene Ubah,
Hannah Moore,
Caitlyn Gallagher,
Andrea Dorbu

Faculty Mentor:
Aisha Adams,
Psychology

Myths are highly pervasive and hard to overcome, yet not impossible. Standing and Huber (2003) found that belief in psychological myths declined as the number of psychology courses (taken at a university) increased, although overall myth acceptance was high. The purpose of this project is to dispel psychological myths by using the QEP problem solving guidelines to question the validity of the myth. These problem solving and critical thinking skills are imperative in order to distinguish between facts and falsehoods.

Presented: CSU Tower Day 2017

Cubesats at CSU: The First Step to Space

Cubesats are a small form factor of nano satellites that are 10 centimeter cubed and weight about 1 kilogram. This makes cubesats very cost efficient to launch and a good platform for university level research. This semester we have begun learning the process of creating cubesats, learning the subsystems of satellites and taking the first steps of researching, planning, and manufacturing cubesats for space missions. This poster will highlight our results of our telemetry data demo satellites. These demos help us understand how satellites move in space and how to interpret the raw data the systems produce.

Nicholas Garcia, Ross Hodge, Dalton Batastini, Anne Mintz

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

Presented: CSU Tower Day 2017

Early Childhood Literacy and ACT Mathematics scores examined

Eric Goebel

Faculty Mentor: Houbin Fang, Mathematics

The United States is seeing emphasis placed on introducing science, technology, engineering and mathematics (STEM) to increasingly younger students. More and more the United States attracts scientist and technology field workers from overseas as our population has not been able to produce enough STEM field practitioners. This shortage also includes medical and educational fields. Financial incentives and scholarships are being offered to teacher candidates to pursue a degree in a STEM teaching topics to support the same. These programs are worthwhile; however, they are failing to address the core issues of cognitive development and the significance of literacy in childhood to the development of full potential of a student.

It is my conviction that a more (higher) literate mind in children aged eight to nine years old (third and fourth grades) are directly corresponding to a substantially improved scores in mathematics on the American College Test, which is essential to entering a STEM field of study. We are using the mathematics score specifically as it is generally considered more quantitative and therefore more reliable in statistical analysis. This study is designed to use the data collected by reputable and established source that have large samplings and small standard deviations (SD) to aid in the demonstration of the correlation. To further prevent cases of error, literacy will be assessed by using the Georgia Milestone End of Grade (EOG) test results for English Language Arts scores for the third and fourth grade levels. Like the ACT this is a computer administered test in a proctored environment.

This study clearly demonstrates the correlation between Early Childhood Literacy and ACT mathematics scores. No mind spontaneously, in late life, ever became vastly more capable scientifically, but instead came to be through a love of things that only can be found in a child's mind, thirsting for knowledge. As educators, parents and citizens we must further the case of Literacy in children for the improvement of our Nation.

Presented: CSU Tower Day 2017

Predicting Cloud Development with Linear Algebra

Damian Haye, Cassie Strickland, Elizabeth Schauber, Mory Traore

Faculty Mentor: Dr. Ben Kamau, Mathematics

Cloud development is a difficult task to achieve through normal mathematical methods because cloud development depends on multiple varying factors, such as temperature, humidity, pressure, and wind. However, using matrix analysis and Matlab's image processing software we were able to develop a chart displaying the projected amount of cloud coverage in Columbus, GA using the average of three-day spans over the course of two months. The data for the research was taken by calculating the average of the previous five years, therefore creating the historical trend lines and patterns for the development of clouds around Columbus. We then categorized the cloud density into four categories, which were clear, partly cloudy, overcast, and precipitation. The three-day spans were then averaged to determine the chance of the category of cloud development during a single day during that three -day span. The program is able to provide a general prediction on the cloud coverage for the day in the form of an image of the projected cloud coverage. The projected data is not guaranteed to be 100% accurate, but it follows average historical weather trends through the surrounding area's weather patterns. This creates a basic structure for the weather patterns for the near future, and it allows the construction of a calendar of projected cloud coverage over time.

Presented: CSU Tower Day 2017

Bahamian Basket Weaving

Katelynn Hedgecoke

Faculty Mentor:
Clifton Ruehl,
Biology

Basket weaving is a traditional form of art that has been passed down through generations. A group of people, that live in North Andros in a small settlement called Red Bay, are responsible for making these pieces of art. Each basket is hand crafted from silver thatch palm. The leaves are dried, stripped, then weaved into strong baskets; these baskets have many different uses for the people of Red Bay. This trip would be a great opportunity to ask some of the makers of these baskets a few questions. For example, how they learned how to make these baskets and how many hours each basket takes to make by hand. To be able to watch them make these baskets in person and be able to talk to the directly is a unique experience that not many people get. Basket weaving is a part of the Red Bays culture and history, and to have the chance to share this information to someone, that might not know about these people, is an excellent opportunity. There are so many different stories and traditions that people should hear, so tower day is the perfect place to spread the culture of Bahamian basket weaving.

Presented: CSU Tower Day 2017

William's Women: Understanding Faulkner's Characterization of Matriarch Characters

Alexander Jones

Faculty Mentor:
Dr. Courtney George,
English

Women in the works of William Faulkner have not been generally well received, so much so that this has led many to label Faulkner himself as a misogynist. However, Emily Grierson and Addie Bundren are critical characters in two of Faulkner's most well known works, "A Rose for Emily" and "As I Lay Dying," respectively.

Both works published in 1930 include the death of the matriarch character near the beginning. Readers see that Emily has passed away during the first paragraph, while it takes only a few chapters for the already ill Addie to pass. Each woman, though, remains central to the work. "A Rose for Emily" is told through flashback stories, while "As I Lay Dying" chronicles the Bundren family fulfilling Addie's dying wish. Though they are dead, both women retain their ghostly grip on their fellow characters by being the main focus. They were in control in their lives and have remained in control of the happenings of the people around them without being there.

Presented: CSU Tower Day 2017

Comparison of HIV/AIDS Prevention and Treatment in U.S.A. and Bahamas

ZiJie Lin, Alex Yue

Faculty Mentor:
Dr. Lauren King,
Biology

The extraordinarily high number of HIV/AIDS cases in the Bahamian population has led to the country becoming one of the most HIV/AIDS prevalent countries in the world. Treatment of the retrovirus is much more readily available in the United States than on the small island nation as financial issues limit the resources available. This lack of treatment—along with the social stigma many Bahamians feel when seeking treatment—has undoubtedly contributed to the increase in HIV/AIDS cases. We will be interviewing the local Bahamian clinics about their treatment of HIV/AIDS, the steps they take to prevent its spread, and the accessibility of treatment to the Bahamian population. Upon return into the US, we will interview US clinics on these same measures and compare the collected data with statistics from major global health organizations.

Presented: CSU Tower Day 2017

Using Radiometric Ages to Identify a "Missing" Magmatic Event in the Southern Appalachians

Ryan Lloyd,
Katherine Grego

Faculty Mentor:
Dr. Clinton Barineau,
Earth & Space Science

Xenocrystic ("foreign crystal") zircons in younger geologic materials give geologists the ability to identify cryptic ("hidden") geologic events. Zircon is a highly stable mineral that grows during magmatic and metamorphic events, and can survive geological processes (weathering, metamorphism, partial melting) that commonly alter other minerals. Our work focused on xenocrystic zircon, as it can record events that have been lost due to erosion, melting and/or metamorphism of older units. In this project, we collected individual isotopic ages from published scientific papers and classified each according to the genetic origin of the zircon (xenocrystic, detrital, igneous or metamorphic). By compiling zircon isotopic ages from data across the southern Appalachians, we can gain insights into the geologic history that could not be obtained in a localized study of a single unit. Geologists have demonstrated that the eastern edge of North American transitioned from a passive (Atlantic-style) to active (Pacific-style) margin between 570 and 480 million years ago. The record of this transition, however, has been lost to erosion and/or tectonism. This research, which includes data gathered during two undergraduate research projects in fall 2016 (Grego) and spring 2017 (Lloyd), suggests the possibility of a distinct 500 million year old zircon age peak in the ancient North American margin that does not correspond with a distinctive geologic unit in the Southern Appalachians. This age peak may signify an unrecognized tectonic event, as predicted by models of the formation of a 480 Ma back-arc basin in the southern Appalachians.

Presented: CSU Tower Day 2017

Effects of Distraction on Problem Solving Using the Tower of Hanoi

Caroline Murphy, Eduardo Cubero

Faculty Mentor: Dr. Stephanie da Silva, Psychology

Problem solving can require quiet spaces that allow focus to complete tasks. However, in the real world it is not always possible to have a prime space for focus; this led us to investigate how everyday distractors impact problem-solving performance. An online/electronic version of the Tower of Hanoi was used to test problem solving under conditions where distraction was present or not present. Columbus State University students were recruited face-to-face on campus to participate in the experiment. Participants were randomly assigned to the control condition which contained no explicit distractor (i.e., completed the task in typical quiet room) or the experimental condition which contained auditory distractors. The distractors were a ticking timer and the game sound that marked every move of a disk while completing the task. We compared the number of moves and the number of seconds to complete the Tower of Hanoi for students in each condition. An independent-samples t test will determine if distraction impacted problem solving, and everyday implications will be discussed.

Presented: CSU Tower Day 2017

The Lack of Foreign Language

Angela Pham

Faculty Mentor:
Dr. K. Seon Jeon,
English

Over the past few decades, English has continued to grow as the lingua franca of the world. Most countries learn their native language as well as English and possibly another. Americans on the other hand are not expected to know another language, yet expect everyone else to know their native and English language. Many studies have been done in other countries to investigate how their citizens learn multiple languages, but few have been done with Americans and foreign languages. The rising diversity in the United States implies a need for foreign language skills. Despite this, the U.S. education system continues to keep foreign language as an optional program to have at schools prior to high school. If schools have provided foreign language, the amount and quality of instruction has decreased nationwide for the past few decades. This leaves students uninterested and not motivated in continuing or starting to learn another language. Past historical events have been examined and considered to have led to the current issues in foreign language education. The lack of foreign language in America causes a negative impact on society as its citizens push away the benefits of speaking another language. In this paper, American elementary and middle school students who study foreign language have been compared to those who waited until high school. Past studies' have been acknowledged and a personal solution to this problem has been concluded.

Presented: CSU Tower Day 2017

Linguistic Discrimination in the Workplace

Nicole Pollzzie, Kearston Boyd, Alexis Hendrix

Faculty Mentor: Dr. Seon Jeon, English

The purpose of this project is to explore linguistic discrimination in the workplace. The unemployment rates for immigrants are higher and they statistically earn much less. Language discrimination and profiling is active all over society, which is a notable problem for individuals with foreign backgrounds, especially one's trying to enter the labor field. In the work field, many people are denied jobs due to their form of speech. Foreigners face problems when applying for jobs at high ranking companies. The ideal employee's for these organizations are usually applicants with no accent at all. These applicants that do have accents receive backlash and prejudice because of language barriers (Nguyen). While examining this information, data was gathered showing the low rate of employment for applicants with accents. These statistics show that foreigners have a very difficult time finding jobs in the United States due to the unfair prejudice of employers.

Presented: CSU Tower Day 2017

How Internet Slang Affects Students' Academic Writing

Hannah Reed, Jacob Woodard

Faculty Mentor: Dr. Seon Jeon, English

The purpose of this project is to show how Internet Slang has affected high school students' writing assignments. Internet Slang has become a common form of language in texting, social media, and other electronic communication outlets. A survey consisting of open-ended questions was conducted by Thomas Fish in 2015. This study showed that students are incorporating Internet Slang terms in their formal writing assignments. Many students are unaware that using Internet Slang is inappropriate in classroom settings. Due to the decrease in writing skills in students, solutions have been proposed for the classroom. Kathleen Bronowicki's approach to the problem was to improve lesson plans in the classroom by explicitly teaching the difference in formal and informal writings (Bronowicki, 2014). Another approach to the problem was proposed by Dave Winet of California State University East Bay. His idea differed from Bronowicki's, in that he wanted teachers to incorporate instant messaging apps into the curriculum in order to give the students an exciting, yet effective way to learn about the effects of Internet Slang (Winet, 2016). The overall solution to the problem relies on the teachers and their efforts to teach the students about the negative effects of Internet Slang.

Presented: CSU Tower Day 2017

Comparative analysis of species diversity, morphology, and abundance in simple and complex marine environments off the eastern shore of Andros Island, Bahamas.

Joshua Rogers, Austin Strellner

Faculty Mentor: Dr. Ruehl, Dr. Holt Biology

Species diversity varies through space and time. Biotic factors such as predator pressure, and competition as well as abiotic factors such as habitat complexity and nutrient availability all impact the presence and diversity of fishes. Andros Island, Bahamas is a largely underdeveloped island to the east of Nassau, Bahamas. Off the eastern shore of Andros lies the Andros Barrier Reef, which is the world's sixth longest barrier reef spanning a distance of nearly 142 miles. Our study tests for differences in species diversity, morphology, and abundance of fishes between simple (sand) and complex (seagrass) marine environments off the eastern shore of Andros Island. We hypothesize that complex environments will have greater species diversity than simple habitats because the greater complexity provides increased shelter from predators, and greater availability of food items. Our approach in testing this hypothesis is to collect fishes from each habitat with cast nets, identify and count the fishes that are present, and capture photos of fishes to quantify size and shape. Data will be analyzed with a combination of univariate and multivariate analyses to quantify differences in diversity and shape between simple and complex habitats.

Presented: CSU Tower Day 2017

CSU News Team

Students enrolled in the blended class of ENGL 3155 News Writing ENGL 3183 Special Topics in Journalism worked together over the course of the Spring 2017 semester as an investigative news organization, utilizing journalistic skills such as in-depth background research, interviewing, statistical and financial analysis to explore the issues of financial aid and health care from as many angles as possible, from the intensely local impacts on students in the CSU community, to county and state government, Congress, and industry, all the way up to the incoming presidential administration. Students produced in-depth packages of stories that are published in an online publication entirely created by the class.

Sam Sachs, Kayla Jarrett, Ellie Hughes, David Cotton, Mariah McLendon,

Faculty Mentor: Prof. Joe Miller, English

Presented: CSU Tower Day 2017

Androsian Fabrics

Meagan Sanders

Faculty Mentor:
Dr. Clifton Ruehl,
Dr. Cindy Ticknor
Biology

Androsia is a fabric that is made on Andros Island which is a part of the Bahamas. This fabric is handmade by Androsians through the process of batik. Batik fabric is dyed after the parts not receiving dye are covered in wax. Androsia fabric is sold in many different forms such as shirts, dresses, or even by the yard to be made into other items. This fabric is uniquely made and has been produced only on Andros Island for over 40 years. This presentation will explore the peculiar process used to make the shapes on the fabric. I will also be discussing the specific items used in the production of the fabric that are sourced from the island to make Androsia.

Presented: CSU Tower Day 2017

Lifestyle Changes in the Patient with Hypertension

Christina Branton, Kelsey Brannen, Levie Jones, Jennifer Burdett, Samantha Daniel, Stefaniya Havens

Faculty Mentor: Dr. Cheryl Smith, School of Nursing

One in three adults in the United States has hypertension. In addition, Medicare spends $12 billion per year for hospital readmissions which are deemed "potentially preventable" (Silow-Carroll, Edwards & Lashbrook, 2011, p.1). There is a significant correlation between patient compliance with recommended lifestyle changes and disease progression. The pertinent question is, "Does the use of lifestyle changes in combination with pharmacological treatment improve patient outcomes in patients with hypertension as opposed to solely using pharmacological treatment?" Current, reliable quantitative research shows knowledge and adherence to hypertension medications and modifying lifestyle significantly improves patient's ability to lower blood pressure and prevent related comorbidities. This includes smoking and alcohol cessation, modified diet and exercise, and maintaining a healthy body mass index.

Funded: CSU Department Funds
Presented: Evidence Based Practice Presentations at Chattahoochee Valley Community College

Carson McCullers at 100: Experience as Immersive Research

Elizabeth Schlender, Nolan Reed, Faith West, Rae Baker

Faculty Mentor: Dr. Susan Hrach, English

The centennial of hometown author Carson McCullers's 1917 birth was celebrated this February in Columbus through a host of events: movies, lectures, gallery exhibits, and a keynote event with music and theatrical performances, plus the premiere of Karen Allen's short film, _A Tree, A Rock, A Cloud_. Panelists in this session were able to draw from the experiences of _Carson at 100_ events as immersive research opportunities to understand aspects of McCullers's novel _The Heart is a Lonely Hunter_ and her short story, "Wunderkind." Researchers also visited the CSU Archives to examine McCullers's personal library and music album collection, and conducted a walking tour of sites in downtown Columbus that appear in her work as fictional locations. Panelists will address their respective research agendas (which treat McCullers's artistic expression of ideological, political, and spiritual convictions, as well as her literary reputation in the decades following her death in 1967) and how experiential learning deepened their motivation to learn about and understand a figure who was previously unknown to them. As beginning researchers, they will share reflections about the process of choosing a topic and shaping an interpretive argument, as well as the challenges of citing experience as supporting evidence in academic papers. This panel is comprised of four first year students pursuing studies in the Schwob School of Music.

Presented: CSU Tower Day 2017

Professional Development for Those Serving Students with Disabilities

Jonathan Spencer, Andre' Burks

Faculty Mentor: Paul Luft

Utilizing in-service training for both students and professors at the collegiate level has shown a significant increase in the performance both academically and socially of students with a documented disability. Equipping those around these students with the ability to remove the stigma that comes with the word, "disability" allows the student to feel more comfortable with approaching peers and staff if they have a problem or need help. In order to remove the stigma we have evaluated different programs that have been used at academic institutions from all levels of education. We were very critical of our sources checking for date posted, credibility of the individual who did the research, we also took into account the interpretations of the researcher. We found that professors who were given professional development were on average 18 percent more knowledgeable on an assessment that judged their aptitude to properly adapt and better serve students. Also mentioned by 45.5 percent of students with learning disabilities who were studied, was peer support being a way to build self-confidence. When approaching teachers about changing the way that they think about disabilities, the method we found to be the most successful was giving an in-person course that gives real world problems that they must think through with some kind of limitation (i.e. Not allowed to talk).

Presented: CSU Tower Day 2017

Language discrimination in the business field

D'Ara Stevenson, Jordyn Jefferson, Tyler Harden

Faculty Mentor: Dr. Seon Jeon, English

The purpose of this research project is to examine the practice of linguistic profiling in the business setting. "Linguistic profiling is showing discrimination towards an individual simply by the way speak" (H.W Wilson). Innocent people who apply for jobs are being turned down in America due to their heavy accents. "Linguistic profiling has affected many people across the United States" (H.W Wilson). The United States is built up with so many different cultures, that it should be common to see diversity in the workplace, but if you were to pay attention to certain businesses you would take notice that there are a majority of white Americans being hired more than any other race. Businesses tend to show linguistic profiling against people who have accents, for some reason businesses feel that people who carry an accent are less educated and don't understand as well as people who don't have an accent. Managers of companies are less incline to want to hire people with an accent then someone without one. The whole reasoning is because customers might find it difficult comprehending someone with a heavy accent and managers feel that isn't good for business. However, linguistic profiling based on accents shouldn't be allowed across the board. Someone cannot help where their accent came from and certainty can't just get rid of it in the blink of an eye. Nobody should face discrimination based off the way someone speaks. When referring to accents it isn't just about discrimination against accents such as hispanic accents or chinese accents, people face discrimination in the business field from having a deep Southern accent that can be hard to understand. Instead of completely turning them down and not hiring them at all, managers should offer a speech class before they are put to work to better those who need a little help in pronouncing their words more clearly so that employees can understand and work with them better.

Presented: CSU Tower Day 2017

The Benefits of Social Interaction among College Students with PTSD

Allison Thompson,
Namrata Mandiga

Faculty Mentor:
Paul Luft

PTSD is developed when someone is affected by a shocking event and plays a role in their daily lives. Our goal is to improve the experience of college at CSU for students who suffer from PTSD through social integration. Studies have shown that students who have additional support are more likely to be motivated to be successful in school and may also participate in extracurricular activities.

Presented: CSU Tower Day 2017

Network Packet Injection in Linux

Tim Tolbert, Robert King

Faculty Mentor: Dr. Jianhua Yang, Computer Science

The purpose of this research is to explore packet injection, also known as chaffing and winnowing, on Linux systems. Packet injection is the process of injecting extra packets into a data stream to hide information, disrupt communication, or execute a malicious agenda. Some common software used to complete this task are PackIt, Ettercap, and AircrackNG. For our research, we will be testing Ettercap.

Presented: CSU Tower Day 2017

Collaborative vs Sole Completion of the Tower of Hanoi: Are Two Heads Better than One?

Alexandria Valentini, Robert Wright

Faculty Mentor: Dr. Stephanie da Silva, Psychology

It is commonly held that problem-solving is made easier with the help of others. As the old adage "two heads are better than one" implies, more ideas can be generated by making collaborative efforts to solve a problem rather than doing so alone. Within the scope of this study, the effects of collaboration on problem solving were tested by having participants complete a puzzle, known as the Tower of Hanoi (TOH), either alone or with a partner. Researchers recruited the sample of CSU students face-to-face and randomly assigned the willing participants to one of two conditions: solo-completion or collaborative-completion. Participants were kept blind to the existence of two separate conditions related to collaboration until after sessions were completed and debriefing occurred. Performance was measured uniformly across the two groups by the number of moves made and the amount of time taken to complete the puzzle, where 15 minutes was the maximum time allowed to complete the task/puzzle. These measures were compared between the conditions, collaboration or alone, to determine the impact of collaboration on problem-solving. Implications for effective problem solving in the real world are presented and discussed.

Presented: CSU Tower Day 2017

Nicholas Wilson, Caleb Corbin, Jaleesa DeJesus, Alishba Arshad

Faculty Mentor: Mr. Joseph Miller, Dr. Gary Sprayberry English

Carson McCullers, a famed, international author from Columbus who specialized in the topics of Southern Gothic and existentialism, was the topic for an interdisciplinary studies course at Columbus State University. Books such as The Heart is a Lonely Hunter, The Ballad of the Sad Cafe, and Reflections in a Golden Eye were read and discussed in a seminar format during class instruction. Through the students' own findings and research, McCullers' works were observed and compared from a contemporary standpoint. Such themes as sexism, racism, inequality in socioeconomic status, and human nature all play equally pivotal roles in her novels; each of the aforementioned themes were further discussed in relation in modern society.

Through retrieval of primary-evidence based documents and artifacts collected from the archives at Columbus State University and the Columbus History Museum, students in the interdisciplinary class constructed interpretations of the life and works of McCullers' from several different viewpoints. Some aspects that were considered were McCullers' relationship with Dr. Mary Mercer, McCullers' failing health and alcoholism, and McCullers' personal motivation and inspiration. In all, the research conducted in this class is geared more towards the sociological interpretations of a Southern author with a global impact.

Presented: CSU Tower Day 2017

ADDITIONAL RESEARCH PROJECTS

The Rape of Nanking 1937-1938

Kevin Fabery

Faculty Mentor:
Dr. Ryan Lynch,
History & Geography

In this project, we identified and investigated various psychological myths and/or misconceptions [DISCOVERY]. Some examples include opposites attract, first instinct fallacy, learning styles, and criminal profiling. We identified potential reasons for why individuals maintain a particular myth and what could be done at the entry level (1st or 2nd year) to encourage greater critical thinking skills [DESIGN]. Following our investigations into our individual psychological myths and misconceptions, we will provide tangible, research-based solutions for our myths [DELIVERY]. During the presentation, possible improvements to the delivery and insight into the process will be given [REFLECTION].

Virtue or Vice? Implications of the Tourism Industry in Modern-Day Belize

Jane Mader

Faculty Mentor:
Dr. Doug Tompson,
History & Geography

In recent decades, the Caribbean region has seen a massive boost in the tourism sector. Frequently referred to as an industry due to the amount of profit which is involved, tourism is present in almost every corner of the Caribbean, from cruise tourism to overnight resort tourism and even ecotourism. While some argue that the industry has had positive implications, from providing economic support to the destination countries to increasing awareness for protected and isolated areas, others argue that it has had damaging effects on the cultures of the people whose regions are visited. The Central American region of the Caribbean, in particular Belize, has been heavily involved with the tourism industry since independence from Great Britain in 1981. In the past thirty years, many cities in Belize have become tourist destinations, including San Ignacio, Dangriga and Belize City.

Belize is composed of a number of ethnic groups with the largest populations being the Mestizos, Creole, Maya and Garifuna peoples. Because tourism has become present in every district which composes Belize, each ethnic group has experienced implications from the industry. The research completed for this project involved interviewing local Belizean citizens in the Cayo and Stann Creek Districts. The locals were asked questions regarding which ethnic group they identified with and whether or not they believed the tourism industry had positive or negative effects on their culture. This paper is a cultural analysis of the answers which were given in regards to the implications of the tourism industry in Belize.

SUBMISSIONS FOR ABSTRACTS 2018

Undergraduates at Columbus State University who engage in research, critique and scholarship during the academic year of 2017-18 are invited to publish an abstract of their work in next year's annual. Abstracts from all disciplines which have been published or presented at local, regional, national or international conferences during the Summer 2017, Fall 2017, and Spring 2018 will be included.

Abstracts that are approved by faculty mentors may be submitted electronically at Honors.ColumbusState.edu/abstracts/php. Interested students are encourages to visit the site to review the full list of information required when submitting their abstracts.

INDEX OF FIRST AUTHORS

COVER ART

The painting is called "The Uncertainty Principle."

The viewer sees a girl at a desk in front of a world map and next to a window that is so bright, we cannot see what is outside. I made this painting as I was looking at what I wanted to do after I graduated. I was wondering where I would be in the next year. The painting is about sense of wonder and making decisions, but it is also about uncertainty.

In my spring semester of junior year, I took the Honors 3000 class directed by Deslov Hrepich called the "Physics of Happiness." In the course, he used scientific principles as metaphors for positive living. The uncertainty principle states that the momentum and position of a particle cannot both be precisely determined at the same time. Just like as we go through life, there is no true certainty where our actions will lead us. However, when the energy levels of the particles increase, it is easier for scientists to determine the general area of where it could be. For us, that means the more positive and goal oriented we are, the more idea we have of how our life will be.

From the artist, Julianna Wells, a Columbus State University Honors College graduate.

HONORS COLLEGE

COLUMBUS STATE UNIVERSITY