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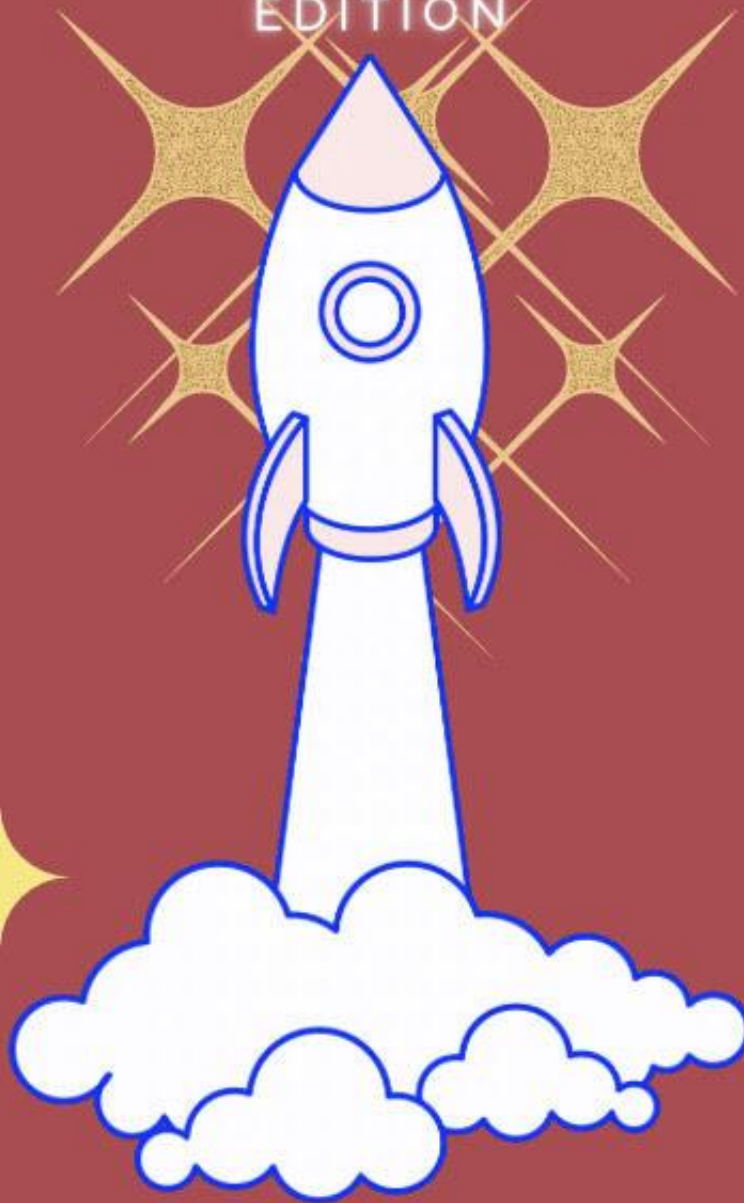
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UNDERGRADUATE RESEARCH
JOURNAL

Momentum

1ST TOWER DAY ABSTRACT
EDITION



“Momentum of Success = Your Speed and Direction x Mass of Your Action”

Dr. Zdeslav Hrepic

Table of Contents**Front Matter**

Editorial Board	15
Editor's Note	16
Letter from Dr. Welburn	17

Student Work

Analysis of Spatial Distribution and Carbon Density of Trees at Lynnhaven	18
<i>Likhita Aluri, Olympia Badwan, Nameera Khan & Sneha Rajeev</i>	
A Global Ambition: A Survey of the Development of Militant Islamic Thought on Jihad	19
<i>Justin J. Arnette</i>	
Determining Species Diversity of Macroinvertebrates in Aquatic Ecosystems	20
<i>Bethany Boone, Isabella Jaquez, Cole Lassiter</i>	
Columbus State University Peace Cooperative	21
<i>Tod W. Barclay</i>	

	3
Ultra-Sonic Radar	22
<i>Himanshu Bohra & John Morales</i>	
Species Richness for Terrestrial Invertebrates found within Leaf Litter in an Experimental Woodland Hillside	23
<i>Curtis T. Bone, Monica Murphy & Marcos McDaniel</i>	
Beta Diversity of Meso-consumers among Local Sites at Lynnhaven and their Temporal Activity in Proximity to a Human Residential Area	25
<i>Anthony R. Brown, Jr. & Christian Contreras</i>	
Analysis of Bluegill, <i>Lepomis macrochirus</i> age and growth, diversity, and species richness in two urban creeks in Columbus, Georgia	26
<i>Anthony R. Brown, Jr., Lydia Jones, Sharanna Stone, Vanisha K. Strahota & Carmen Upshaw</i>	
How To Kit: Blueprint Carrier	27
<i>Bridget B. Brown</i>	
A Reflection on the Protests Against the School of the Americas at Fort Benning	28
<i>Sophia G. C. Brown</i>	
Photobook Project	29
<i>Erendida A. Camacho</i>	

	4
Chemical Investigation of Organics in the Chattahoochee River	30
<i>Harris W. Carlisle</i>	
Hydrological Analysis of <i>Hymenocallis coronaria</i> through Monitorization of Inundation	31
<i>Dorothy C. Caughey</i>	
Annotation of the <i>lin-28</i> Gene Across Three Species of <i>Drosophila</i>	32
<i>Simran K. Chhina & Jessica Odum</i>	
Mixed Marriage: Intolerance through the Ages	33
<i>Lindsay B. Clifton</i>	
A Study of Distortion in Translation Using	34
<i>Meredith E. Cohen</i>	
Marketing Local Health: Evaluating Public Health Marketing to Underprivileged Populations	35
<i>Maya S. Davis</i>	
Identifying Food Insecurity Levels among College Students	36
<i>Maya S. Davis</i>	

	5
Accessible Visualizations for Data Structures	37
<i>Kelsey B. Decuir, Kameryn Redd & Anaja Houston</i>	
ROB-E: The Sound Emitting Insecta	38
<i>Skylar Dexter & Frida Powers-Coates</i>	
Hermit Crab Food Preferences on Andros Island	39
<i>Samuel W. Dixon, Sierra Barlow, Logan Rush & Anthony Cangemi</i>	
The Effects of Ammonium Nitrate on Larval Amphibian Response to Predation Cues and Stimuli	40
<i>Samuel W. Dixon</i>	
An analysis of the antibacterial properties of the Indian Tulip tree, Thespesia populnea, on clinical isolates of Acinetobacter baumannii	41
<i>Carlie H. Dollar</i>	
The Evolution of Shakespeare	42
<i>Sidney Ducleroir</i>	
Los Temas de Los Artes	43
<i>DaShaundra T. Fluellen</i>	

	6
How Live Music Can Survive in The Digital Age	44
“Did you hear that _____ is performing?”	
<i>Daniel Gallardo</i>	
Medicinal Plants of Andros	45
<i>Matthew F. Gilbert & Carlie H. Dollar</i>	
Media In Modern Business	46
<i>Spencer A. Gilland</i>	
Chemical Investigations of Pasaquan and Interdisciplinary Paint Restoration	47
<i>Cydnee A. Harrison</i>	
The Potcake's of Andros	49
<i>Erin R. Hayes, Kristina Armstrong & Jamarius Walker</i>	
The Effect of Home Infrastructure on Fecal Coliform in the Water of Local Communities	50
<i>Asia S. Hill</i>	
Gestural Control of Music	51
<i>Riley J. Hinson</i>	

	7
Invertebrate Species Richness and Diversity in Tidal Pools of Money Point, Andros Island, The Bahamas	52
<i>Andrew C. Holmes, Marc A. Pierre & Rajvi Desai</i>	
Understanding the Weather Photobook Project	53
<i>Donald W. Jablonski</i>	
Identifying Supernova Remnants in the Large Magellanic Cloud	54
<i>Devin A. Janeway & Kaylee E. Linge</i>	
Classroom Management: Redirecting Behavior	55
<i>Jasmine R. Johns</i>	
A Comparison of Temporal Influences on Abiotic Factors in Aquatic Ecosystems	56
<i>Lydia Jones, Vanisha Strahota & Jacob Woessner</i>	
The Cultural Poetics of Characters in Selected Works of William Shakespeare	57
<i>Kailey L. Katzfey</i>	
Applying Multi-Thematic Units in The Classroom: A Powerful Tool for Teachers	58
<i>Rachel L. Kennedy, Alivia Stewart, Leah Poyotte & Landon Averett</i>	

**A Comparison of Liver Histopathological Features Between Spotted bass
(*Micropterus punctulatus*) and Largemouth bass (*Micropterus salmoides*) from Lake**

Oliver

Nameera N. Khan

Building a Photometric Science Pipeline at CSU's WestRock Observatory 60

Samuel C. Kimball, Olivia Motin, Trinity Smith, Anaja Houston, Joy Flowers & Sabrina Fisher

**Financial Literacy: The Effects of Geography and Demographics
on Financial Literacy** 61

Kiera A. King, Selina Budde & Michelle Lamorte

Composites with Beta-Sheet Polymers 62

Dominic S. Koh

Voting in Georgia: Equal Access and Opportunity Costs 63

Julia J. Lawyer

**A comparison of age and growth characteristics between 24-hour and
maximum mean annual thermal gradients for Black Crappie (*Pomoxis nigromaculatus*)** 64

Elva Y. Lucero

Pre-Ejaculation Putting Women At Risk For Pregnancy 66

Shaylyn Marshall & Kiara Owens

Servant Leadership in Action: Creating a Lasting Impact 67

in the Highland Community

Laura F. McKenna, Billy Daffin, JJ Harrison, Riley Higgins, Nameera Khan, Liz Laneche, Tyisha Langers, Shaylyn Marshall, Josh Mellman, Kyla Mims, Kealan Neal-Farr, Anthonia Oludimimu, Curtis Walker, Tamera Wilkerson & Sarah Grace Womack

Historical Anti-Semitic Rhetoric in 9/11 Conspiracy Theories 69

Bailey Melton

Topography and its statistical relationship with Thunderstorm Intensity 70

Michael S. Mertens

Compassion Fatigue and Compassion Satisfaction in Nurses: 71

Examination of Intervention Approaches

Ivey B. Milam & Taylor M. Mattson

The Awakening: Race, Space, and Social Mobilization 73

Madison D. Miller

	10
The Impact of Celiac Disease on Pregnancy Outcomes	74
<i>Kyla A. Mims, Chelsea Nguyen & Alex Yarborough</i>	
The Impact of Socioeconomic Status on Perception of Opioid Use	75
<i>Kyla Mims, Sara Halilhodžić, & Jessica Zaw</i>	
Preliminary Observations of Variable Star Fields in Comparison to Standard Stars	77
<i>Sharmaine O. Motin, Samuel Kimball, Trinity Smith, Joy Flowers, Sabrina Fisher & Anaja Houston</i>	
Influenza Infection Disparities in U.S. Minority Populations	78
<i>Chelsea T. Nguyen, Siara Luster & Kyla Mims</i>	
The Legacy of September 11th, 2001 in U.S. Schools	79
<i>Abbigail F. Parker</i>	
Analysis of the HSP33 Gene Function in <i>Saccharomyces cerevisiae</i>	80
<i>Sneha Rajeev</i>	
The Effects of Air Pollutants on Human Populations	81
<i>Ethan W. Rieck, Rashalyn Smith & Jennifer Thompson</i>	

	11
Targeting Excessive Screen Time in Children Through Stress-Reducing After School Programs	82
<i>Ebony Robinson, Kamaya Foster, Serenity Freeman & Carmen Upshaw</i>	
Synthesis and activity of Pd/alumina catalysts for methane combustion under stoichiometric conditions	83
<i>Imani A. Rogers, Kristina Armstrong & Austin Clance</i>	
Effects of Turtle Grass Density on Invertebrate Diversity	84
<i>Imani A. Rogers & Brianna Sattinger</i>	
Reimagining the Dead, Beautiful Woman Trope: Mary Shelley's Feminist Vision in Frankenstein	85
<i>Leora Rogerson</i>	
Historic Westville Museum Spanish Translation Project	86
<i>Marta Sanchez Lozada, Ana Turner & Esmirna Vital-Vences</i>	
Cause and Effect Behavior Management Strategy	87
<i>Jennifer M. Shult & Sydney Offenback</i>	
Positive Behavioral Interventions and Support in a Third Grade Classroom	88
<i>Suzanne C. Sikes & Jodi Hearn</i>	

	12
Digital Forensics with SSD's	89
<i>Joseph E. Smith, Conner Moeck & Nicholas Kimmel</i>	
Synthesis of Mellitic Triimide Based Covalent Organic Frameworks	90
<i>Elise R. Snow & Megan E. Brenner</i>	
Tracking Encounters While Respecting Privacy	91
<i>Joseph E. Smith, Roydon D'Souza, Sonipriya Paul & John Walker</i>	
Georgia Wetlands and Climate Change	92
<i>Mary C. Streat, Clareese Spahn, Karla Lumbard & Peyton Avery</i>	
OPIOIDS: THE NATIONAL HEALTH CRISIS	93
<i>Kyla M. Sumter</i>	
Examining The Association Between Racial Bias and Poor Health Outcomes Among African Americans	94
<i>Kyla M. Sumter, Jasmine Constant, Aniya Boyd, Emmitt G. Brown & Julia Thompson</i>	
Biological Effects of Benzothiazole Derivatives: ALS cells and the effects of the TDP-43 Protein	96
<i>Destini A. Thornton & Alexandria White</i>	

	13
A Moment of Science, Please	97
<i>Mattea G. Twigg, Lauren Breaux & Curtissia Penamon</i>	
Identifying a Hidden Fault	98
<i>Skylar S. Vaughn</i>	
Comorbidity of Autism Spectrum Disorder and Intellectual Disabilities	99
<i>Kierstin E. Wengryn</i>	
Spanish Painter Diego Velázquez	100
<i>Kayah A. Young</i>	
Assessing coral reef health through fish abundance and diversity	101
<i>Arianna Zapata, India Thomas & Mitdalia Alonso</i>	
Behavior Management with Elementary Students: Positive Reinforcement	102
<i>Breanna R. Zator & Taylor Small</i>	
Alternative Feedback for Autograded Assignments	103
<i>Ryan Zimmerman & Kaleb Horvath</i>	

End Matter

Acknowledgements

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Editor's Note

After a two-year hiatus due to COVID-19 and other complications, we are excited to announce that *Momentum* is back in full-swing. Moving forward, we have decided to publish not only our usual editions, but also to publish the abstracts from Tower Day as we continue to work closely with the Tower Day program. We hope that you enjoy the content and have a safe holiday, and please keep an eye out for our usual publication next semester.

Youbin Park

Editor-in-Chief

Letter from Dr. Welburn

Dear Colleagues,

I am thrilled to be a part of this wonderful endeavor to recognize and publish the work of our undergraduate students at Columbus State University in *Momentum*, our journal that promotes undergraduate research. I would be remiss to not recognize the struggles that everyone has faced, in light of the COVID-19 pandemic; however, our students, faculty, and staff have shown their resilience in overcoming some of the toughest of challenges. Despite these challenges, our students have engaged in some fascinating research that demonstrate the best of our core values at Columbus State University. From the sciences to the arts, we value the effort of our students to answer some of science's tough research question, explore the evolution of famous playwrights and musicians, and understand the world around us. I find myself to be continuously impressed with the creativity and dedication of our students.

It is also important to note that with each of these student projects, there are faculty members across all disciplines who have mentored and encouraged our students to strive for excellence. While my time in academia from a faculty perspective is somewhat limited, Columbus State University's faculty have demonstrated that they are passionate and committed to educating and preparing our students for a future that is brighter than we can imagine. To all the faculty who continue to fight for student engagement in undergraduate research, a simple thank you will never be enough.

With this, I am pleased that this edition of *Momentum* is featuring the abstracts from Columbus State University's annual 2022 Tower Day Undergraduate Research Conference. Tower Day celebrates undergraduate research and creative endeavors from all majors. Our editorial staff has done an amazing job at compiling all of the abstracts from Tower Day for your viewing. I hope you enjoy these abstracts, and we will see you at our next publication.

Sincerely,



Sharon Cho Welburn, PhD, MPH

Momentum Faculty Advisor

Assistant Professor of Health Sciences and Public Health

Analysis of Spatial Distribution and Carbon Density of Trees at Lynnhaven

Likhita Aluri, Olympia Badwan, Nameera Khan & Sneha Rajeev

Columbus State University

Abstract

Spatial distribution and carbon density of trees in forests can provide insight to species coexistence, richness, diversity, and community structure. Georgia has one of the largest biomass pools in the Southeastern United States and the highest density in mixed and deciduous forests. This biomass serves to bind carbon from the atmosphere and store it in living and dead trees, trunks, roots, and soils. However, despite the evidence of these immense resources in Georgia and other Southeastern states, few studies have attempted to quantify this storage at small spatial scales. We examined spatial distribution and above ground carbon density variation among hardwoods around an intermittent stream and upland habitat in a secondary forest of west-central Georgia. We hypothesized that because the lowland hardwoods are closer to a water source, they will have a higher carbon storage and lower spatial distribution compared to the upland site. To test our hypothesis, we established four plots dispersed between upland and lowland sites and trees were identified to species, mapped, tagged, and measured for height and diameter at breast height. Equations were used to estimate carbon density. Spatial distribution was analyzed using mapping software. This research provides important information on the fast-changing areas and the management of public lands in Georgia.

A Global Ambition: A Survey of the Development of Militant Islamic Thought on Jihad

Justin J. Arnette

Columbus State University

Abstract

The events of September 11, 2001 prompted many to inquire into the nature, origins, and historical development of militant Islam, a pursuit which requires an accurate definition of the term “jihad” as it has been used throughout Islamic history. Muslims throughout the centuries have reevaluated their understanding of jihad and its implications by comparing their relationships and interactions with non-Muslims to those of the prophet Mohammed and the early period of Islamic expansion in the seventh and eighth centuries. The concept grew in meaning and application as early as the thirteenth century in the writings of Ibn Taymiyya amidst Muslim conflicts with both Mongols and crusaders. However, twentieth-century Muslim thinkers such as Sayyid Qutb and Abd Allah Azzam considerably transformed jihad to imply a sharp divide between Islam and the rest of the world, resolved only by universal submission to Muslim rule with the use of violence, if necessary. Thus, jihad had become a global rather than local goal. Successors to Qutb and Azzam, such as Osama bin Laden, maintained the momentum built by these figures following the Soviet withdrawal from Afghanistan. While the militant definition of jihad has many adherents across the Muslim world, this presentation will propose that large portions of the Muslim population are not prepared to accept such a definition. However, even with large public repudiation, the actions of organizations like al-Qaeda, such as the attack on the World Trade Center, demonstrate a small body of adherents to be significant, and a scholarly investigation into their worldview valuable.

Determining Species Diversity of Macroinvertebrates in Aquatic Ecosystems

Bethany Boone, Isabella Jaquez, Cole Lassiter

Columbus State University

Abstract

Conducting a study on the species diversity of macroinvertebrates in an aquatic ecosystem is a reliable way to determine the integrity of the ecosystem. The aim of this study is to collect data on species diversity in a small reservoir in a stream containing high levels of iron to compare the different macroinvertebrates that live in still and flowing habitats to determine if there are significant differences between the two habitats. Samples will be collected with seven sweeps of a standard d-frame net at three haphazardly chosen spots upstream of the pond, in the pond, and downstream of the pond. We expect to find no difference between the two stream locations, but the pond should have a different community of macroinvertebrates due to the different abiotic conditions present in streams and ponds. For example, streams flow, and flow fluctuates, while the pond is stable and water levels do not fluctuate. This research contributes to our understanding of spatial variation in community structure at the landscape scale.

Columbus State University Peace Cooperative

Tod W. Barclay

Columbus State University

Abstract

In recent years, the city of Columbus has been devastated with violence and insecurity. During 2021 the city set a new and somber record of seventy recorded murders. That number is up from forty-four recorded murders in the year 2020 (wrbl.com). Persistent poverty particularly in minority communities, and the ensuing COVID-19 pandemic have fractured the social fabric of many families, altering ways in how people relate to each other. In this context, local disputes or deep-seated concerns about livelihoods have the potential to turn violent and to expand beyond the confines of one community. While peacebuilding is one of the important means for addressing insecurity, Columbus city relies more on Police and Policing. Other initiatives such as the gun buyback program are significant, but they operate on a top-down city managed approach which leaves out significant population segments such as college students and other community stakeholders. The purpose of this presentation is to introduce the Peace Cooperative model to peacebuilding and discuss case studies of this participatory bottom-up approach. The discussion is premised on a Hermeneutical model of peace in self, peace in family, peace in community and peace within self (Stanford Encyclopedia of Philosophy, George). Our goal is to start a Peace Cooperative Student Organization at CSU. This will help to support the wider Columbus community to build social cohesion and resolve violence peacefully and justly.

Ultra-Sonic Radar

Himanshu Bohra & John Morales

Columbus State University

Abstract

We have created an Ultra-Sonic radar by mounting a HC-SR04 sensor on top of a SG-90 servo. The radar can rotate on a 180-degree plane and detect objects up to ~400 cm from the radar. The data collected from the environment is then displayed on the console, along with the graph of the data. The data can then further be uploaded to thingspeak.com for cloud computing and ease of access. The project was implemented by combining sensor-level device-based computing and cloud level computing which together is the backbone of Internet-of-Things technology. A lot of data can be obtained through the sensor, then stored and processed on the cloud to make it meaningful.

For students interested in computer science, the project can demonstrate the relationship between software development, data transfer through IoT and also inspire them towards robotics, which in the future may be heavily dependent on IoT.

Species Richness for Terrestrial Invertebrates found within Leaf Litter in an Experimental Woodland Hillside

Curtis T. Bone, Monica Murphy & Marcos McDaniel

Columbus State University

Abstract

Elevational gradients share characteristics of latitudinal gradients by having a negative effect on species richness, which is represented by the Evolutionary Speed Hypothesis (ESH) and the Latitudinal Diversity Gradient (LDG) hypothesis. Terrestrial invertebrates respond to environmental changes more rapidly than other organisms; therefore, terrestrial invertebrates can be used as ecological bioindicators to measure the health and changes in environmental conditions. Furthermore, leaf litter is the connection between air and ground; therefore, the interactions of atmospheric conditions and soil functions can be seen by studying the terrestrial invertebrates therein. Soil temperature, water availability (i.e. humidity, precipitation, and soil retention), plant species richness, and seasonal changes are key factors that can affect terrestrial species richness. These factors can be represented across an elevational gradient, such as a hill. For our study, we examined if there were any differences of terrestrial invertebrate species richness in deciduous forest leaf litter across an elevation gradient (hill) at a patch of a secondary forest with several contemporary streams and reservoirs located in Columbus, Georgia. We hypothesized that species richness would be higher in leaf litter found in lower elevational zones than medium and high elevational zones due to lower elevational zones possibly having higher soil temperature, more water availability, and more plant species richness/diversity that are optimal for terrestrial invertebrate survival. We sampled leaf litter from 1m² at each elevational zone from seven transect lines, as well as measured soil temperature, water moisture, and plant

species richness. So far, our results indicate species richness is not significantly different across high, medium, and low elevational zones. However, terrestrial species diversity is significantly different across these three gradients. We also discovered that seasonal changes had the largest impact on terrestrial species richness, where species richness increased with warmer seasonal temperatures independent from water availability. Our results may support the Evolutionary Speed Hypothesis (ESH) and the Latitudinal Diversity Gradient (LDG) hypothesis, though our study was conducted at such a small-scale where local variations of water availability and temperature may inhibit application of the research to the regional scale where ESH and LDG are most applicable.

Beta Diversity of Meso-consumers among Local Sites at Lynnhaven and their Temporal Activity in Proximity to a Human Residential Area

Anthony R. Brown, Jr. & Christian Contreras

Columbus State University

Abstract

Species diversity is a critical metric for assessing community structure and stability. Species diversity is often divided into local patch (alpha), regional (gamma) and the turnover among habitat patches (beta) diversity. We seek to investigate variation in alpha and beta diversity of meso-consumers in a secondary forest ecosystem of west-central Georgia near an exurban neighborhood. We will separate the forest into three local patches consisting of a flat grassy field, a powerline cut with tall grass and shrubs, and a wetland. Species diversity will be measured as the number of species present. The alpha diversity of each local patch will be determined using a multimethod data collection strategy that includes camera traps, scat identification, and tracks. Beta and gamma diversity metrics will be derived from alpha diversity measurements. We predict that alpha diversity will be highest at the wetland patch, and that beta diversity will be highest between the wetland patch and the powerline cut. Further, we expect that wildlife activity will be greatest during the evening and early morning because many mammals are crepuscular. Identifying site preference in a region can focus conservation efforts.

**Analysis of Bluegill, *Lepomis macrochirus* age and growth, diversity, and species richness
in two urban creeks in Columbus, Georgia**

Anthony R. Brown, Jr., Lydia Jones, Sharanna Stone, Vanisha K. Strahota & Carmen Upshaw

Columbus State University

Abstract

We compared fish health in two polluted creeks in Columbus, Georgia. The study stream Lindsey and Weracoba creeks are both listed by the Environmental Protection Agency as 303(d) creeks (impaired and threatened waters). The purpose of this project was to compare health of Bluegills and the diversity of fishes between the two creeks. We used four bioindicators of fish health: age, weight, species richness, and diversity. To understand more about the fish communities in the two urban creeks we collected, identified, and recorded the fish species. We calculated diversity using the Shannon Diversity Index from 24 sites in Lindsey Creek and five sites from Weracoba Creek. We found no significant differences between species richness and diversity in Lindsey and Weracoba creeks. There was also no significant difference in body weight at age between the two creeks for Bluegill. However, we identified that longevity of Bluegill was truncated in Weracoba Creek. Bluegill lived up to 5 years old in Lindsey Creek (n=70), however, Bluegill (n = 65) only lived up to 3 years old (n = 1 at 3 years old) in Weracoba Creek. Age truncation suggests that Weracoba Creek is more polluted than Lindsey Creek. According to Chattahoochee Riverkeeper data, Weracoba Creek has more occurrences of high coliform bacteria counts from human waste and chlorinated water contamination.

How To Kit: Blueprint Carrier

Bridget B. Brown

Columbus State University

Abstract

This project was for a Graphic Design assignment in which students created a “how to” kit as a promotional item for a brand. The project had to include all the materials needed to make the item, a well-designed package to hold all the materials, and a set of easy-to-follow instructions. This presentation will take the viewer through each step in the design process for the Blueprint Carrier How to Kit including how I researched the project, the testing phase of the project, the finalized project, and what the future of the Blueprint Carrier may be.

A Reflection on the Protests Against the School of the Americas at Fort Benning

Sophia G. C. Brown

Columbus State University

Abstract

For over two decades, thousands have made an annual pilgrimage to the gates of Fort Benning to protest the past actions and current iteration of the School of the Americas, a U.S. military-training school for North and South American military and security personnel. The School has a bloody history with hundreds of its graduates committing human rights atrocities, along with a few becoming brutal dictators throughout Latin America. To protest both the actions of the School and what it represents, various social, political, and religious groups have traveled to Columbus, Georgia to stand at Fort Benning's gate. This paper seeks to explore this piece of Columbus history and question the protest's waning popularity.

Photobook Project

Erendida A. Camacho

Columbus State University

Abstract

Five photo-books of the everyday weather. That is on the formation of the clouds and observations of the everyday life.

Chemical Investigation of Organics in the Chattahoochee River

Harris W. Carlisle

Columbus State University

Abstract

My project seeks to conduct water analysis of the Chattahoochee River and its tributaries to determine the components in the water. The Columbus WaterWorks (CWW) facility in Columbus, GA is noticing chlorinated hydrocarbons, such as chloromethane, chloroethane and dichloromethane, post the disinfection process of the water. High levels of such compounds are identified post rains. Presently, the facility is treating the water with NaClO₄ (sodium hypochlorite), and noticed issues in their effluent, meaning it is coming from their facility's two locations, roughly 4.3 miles apart. Chemical Testing will be utilized to identify the organic compounds located in the influent and effluent water of the two plants. The aim is to identify what organic compounds are found in the influent water and help Columbus WaterWorks finalize a modified treatment procedure to remove the organics during water purification.

Hydrological Analysis of *Hymenocallis coronaria* through Monitorization of Inundation

Dorothy C. Caughey

Columbus State University

Abstract

The goal of this project was to assess the success of the *Hymenocallis coronaria* against inundation frequency and intensity. Previously germinated plant bulbs (~5 months old) of the *Hymenocallis coronaria* were planted with gravel-sized river rocks and housed in metal cages (4.572cm x 12.192cm x 13.97cm). The metal cages (suet bird feeders) were utilized throughout the experiment in hopes to prevent sample loss downstream, due to strong discharge potential. Cages were placed near the 14th street bridge in the Chattahoochee River at varying elevations to expose the plants to 3 inundation levels. The frequency of inundation was monitored using the USGS gauge at the 14th Street Bridge (monitoring location 02341460) and will be reported with flow duration and hydrographs. Each inundation level had ten replicates. Plant success was tested dependently against streamflow, gauge height, and sample elevation (i.e., the lowest elevation sample group's inundation duration will be inherently longer and more frequent, as compared to that of the higher elevation sample groups). Success was measured as a percent survivorship. The results of this case study will provide new insights regarding the effects of highly variable streamflow on *Hymenocallis coronaria* survivability and other potential aquatic plant species (e.g., *Justicia americana*).

Annotation of the lin-28 Gene Across Three Species of Drosophila

Simran K. Chhina & Jessica Odum

Columbus State University

Abstract

The primary goal of the Pathways Project of the Genomics Education Partnership is to determine the evolution of regulatory regions of the 64 genes in the insulin-signaling pathway across 28 *Drosophila* species. The insulin-signaling pathway is important because it regulates how sugars are processed and contributes to the growth and development of animals. This project will identify, annotate, and build gene models for the lin-28 gene in 3 species at various evolutionary distances from *D. melanogaster*: *D. simulans*, *D. biarmipes*, and *D. willistoni*. The lin-28 gene encodes a protein that regulates developmental timing and positively regulates the insulin-like receptor signaling pathway. These gene models and many others will allow the Pathways Project consortium to locate gene regulatory regions and compare them across the *Drosophila* genus. Additionally, we will assess the conservation among the 3 species of the genomic neighborhood, gene structure, and amino acid sequences of the gene products. Progress to date includes the complete annotation of the gene models of the *D. biarmipes*, *D. willistoni*, and the *D. simulans*. Results indicate that the genomic neighborhood and overall gene structure are well conserved for both the *D. biarmipes* and *D. willistoni* species compared to *D. melanogaster*, and the amino acid sequence divergence corresponds to their phylogenetic distance from *D. melanogaster*.

Mixed Marriage: Intolerance through the Ages

Lindsay B. Clifton

Columbus State University

Abstract

Throughout history, mixed marriage has been a point of debate. Whether religious, moral, or simply stereotypical, many people have reasons for rejecting the idea of marrying or having sexual relations with people from a different background than themselves. This idea is not new. In fact, religious intolerance has existed for at least 12 centuries. Multiple kings and queens of the Iberian Peninsula, more specifically the region now known as Spain, have tried to unite the country under their idea of “nationality”, which is usually based in religion. Using multiple sources (Glazer-Eytan and García-Arenal; Menchi and Eisenach; Zorgati; Vaughan), I demonstrated that the basis of the medieval Iberian marriage laws influenced the way in which many human beings continue to think about mixed marriage to this day.

A Study of Distortion in Translation Using

Meredith E. Cohen

Columbus State University

Abstract

The purpose of this study is to demonstrate the distortion that can occur in the translation of poetry as a result of the priority of the translator and that a balance of priorities leads to the most faithful translation. There are three elements which can be prioritized during the translation of poetry: accuracy, meaning, and sound. In order to demonstrate the distortion that occurs due to the prioritization of each of these elements, I have translated an abridged version of “Hombres Necios” a total of four times. Translation 1 prioritizes accuracy, Translation 2 prioritizes meaning, and Translation 3 prioritizes sound. The final translation balances these three elements instead of prioritizing one over the other two. Through analysis of the distortion of each poem, I have concluded that the final translation incurred the least amount of distortion and therefore is the most faithful of the four translations.

Marketing Local Health: Evaluating Public Health Marketing to Underprivileged Populations

Maya S. Davis

Columbus State University

Abstract

Underprivileged populations have been known to experience a multitude of economic and social disparities. The city of Columbus, Georgia has a variety of these underprivileged populations across the city. This research will investigate the current marketing techniques for healthcare that are being utilized for the residents in these disadvantaged communities. We want to explore possible marketing techniques that could be implemented to provide these communities with proper information about the resources available to them. Additionally, this research will highlight COVID-19 in order to evaluate how marketing plays a role in vaccination rates and overall preventive health. Combining marketing and public health, this research will demonstrate the importance of closing the gap between health professionals and how health information is administered and marketed to the public. The topics for the public health marketing techniques we will evaluate are: hospitals and medical care, food bank services, and housing services.

Identifying Food Insecurity Levels among College Students

Maya S. Davis

Columbus State University

Abstract

The purpose of this research project is to investigate and bring awareness to the underlying food insecurity issue at Columbus State University (CSU) in Columbus, Georgia among the student population. Food insecurity has been an issue that has been estimated to affect households globally for decades (5). Multitudes of research about food insecure households, age, and racial demographics have been conducted, but there is a distressing gap between food insecurity and college students. A cross-sectional study was conducted between November 2020 to February 2021 using a Qualtrics survey. N = 1,632 students fully completed the survey. Over a quarter of this sample (26.3%) reported experiencing low to very low food security. After a second wave of survey distribution, an additional 1,186 students (N=2,818) completed the survey from August 2021 to October 2021. Out of the total valid responses (N=2,451), 292 students reported low to very low food security demonstrating a growing need for food insecurity intervention. As a result, the literature review for the collected data focuses more on resource and program utilization and implementation – more specifically on the importance of university food Pantries.

Accessible Visualizations for Data Structures

Kelsey B. Decuir, Kameryn Redd & Anaja Houston

Columbus State University

Abstract

This project explores how data structures and programming can be applied to solve real-world problems. The focus of this project was to utilize a linked list structure to store movie objects that contain various information about a movie, such as a movie name. The goal was to accomplish a multitude of tasks, such as finding a particular actor. Data visualization is very important when it comes to big data interpretation. Bridges, a data visualization tool, was used to visualize the output of the program using a GUI that would allow user interaction with the visualized linked list structure. Accessibility has been found to be important to accommodate users with visual impairments. Accordingly, accessibility measures were considered to improve the produced visualizations, which have been shown to better serve a wider range of users. This poster presentation will compare and contrast the visualizations before and after applying software design accessibility measures.

ROB-E: The Sound Emitting Insecta

Skyler Dexter & Frida Powers-Coates

Columbus State University

Abstract

With the advancement of technology comes with more capabilities within world of design. Wheeled robots may be easier to design and control but are limited to certain infrastructures such as paved and dirt roads. On the other hand, legged robots, by virtue of their biological similarities, offer better maneuverability even in cluttered terrain. Therefore, in our robotics design lab, we decided to take what we observed from nature and other predecessors and create a four-legged bug with environmental avoidance protocols. This was achieved using several components such as ultrasonic sensors coded within Arduino. Over the course of five months, we have integrated mechanical, electrical, and software engineering into a final project named ROB-E. ROB-E was fully constructed because of our Design Lab course. The body of the robot was modeled through Solidworks and 3D printed in-house. Legs were constructed from high-stiffness metallic cliffhangers and locomotion was facilitated through 3 servomotors. ROB-E is successfully controlled through an Arduino microcontroller board to move forward. If ROB-E's ultrasound sensors detect a nearby object, ROB-E is designed to reverse course to avoid potential dangers. ROB-E's design allows him to be autonomous in the environment but due to its size and fragility, he can avoid potential hazards such as a human inadvertently squishing him. What we have learned from this project was that designing and building a robot may never turn out exactly how you first intended it to be. What we had originally designed in the beginning was nowhere near our current product.

Hermit Crab Food Preferences on Andros Island

Samuel W. Dixon, Sierra Barlow, Logan Rush & Anthony Cangemi

Columbus State University

Abstract

Hermit crabs (*Coenobita clypeatus*) are a vital member of the coastal ecosystem on Andros Island in the Bahamas. These crabs are nocturnal scavengers that feed on vegetation, dead animals, and fruit. Given the presence of humans on Andros Island, these crabs have been exposed to human foods, such as bread and lunch meat, and may have developed a preference for them. However, this hypothesis has only been lightly tested. We predicted that hermit crabs would prefer man-made foods to naturally occurring foods. Three experiments were conducted on two islands of the Bahamas, Andros Island and Saddleback Cay. Each of these used 2 man-made foods (bread, processed lunch meat) and 2 natural foods (tomato, apple) to attract hermit crabs and determine food preference. However, only a couple of crabs were observed through all of the experiments and there was not enough data to conduct analysis. Future studies should make use of active collection and data collection methods, rather than passive methods.

The Effects of Ammonium Nitrate on Larval Amphibian Response to Predation Cues and Stimuli

Samuel W. Dixon

Columbus State University

Abstract

Amphibians are important members of wetland ecosystems, acting as both predator and prey in these ecosystems. They also serve as sentinels of environmental health, as they are sensitive to a wide array of ecosystem changes. This sensitivity makes them excellent early warning indicators of chemical pollutants such as fertilizers, the most common pollutant in aquatic ecosystems. In this study larval *Hyla chrysoscelis*, (Cope's gray treefrogs), were exposed to five different concentrations of ammonium nitrate in two different experiments. After a week of exposure to the fertilizer, their responses to both physical and chemical predation cues were tested over five days. The results indicated that, for the most part, the concentration of ammonium nitrate did not affect their responses to the two predation cues provided. There was, however, a significant difference in the distance traveled after the physical stimulus in experiment 2 between the 0 mg and 100 mg concentrations ($F_{3, 56}=2.996$; $p<0.05$). While not conclusive, my results indicate that ammonium nitrate can have a negative effect on the interspecies interactions of amphibians inhabiting wetland areas exposed to the pollutant. The use of ammonium nitrate fertilizers in areas where runoff flows into freshwater wetlands should be closely monitored until a definitive answer can be given.

An analysis of the antibacterial properties of the Indian Tulip tree, *Thespesia populnea*, on clinical isolates of *Acinetobacter baumannii*

Carlie H. Dollar

Columbus State University

Abstract

For the past eighty years, antibiotics have been a frontline defense against many common bacterial infections. However, due to the rise in multi-drug resistant bacterial strains, the efficacy of antibiotics is rapidly decreasing. Considering this issue, the search for therapeutic options for bacterial infections is rising in importance. With plants being a potential source of antimicrobial benefit, researchers across the world have been investigating the antimicrobial activity of medicinal plants, specifically those used in traditional or alternative healthcare. In this study, we are investigating the antibacterial potential of extracts of *Thespesia populnea*, a rapid growing evergreen shrub found in tropical areas in South Asia, Africa, and the Pacific Islands, on *Acinetobacter baumannii*, an opportunistic bacterial pathogen known for causing nosocomial infections. *T. populnea* is known for exhibiting antimicrobial properties due to the presence of several phytochemicals, such as flavonoids and tannins, in various extracts of the leaves. Various botanical extracts using different solvents will be analyzed for select phytochemicals and tested on multi-drug resistant (MDR) and non-multi-drug resistant (non-MDR) human wound isolates of *A. baumannii* by measuring minimum inhibitory and bactericidal concentrations. The purpose and hope for this study is to evaluate the efficacy of *T. populnea* extracts in combating antibiotic resistance by serving as an alternative treatment to traditional antibiotics.

The Evolution of Shakespeare

Sidney Ducleroir

Columbus State University

Abstract

The goal of my research was twofold. Prior to this project, I was accustomed to straightforward research papers as a way of collecting and presenting information. With my online portfolio, I was able to compile and process information in a completely new way. During the semester, I collected images, videos, academic articles, my own class notes, my peers' class notes, and reference sites and arranged them in a way that would serve me best in future research endeavors. My main goal was to learn as much as I could about a selection of William Shakespeare's plays and poetry. This project would span the entire semester and allow me the space to explore whatever caught my attention about each play we studied, beginning with Shakespeare's earliest, *The Comedy of Errors*, and ending with his last, *The Tempest*. I took special care to track how his style changed and what themes Shakespeare remained interested in for the entirety of his career. My secondary goal was to approach research accumulation from a new perspective. In this presentation, I will share an overview of my digital portfolio, my research methods, and my sense of Shakespeare's development as a playwright.

Los Temas de Los Artes*DaShaundra T. Fluellen*

Columbus State University

Abstract

The Arts, a general term for paintings, theater, writings, etc., tend to have an overarching theme under which they fall if they were created during the same period, especially if they originated from the same country. Before 1700, modern-day Spain was riddled with cultural influences from the major empires of the time. My research highlights key characteristics that are similar between painting and theater depictions and provides evidence for the argument that neither would have been as effective as representations of culture without the other.

How Live Music Can Survive in The Digital Age “Did you hear that _____ is performing?”

Daniel Gallardo

Columbus State University

Abstract

In this poster, I argue that live music events are able to continue to occur in this recent digital age of live streaming with the anticipation of experiencing brand new music through live streaming or live performance and seeing an artist that was once cut off from his audience due to the global pandemic. Examples included to convey this message are Kanye West's Donda Listening Party, Day N Vegas with Kendrick Lamar, and Coachella to name a few modern examples.

Medicinal Plants of Andros*Matthew F. Gilbert & Carlie H. Dollar*

Columbus State University

Abstract

Several medicinal plant taxa on Andros Island used by natives in local "Bush Medicine" were collected and tested for antibiotic properties.

Media In Modern Business

Spencer A. Gilland

Columbus State University

Abstract

I have created a short documentary film exploring the need for modern businesses to become a media business as well. This includes branching out on to platforms such as Instagram, Twitter, or even Tik Tok. We live in a digital age, and it is necessary for these businesses to adapt to that in order to reach a larger audience and create more staying power.

Chemical Investigations of Pasaquan and Interdisciplinary Paint Restoration

Cydnee A. Harrison

Columbus State University

Abstract

It has been three years since the complete, multi-million-dollar restoration of Pasaquan (Buena Vista, GA). Since then, there have been a number of dramatic changes in the painted facade on the outdoor structures, walls, and sculptural forms. The paint appears to be fading over time. In February 2018, Parma Conservation, the conservation group that painted and prepared the paint for the Pasaquan restoration, submitted an initial report regarding the paint changes. The Parma Conservation report was inconclusive, and the solutions that were recommended were executed but did not garner positive results. It was suspected that the harsh conditions and environmental factors, such as sunlight, rain, and heat, contributed to the cause of these exterior refrescos not maintaining its longevity.

Researchers at Columbus State University (Columbus, GA) executed a thorough chemical analysis of the paint at Pasaquan to obtain a more definitive understanding of the chemistry at the site. Through designed experiments, conclusive evidence was gathered indicating where and what exactly is happening to the paint at Pasaquan. A vast range of chemical analysis was conducted for this research, including X-ray diffraction (XRD), X-ray fluorescence (XRF), energy-dispersive X-ray spectrometry in the scanning electron microscope (SEM-EDS), Mass Spectrometry (MS), and Elemental Analysis (EA), to provide complete insight into the issues on the surface of Pasaquan. These tests helped determine if the atmospheric conditions are causing some of the pigments to oxidize and if the pigments are actually not binding with the binder. The amount of pigment, binder, and Ethylene Glycol were examined, in order to determine a mixture

that withstands these environmental conditions to a greater extent than the currently used mixture. The aim is to help Pasaquan understand why the paints used are not being maintained and to propose a solution for conservation.

The Potcake's of Andros

Erin R. Hayes, Kristina Armstrong & Jamarius Walker

Columbus State University

Abstract

A study taken over the General Health of a mixed breed in the Bahamas known as potcakes.

Potcakes are a mixed breed predominantly found in the Bahamas.

The Effect of Home Infrastructure on Fecal Coliform in the Water of Local Communities

Asia S. Hill

Columbus State University

Abstract

The Effect of Home Infrastructure on Fecal Coliform in the Water of Local Communities

Typhoid Fever, Cholera, and Hepatitis A are a few of the many waterborne diseases that impact public health. These diseases are the deadly product of contaminated water. Millions contract these illnesses every year due to consumption of or bathing in poor quality water. Aging and poorly maintained sewage infrastructure is the main contributor to the spread of these diseases.

In this study, I predict the hypothesis that lower socioeconomic communities are exposed to poor surface water quality due to improperly treated sewage, septic tanks, and pipelines within their homes that drain into local water systems relative to those in higher socioeconomic communities.

I test this hypothesis by comparing fecal coliform levels in an urban stream with home values that are adjacent to the stream after controlling for the position in the watershed. Preliminary results suggest that fecal coliform levels tend to be higher in lower socioeconomic communities.

Gestural Control of Music

Riley J. Hinson

Columbus State University

Abstract

The French company Enhancia recently released a wearable wireless device called the Neova Ring that expands gestural control possibilities for keyboard players. My research takes this device and transforms it into its own gestural musical instrument.

To demonstrate the possibilities of this new instrument, I have composed and will perform a new musical work using this ring. This composition was completed in the Max programming environment and makes use of a variety of technologies including MIDI, USB, digital sound synthesis, recording, sequencing, and advanced signal processing algorithms. I have also prepared a musical score using alternative graphic notation, so others may perform the piece and explore the expressive possibilities of gestural control.

**Invertebrate Species Richness and Diversity in Tidal Pools of Money Point, Andros Island,
The Bahamas**

Andrew C. Holmes, Marc A. Pierre & Rajvi Desai

Columbus State University

Abstract

Island biogeography theory outlines the effect both the size and location of an island, relative to a source, has on its immigration. Islands that are closer or larger have greater immigration rates, and thus higher species diversity and richness, compared to those that are smaller or further away. For this study, we are applying this concept to tidal pools located in Money Point, Andros Island, The Bahamas. In this case, the pools closer to the ocean will function as closer islands, as well as those pools that are larger will naturally be larger islands. To do this, we plan to establish a 30 m transect outwards towards the water, with it being divided into three 10 m zones. Each zone represents the three tidal zones, these being the high tide region, mid-tide region, and low tide region. Within each zone, we would further extend from the transect line 8 m on each side, creating three 160 m² rectangles. Within each rectangle, we will randomly sample water from 15 pools, both counting and identifying the species present in the sample. These will be used to later determine the species richness and species diversity of the different tidal regions. Based on island biogeography theory, we predict the low tide region will have significantly greater species richness and species diversity than both the high and mid-tide regions. This is primarily due to the low tide region being closer to the ocean, which is the source in this study.

Understanding the Weather Photobook Project

Donald W. Jablonski

Columbus State University

Abstract

Weather is more than just looking it up to figure out if you need to bring your umbrella with you to work. The weather is more complex and exciting than what we see on the local news. This project will bring together science and what we see in the sky and help explain what is happening in the sky. The data being used to explain the weather in these photos will be from meteograms taken from the Columbus airport and will also use skew-T diagrams taken at Peachtree City, GA. The data will show how the moisture and clouds are at various altitudes. The photos and data will provide a combined view of the weather at that given time.

Identifying Supernova Remnants in the Large Magellanic Cloud

Devin A. Janeway & Kaylee E. Linge

Columbus State University

Abstract

Supernova Remnants (SNRs) are the gaseous clouds left behind after the explosion of a star. These events create most of the naturally occurring elements heavier than carbon, as well as creating cavities of hot gas in the surrounding interstellar space. The neighboring galaxy of the Large Magellanic Cloud (LMC) provides a broad sample of SNRs at a common distance, but it is likely that some of the older, fainter examples have yet to be discovered. We will compare newly obtained optical data at sulfur [SII] wavelengths with hydrogen (H-alpha), radio, and X-ray data to identify SNRs and deduce key features. We will investigate SNR properties such as explosion type, the expansion and behavior of hot gas in comparison to the optical structure, and interaction with the surroundings. We will compare any newly discovered SNRs with the older cataloged population to determine notable differences such as the influence of late-stage evolution or obscuring foreground material. Our findings will provide a more complete catalog of LMC SNRs and enhance our understanding of the later, less studied stages of SNR development.

Classroom Management: Redirecting Behavior

Jasmine R. Johns

Columbus State University

Abstract

Behavior management is a common concern for preservice elementary education teachers. In my ELEM 4217 course we engaged in an action research project where we investigated one area of behavior management over the course of eight weeks. While in a local elementary school I interviewed my cooperating teacher, observed behavior management techniques, and kept a daily journal. I then implemented a redirection strategy for behavior that was not conducive to the classroom. In doing so students changed their behavior while employing non-punitive methods. Reducing the amount of downtime students were exposed to was a dependent variable and choosing when to intervene is an independent variable in the implementation of this research.

A Comparison of Temporal Influences on Abiotic Factors in Aquatic Ecosystems

Lydia Jones, Vanisha Strahota & Jacob Woessner

Columbus State University

Abstract

Light attenuation and temperature in ponds and streams influence productivity rates in aquatic food webs because primary producers are the foundation of aquatic food webs and depend on sunlight and temperature. The purpose of this research is to determine the importance of abiotic factors on a pond and a stream to highlight variation in ecosystem characteristics. In this study, we examined the abiotic factors in a stream and a pond found in a secondary forest of west-central Georgia. This forest consists of hardwoods, pines, a permanent reservoir with an area of 2000 square meters, and temporary lowland streams. We measured light attenuation and temperature at increasing depths in the pond and compared it to an equivalent depth within the stream using continuously recording light temperature probes. We hypothesize that seasonal variations will lead to an increase in temperature and light. We also hypothesized that the abiotic environment of the stream would be more similar to the abiotic environment of the pond surface in comparison to the deeper pond depths.

We expect to find that light and temperature will decrease with increasing depth in the pond. Our results will contribute to a better understanding of the effects that light attenuation and seasonal variation have on a pond and stream through examination of the properties within each habitat. This information will serve in ecological conservation efforts to support healthy populations of primary producers that benefit organisms throughout the food web of freshwater ecosystems.

The Cultural Poetics of Characters in Selected Works of William Shakespeare

Kailey L. Katzfey

Columbus State University

Abstract

How did the society and environment surrounding William Shakespeare influence his works and characters? Does learning about these cultural and historical contexts truly help students better understand the world of Shakespeare? I, under the mentorship of Dr. Susan Hrach, studied and analyzed five of William Shakespeare's works, *The Comedy of Errors*, *Henry V*, *Othello*, "Venus and Adonis," and *The Tempest*. For each work, I completed a set of daily activities, surrounding history, and a complete character analysis on a character of my choice – all coming together in an online portfolio. Through my research, I discovered connections between the history and the characters that were influenced by it. Ariel, a spirit in *The Tempest*, is greatly influenced by the view of spirits during the Elizabethan era: elements of nature that could be controlled. And *Othello* speaks to the perception and attitude towards Africans in Elizabethan England (and Europe). With his works and performances, William Shakespeare wanted to transport audiences into alternative worlds, to use other times and places as reflections of his own time and place. And Elizabethan audiences would have understood the references, the language, the history behind these works, but modern audiences are often stumped. Through research, analysis, and a little time, we can grasp the words that Shakespeare penned and may even begin to feel the wooden bench under us as we watch the play unfold.

Applying Multi-Thematic Units in The Classroom: A Powerful Tool for Teachers

Rachel L. Kennedy, Alivia Stewart, Leah Poyotte & Landon Averett

Columbus State University

Abstract

This presentation focuses on the impact that completing a multi-thematic, multi-class project has on a pre-service teacher's future practices. A survey was conducted among a group of pre-service teachers who participated in a multi-thematic, multi-class project. A series of open-ended questions relating to; benefits, advantages, disadvantages, and thoughts on use of multi-thematic units in a special education setting were conducted among the group. Based on the pre-service teacher's responses, it is predicted the data collected will suggest; a common theme and notions among pre-service teachers' feelings surrounding the impact of having multi-thematic, multi-class projects blended in their future practices.

A Comparison of Liver Histopathological Features Between Spotted bass (*Micropterus punctulatus*) and Largemouth bass (*Micropterus salmoides*) from Lake Oliver

Nameera N. Khan

Columbus State University

Abstract

The detrimental effects of pollutants on the health of aquatic organisms have been a longstanding environmental issue. Several studies have analyzed the effects of environmental stressors, specifically pollution, through the analysis of histopathological markers. This study will further expand on research that has already been conducted on the detrimental effects of toxins on the livers of fish species. Specifically, the main goal of this study is to compare the harmful effects of toxins on the livers of Largemouth bass (*Micropterus salmoides*) and Spotted bass (*Micropterus punctulatus*) fish species found in Lake Oliver, Chattahoochee River, GA. The severity of tissue damage among both males and females in both fish species will also be compared. The impact of these toxins on fish liver health will be analyzed by looking at histopathological parameters such as cytoplasmic degeneration, cellular hypertrophy, fibrosis, and necrosis. Hematoxylin and eosin (H&E) stain along with the reticulin stain will be used in order to further identify the histopathological characteristics of the liver samples. Liver tissue damage from the specimens will be categorized using a scoring system based on their degree of tissue change (DTC). Higher DTC scores can potentially be correlated to increasing levels of toxicity. Ultimately, a higher score can indicate a decrease in the functionality of the liver tissue and have an impact on fish health.

Building a Photometric Science Pipeline at CSU's WestRock Observatory

Samuel C. Kimball, Olivia Motin, Trinity Smith, Anaja Houston, Joy Flowers & Sabrina Fisher

Columbus State University

Abstract

Working with the WestRock Observatory and the Planewave 24 inch CDK telescope, a science pipeline is being built to better compare our data with other observatories around the world, allowing us to remove local biases. A pipeline is a step-by-step sequence by which we as scientists process data automatically using software packages and programming languages, such as Python, to automate the calibration process of our data. Developing a science pipeline to contribute to variable star observations requires a deep understanding of the instruments used to collect data and finding methods to remove any local bias. Through this pipeline we are trying to make science data from the WestRock Observatory comparable to other observatories and telescopes.

Financial Literacy: The Effects of Geography and Demographics on Financial Literacy

Kiera A. King, Selina Budde & Michelle Lamorte

Columbus State University

Abstract

This study explored the effects of geography, specifically the United States regions, and demographics, on financial literacy. To investigate this, we used datasets provided by the FINRA Investor Education Foundation and statistical analysis to determine gender effects on processing financial information and making financial decisions.

Composites with Beta-Sheet Polymers

Dominic S. Koh

Columbus State University

Abstract

A soluble polymer containing beta sheets was synthesized using a combination of ring opening and emulsion polymerization. In order to synthesize a polymer that contains beta sheets, L-valine was used to create polyvaline. The N-carboxyanhydride form of valine (NCA-valine) was synthesized under an inert atmosphere, and purification was performed by precipitation followed by recrystallization. Purity was checked using proton nuclear magnetic resonance and infrared spectroscopy. Polymerization of the monomer was performed in an emulsion by adding NCA-valine to an aqueous solution containing surfactant, with initiation by a tertiary amine. To the formed beta sheets located in the micelles, methyl methacrylate was added as a monomer and polymerized to form polymer nanocomposites consisting of beta sheets of lysine surrounded by polymethylmethacrylate. Dynamic light scattering was used to determine the size of the nanocomposites and gel permeation chromatography was used to determine their approximate molecular weight.

Voting in Georgia: Equal Access and Opportunity Costs

Julia J. Lawyer

Columbus State University

Abstract

Voting is considered to be the cornerstone of a freely elected democratic government. The government that is formed from these elections is representative, not of all eligible citizens, but of all registered and engaged voters. Thus, not only is there a need to have equal legal access to vote but also equality for voting cost in time and effort. The state of Georgia is one of the few in the nation that request racial/ethnic data when registering to vote and this provides a unique opportunity to uncover racial differences in voting behavior. In 2020, 30% of registered voters were Black and 52.7% were white. However, the percent of total voter turnout by race for the same year was 27.3% Black and 58.2% white (Greenbaum et al., 2021). This difference between the percentage of registered voters by race and percent of total voter turnout of -2.7% for Black people and +7.5% for whites needs to be examined to determine if the cost of voting is unequal for different racial groups in Georgia. This paper uses rational-choice theory to explore possible structural inequalities in voting access within Georgia. Our goal is to raise awareness about existing discrepancies in voting behavior and the possible racial effects of recently enacted laws. Suggestions will be provided for practical interventions to maximize voter engagement using conceptual mapping of interrelated factors through the examination of the calculus of voting equation, $PB+D>C$ ((P)robability their vote will matter "times" the (B)enefit of their preferred candidate winning combined with the feeling of civic (D)uty, must be greater than the (C)ost of voting) (Blais et al., 2000).

A comparison of age and growth characteristics between 24-hour and maximum mean annual thermal gradients for Black Crappie (*Pomoxis nigromaculatus*)

Elva Y. Lucero

Columbus State University

Abstract

Little is known about how fish age and growth respond to climate change. Managing our fisheries in a changing climate requires us to describe how fish age and growth characteristics (size at age, longevity, growth rate, etc.) change across a thermal gradient, but these data exist for only a few species. We focused on the Black Crappie (*Pomoxis nigromaculatus*) and our goal was to compare how the age and their growth characteristics differ between 24 hours mean annual temperature (MAT(24hr) °C) and maximum mean annual temperature (MAT(Max) °C). The geographical range of the Black Crappie extends across a thermal gradient spanning 18.9°C MAT from Florida (21.3°C) to Canada (2.4°C). The thermal data gathered for the MAT(24hr) °C and MAT(Max) °C were generated from the National Oceanic Atmospheric Administration (NOAA). The age and growth data of the Black Crappie were gathered from the published literature and consist of geographic locations, sample size, age, and total length. We examined the relationships among MAT(24hr) / MAT(Max) °C and longevity, maximum total length (MTL), and total lengths at ages 3, 4, and 6 years of chronological age. Using least squares regression, we found significant positive relationships among MAT(24hr) / MAT(Max) °C and total length for ages 3, 4, and 6 years old, but a significant negative relationship between longevity with MAT(24hr) / MAT(Max) °C. There was no significant relationship between MTL and MAT(24hr) / MAT(Max) °C as has been reported for other species. While the significant relationships remained the same between MAT(24hr) / MAT(Max) °C, we found that

MAT(Max) °C has a 5°C temperature difference compared to those relationships with MAT(24hr) °C. We found no evidence of reduced growth at high temperatures. However, Black Crappie in warm climates exhibited a shorter lifespan. We suggest that fish have differential responses to climate change when our data from Black Crappie are compared to the same kinds of tests performed for other species in the published literature. Future fisheries managers will need to consider that fishes respond to a thermal gradient in different ways.

Pre-Ejaculation Putting Women At Risk For Pregnancy

Shaylyn Marshall & Kiara Owens

Columbus State University

Abstract

Women getting pregnant by pre-ejaculatory fluid has been one of the most surprising facts students have heard regarding sexual health. Despite the development of condoms, birth control pills, vasectomy, hysterectomy, and fertility awareness method the withdrawal method, also called the pull-out method, is still commonly used today. There have been questions among all students concerning if a woman can become pregnant by pre-ejaculatory fluid. Pre-ejaculation fluid, also known as pre-cum, is released from the male's penis when aroused and before ejaculation. Pre-ejaculatory fluid is released involuntarily from glands connected to the penis and has two main functions. It is supposed to clean the male's urethra when aroused, and it acts as a natural lubricant during sexual intercourse. Many studies have proven there are motile spermatozoa present in some males' pre-ejaculatory fluid. This means using the withdrawal method or the pull-out method is not 100% at pregnancy prevention; it surprisingly can pose a risk for unintended pregnancy. The purpose of our presentation is to educate all students about pre-ejaculatory fluid and its result on women becoming pregnant. Our goal is to inform all students about pre cum and educate them about more effective forms of birth control other than the delayed withdrawal method.

Keywords: Conception, Male Ejaculatory fluid, Spermatozoa, and Pregnancy

Servant Leadership in Action: Creating a Lasting Impact in the Highland Community

Laura F. McKenna, Billy Daffin, JJ Harrison, Riley Higgins, Nameera Khan, Liz Laneche, Tyisha Langers, Shaylyn Marshall, Josh Mellman, Kyla Mims, Kealan Neal-Farr, Anthonia Oludimimu, Curtis Walker, Tamera Wilkerson & Sarah Grace Womack

Columbus State University

Abstract

The 2022 senior class of the undergraduate Servant Leadership Program defined servant leadership as the innate desire to serve others with a commitment to their autonomy and growth as servants. When searching for ways to apply this definition, we became connected with the Highland Community. Through our collaboration with organizations in the Highland Community, we have helped make a long-lasting impact on the residents, specifically through volunteer events, donations, and community programs. We have created a project to which we have applied the critical thinking, problem solving, and decision-making skills developed in previous LEAD courses to a real-world setting.

During our senior project, we have worked alongside MercyMed Columbus, Truth Spring Academy, and The Food Mill. These organizations are committed to supporting the needs of residents in the Highland Community in the areas of well-being, nutrition, education, and food scarcity. We have volunteered at the MercyMed Farm, which provides fresh produce to residents of the Highland Community in exchange for meal benefits programs. We have also provided cooking kits for the participants of MercyMed's wellness programs that will allow them to be more self-sufficient in maintaining healthy cooking and eating habits. Additionally, we have hosted a large-scale community event in partnership with Truth Spring Academy to promote healthy eating habits, literacy, and the awareness of resources. At The Food Mill, we assembled

bags of food for distribution and assisted in the development of medically tailored meals. We set out with the goal to make a lasting impact in the Highland Community, and we believe we have achieved that!

Historical Anti-Semitic Rhetoric in 9/11 Conspiracy Theories

Bailey Melton

Columbus State University

Abstract

After the terrorist attacks of September 11, 2001 (9/11), conspiracists were quick to generate backlash against the official narrative of the U.S. government; a narrative that placed the blame of the attacks on the terrorist group al-Qa'ida, led by Osama bin Laden. While there is an enormous quantity of evidence to support the U.S.'s stance, in addition to al-Qa'ida claiming responsibility, this has not stopped anti-Semitic conspiracists from claiming that Jews were behind the 9/11 attacks. Some of these conspiracists also claim that Israel played a large part in carrying out the attacks, but even these claims are built upon historical anti-Semitic rhetoric rather than any evidence. These conspiracies, far from being unique, are built particularly on the anti-Semitic writings of previous eras, particularly *The Protocols of the Elders of Zion*. These conspiracies claim that the Jewish desire for financial, militaristic, and world domination compels Jews to create chaos, and the presentation will demonstrate that these claims are very prominent in 9/11 conspiracies. These anti-Semitic conspiracies, which are continually updated to fit current events, continue to make their way mainstream, and a renewed and united effort needs to be carried out to dismantle these conspiracists and their platforms.

Topography and its statistical relationship with Thunderstorm Intensity

Michael S. Mertens

Columbus State University

Abstract

The main purpose of this research is to define the statistical relationship between the topography of the Hudson River Valley and thunderstorm cell intensity through analyzing the radar data of the region. A method of comparison is derived so that the same process can be extrapolated to other regions. The methodology used to extract radar data from thunderstorms is through the Weather and Climate Toolkit Service, which is a national standard of collecting weather information. There are three main variables that are being examined from the weather toolkit, and they are Correlation Coefficient (CC), Differential Reflectivity(ZDR), and Specific Differential Phase(KDP). These three variables are extracted for a box of 0.01 degrees longitude by 0.01 degrees latitude around the storm centroid for all radar sweeps up to an elevation of 5 kilometers. Correlations are computed between the land's elevation at the storm centroid point and each of these variables for 20-time steps crossing the Hudson River Valley. What is expected to be seen is a positive relationship between the change in elevation, and thunderstorm intensity.

Compassion Fatigue and Compassion Satisfaction in Nurses: Examination of Intervention

Approaches

Ivey B. Milam & Taylor M. Mattson

Columbus State University

Abstract

PI(C)O Question: Do nurses suffering from compassion fatigue and burnout (P) significantly benefit from self-care and educational practices (I), as measured by reports of increased compassion satisfaction and decreased compassion fatigue and burnout (O)?

Definition of Problem: Compassion fatigue is the exhaustion of one's empathy and emotional resources for patients while burnout results from a combination of factors that exhaust a nurse's coping abilities for the stressors of work (Yilmazer et al., 2020).

Methods: Nursing databases were searched using the key terms "nursing" plus "compassion fatigue," "burnout," and "emotional exhaustion." Results were filtered using options for "full text" and "scholarly, peer-reviewed journal articles" only. No studies chosen were over five years since publication.

Results: Copeland (2021) found a significant reduction in compassion fatigue and burnout due to five-minute interventions during a break period at work. Zhang et al. (2018) revealed a moderately strong positive correlation between stress and compassion fatigue and a weak negative correlation between compassion fatigue and compassion satisfaction. Esposito et al. (2021) found that pairing nurses together when caring for COVID-19 patients reflected safer nursing practices for the patients. Cao and others (2021) revealed that nurses need to develop healthy coping strategies to increase empathy and resilience, with adaptive coping to increase

compassion satisfaction and lower compassion fatigue. Yilmazer and others found that dance and movement therapy methods (DMTM) helped mediate burnout and compassion fatigue.

Conclusions: It is vital to identify methods of reducing compassion fatigue and burnout of nurses, along with increasing their sense of compassion satisfaction.

Keywords: Five-minute interventions, nursing practices, coping strategies, dance and movement therapy, compassion fatigue, burnout, compassion satisfaction, support

The Awakening: Race, Space, and Social Mobilization

Madison D. Miller

Columbus State University

Abstract

This paper examines the topics of race and class disparities using an ethnographic study of The Lathrop Preservation Campaign (LPC) in Chicago. The LPC was a grassroots mobilization effort by public housing residents and organizers to protect the Lathrop Homes development from being demolished and turned into a mixed-income community. This study integrates the personal interviews of participants and observations of the Lathrop Preservation Campaign to analyze how race and class disparities are incorporated into public issues—specifically low-income housing. Participants were asked open-ended questions to help understand their involvement with the LPC and how the topics of race influenced their mobilization efforts to save subsidized housing in Chicago. The research finds that the #BlackLivesMatters movement provided an environment where LPC participants felt comfortable talking about issues of race and engaging in new forms of social mobilization, like acts of civil disobedience to save public housing.

The Impact of Celiac Disease on Pregnancy Outcomes

Kyla A. Mims, Chelsea Nguyen & Alex Yarborough

Columbus State University

Abstract

Background: Celiac disease is a common autoimmune condition that results in damage of the lining of the small intestine secondary to ingestion of gluten. Estimated to affect about 1 in 100 people worldwide, this disease has been linked to multiple medical complications, including adverse pregnancy outcomes.

Objective: The objective of this study is to examine the effect of celiac disease on pregnancy outcomes (i.e., chance of pregnancy, live and stillbirths, induced and spontaneous abortions or miscarriages, and molar and ectopic pregnancies).

Methods: Using databases, such as Biomed Central Public Health, PubMed, GALILEO, and Google Scholar, we will collect and synthesize data from peer-reviewed sources to assess the history, epidemiology, occurrence, cause, and results of celiac disease in pregnant women.

Results: It is hypothesized that women with celiac disease will have increased risk of adverse pregnancy outcomes, including, but not limited to, low birth weight, threatened abortion, and premature delivery. With each generation, celiac disease is becoming more common, which motions for more women to adhere to a strict gluten-free diet in order to prevent disruption in the small intestine and subsequent pregnancy complications.

Conclusion: Undiagnosed celiac disease may affect overall female reproduction. The influence of celiac disease is most apparent on the early detection of the disease in high-risk groups to reduce adverse pregnancy outcomes, such as new public health screening guidelines for women who are currently pregnant or planning to conceive.

The Impact of Socioeconomic Status on Perception of Opioid Use

Kyla Mims, Sara Halilhodžić, & Jessica Zaw

Columbus State University

Abstract

Background: Unintentional drug overdoses serve as one of the leading causes of death in America, with several studies demonstrating a significant relationship between a community's socioeconomic status and prevalence of opioid use, injuries, and fatalities. However, there is minimal research exploring the impact of socioeconomic status on residential perception of opioid use within these communities.

Objective: To examine the impact of socioeconomic status, defined in terms of poverty, income, occupation, and educational attainment, on perception of opioid use within a given community.

Methods: This study will assess perceptions of opioid use among residents of Columbus, Muscogee County, GA. Using the Community Assessment for Public Health Emergency Response (CASPER), we will survey residents living in two socioeconomically distinct zip codes (31907 and 31903) in Muscogee County on their knowledge and perception of opioids in Spring 2022. Data obtained will be analyzed using basic descriptives, t-tests, and chi-square through SPSS version 27.

Results: It is hypothesized that residents of lower socioeconomic status areas will be more likely to perceive opioid use as problematic within their community than residents of high socioeconomic status areas. We expect to find that residents of zip code 31903 will be more likely to view opioids as a problem within the community than residents of 31907.

Conclusion: Results from this study bring attention to the connection between educational attainment, poverty, income, occupation, and perception of opioid use among these groups,

providing additional foundation for the development of effective community-specific interventions.

Preliminary Observations of Variable Star Fields in Comparison to Standard Stars

Sharmaine O. Motin, Samuel Kimball, Trinity Smith, Joy Flowers, Sabrina Fisher & Anaja

Houston

Columbus State University

Abstract

It is often thought that every telescope is the same. Although some of the functions they perform are similar, for instance; locating stars and formulating data on the star, they are not the same.

This is a bias that we must calculate for, since telescopes have different apertures and may even see light in different wavelengths. A telescope has several components, including light-gathering ability and resolution, which extend the user's vision: light-gathering power enables us to see faint objects, and resolution facilitates a closer look at tiny detail.

Using a new calibration process (photometric science pipeline) at WestRock Observatory, a Columbus State University 2022 Spring Space Grant group is currently validating new observations with previous data from the observatory's Planewave 24-inch CDK. During this validation process current data will be compared with data from other telescopes taken in the same time frame to confirm and adjust improvements in the photometric science pipeline. We obtain this data by using the photometric broadband filters(UBVRI) to see standard stars, whose apparent brightness stays the same over time, and variable stars, whose apparent brightness varies over time due to internal instabilities, companion stars, etc. With these results we hope to improve our offsets from other instruments and the scientific data at WestRock Observatory to allow for more expansive scientific observations in the future.

Influenza Infection Disparities in U.S. Minority Populations

Chelsea T. Nguyen, Siara Luster & Kyla Mims

Columbus State University

Abstract

Background: Influenza, also known as the flu, is a communicable respiratory illness caused by influenza viruses, which can infect the upper and lower respiratory tract. The Centers for Disease Control and Prevention have identified multiple groups at higher risk of influenza infections and complications, including racial and ethnic minority populations.

Objective: The aim of this study is to present information of the occurrence, cause, and results of disparities in influenza infections of U.S. racial and ethnic minority populations.

Methods: Using databases, such as Biomed Central Public Health, PubMed, GALILEO, Google Scholar, and Centers for Disease Control and Prevention, we will collect and synthesize data from multiple peer-reviewed sources to assess disparities in influenza infection rates, complications, treatments, and outcomes within U.S. racial and ethnic minority populations.

Results: From the data that will be collected and reviewed, the results on the cause(s) and disparities of influenza infections will be determined. We hypothesize that people in minority populations are at a higher risk for influenza infections and complications.

Conclusion: A multifaceted approach that combines the increase of influenza vaccination rates, collection of data on disparities in minorities, and the development of programs that increase vaccination access and uptake should be implemented in non-Hispanic Black and Hispanic populations to prevent and reduce disparities in influenza infections.

The Legacy of September 11th, 2001 in U.S. Schools

Abbigail F. Parker

Columbus State University

Abstract

The terrorist attacks that took place on September 11th, 2001 (9/11) happened twenty years ago, and an entire generation of American young people were born and have grown up in the shadow of the attacks. For Americans that remember the attacks, most will never forget what they went through that tragic day; but this new generation that has only grown up in a post 9/11 world knows little to nothing about the event that has affected their whole life. Students may only learn about the attacks from family members' stories about the events because 9/11 is not widely discussed in school.

This presentation will consider school curriculum and educational standards for history classes in the United States as they relate to the events of 9/11. It will discuss how these standards vary from state to state and will demonstrate that the way September 11th is taught in classrooms varies even more. Teachers sometimes have a hard time teaching students about 9/11 and the aftermath because their standards do not include the events, or there is not enough time to get through all of U.S. and World History in a single school year. Sixteen out of fifty states do not include any standard in their history curriculum that discusses 9/11. This presentation discusses some of the reasons why 9/11 is not discussed in schools, the issues at stake when it is discussed, and how the educational standards referring to the events are widely different across the United States.

Analysis of the HSP33 Gene Function in *Saccharomyces cerevisiae*

Sneha Rajeev

Columbus State University

Abstract

The Yeast ORFan Gene Project is an association of undergraduate researchers and faculty who coordinate resources and design strategies to assign molecular functions to genes of unknown function in baker's yeast (*Saccharomyces cerevisiae*). My project studies the HSP33 yeast gene which is related to the PARK7 gene in humans. Mutations in the PARK 7 gene correspond to the development of Parkinson's disease. Yeast models can be used to study neurodegenerative diseases because the cellular pathways associated with neurodegeneration are highly conserved. The function of the HSP33 gene is not completely known so we have used online bioinformatics tools such as multiple sequence alignment, conserved domain identification, and signal sequence prediction in order to determine the function of the gene. Results showed that the HSP33 gene function is related to the stress response of the protein degradation pathway. I found that the protein created from the HSP33 gene likely localizes in the cytoplasm. In addition, the HSP32 and SNO4 genes in yeast constantly interact with HSP33 and have similar gene expression so they may have related functions. Yeast is also amenable to genomic manipulations such as gene knockout, which replaces a gene of interest with a selectable marker, allowing for analysis of the HSP33 gene function. In an ongoing research project, I am studying the effect of single gene knockouts on yeast mitochondrial structure and function in order to learn more about the HSP33 gene. We hypothesize that the transformed HSP33 yeast will have lower mitochondrial activity compared to parental yeast strains. Through this research, we hope to broaden our understanding of the cellular pathways associated with neurodegeneration in yeast and humans.

The Effects of Air Pollutants on Human Populations

Ethan W. Rieck, Rashalyn Smith & Jennifer Thompson

Columbus State University

Abstract

With the onset of the industrial revolution in the late 18th century, humanity moved away from farms and small towns of the countryside and into massive cities. With this came a new slew of social, economic and environmental concerns that people would now have to face. One of the most pressing matters would be the massive amount of pollutants that were being pumped out of big industrial centers into the land, water, and air. Many of these issues would not be addressed until much later and therefore would create irreversible effects that we are still experiencing today. The carbon emissions and air particulates released by major cities have had seriously adverse effects on both the health of the people living in them and the atmosphere around them. Certain gasses and air particulates such as have been shown to be a major cause of a list of noninfectious diseases with an emphasis on cardiovascular and respiratory issues. These gasses include but are not limited to Nitrogen Oxide, Sulfur Dioxide, and Ozone as well as air particulates such as halocarbons, heavy metals, and other carbon-based particulates. Most of these are created by the combustion of carbon-based fuels from sources such as factories and motor vehicles. While some of the effects of the release of these gasses and particulates are irreversible, there are still some actions that can be taken to limit the amount of pollution that is put into the air and to help counteract the effects of this pollution.

Targeting Excessive Screen Time in Children Through Stress-Reducing After School Programs

Ebony Robinson, Kamaya Foster, Serenity Freeman & Carmen Upshaw

Columbus State University

Abstract

In this study, we will expand upon the current research literature on screen time exposure in children by examining ways to reduce their stress levels. We aim to do this by targeting children's screen time usage and promoting a healthier lifestyle. This intervention will be based on two components of the Health Belief Model: benefits and barriers. Our intervention will focus on educating children and their parents about the benefits of engaging in less screen time. We plan to target elementary schools in Columbus, GA by offering technology-free after school programs which are offered year-round. This eliminates the barriers of children engaging in screen time while their parents are at work. Everyone who participates in this program will receive information about the benefits and drawbacks of excessive screen time for children, as well as ways in which less screen time is associated with reduced stress in children.

Synthesis and activity of Pd/alumina catalysts for methane combustion under stoichiometric conditions

Imani A. Rogers, Kristina Armstrong & Austin Clance

Columbus State University

Abstract

Catalytic combustion of methane at low temperatures under stoichiometric conditions is relevant for energy utilization and pollution control. A Pd catalyst (4.0% Pd) on a gamma-alumina support was prepared by a slurry-incipient wetness -vortex method. The catalyst was calcined at 500 0C and 850 0C to study the effect of calcination temperature on methane conversion. The activity (% conversion of methane) of each catalyst was determined in a fixed-bed temperature-controlled catalytic reactor by flowing a gas mix (1% methane, 2% oxygen and balanced nitrogen) for 45-60 min at 250-400 0C. The catalyst calcined at 500 0C showed little activity below 275 0C, and activity increasing steadily from 32 % at 300 0C to 100% at 375 0C. The light-off temperature was at 300 0C. The activity of the catalyst calcined at 850 0C is under study. The effect of calcination temperature will be presented.

Effects of Turtle Grass Density on Invertebrate Diversity

Imani A. Rogers & Brianna Sattinger

Columbus State University

Abstract

Thalassia testudinum or Turtle grass, is a marine species of seagrass that grows in shallow waters on the coast. Turtle grass meadows provide important habitats and feeding grounds for many marine animals. The purpose of this study was to determine human activities that decrease turtle grass densities, such as boats and water vehicles, could have a negative impact on diversity of invertebrate species within turtle grass in Andros Island, Bahamas.

**Reimagining the Dead, Beautiful Woman Trope: Mary Shelley's Feminist Vision in
Frankenstein**

Leora Rogerson

Columbus State University

Abstract

Feminism is not usually associated with Mary Shelley's *Frankenstein* because the female characters do not play the kind of roles expected in a Feminist story. In my presentation I will demonstrate how *Frankenstein* can be interpreted as a Feminist work. It is often forgotten that there are two sides to feminism; uplifting women to equality cannot be done without correcting the behavior of the patriarchy. *Frankenstein* is considered a feminist work because it does the latter.

Historic Westville Museum Spanish Translation Project

Marta Sanchez Lozada, Ana Turner & Esmirna Vital-Vences

Columbus State University

Abstract

In order to provide a better understanding of the artifacts from the 1800s of the Historic Westville Living History Museum to the visiting parties, the translations of panels and audio tours have been undertaken by students of SPAN 31671 - Introduction to Spanish Linguistics class. The connection between the students of linguistics was possible because of communication from the staff of the museum and the language department. The Spanish linguistics class took a field trip to the museum where they were guided by the museum staff and reenactors to observe the artifacts and practice of that time. The students took notes and asked questions to gain a cultural context, and they took pictures of the panels and signage for translation. This information along with the use of technical dictionaries, historical research, and a peer review process was used to determine the correct translation through a clear and precise interpretation of the material. The challenge of this translation is found in the historical use of language as it relates to the evolution of machinery and factory production, agriculture, and other historical practices of the southern culture era. The students were able to effectively translate the materials so that the translations can be used by visiting Spanish speakers to the Historic Westville Museum.

Cause and Effect Behavior Management Strategy

Jennifer M. Shult & Sydney Offenback

Columbus State University

Abstract

Preservice teachers tend to struggle with classroom management. Due to this, we conducted a research project in our ELEM 4217 course where we collected observations, daily journals, and discussions with our cooperating teacher about classroom management strategies. From this we learned and observed a cause-and-effect strategy for managing effective classrooms. This strategy highlights the cause-and-effect relationship of students' actions. We observed our cooperating teacher using this strategy in the following ways: tickets out the door, class store, and flexible seating. These strategies promoted positive effects for students' actions in the classroom while simultaneously deferring away from negative behaviors. This project will aid us in our future classrooms as well as other preservice teachers coming through the program.

Positive Behavioral Interventions and Support in a Third Grade Classroom

Suzanne C. Sikes & Jodi Hearn

Columbus State University

Abstract

Pre-service teachers tend to struggle with behavioral management in the classroom. We collected data through an 8-week observation at a local elementary school in a third-grade inclusion classroom. We chose to focus on Positive Behavioral Interventions and Support (PBIS) in students with disabilities. Our placement included 13 students with an IEP; 5 of the students were pulled out for additional support, 2 students were ESOL, and 8 had behavioral plans. We interviewed our cooperating teacher and discussed behavioral management plans. After discussing, we brought our attention to a positive reinforcement management plan with interventions and support to enforce in the classroom. Positive reinforcement is a type of behavior management that focuses on rewarding a student when a student has done well. Through the PBSI support, we observed students becoming more motivated and demonstrating higher levels of academic success.

Digital Forensics with SSD's

Joseph E. Smith, Conner Moeck & Nicholas Kimmel

Columbus State University

Abstract

Solid State Drives(SSD) are modern storage devices, more efficient than traditional hard drives. As the use of SSDs becomes more widespread, we are challenged with understanding the intricacies of these devices, especially from a data recovery standpoint. In the interest of fast rewriting, SSD's utilize a garbage collection process. This process prioritizes making sure the deleted files are all grouped together and they are collected and deleted automatically. Some SSD's utilize an operation called TRIM which both finds the files to delete and deletes them almost instantly. In this project, we plan to explore how TRIM impacts deleted data recovery. We plan to install Windows in a SSD. Windows will enable us to enable or disable TRIM operations. We will conduct data recovery once with TRIM enabled, and then with TRIM disabled. We will compare the results to understand how TRIM impacts deleted data recovery in digital forensics investigation.

Synthesis of Mellitic Triimide Based Covalent Organic Frameworks

Elise R. Snow & Megan E. Brenner

Columbus State University

Abstract

As global warming remains an ongoing threat to the earth, new and innovative solutions are continuously being created, tested, and modified. Carbon capturing polymers aim to assist in reduction of greenhouse gasses that cause increased global temperature. This research will hopefully produce such polymers to reverse the changes seen from global warming, such as the rising climate and deteriorating ozone layer. The polymers will be synthesized through heating of salts derived from a solution of mellitic acid with various amines. Infrared spectroscopy will be used to verify that polymers have been formed from this process. In addition, weight of the compound will be recorded to measure water loss and track polymerization during heating. For the polymers to be effective, the structure must be porous with a high surface area allowing for a greater absorption of gasses. This will be measured through Scanning Electron Microscopy in future research. To determine the most viable and effective carbon capturing polymer, we also plan to vary heating temperatures and time in later trials.

Tracking Encounters While Respecting Privacy

Joseph E. Smith, Roydon D'Souza, Sonipriya Paul & John Walker

Columbus State University

Abstract

The COVID19 outbreak in 2019 has rendered the entire humankind in a state of complete chaos and distress. An air borne virus that claimed the lives of many was enough to keep the health officials on toes to try and curb the spread of the virus as much as possible. It was of utmost importance that people were made aware of the consequences of not wearing masks and how the virus transmission works. But even with the best preventative measures, one could not be complacent and the knowledge of any infected person around them was very crucial. Our project is extensively on building an effective way to notify an individual if and when someone around them got infected which should prompt them to take the COVID19 test to be cautious keeping in mind to maintain the privacy of the infected individual. The basic outline of our project, "Tracking encounters while respecting privacy", is to store encounter IDs in a bluetooth dongle when two such bluetooth dongles come in close proximity i.e., within 6ft. These encounter IDs are generated every minute to respect the individuals' privacy and later the dongle could be connected to their laptops where the encounter IDs stored would be transferred to a basic tracking software we develop under the credentials of the user of the dongle. They are then sent to a central server where the encounter IDs are stored for cross reference to notify users when someone around their vicinity was tested positive. We are implementing ring signatures to account for the privacy of the users to send the encounter IDs fetched from a dongle for that day to the server.

Georgia Wetlands and Climate Change

Mary C. Streat, Clareese Spahn, Karla Lombard & Peyton Avery

Columbus State University

Abstract

Wetlands are a key feature in protecting our coasts. They are mostly known for helping control the impacts of floods and storms. Wetlands are negatively affected by increasing storm intensities that are tied to habitat destruction and damage to species, hypothesized to be rising with climate change. Through researching the history of Georgia's coastal wetlands, as well as looking at records of weather and habitat damage, we seek to showcase ways in which these wetlands are damaged and how we can mitigate these issues.

Throughout our analysis, time has shown how temperature, severe weather, and species richness have been affected by climate change. The temperature of the ocean continues to increase year after year. The warming of the ocean can alter marine ecosystems and have many harmful impacts; reefs are especially sensitive to temperature. With changes in the climate, we see an unbounding change in the species diversity and distribution of many animals in the Southeast. The effects on the Southeastern coast in the absence of wetlands was also analyzed. Research and species tracking shows many species are entirely dependent upon wetlands which have a rich biodiversity that is essential for biological cycles; additionally, wetlands are vital for humans. They provide protection from flooding and shoreline erosion. Furthermore, wetland filters pollutants from runoff before it reaches the oceans. As the sea level rises every year wetlands are becoming more essential than ever in coastal ecosystems.

OPIOIDS: THE NATIONAL HEALTH CRISIS

Kyla M. Sumter

Columbus State University

Abstract

This article is an in-depth literature review of forty-seven publications (i.e., scientific journals, periodicals, etc.) on the United States opioid crisis and examines the historical context of the epidemic. Furthermore, it explores the history and pharmacology of most commonly used opiates, their biological impact, the highest at-risk populations for prescription and illicit opioid abuse, and current treatment options. By analyzing this information policy recommendations should be considered for federal implementation which look to raise awareness for associated dangers and reduce opioid addiction stigma.

**Examining The Association Between Racial Bias and Poor Health Outcomes Among
African Americans**

Kyla M. Sumter, Jasmine Constant, Aniya Boyd, Emmitt G. Brown & Julia Thompson

Columbus State University

Abstract

Background: African Americans are a group commonly overlooked and often neglected by some healthcare institutions and workers. The objective of this study was access whether perceived discrimination increases the likelihood of taking medication for heart disease, blood pressure, anxiety, or stress.

Methods: The data used was collected using a survey designed specifically for this study to assess the prevalence of racially discriminatory experiences and likelihood of taking medication for heart disease, blood pressure, anxiety, or stress, of individuals affiliated with Columbus State University (N=18) by analyzing the responses to three questions relating to: usage of prescription medications for heart disease, blood pressure, anxiety, stress, congenital disorders worsened by stress, and the average number of discriminatory incidents. An Ordinal Logistic Regression was used to analyze the potential relationship between participant health disparities and average number of discriminatory events.

Results: The research conducted actually shows that those who experienced low discrimination had a slightly higher likelihood (beta=33.3) of taking medication for heart disease, blood pressure, anxiety, or stress compared to those who experienced no discrimination.

Interpretation: According to the conducted research, African Americans who experienced low or no discrimination are less likely to take medication for heart disease, blood pressure, anxiety, or

stress. A possible explanation for this outcome is that results were skewed due to low participation indicating more research should be conducted with a larger survey pool.

Biological Effects of Benzothiazole Derivatives: ALS cells and the effects of the TDP-43**Protein**

Destini A. Thornton & Alexandria White

Columbus State University

Abstract

Amyotrophic lateral sclerosis (ALS) is a progressive neurodegenerative disease that affects nerve cells in the brain and the spinal cord. Motor neurons run from the brain to the muscles by going through the spinal cord. When the motor neurons stop functioning, the ability of the brain to initiate and control muscle movement is lost. With voluntary muscle action progressively affected, patients may lose the ability to speak, eat, move, and breathe. There are only a few drugs that are known to be used against ALS but Riluzole is the only FDA-approved oral drug for ALS. This drug has been shown to have little to no effects on the treatment. Riluzole falls under a family of chemical compounds known as benzothiazoles. Benzothiazoles has various functions in the medical field from use as fungicide to a cancer targeting agent, and up until recently, an anticonvulsant like in compounds similar to Riluzole. A series of substituted benzothiazoles have been synthesized and will be tested on U2OS, SH-SY5Y, and HEK293T cells with overexpressed TDP-43 protein aggregates. This study will determine the effects of the TDP-43 protein in U2OS, SH-SY5Y, and HEK293T cells. TDP-43 is a protein that is commonly found within the nervous system of sporadic ALS patients, that causes rapid pathogenic activities. During this process the cells will be analyzed for rate of growth. Once there is an abundance of cells, TDP-43 aggregates will be transfected with the HEK293T cells in hopes of creating a cell model that will be used to create a more therapeutic option for treating ALS.

A Moment of Science, Please

Mattea G. Twigg, Lauren Breaux & Curtissia Penamon

Columbus State University

Abstract

The purpose of this project is to provide an experience to the exceptional student community they usually do not experience. The self-contained classrooms and teachers would not normally go out on field trips let alone complete a project. It was a way for the community to come together for a common purpose. This project has been thought out throughout three of our classes and practicums. Exceptional students from a variety of elementary schools will receive funding to conduct their own science project and have it on display at Oxbow Meadows. This presentation will explore our two research questions, which are: Did the science project increase student engagement in science & what was the overall impact of a science fair project in the self-contained classroom? To answer our research questions, we will conduct a survey for both students and teachers participating.

Identifying a Hidden Fault

Skyler S. Vaughn

Columbus State University

Abstract

The pre-metamorphic Hillabee thrust fault separates ca. 360 million year old rocks of the Talladega Group from ca. 470 million year old rocks of the Hillabee Greenstone. A rare outcrop exposing this fault was located near Buchanan, Georgia and allows us to compare the geology here with better studied portions of the fault in central and eastern Alabama. Rock samples were collected from intervals across the outcrop in order to characterize the mineralogy of these two contrasting rock units. Analyzing rocks on either side of the fault allows us to better understand the geologic history of this portion of North America, especially the relationship between metamorphosed volcanic rocks of the Hillabee Greenstone and continental shelf rocks of the Talladega Group. In this study, we use thin sections and point count analyses, as well as mineral compositions determined by scanning electron microscope, as a means of identifying and understanding rocks on either side of this important fault. The dominant quartzofeldspathic rocks of the Talladega Group and metabasalt or metadacite lithologies of the Hillabee Greenstone should allow us to isolate the location of the Hillabee thrust in this outcrop.

Comorbidity of Autism Spectrum Disorder and Intellectual Disabilities

Kierstin E. Wengryn

Columbus State University

Abstract

For this project I will be presenting research I have found on how Autism Spectrum Disorder (ASD) and Intellectual Disabilities (ID) affect each other when diagnosed together. This presentation give a definition and brief overview of both disorders and will look at how being diagnosed with both differs in areas of symptoms concerning sleep, speech, behavior, and cognition. Each of those four sections will also include a subsection of potential treatments and/or ways that the symptoms can be better managed. Having two disorders is more difficult to manage than just one, and I hope to showcase that through the interaction between these two disorders.

Spanish Painter Diego Velázquez

Kayah A. Young

Columbus State University

Abstract

This research paper examines the works, achievements, and influence of 17th-century Spanish painter, Diego Velázquez. I hope to show how influential he was as a painter, and why he will always be considered one of the greatest painters in Spain. For support of my claim, I read several articles that I got from Galileo, as well as books from the library about Velázquez and his works. Many of these books contain some of his most important works, so I was able to elaborate on some of them in-depth. Using these sources, I was able to prove my thesis and conclude that Velázquez was one of the most talented Spanish artists of his time due to the skill and style he used, the choice of colors, and the use of religion in his artwork. His influence was felt by many artists, including Pablo Picasso and Salvador Dali. Even French Impressionist Edouard Manet described him as "the painter of painters."

Assessing coral reef health through fish abundance and diversity

Arianna Zapata, India Thomas & Mitdalia Alonso

Columbus State University

Abstract

Coral reefs support approximately 25% of all marine life and are among the most diverse and viable ecosystems. Coral reefs can be primary habitat bearing environments and play crucial roles in various structure associated reef fish communities. Many fish not only thrive, but depend on the live tissue on coral reefs for their food. For this reason, fish species abundance can be a good indicator of coral reef health. In this study, we will evaluate the effect(s) of coral reef health on the abundance of fish present. Our study will look at the difference between abundance of fish in healthy vs unhealthy coral reefs. To determine the health of a reef, we will be calculating the number of algae per foot of our transect line. In addition, we will also look at how the health of reefs affects marine life acoustics. We will be using a GoPro to film along a 10 ft transect line to measure the algae and count the number of fish. Finally, the acoustic recorder will be placed on the two different reefs for 24 hours at a time to record the acoustics in the water. We will analyze our results by T-test and ANOVA.

Behavior Management with Elementary Students: Positive Reinforcement

Breanna R. Zator & Taylor Small

Columbus State University

Abstract

The objective of the presentation is to inform pre-service educators of behavior management. This presentation was presented in the fall of 2021 in the ELEM 4217 class. Positive reinforcement occurs when a behavior is encouraged by a reward. Teachers are encouraged to be intentional, curb expectations, develop a rewards system, and understand how their students learn. Within a period of six weeks a cooperating teacher was observed in class and noted the positive reinforcement utilized. The main focal point of behavior management by using positive reinforcement was a clip chart. This chart helped students and the teacher have a visual representation of their behavior and opportunity to earn rewards. Research was explored on the effectiveness of Tootling, which can be implemented to combat negative tattling. The research focused on students in two classrooms and how it affected their disruptive behavior and their academic engagement and performance.

Alternative Feedback for Autograded Assignments

Ryan Zimmerman & Kaleb Horvath

Columbus State University

Abstract

Helping students to build an intuition for software development is non-trivial and we approach this by introducing them to simple tasks that highlight coding methods throughout the field. As these students complete around 90 codePost.io problems per semester, the boons of concise feedback are made especially obvious when we consider the average time spent by the student body on a given problem. We have created a program that accepts as its standard input the standard output of an autograder's (codePost.io) feedback with respect to problem sets in both Computer Science 1301K and 1302. Instead of the default feedback, we present the analysis in two formats: the "stacked view" which juxtaposes expected regular expression patterns with student output and the "annotated view" which utilizes a clear format based on whether a match was found. This refined feedback works to not only entice the student's curiosity but provides an exact point of divergence from the expected solution to explicitly highlight the underlying misunderstanding. We argue that our revised feedback provides a focused guidance that is not only clearer and more understandable but can help pique interest in relevant implementation topics such as regular expressions. Building intuition toward the subject will, we hope, help the students to build a passion for this complex and rewarding field.

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