TOWER DAY | COLUMBUS STATE UNIVERSITY

Welcome to Tower Day 2023!

COLUMBUS STATE UNIVERSITY

April 28

Join us for a day of academic dialogue and celebration at Columbus State University. Tower Day is an annual celebration of CSU undergraduate research and creative endeavors. CSU students from different disciplines will present their research and creative endeavors in the form of ten-minute oral presentations and poster presentations, both virtually and in person.

This program is designed as an initiative to give CSU students an opportunity to share their work outside of the classroom. Our event has keynote presentations by a CSU alum and a current faculty member, poster presentations, and oral presentations.

Program

10:00am-12:00pm **Morning Poster Presentations**
In person (Davidson - Columbus Room)

10:30am-11:30am **Morning Oral Sessions**
In person (Davidson 256 or 258)

11:30am-12:00pm **Virtual Poster Presentations**
Zoom link on page 4

12:30pm-1:30pm **Keynote Session**
In Person (Davidson Auditorium)
Lunch & Snacks (Schuster 130)

12:30pm - 1:00pm *"To Find Ourselves at Home: API Storytelling Beyond Tokenism in 2023"* – **Dr. Jordan VanHemert**, Director of Jazz Studies at Schwob School of Music

1:00pm-1:30pm *"Finding a Career in the Fight for Trans Rights"* – **Dr. Dorian Rhea Debussy**, Alumna of the Department of Political Science and Inaugural Director for External Affairs at Equitas Health

1:30pm-3:30pm **Afternoon Poster Presentations**
In person (Davidson - Columbus Room)

2:00pm-3:00pm **Afternoon Oral Sessions**
Both in person (Davidson 254, 256, or 258)

2:00pm-2:30pm **Virtual Oral Presentations**
Zoom link on page 4

For registration, see Ahmad Djigal, Tiera Rowan, & Leigh Mccormick at the Registration Table.

QR Codes & Zoom Links

Morning Virtual Zoom Poster Q&A

Afternoon Virtual Zoom Oral Presentation

Morning Poster Presentations

Moderators: Lina Heng & Michael Lambert

1. Kristina M. Armstrong, Austin Clance, Imani Rogers
   Synthesis, activity, and characterization of Pd/Al2O3 catalysts for methane combustion under stoichiometric conditions [Abstract]
   Mentor(s): Anil Banerjee
   Major: Chemistry

2. Megan E. Brenner, Elise Snow
   Synthesis and Characterization of Mellitic Triimide Based Covalent Organic Frameworks [Abstract]
   Mentor(s): Daniel Holley
   Major: Chemistry

3. Lance N. Crane, Alisha Kennedy
   Synthesis, Characterization, Solubility, and Toxicological Effects of N,N'-Substituted Triazoles [Abstract]
   Mentor(s): Kerri L. Shelton, Jeffrey Zuiderveen, Monica Frazier
   Major: Chemistry

4. Nevaeh D. Davis, Havahna Wilkes, Alisha Kennedy, Katie Powell, Isabelle Rodriguez, Dominic Fico
   Synthesis and biological activity of N,N'-bis-substituted-triazolium salts against the cell proliferation and cell viability of NCI-H1299 carcinoma and WI-38 cells [Abstract]
   Mentor(s): Kerri L. Shelton, Monica Frazier
   Major: Biology

5. Emily N. Knox, Maddison Montgomery
   Catalytic oxidation of CO under lean conditions [Abstract]
   Mentor(s): Anil Banerjee
   Major: Chemistry

6. Elise R. Snow
   Isolation of Secondary Metabolites in Eupatorium Serotinum [Abstract]
   Mentor(s): Daniel Holley
   Major: Chemistry

7. Caitlin S. Parker
   Alzheimer's Disease: Next step for future synthetic work of alternative treatments of AD [Abstract]
   Mentor(s): Kerri L. Shelton
   Major: Chemistry

8. Kaela M. Mercer
   Agrochemical Effect on the pH of Soil and Groundwater [Abstract]
   Mentor(s): Troy Keller
   Major: Earth and Space Science

9. John M. Ward
   The "Dark Triad", Sexual Orientation, and Mate Selection [Abstract]
   Mentor(s): Rebecca Toland
   Major: Health Science

10. Alexandria M. Yarborough, Leigh Mccormick
    Sexual Behavior During the Covid 19 Pandemic [Abstract]
    Mentor(s): Rebecca Toland
    Major: Health Science

11. Anterious D. Ridley, Quynh La
    Multivariable Analysis on Popular Drugs [Abstract]
    Mentor(s): Nehal Shukla
    Major: Mathematics

12. Tamia P. Nelson
    Podcasts By Kids, for Kids [Abstract]
    Mentor(s): Kalynn Pistorio
    Major: Spec Ed: Gen. Curr. - Reading

Morning In Person Oral Sessions

10:30am-11:30am - Room 256
Moderator: Destinee Williams

1. Wendy Brundage
   Factors Influencing Adolescent Female Gang Member Affiliation [Abstract]
   Mentor(s): Florence Wakoko
   Major: Sociology

2. Kelsey DeCuir, Taylor Carson, Bre'Yonna Stone, Valeria Segura
   Gender Inequality Across the Board [Abstract]
   Mentor(s): Eric Spears
   Major: Comp Sci - Games Programming

3. Kiara Clemons, Christian Jones, Emilia Tenbrock, Seyeon Kim
   No Room for the Homeless [Abstract]
   Mentor(s): Eric Spears
   Major: Comp Sci - CyberSecurity

4. Makeda Andwele, Kylie Albaujh, Liz Forshaw, Hudson Carney
   The Missing Children: The Exclusion of Cognitively Disabled Children in Mexico [Abstract]
   Mentor(s): Eric Spears
   Major: Communication

10:30am-11:30am - Room 258
Moderator: Jonathan Stringfellow

1. Bradley T. DeFore
   Quantum Computers and Their Effects on Cybersecurity [Abstract]
   Mentor(s): Yesem Peker, Lydia Ray
   Major: Comp Sci - CyberSecurity

2. Austin L. Lee, Thomas Merino, Kaleb Horvath, Ryan Zimmerman
   CSU Energy Incident Management [Abstract]
   Mentor(s): Shamim Khan, Mohamed Riduan Abid, Yesem Peker
   Major: Comp Sci - Web Development

3. Justin T. Ludwig
   Data Analysis of Columbus Fire Department Call and Incident Logs [Abstract]
   Mentor(s): Kristin Seamon Lilly
   Major: Mathematics

Virtual Poster Q&A

To view virtual posters, click on the Poster Title or scan the QR code (11:30am-12:00pm)
Moderator: Amy Edge

1. Victoria A. Ayodele, Tahjay Miller
   Evidence-Based Exercise Prescription: Improving the Diabetes Lifestyle
   [Abstract]
   Mentor(s): Kate Early
   Major: Kinesiology

2. Makenzie C. Bailey, Lily Simmons
   Working to Improve Childhood Obesity [Abstract]
   Mentor(s): Kate Early
   Major: Kinesiology

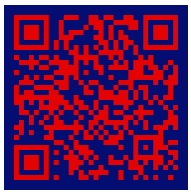
3. Tynece C. Brockington, Kemuel Terry, Kolawole Olerunfemi
   Lifeline for Older Adults [Abstract]
   Mentor(s): Kate Early
   Major: Kinesiology

4. Alexis C. Heard, Jasmine Woods
   Evidence-based Exercise Prescription: Let Focus on Beating this Osteoporosis!! [Abstract]
   Mentor(s): Kate Early
   Major: Kinesiology

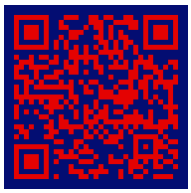
5. Kyana Henderson, Taylor Brown
   Baby Bump Back Pain [Abstract]
   Mentor(s): Kate Early
   Major: Kinesiology

6. Emily L. Holmes, Noah Windhorst
   Happy Feet, Happy Heart [Abstract]
   Mentor(s): Kate Early
   Major: Kinesiology

7. Jahfel N. Jones, Kamryn Allen
   Evidence Based Exercise Prescription for Healthy Adults [Abstract]
   Mentor(s): Kate Early
   Major: Kinesiology



8. Andrew S. Munsey, Jaquarius Harrison
   Physical Activity in Hypertensive Clients [Abstract]
   Mentor(s): Kate Early
   Major: Kinesiology

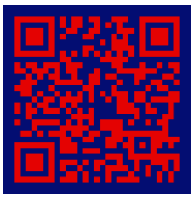


9. Kaitlyn G. Shepherd, Hannah Trawick
   Evidence-based Exercise Prescription: Physical Activity in Children with Autism Spectrum Disorder [Abstract]
   Mentor(s): Kate Early
   Major: Kinesiology

10. William A. Wilbanks, Tristan Stanley
    Burn Calories, not cigarettes [Abstract]
    Mentor(s): Kate Early
    Major: Kinesiology

11. TaLia J. Alston, Lydia Reeder, Kamryn Lucas
    The Exceptional Science Fair [Abstract]
    Mentor(s): Kalynn Pistorio, Mary B. Hendricks
    Major: Spec Ed: Gen. Curr. - Reading

12. Brittany M. Perez-Verdugo
Project Based Learning in Elementary Special Education: Books for Kids by Kids [Abstract]
Mentor(s): Kalynn Pistorio
Major: Spec Ed: Gen. Curr. - Reading

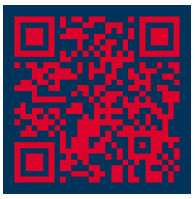


13. Adelheid L. Smith, Mia Dilmar, Kaela Holland, Katelynn Hoskins, Kirsten Ware
How Preservice Teachers Benefit From Project-Based Learning [Abstract]
Mentor(s): Kalynn Pistorio
Major: Spec Ed: Gen. Curr. - Reading

14. Joysasha G. Tucker
Exceptional Science Fair [Abstract]
Mentor(s): Kalynn Pistorio
Major: Spec Ed: Gen. Curr. - Reading

15. Cassidy L. Fine, Courtney Devera
Development and Evaluation of Audible Titration Modules: Chemistry Learning for Visually Impaired Students [Abstract]
Mentor(s): Rajeev Dabke, Kerri L. Shelton
Major: Chemistry

16. Kendall L. Smith, Brittani Clary, Silas Fuller
Exceptional Science Fair at Oxbow Meadows: Providing Extracurricular Opportunities for Students with Disabilities [Abstract]
Mentor(s): Kalynn Pistorio, Mary B. Hendricks
Major: Spec Ed: Gen. Curr. – Reading



17. Rachel Kennedy, Alivia Stewart, Leah Poyotte, Landon Averett
    Applying Multi-Thematic Units in the Classroom: A Powerful Tool for Teachers [Abstract]
    Mentor(s): Kalynn Pistorio
    Major: Spec Ed: Gen. Curr. - Reading

Keynote Session

12:30pm-1:00pm — Dr. Jordan VanHemert, Faculty Keynote
"To Find Ourselves at Home: API Storytelling Beyond Tokenism in 2023"

1:00pm-1:30pm — Dr. Dorian Rhea Debussy, Alumna Keynote
"Finding a Career in the Fight for Trans Rights"

Dr. Jordan VanHemert (he/him) is a Korean American saxophonist and composer lauded for his skill as a modern jazz improviser. Dr. VanHemert currently serves as Director of Jazz Studies at the Schwob School of Music. He was also the Music Director and founder of the Holland Concert Jazz Orchestra, a 501(c)(3) nonprofit organization dedicated to jazz advocacy, education, and performance.

Dr. Dorian Rhea Debussy, Ph.D. (she/her) is the inaugural Director of External Affairs at Equitas Health, which is a federally designated community health center and one of the largest LGBTQ+ and HIV/AIDS serving healthcare organizations in the country. In her role at Equitas Health, Rhea is responsible for setting the government and community relations agenda for the agency.

Afternoon Poster Presentations

Moderators: Lina Heng & Michael Lambert

1. Mitdalia P. Alonso
   Effects of a latitudinal gradient on the age and growth characteristics of Smallmouth Bass (Micropterus dolomieu) [Abstract]
   Mentor(s): Michael Newbrey, Jennifer Newbrey, Ashley Desensi
   Major: Biology

2. Likhita Aluri
   A proposed assessment of carotenoids as bioindicators of health using the eggs of Bluegill and Redbreast Sunfish in Columbus, GA [Abstract]
   Mentor(s): Michael Newbrey, Jennifer Newbrey, Ashley Desensi
   Major: Biology

3. Simran K. Chhina
   Should carotenoids in the eggs of Largemouth and Spotted bass, Micropterus salmoides and M. punctulatus, be used as an assessment of aquatic system integrity? [Abstract]
   Mentor(s): Michael Newbrey, Jennifer Newbrey, Ashley Desensi
   Major: Biology

4. Gabrielle Dillard
   The effect of natural products on the growth of docetaxel-resistant triple-negative breast cancer stem cells [Abstract]
   Mentor(s): Ramneet Kaur
   Major: Biology

5. Taj S. Knight
   Yellow Bullhead (Ameriurus natalis) as bioindicators of water quality in West Central Georgia [Abstract]
   Mentor(s): Michael Newbrey
   Major: Biology

6. Elizabeth A. Lambert, Amber Maxis, Melanie Prescott, Cole Lassiter
   Analyzing Leukocyte Proportions in Yellow Bullhead Catfish (Ameiurus natalis) to Assess Water Quality in Two Georgia Creeks [Abstract]
   Mentor(s): Michael Newbrey, Ashley Desensi
   Major: Biology

7. Gisele L. Pierce
   The relationships between temperature and age and growth characteristics for populations of Spotted Bass (Micropterus punctulatus) [Abstract]
   Mentor(s): Michael Newbrey
   Major: Biology

8. Jiayu Wang
   The effect of natural products on the growth of triple-negative breast cancer stem cells (mammospheres) [Abstract]
   Mentor(s): Ramneet Kaur
   Major: Biology

9. Angelika Romo, Mary Claire Streat
   The relationship between sounding data and large raindrop pools in thunderstorms crossing the Hudson River Valley, NY [Abstract]
   Mentor(s): Stephen Jessup
   Major: Biology

10. Richard A. Callahan, Likhita Aluri, Samantha Barfield, Alyssa Barker, Ja'Kayla Bell, Kaylee Day, Bradley DeFore, Journey Denson, Tasya Diaz, Jason Dine, Lizzie Hedrick, Reanna Hylton, Jocelyn Jackson, Jo Lamberty, Aaliyah McCoy, Deikyn Moore, DJ Peavler, Kaitlyn Shepherd, Sam Stephens
    Educate. Connect. Rebuild. - Servant Leadership 2023 Senior Project [Abstract]
    Mentor(s): Cortney Wilson, Laura Pate
    Major: Servant Leadership Program

11. Kenya A. Jackson
    Investigating the Impact of Perception of Mental Illness on Parenting Styles: A Quantitative Correlational Study [Abstract]
    Mentor(s): Youngrak Park
    Major: Communication

12. Nicholas R. Phillips
    How a coach's credentials and communication skills impacts an athlete's motivation to perform [Abstract]
    Mentor(s): Youngrak Park
    Major: Communication

13. Samuel C. Kimball, Joy N. Flowers, A'Naja Houston, Kayleen E. Linge, Cory G. Mitchell
    The Stellar Graveyard [Abstract]
    Mentor(s): Rosa Williams
    Major: Earth and Space Science

14. Bradley T. DeFore
    Single Program for Multiple Encryption and Decryption [Abstract]
    Mentor(s): Cindy Ticknor
    Major: Comp Sci – CyberSecurity

15. Kiara F. Clemons, Amanda Candies, Donald Beaulieu
    Connect 4 Project [Abstract]
    Mentor(s): Monica Frazier, Corey Stewart
    Major: Comp Sci - CyberSecurity

16. James A. Cox, Nicholas Dunn, Austin Lee, Max Lewis, Thomas Merino
    SmartPlanner - Intelligent Course Scheduling [Abstract]
    Mentor(s): Rania Hodhod, Yi Zhou
    Major: Comp Sci - Web Development

17. Tasya K. Diaz
    The Effects of Artificial Intelligence on Accounting Jobs [Abstract]
    Mentor(s): Charles Boster
    Major: Accounting

18. Timothy J. Sabau
    Sino-American Competition in the Field of Artificial Intelligence [Abstract]
    Mentor(s): Daewoo Lee
    Major: Political Science

19. Gabriel K. Williams, Justin Ludwig
    Variables Relating to Sports Teams Win/Loss Ratio [Abstract]
    Mentor(s): Nehal Shukla
    Major: Mathematics

20. Rahul V. Clamor
    Synthesis, characterization and biological properties of asymmetric N,N'-bis- substituted triazolium salts [Abstract]
    Mentor(s): Kerri L. Shelton
    Major: Chemistry

Afternoon In Person Oral Sessions

2:00pm-3:00pm - Room 254
Moderator: Kayla Bridges

1. Jonathan Stringfellow
   Humor, the Last Service to Our Senseless Resolve – Satire in Anton Chekhov's Short Stories [Abstract]
   Mentor(s): William Owen
   Major: English Language/Literature

2. Brian T. Nguyen
   The Armed Riders Pitch Deck [Abstract]
   Mentor(s): Carey Wilkerson
   Major: English Language/Literature

3. Molly G. Thomas
   The Zipless Fuck: A Vestige of "Love" [Abstract]
   Mentor(s): Courtney George
   Major: English Language/Literature

2:00pm-3:00pm – Room 256
Moderator: Rolo Lopez

1. Harris Carlisle
   Rational Design and Synthesis of Substituted N,N'-Bis(arylmethyl)imidazolium Salts [Abstract]
   Mentor(s): Kerri L. Shelton
   Major: Chemistry

2. Katelynn B. Powell, Alisha Kennedy
   Synthesis and biological activity of N-substituted-azolium salts against ALS-like cells and the TDP-43 Protein [Abstract]
   Mentor(s): Kerri L. Shelton, Monica Frazier
   Major: Chemistry

3. Elva Y. Lucero
   Effects of minimum, maximum, and 24-hour thermal gradients on age and growth characteristics of the Black Crappie (Pomoxis nigromaculatus) [Abstract]
   Mentor(s): Michael Newbrey, Ashley Desensi, Jennifer Newbrey
   Major: Biology

2:00pm-3:00pm – Room 258
Moderator: Jacob Moore

1. Kayleen E. Linge
   Modelling Planetary Orbits Using the Schwarzschild Metric [Abstract]
   Mentor(s): Carlos Almada
   Major: Mathematics

2. Rohan M. Shah
   Perspectives gained from a Civil Rights Odyssey [Abstract]
   Mentor(s): Sharon Welburn, Caroline Newhall
   Major: Communication

3. Richard E. Rodgers
   The Chattahoochee River Valley Story: From Columns of Smoke in 1865 to Whitewater Rafting [Abstract]
   Mentor(s): Gary Sprayberry, Cindy Ticknor
   Major: Interdisciplinary Studies

Virtual Oral Session

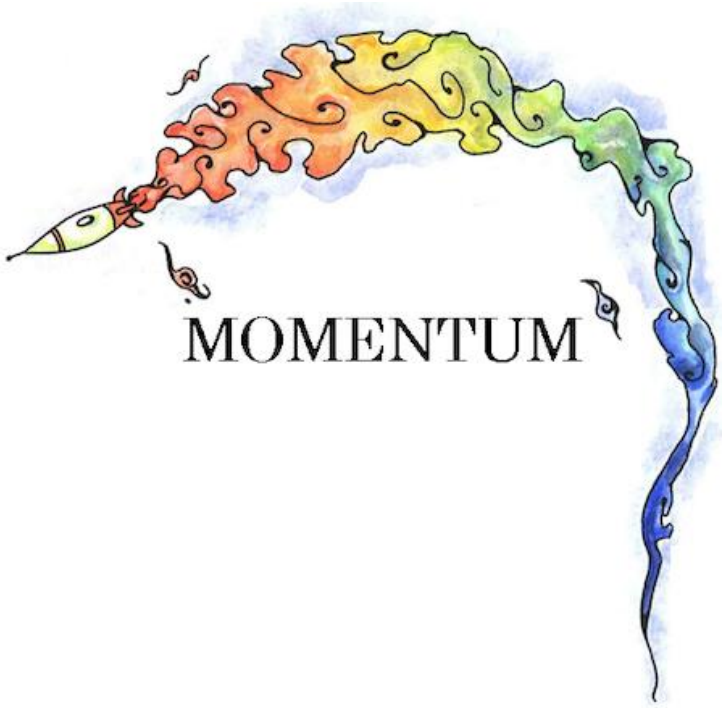
2:00pm-2:30pm - Zoom
Moderator: Amy Edge

1. Marinella A. Hernandez
   The Myth of Eva Perón [Abstract]
   Mentor(s): Alyce Cook
   Major: Criminal Justice

Additional Exhibits

Oxbow Meadows will be joining us at the Davidson Center Patio. They will have some information on their programs and a few surprise guests!

Our CSU Esports Teams and Columbus Got Game will be hosting a live Super Smash Brothers tournament in the Davidson Student Lounge. Sign-ups will begin at 10am, with the tournament starting at 10:30am. We will also have other friendly games and activities available. To learn more about our Esports team and chat with some of our former players, join our Discord at discord.gg/bVr9Nc9GCD



Momentum is Columbus State University's peer-reviewed undergraduate research journal that is open to students of all disciplines. Successful papers are original works that appeal to a widely diverse audience. Work should be in clearly defined technical language that may be discipline-specific. Scholarship may include, but is not limited to, research studies, business plans, literary analyses, or artistic critiques.

Follow the QR code to join Momentum Undergraduate Journal's staff. We at Momentum look forward to publishing a Tower Day edition of our journal! If you are interested in publishing your own research, email Youbin Park at Park_Youbin@ColumbusState.edu.

Abstract Index

Mitdalia P. Alonso

Effects of a latitudinal gradient on the age and growth characteristics of Smallmouth Bass (Micropterus dolomieu)

The effects of a thermal gradient on age and growth characteristics of Smallmouth Bass (*Micropterus dolomieu*) are poorly described, yet these relationships must be described to function as a cornerstone of proper fisheries management in a changing climate. We predict that Smallmouth Bass should exhibit thermal influence on a suite of age and growth characteristics based on previous work on Smallmouth Bass and other species. Our initial analyses consist only of latitude, as we are in the process of collecting thermal data. Smallmouth Bass range from southern Ontario and Quebec (45°N and 0.2 MAT_{24hr} °C) to northern Georgia (34°N and 15.1 MAT_{24hr} °C). Specifically, we examined relationships among latitude (i.e., proxy for temperature) and total length (TL) at ages 3, 5, and 8 years old, maximum total length, and longevity for 54 populations of Smallmouth Bass from published literature. Samples range in latitude from 45.8°N (Michigan) to 35.1°N (Tennessee). We found significant negative relationships among latitude and TL at ages 3, 5, and 8 years old with larger fish occurring in southerly latitudes. There was a significant negative relationship between latitude and longevity with older fish occurring in northerly latitudes. There was no relationship between latitude and maximum total length. These data conclude that not all age and growth characteristics are related to a latitudinal gradient. This could suggest that theoretical ultimate length in a population is the same across all latitudes; however, latitudinal data do not necessarily represent accurate thermal data. Our next objective is to analyze the thermal data and describe age and growth characteristics across a thermal gradient. Ultimately, this research will enable fisheries biologists to more effectively manage Smallmouth Bass in a warming climate.

TaLia J. Alston, Lydia Reeder, Kamryn Lucas

The Exceptional Science Fair

The Exceptional Students Science Fair was created for students with exceptionalities who cannot attend their assigned school's science fair and who generally were not included in any outside school activities at all. The science fair consists of Evidence-Based Practices (EBP) through learning stations that allow students to engage in hands-on experiments related to science concepts. This event takes place at Oxbow Meadows Environmental Center every year that consists of science fair stations and sensory-friendly activities for our students. To keep our students engaged, we will create our own science experiment and activity to keep our students

engaged known as the exploration station. The exploration station we will have will be on magnets for our students to be able to correctly use key terminology to maintain a conversation on a given topic in different content areas as their learning goal. At the exploration station, we will do an experiment with our students on this concept with materials listed with a learning objective, visuals, step-by-step procedures with visuals as we are doing our task analysis, and having our students complete an observation with questions and prompt discussion with our students to talk about what they observed throughout the experiment. There will also be multiple stations set up where students can rotate to different stations to explore the different concepts of science experiments that will be set up for them. This year will be our biggest year of the number of students we will have and multiple schools around the Muscogee County School District will be in attendance.

Likhita Aluri

A proposed assessment of carotenoids as bioindicators of health using the eggs of Bluegill and Redbreast Sunfish in Columbus, GA

Carotenoids are lipid-soluble color pigments obtained in the food of heterotrophs, and they function as important antioxidants by inactivating free radicals that damage the DNA, proteins, and lipids in fish eggs. However, despite the incredible diversity of fishes, little has been published on their carotenoids. For example, previous work with Chinook Salmon, Oncorhynchus tshawytscha described positive relationships among carotenoid allocation to eggs and higher survivability and disease resistance. The primary carotenoid found in salmon eggs was astaxanthin, which accounts for the red coloration of the fish and its eggs. I propose an assessment of the carotenoids in the eggs of Redbreast Sunfish, *Lepomis auritus*, and Bluegill, Lepomis macrochirus due to there being no published research on the carotenoids in the eggs of these species. The goal is to compare the yolk carotenoids from these species in urban creeks and rural creeks. We predict that polluted water bodies will contain a poor forage base as a source for carotenoids, so fewer carotenoids or lower concentrations of carotenoids will be allocated to their eggs.

Makeda Andwele, Kylie Albaujh, Liz Forshaw, Hudson Carney

The Missing Children: The Exclusion of Cognitively Disabled Children in Mexico

This research studies how poor infrastructure and iniquitous education contribute to abject poverty in Mexico. This study encompasses three of the United Nations Sustainable Development Goals (SDGs): No poverty, good health and wellbeing, and quality of education. The case study investigates the child populations of Lomas Modelo in Monterrey (who are supported by a non-governmental organization (NGO) named Escalando Fronteras) and communities in Coahuila and Cuilacan (State of Sinaloa) in 2021-2022. The project explores the following things: how are these goals not being met? How does the exclusion of children with

“Cognitive Immaturity/Disability'' by the government perpetuate this problem? Why are these cognitively disabled children so common in marginalized communities? What is the outcome as a result? And what can be done to work towards meeting these goals?

Kristina Armstrong, Austin Clance, Imani Rogers

Synthesis, activity, and characterization of Pd/Al2O3 catalysts for methane combustion under stoichiometric conditions

Catalytic combustion of methane at low temperatures under stoichiometric conditions is relevant for energy utilization and pollution control. A Pd catalyst (3.3 wt.% 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 balance nitrogen) at 250-400 0C. The catalyst calcined at 850 0C showed much higher activity at 300-400 0C compared to the same catalyst calcined at 500 0C. The better activity of the catalyst calcined at 850 0C is due to a lower activation energy. The results are opposite to the results of methane combustion under lean conditions. The two catalysts are being characterized by pulse chemisorption, temperature-programmed reduction, and x-ray photoelectron spectroscopy. The characterization data will reveal the particle sizes, metal support interactions, and relative proportions of PdO/PdOx in the two catalysts. The correlations between activity and properties of the catalysts at the two calcination temperatures will be presented.

Victoria A. Ayodele, Tahjay Miller

Evidence-Based Exercise Prescription: Improving the Diabetes Lifestyle

Background and Purpose: Diabetes is a chronic disease with over 1.4 million new diagnoses in Americans each year. It’s seen in individuals that are unable to successfully produce enough insulin for the body, which is a hormone that is very necessary for regulating blood glucose. Maintaining physical activity helps to control blood sugar levels and even makes patients more sensitive to insulin. The purpose of this case study is to examine the impact of exercise prescription on patients with Diabetes.

Case Description: The client is a 44 year old diabetic male, who is looking forward to improving his health and preventing future heart attacks from happening. This client is currently on Metformin for his diabetes, but wants to improve his overall health without the use of any medications. The typical lifestyle for this client doesn’t involve regular physical activity or smoking, but we see his high stress job, 6 hours of sleep, is something that he is accustomed to, making it a part of his everyday lifestyle. While keeping his diabetes and his peripheral neuropathy in mind when creating such exercise prescription, research shows that an exercise

prescription of 6 days of moderate-intensity aerobic exercise, 2 days of resistance training & 2 days of flexibility training will help the clients seek benefits of this prescription.
Discussion: The client will maintain an effective aerobic, resistance & flexibility exercise program that will align with the client's needs & wants, while ensuring he is comfortable, given his health background. Problems that could arise include hypoglycemia & hyperglycemia. The client will see improvements in insulin sensitivity, blood pressure, physical function, which will land this client in the best situation possible and improve his diabetes management.

Makenzie C. Bailey, Lily Simmons
Working to Improve Childhood Obesity
Background and Purpose: Childhood obesity has increased in prevalence in the United States, with multiple factors playing a role. Improving nutrition, physical activity education, and reducing screen time can help to improve childhood obesity. The purpose of this case study is to examine the effects of physical activity on childhood obesity.
Case Description: The patient is a 14-year-old female, who has been withdrawing from physical activity. Her parents took her to the doctor as a precaution, but nothing unusual was found. However, the patient has begun to show signs of self-consciousness about her current physical state. Upon evaluation her weight, waist circumference, and body fat are high. During the patient's fitness tests she showed difficulty with completing the curl-ups and push-ups. Evidence-based guidelines recommend 60 minutes per day of exercise, while emphasizing aerobic activity to aid in weight loss. Resistance training and bone strengthening will also be included have research demonstrates these are crucial to fitness. Combining aerobic activity, resistance training, and bone strengthening activities will provide her with the resources she needs to meet her current physical activity goals and live a healthier lifestyle as she grows into adulthood.
Discussion: Becoming educated on nutrition and physical activity can help the patient and her parents to live a healthier lifestyle. Going forward, the patient may develop increased self-confidence and fitness, which can help encourage her to participate in school sports programs of interest. Adhering to exercise programming during her youth can translate less risk for chronic disease during adulthood.

Megan E. Brenner, Elise Snow
Synthesis and Characterization of Mellitic Triimide Based Covalent Organic Frameworks
As global warming becomes an increasing issue, scientists are creating, testing, and trying new and innovative ways to help the problem. Carbon-capturing polymers can be used to reduce and limit the harmful carbon gases getting into the atmosphere. Based on structure, organic frameworks have shown promise to capture carbon. In this work, novel triimide polymers are synthesized by heating insoluble organic salts of mellitic acid and various bi and tri-functional

amines. Qualitative analysis using infrared spectroscopy has proven the material has been made in the process. Scanning electron microscopy was used to examine the effect of varying reaction conditions on the resulting nanoparticle morphology. CO2 uptake capacity was also measured and correlated with particle morphology and chemical structure.

Tynece C. Brockington, Kemuel Terry, Kolawole Olerunfemi

Lifeline for Older Adults

Background and Purpose: Older adults refers to a wide range of ages and physiologic capacities, including people over the age of 65 and people between the ages of 50 and 64 who have a known chronic disease. Older adults can have clinically significant conditions or limitations that limit their range of motion, level of fitness, or participation in physical activity. The purpose of this case study is to examine the impact of exercise prescription on older adults.

Case Description: The client is a woman at the age of 68 living in the metropolitan area. She wishes to start exercising at her local gym but is hesitant due to wavering weakness regarding her body. The only physical levels noticeably lacking are upper extremity strength, weight, and prior wrist injury. We hope to improve her upper body strength and overall fitness to assist with ADLs. Evidence suggests that the client needs to participate in 5 days a week and 150 minutes of aerobic exercise and 2 days of resistance exercise to work on her upper body strength and overall fitness.

Discussion: There is a large amount of research-based evidence that shows the positive benefits of exercise prescription in this population. Benefits such as managing chronic disease, reducing physical disability, increasing longevity can improve the quality of life for this population. We hope to improve her upper body strength and overall fitness to help with daily activities. Precautions will be taken with her overall training due to B.R.'s previous injuries and knee pain.

Wendy Brundage

Factors Influencing Adolescent Female Gang Member Affiliation

Today's society is experiencing a growing level of violence and mayhem. This paper seeks to provide some answers and reasoning for the increasing violence that is notably being committed by a group that is one of the most vulnerable in society: adolescent females ranging in age from 9 years old to 18 years old. The requirement for gang affiliation and the associated consequences are great. In some cases, one is required to sacrifice their body and/or commit crimes, but adolescent females still have a positive outlook on their gang of interests. From reading multiple articles and reviews, the conclusion is that adolescent girls are drawn to gangs because of what the gangs represent to them. For some gangs are family and others are influenced by their peers. For others, being socioeconomically disadvantaged the gang is viewed as a way to improve their status. Lastly, some of these young females have experienced trauma from abuse, physical and sexual, and feel as though gangs are their gateway to being

protected and empowered. The effects of gangs is a public safety issue, with many victims and expenses to society. Additionally, a failing educational system has led to truancy. Gangs must lose their appeal and this can be accomplished by satisfying the needs of the at-risk group before gangs step up to fill that role. By providing free and engaging activities during class time and partnering with positive female role models that can mentor at various jobs they'll be engaged and excited to learn.

Richard A. Callahan, Likhita Aluri, Samantha Barfield, Alyssa Barker, Ja'Kayla Bell, Kaylee Day, Bradley DeFore, Journey Denson, Tasya Diaz, Jason Dine, Lizzie Hedrick, Reanna Hylton, Jocelyn Jackson, Jo Lamberty, Aaliyah McCoy, Deikyn Moore, DJ Peavler, Kaitlyn Shepherd, Sam Stephens

Educate. Connect. Rebuild. - Servant Leadership 2023 Senior Project

The Columbus State University Servant Leadership Program class of 2023 defined Servant Leadership as leading by example through meaningful, empathetic, dedicated service intended to have a lasting impact that promotes autonomy, security, and healing of those being served. Each year, the senior class of the undergraduate Servant Leadership Program organizes a project that serves the community to enrich and empower as many lives as possible. The class of 2023 chose to partner with Hope Harbour, Open Door Community House, and SafeHouse Ministries with the slogan, "Educate. Connect. Rebuild."

With the goal of helping to increase opportunities for education, nutrition, and safety for those being served by our partnered agencies, we wanted to leave a lasting impact by serving others, fostering growth, and ultimately raising awareness of those helping to break the cycles of emotional and socioeconomic hardships for families in the Columbus, Georgia community.

Harris Carlisle

Rational Design and Synthesis of Substituted N,N'-Bis(arylmethyl)imidazolium Salts

With a high death rate in America, cancer has been a topic for many researchers and scientists to investigate for possible cures and treatments. This focuses on the characterization of a series of imidazolium salts. Imidazole salts are a class of compounds that have received attention for their in vitro anti-cancer activity against a variety of cancers, particularly non-small cell lung cancer (NSCLC) cell lines. The synthesis of the benzimidazole derivatives was done over a three to five day process. Once the synthesis is complete, the product needs to be tested to prove that the compound produced is the desired result as well as to check the purity. The purity of synthesized benzimidazoles derivatives were examined by the use of a variety of techniques to evaluate the melting point, mass, elemental structural percentage, and the crystalline structure. Proton nuclear magnetic resonance (H-NMR chromatography) identified that the measured chemical shifts and peak integrals matched the predicted theoretical molecular structure. Melting point comparison showed that the synthesized derivative products each had

a melting range that did not correlate to the ranges of its starting components, which shows a different compound was formed at the end of the synthesis reaction. High resolution mass spectroscopy (HRMS) showed that the measured mass to charge ratio (m/z) of the synthesized product was nearly uniform to the theoretical. The calculated elemental analysis ratio of carbons, hydrogens, and nitrogens in the synthesized sample were similar to the expected elemental ratio, which fell within the accepted deviation range. X-ray crystallography testing compared the mapped out synthesized product's molecular structure to an expected model of the atomic molecular structure with slight deviations. The combined result of the various testing indicates that the benzimidazole derivatives synthesized were the intended product and met the chemical standard of purity for testing.

Simran K. Chhina

Should carotenoids in the eggs of Largemouth and Spotted bass, Micropterus salmoides and M. punctulatus, be used as an assessment of aquatic system integrity?

Carotenoids are pigments that play a critical role in animal health, but they are synthesized by both plants and photosynthetic microorganisms. The pigment colors of carotenoids commonly range from reds, oranges, and yellows, but there are more than 600 carotenoids recognized in nature, all serving important purposes in animal physiology. The functions of carotenoids include serving roles as antioxidants, immunostimulants, and protecting organisms from ultraviolet radiation and free radicals. Carotenoids are also used in the sexual signaling of many animals, such as fish and birds, but they are thought to be honest signals of good health. Our primary goal is to examine the previous research on carotenoids in both fish and birds, in order to develop a new project targeted at assessing waterbody health using carotenoids. Carotenoids are better studied in birds and can be found in high concentrations in areas such as the skin, feathers, adipose tissue, liver, ovaries, and egg yolk. Carotenoids also serve a wide variety of functions in the health of the embryos including enhancing the immune systems and survivability of the embryos. Carotenoids in fish are found to reduce metabolic stresses, enhance immune responses, and skin coloration to attract mates. Nothing is known about the carotenoids in Largemouth and Spotted bass, popular sport fishes. We will collect eggs from these fishes to identify and quantify carotenoids among different waterbodies. A synthesis of the literature suggests carotenoids should be used for a novel assessment of aquatic system integrity.

Rahul V. Clamor

Synthesis, characterization and biological properties of asymmetric N,N'-bis- substituted triazolium salts

Cancer is one of the most complex ailments to treat and assess within both the medical and pharmaceutical industry. Although there are current treatments to combat cancer, oftentimes

the main treatments immunocompromise the patient in question, namely through the use of chemotherapy. N, N'- bis(arylmethyl)imidazolium salts and its respective derivatives are utilized in order to elucidate anti-cancer and antibacterial activity. Triazoles have been researched extensively for their medicinal properties as a scaffold for their investigation as potential drug therapeutics. However, N,N'-bis-substituted triazolium salts, a class of compounds derived from triazole systems, have yet to be investigated for their structure activity relationship (SAR) relating substituents to the varied antimicrobial activities. Azolium salts that are similar in structure, such as imidazolium and benzimidazolium salt compounds, have been extensively utilized, due to their promising biological activities. Though non-water soluble, imidazolium and benzimidazolium compounds have substantially decreased viability in the clinical atmosphere. The SAR of this unique substituted class of N,N' - bis-substituted triazolium-based compounds has supported the claim that triazole rings would provide the greatest water solubility. This study evaluates a series of novel triazolium salt derivatives that were considered high efficiency triazolium compounds with antimicrobial activity against four pathogens of the ESKAPE bacteria that are known to cause infection in immunocompromised patients. The effectiveness of symmetric and asymmetric triazolium compounds are synthesized, characterized and assessed for their biological activity against carcinoma cell lines.

Kiara F. Clemons, Amanda Candies, Donald Beaulieu

Connect 4 Project

We are researching the feasibility of a system that uses machine learning and data from multiple users to improve overall system performance, displays statistics of user interactions with the system, uses cloud-based services to manage the system and store user actions, and deploys the system to a physical apparatus. These goals were implemented into the game of connect 4 through a machine learning approach called recurrent neural networks (RNNs). We also developed a web-based application and an Android application utilizing Flutter, a user interface library. The app served as a data collection front end and the Google Cloud Platform managed the back end.

This material from the Southwest Georgia Louis Stokes Alliance for Minority Participation is based upon work supported by the National Science Foundation under Grant No. HRD-1817519.

Kiara Clemons, Christian Jones, Emilia Tenbrock, Seyeon Kim

No Room for the Homeless

Homelessness is an issue that plagues most cities around the world. Be it due to a high cost of living, mental health issues, or simply drug abuse most cities have a homeless population. Over time, a multitude of cities has begun to find ways to alleviate or even combat the homelessness issue. This problem connects back to the United Nations Sustainable Development Goals

(SDGs), specifically the goals of No Poverty, Decent Work and Economic Growth, and Good Health and Well-being. As a group, we plan to use Tokyo, Japan as a prime example of how these goals not only intersect but can be met successfully, while Los Angeles, USA is an example of a city failing to meet these goals. Both cities are in the 'Global North' but have very different approaches and outcomes.

James A. Cox, Nicholas Dunn, Austin Lee, Max Lewis, Thomas Merino

SmartPlanner - Intelligent Course Scheduling

Academic advising, especially properly planning courses across semesters to ensure students graduate on time, requires significant time and effort from both students and faculty. This project aims to design, develop, and evaluate a python-based smart class planning advising tool that can be executed as stand-alone software. The only files required from the user is a PDF of their degreeworks (easily downloaded from MyCSU) and can output a recommended class plan, in the form of Excel Sheet, for a student to follow until the student's graduation based on the student's career goal, program interests, expected graduation date, etc.

The SmartPlanner has a Graphical User Interface (GUI) as well as text-based Command-Line-Interface (CLI). The system has been designed so that user input is as simple and accessible as possible. The intended audience is both students and advisors - students can submit their own degreeworks and advisors can submit batch degreeworks files to advise multiple students at a time. The core of SmartPlanner is an intelligent experts system that uses rules and cases as its knowledge base. The expert system relies on past advisors' experiences to come up with a recommended schedule. A showcase of SmartPlanner and how it works will be available during the presentation.

Lance Crane, Alisha Kennedy

Synthesis, Characterization, Solubility, and Toxicological Effects of N,N'-Substituted Triazoles

Cancer is one of the deadliest ailments known in modern medical history with research towards a cure still ongoing. While chemotherapy is an effective procedure against cancer, it is often harmful to healthy cells, possibly causing further damage than the cancer itself. Therefore, many are searching for a novel medication to target cancer. Yet, pharmacological activity of these medications is often prohibited due to a lack of water solubility. After extensive examination of several potential compounds, a triazole-based system with varying substituents soon stood out as pharmacologically potent against cell cancer lines and water soluble. The initial focus was aimed at finding a N,N'-bis-substituted triazolium salt with optimal anti-proliferative activity and aqueous solubility. This work highlighted the 1,2,3-triazolium salt N,N'-bis-substituted with 2-methyl–naphthalene, which was found the most active against cancerous cell lines while not seeming to affect normal cell lines with a 5 or 15 micromolar solution. A separate azolium compound, 2-amino-1-methyl-benzimidazole, has great potential.

It has a strongly polar free amino group which could aide in water solubility as well as pharmacological activity. However, to prevent this reactive functional group from forming unwanted species, its reactivity must be reduced by a protective group such as the BOC, tert-butyloxycarbonyl. This will transform the free amino into an unreactive amide. This will allow for reactions to be carried out without affecting the free amino group, and then easily breaking off the protecting group to put the amine back into place. In addition, activity and potency of the triazole salt will be further examined using cancer cell lines such as prostate (PC-3), breast (MDA-MB-468), and lung (NCI-H1299) cancer cell lines as well as healthy lung cell lines (WI-38). In addition to this, organismic and environmental toxicology will be evaluated in tests with Asian clams (Corbicula fluminea). The species is abundant and easily accessible, and they could be good biomarkers in freshwater biomonitoring. Thus, once the solubility analysis is completed, research will be conducted concerning anti-proliferative activity of the triazolium salts at both the cellular and organismic level.

Nevaeh D. Davis , Havahna Wilkes, Alisha Kennedy, Katie Powell, Isabelle Rodriguez, Dominic Fico

Synthesis and biological activity of N,N'-bis-substituted-triazolium salts against the cell proliferation and cell viability of NCI-H1299 carcinoma and WI-38 cells

Every 1 in 16 Americans will be diagnosed with lung cancer in their lifetime. It is the number one leading cause in cancer deaths. The complexity of lung cancer continues to perplex scientists and doctors due to its unpredictability in morphology and treatment. Treatment options can be broad based on the stage of cancer and most commonly include surgery, chemotherapy, and radiation. Although these options may extend the patient's lifespan, side effects are still present. Follicle damage, hair loss, organ damage, and infertility are all effects of radiation and chemotherapy. These outcomes have led scientists to explore less harmful and more efficient approaches to treating cancers. Benzothiazolium and triazolium salts have been shown to have anti-tumor properties. The synthesized triazolium compounds were designed with various substituent properties, specifically hydrophilic properties, to provide therapeutic effects to the carcinoma. A preliminary structure activity relationship (SAR) against normal lung cells (WI-38), and lung cancer cells (NCI-H1299) can be presented with three N,N'-bis-substituted-triazolium salts, bis(naphtylmethyl), bis(naphthylacyl), and bis-(3-phenylbenzyl), which are referred to as T3-2-2, T3-4-4, and T3-5-5, respectively. This research will investigate the biological effects of these salts and other salts from the drug series on the proliferation and viability of both normal and cancerous lung cells. Using MTS assays we are able to test the cytotoxicity and effectiveness of the salts over a 48-hour period. The aforementioned triazolium salts have promise to be effective in decreasing the proliferation of cancer cells while having a negligible effect on the normal cells. This study establishes a potential that the salts may be

able to target cancer cells and leave normal cells unharmed, possibly minimizing the damage from cancer treatment.

Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation. The material from the Southwest Georgia Louis Stokes Alliance for Minority Participation is based upon work supported by the National Science Foundation under Grant No. HRD-1817519.

Kelsey DeCuir, Taylor Carson, Bre'Yonna Stone, Valeria Segura

Gender Inequality Across the Board

This research project examines different aspects of gender inequality and its effects on women. Using a feminist perspective, we explore two different case studies and show the difficulties women face in day-to-day life. Gender inequality has been present since the dawn of time and has been relatively unaffected throughout the years. In present-day society, gender inequality has lessened in some places but is still very much present worldwide. Three United Nations Sustainable Development Goals (SDGs) pertain to this issue: Gender Equality, Good Health and Well-Being, and Reduced Inequalities. We will utilize the facets of gender violence, unequal income, and unsafe work environments in order to elucidate how gender equality remains stagnant.

Bradley T. DeFore

Quantum Computers and Their Effects on Cybersecurity

Technology is always evolving and it is able to do things previously thought impossible. The invention of quantum computers is certainly one of these new emerging technologies. These computers will be able to do things in cybersecurity that are considered impossible to achieve with the computers that we have today. There are some algorithms that we use today that will take modern computers longer than the universe has existed to break. Meanwhile, quantum computers, if realized for practical use, will be able to break most of the ciphers that we use today to keep our data safe in a reasonable time; possibly as short as a timeframe within attacker's lifespan. The National Institute of Standards and Technology (NIST) has been looking into ways to prevent the use of these quantum computers being used for malicious intent. They have been holding contests for new quantum safe algorithms since 2016. NIST isn't the only group that is looking for ways to prevent the future of malicious quantum computers. There are other groups who are joining in but who are participating in ways other than just algorithms. The purpose of this literature review is to gather information about the future of cyber security given the rise of quantum computers. The paper will first go over some of the fundamental differences between quantum computers and modern day computers. It will then go into the effects of advances in quantum computers on cybersecurity.

Bradley T. DeFore

Single Program for Multiple Encryption and Decryption

There are many different algorithms to encrypt and decrypt your data. Just like so many other things on the internet nowadays they can also be spread out all across in different locations of the internet. This program is designed to migrate and combine them all in one place so you have a reliable and safe location to encrypt and decrypt your data. This program will also have some options to crack a cipher if you don't have the key for it.

Tasya K. Diaz

The Effects of Artificial Intelligence on Accounting Jobs

There is speculation around how artificial intelligence will impact jobs. To better understand perceptions and attitudes of accountants, I administer a twelve minute survey addressing perceptions toward artificial intelligence, process automation, and robotic process automation. The survey will be delivered online through a survey platform. Prior research by Douglas and Holmes suggests “the overall effect of AI technology will be to vastly amplify and augment their abilities and handle repetitive tasks,” (Holmes & Douglass, 2021). While I expect to find results similar to prior research, our study extends inquiry to include both process automation and robotic process automation. The purpose of this project is to understand the knowledge and use of automation tools of accountants in their firm or industry. Data for this study has not yet been acquired.

Gabrielle Dillard

The effect of natural products on the growth of docetaxel-resistant triple-negative breast cancer stem cells

TNBC is a very aggressive form of breast cancer and there is no targeted treatment available for this subtype of breast cancer. Chemotherapy drugs like docetaxel are prescribed for TNBC patients. Chemotherapy is cytotoxic and has various side effects as it cannot differentiate between normal fast dividing cells and fast dividing cancer cells. Docetaxel kills most of the cancer cells, but some cells are resistant to docetaxel. These resistant cells survive, they express cancer stem cell markers on them and are responsible for the relapse of cancer. In this project, we are studying if the chemicals in natural products like ginger, turmeric, herb (ashwagandha), grapefruit, lemon peel, etc. can kill docetaxel-resistant TNBC stem cells. We are working with prominent chemicals. We have some preliminary data making use of the online molecular docking tool Patch Dock and Natural products are well tolerated by the human body, and they will be a great substitute for chemotherapy which is toxic for the human body.

Cassidy L. Fine, Courtney Devera

Development and Evaluation of Audible Titration Modules: Chemistry Learning for Visually Impaired Students

Chemistry is central to everyday life and ubiquitous in the STEM classroom setting. Hands-on experiences can offer memorable and relevant interactions that stabilize and solidify students' success. Providing an equitable and immersive experience is critical to student learning. However, visually impaired or blind students are limited with regard to select hands-on experiences. The purpose of this research is to design and evaluate 'audible' modules and titration modules to help demonstrate chemical reactions and acid-base chemistry for visually impaired students. Several experiments will be developed to significantly increase the understanding, satisfaction, and performance of visually impaired students in the chemistry classroom. This research is intended to improve the issue of equity with those visually impaired individuals with STEM interests. Visually impaired students at the Georgia Academy of the Blind will actively participate in classroom sessions. We will give qualitative surveys after the hands-on execution of the audible titrations and analyze data to evaluate the usefulness of the development and evaluation of audible titration modules. This project could benefit the visually impaired community by allowing educational experiments to be constructed and tested effectively.

Alexis C. Heard, Jasmine Woods

Evidence-based Exercise Prescription: Let Focus on Beating this Osteoporosis!!

Background & Purpose: Osteoporosis (OP) is defined as a bone disease that develops when bone mass, bone mineral, or bone structure changes. Half of the adults ages 50 and up are at risk of developing OP. Low impact aerobics/ anaerobic exercises, resistance training, and weight bearing exercises can strengthen the bone. The purpose of this case study is to prevent the client from developing osteoarthritis, and to manage his osteoporosis.

Case Description: The client is a 70-year-old man who has a history of OP which is progressing to osteoarthritis in the knee and hip joints. He has been medically cleared to exercise and tested in the 90th percentile for the grip strength test and the 60th percentile for the bench press. His leg press is below average, and his caretakers are concerned about falls which could lead to bone fractures. The client's exercise program focuses on building strength in his legs. This program will include machine weights, water exercises, and aerobic exercising 5 days/week to equal up to 150 minutes/week. Considering the client was previously a smoker for twenty years aerobically, his exercises should be light to moderate.

Discussion: Providing the correct strength training plan, the client will be able to manage his osteoporosis without the disease progressing. This individual's way of living (smoking, alcohol consumption) should be monitored and should come to a complete halt. After about two weeks

of time frame, we can increase his overload progression, depending on how he responded to the initial prescription.

Kyana Henderson, Taylor Brown

Baby Bump Back Pain

Background and Purpose: Pregnancy has a significant impact on the body. Low back pain (LBP) is the most typical musculoskeletal ailment during pregnancy. Physical activity increases blood flow to the lower limbs to reduce symptoms of LBP as well as ease labor. The purpose of this case study is to examine the effect of exercise prescription on LBP in pregnant women.
Case Description: The patient, a 32 year-old pregnant female in her first trimester, has recently started to develop LBP with her weight gain. She does not exercise regularly and exhibited an uncomplicated pregnancy. She is in good health, but would benefit from strengthening her upper body and aerobic capacity. We will do 150 min/wk aerobic exercise to help alleviate compression in her lower back and help reduce excessive weight gain.
Discussion: Being pregnant, it is inevitable that she is going to gain weight. However, an exercise program involving aerobic activity will help this client to avoid excess changes in weight and experience less LBP. She should refrain from excessive sprinting in her case because lower back pain may be exaggerated. She should avoid contact sports because it can be detrimental. Safe pregnancy and LBP exercises would include swimming, yoga, squats, and walking. Overall, the goal is to get her to meet the physical activity recommendations.

Marinella A. Hernandez

The Myth of Eva Perón

This oral presentation will be based on my thesis on Eva Perón. Using Roland Barthes 1957 essay "Myth Today" as a framework, my intention is to explain how the historical figure Eva Perón has been transformed into a mythical force used to articulate culture and politics. To argue my thesis, I will present the ways in which Eva Perón has been converted into an actual system of communication using an interdisciplinary approach, incorporating examples and sources from literature, biography, history, politics, film, and photography. I will begin with brief introductions to Roland Barthes' essay "Myth Today" and to Eva Perón. This will transition into a discussion on Roland Barthes' theory regarding political and cultural myth, in which Barthes argues that institutions are capable of convincing a population that its beliefs are natural, when in truth they are carefully constructed myths. Barthes explains via semiological analysis that political myth takes a sign, which is full of meaning, converts it back to a signifier, stripping it of its meaning, and proceeds to attach another meaning. I will show examples of how dueling political forces during the time of Eva Perón created a variety of political and cultural myths, which fall into contexts of religious or mystical myth and the black myth. In

closing, I will consider that the full truth of Eva Perón may be unknowable, given that dueling political factions decided that they would represent reality however they wanted it to be.

Emily L. Holmes, Noah Windhorst

Happy Feet, Happy Heart

Cardiovascular disease (CVD) affects around 20 million Americans and is the number one cause of mortality in the United States. CVD is a disease which symptoms such as blood clots, damaged vessels, and ischemia. Aerobic exercise and resistance training have been proven to decrease risk factors and symptoms in patients with CVD. The purpose of this case study is to examine the effects of outpatient cardiac rehabilitation and exercise on patients with CVD. The patient is a 55-year-old male who has been diagnosed with 80% occlusion of his right coronary artery. He has been reporting fatigue and dyspnea during moderate activities of daily living, such as yard work. He has several CVD risk factors including high blood pressure and a large waist circumference. A recent graded exercise test showed changes in his electrocardiogram. He is taking ACE inhibitors and a diuretic and is not meeting physical activity guidelines due to fear of a heart attack. In an outpatient cardiac rehabilitation program for 10 weeks, the focus will be strengthening the patient's cardiorespiratory fitness while building on exercise compliance.

With exercise and rehabilitation, the patient's symptoms, and CVD risk factors should improve and lessen the risk of a cardiovascular event. Exercise prescription for patients with CVD is highly subjective and needs to be specifically tailored to each patient and their symptoms/limitations. Cardiac rehabilitation for patients not only improves fitness, but also is vital in improving all aspects of the body: mental, emotional, and physical.

Kenya A. Jackson

Investigating the Impact of Perception of Mental Illness on Parenting Styles: A Quantitative Correlational Study

According to the Centers for Disease Control and Prevention (CDC), during 2016-2019, 20 million children and adolescents aged three to seventeen were diagnosed with mental, developmental, or behavioral disorders. Underdiagnosis, misdiagnosis, and lack of proper treatment all contribute to the worsening of mental illness, which can lead to problems that continue into adulthood. One of the most important factors in appropriately diagnosing and treating children's mental illness is parenting style. Parenting style is reflected by levels of responsiveness and demandingness, which may be impacted by parental perception and comprehension of mental illness. Research has demonstrated that the more negative attitudes and lack of understanding parents have regarding mental health, the less likely children are to seek help regarding management. This quantitative, correlational study aims to explore the relationship between parental perception and comprehension of mental illness and parenting

styles. The research design will be an online survey. Participants will be provided a link to complete an anonymous 2-phase survey via Survey Monkey. Survey questions will include participant demographics. The research question is: How does parental perception and comprehension of mental illness impact parenting style? The researcher's hypothesis is: Parents with negative perceptions and little understanding of mental illness tend to have stricter, less supportive parenting styles.

Jahfel N. Jones, Kamryn Allen

Evidence Based Exercise Prescription for Healthy Adults

Most Americans do not meet the American College of Sports Medicine's (ACSM) guidelines for physical activity, which is associated with of overall mortality and morbidity and can lead to the development of cardiovascular disease (CVD). The purpose is to examine the impact of exercise prescription on healthy adult.

Case Description: A 47-year-old stay at home woman wants to initiate an exercise program. She has not been involved in any structured physical activity, but occasionally walks approximately 1.5 miles, two to four/per month. Although she is apparently healthy, the client has several risk factors for CVD, including elevated blood pressure and low-density lipoproteins, and low high-density lipoproteins. She has below average lower body strength and fair upper body strength. There is noticeable weakness in balance, thus an evidence-based exercise prescription will emphasize cardiovascular endurance and lower body power. The goal is to meet ACSM guidelines of 150 min/week, 3-5 days/week, for 30min/week of moderate to vigorous activity. In addition, the client should participate in 2 days/week of resistance training to improve lower body strength.

Discussion: Understanding that increasing exercise has multiple health benefits which outweigh the risk associated with it, any apparently healthy adult should aim to meet ACSM guidelines. The possible risks with participating in exercise programming includes musculoskeletal injury and/or over exertion within the first two sessions but that can be minimized with supervision. An increase in physical activity can help improve activities of daily living that may require balance and fitness.

Rachel Kennedy, Alivia Stewart, Leah Poyotte, Landon Averett

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

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.

Samuel C. Kimball, Joy N. Flowers, A'Naja Houston, Kayleen E. Linge, Cory G. Mitchell
The Stellar Graveyard
We will compare newly obtained optical data at sulfur [SII] wavelengths with hydrogen (H-alpha), radio, and X-ray wavelengths to identify Supernova Remnants (SNRs) in the Large Magellanic Cloud (LMC) and deduce key features where possible, including 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. We will use X-ray and radio comparisons, such as files from the European Space Agency, to confirm that the optical shells are indeed SNRs. Our findings will provide a more complete catalog of LMC SNRs and enhance our understanding of the later, less studied stages of SNR development. We expect to confirm several SNR candidates and add them to the catalog, to provide a more complete catalog of LMC SNRs.

Taj S. Knight
Yellow Bullhead (Ameriurus natalis) as bioindicators of water quality in West Central Georgia
Yellow Bullhead (Ictaluridae: *Ameriurus natalis*) as a bioindicator of aquatic health in an assessment of two urban streams. We quantified the presence of topical parasite infections, fungal infections, average length of barbell infections, and age and growth. This study was done by sampling two tributaries of the Chattahoochee River Watershed: Weracoba and Lindsey creeks. Both Weracoba and Lindsey Creeks are classified as impaired streams under section 303(d) of the Clean Water Act with both being listed for fecal coliform from their headwaters to their confluences with Bull Creek. The lower reach of Weracoba is also listed for pH and Bio M (macroinvertebrates). We found no significant difference in size at ages 0 and 1 between the creeks; most of the catfish sampled were ages 0 or 1 years old. However, one Yellow Bullhead lived up to 6 years old. There were no significant differences in external parasites or fungal infections between the creeks. However, Yellow Bullhead from Weracoba Creek exhibited bacterial infections on the chin barbels, and the ventral cephalic and anteroventral abdominal regions. Yellow Bullhead have gustatory receptors on their chin barbels, and the ventral cephalic and anteroventral abdominal regions. These regions are in contact with the substrate while foraging. We propose the infections are a result of being exposed to toxic substances while foraging. Furthermore, three Yellow Bullhead from Weracoba Creek exhibited bifurcated barbels, which are a result of being exposed to a mutagen during embryonic development. Yellow Bullhead function as natural bioindicators and provide evidence of pollution in the substrate of Weracoba Creek.

Emily N. Knox, Maddison Montgomery

Catalytic oxidation of CO under lean conditions

The exhaust gasses from gasoline and diesel-powered automobiles contain 0.5-2% carbon monoxide and 12-14% carbon dioxide. These pollutants contribute to greenhouse gas emissions and overall global air quality. Conversion of these gases typically requires high temperatures above 300 degrees celsius. Not much research has been conducted using lower temperatures to convert carbon monoxide. Heterogeneous catalysts containing noble metals (palladium, platinum) on a support (aluminum oxide, cerium oxide, ceramic oxides) are effective for removing the air pollutants (methane, carbon monoxide) from automobiles and transport vehicles through conversion of carbon monoxide. First, synthesis of Pd/cerium oxide-aluminum oxide catalyst was completed. Next, a mixed gas containing 2% carbon monoxide, 4% oxygen, and balanced nitrogen was reacted with the catalyst under lean conditions (excessive oxygen), across different temperatures. As temperature increases every 5 degrees celsius, more carbon monoxide is converted into carbon dioxide. For example, when the temperature of the catalyst is at 50 degrees celsius there is 14.0% conversion of CO into CO2. As the temperature begins to rise, such as when the temperature is 75 degrees celsius there is more conversion with a 62.0% conversion of CO into CO2. When the temperature hits 100 degrees celsius, the conversion of CO into CO2 is 81.0%. At 120 degrees celsius and above there is a 100.0% conversion. Eventually, at even higher temperatures such as 300 and 500 degrees celsius, the trend stays at 100.0% conversion of carbon dioxide.

Elizabeth A. Lambert, Amber Maxis, Melanie Prescott, Cole Lassiter

Analyzing Leukocyte Proportions in Yellow Bullhead Catfish (Ameiurus natalis) to Assess Water Quality in Two Georgia Creeks

Bioindicators are organisms in complex systems which reflect their environment and thus can be used as tools to measure the environmental quality. We collected Yellow Bullhead catfish (*Ameiurus natalis*) from Weracoba Creek and Lindsey Creek, to use as bioindicators; this allowed us to compare the health of the creeks and determine the effects of pollutants. Both creeks are classified as impaired streams under section 303d of the Clean Water Act for fecal coliform, however Weracoba Creek is also listed for pH and Bio M, therefore we expected the fish sampled from Weracoba Creek to have statistically higher levels of monocytes and total leukocytes compared to those from Lindsey Creek. We also predicted fish from Weracoba Creek would have higher mortality, and less growth due to the difference in water quality. We measured body parameters and condition, collected blood samples, removed sagittal otoliths, and analyzed the leukocyte counts across localities and age classes for each fish. There were no significant differences in age and growth between the creeks, and nearly identical mortality. Yellow Bullhead of ages 0-1 years from Weracoba Creek exhibited significantly higher blood leukocyte proportion than those from Lindsey Creek (Mann-Whitney U-test, n = 17, U = 50, P =

0.037). Higher blood leukocytes indicate immune responses to infections, heavy metal pollution, or other adverse conditions. There were no monocytes found in any of the blood samples and suggests that Yellow Bullhead do not have monocytes. This has also been noted for one other species of catfish.

Austin L. Lee, Thomas Merino, Kaleb Horvath, Ryan Zimmerman

CSU Energy Incident Management

Energy Incident Management (EIM) is a systematic approach to identify, assess, respond to, and minimize the effects of incidents that impact the efficient allocation of energy resources. Effective EIM systems can reduce energy wastage, provide substantial cost savings, and facilitate more efficient infrastructure management. Developments in network and sensor technologies have enabled the proliferation of smart building technologies that assist in EIM initiatives. The US Army Corps of Engineers has commissioned a multi-faceted EIM initiative meant to deliver predictive maintenance capabilities via the real-time tracking of electric power consumption in Fort Benning smart buildings and save costs through energy waste reduction. CSU has been tasked with the creation of a data analytics Artificial Intelligence (AI) model meant to detect system faults in smart buildings. The creation of this model is contingent on four sources of data: 1) electric meter readings, 2) weather data, 3) smart building sensor data, and 4) occupancy data. The proposed model is trained on a baseline of normal electric usage, where electric meter reads are correlated with the other data sources. Building faults are identified by comparing actual electric meter readings to AI-generated usage predictions. Then, the readings are evaluated against fault classification thresholds. The CSU team is also responsible for the significant prerequisite data engineering tasks required to clean and process the available source data. The project is currently being deployed in the Cloud and leverages numerous Cloud technologies, including Blob Storage, Databricks, CosmosDB, AutoML, and others.

Kayleen E. Linge

Modelling Planetary Orbits Using the Schwarzschild Metric

This project presents the derivation of the geodesic equations on an n-dimensional Riemannian manifold (M,g), where g is the Riemannian metric on M, via application of a variational principle. This will be illustrated using the Schwarzschild metric, a solution of the Einstein field equations for the gravitational field outside an isolated spherical mass such as a star. This metric will be used to calculate planetary orbits, considering the specific case of Mercury. Mercury's orbital precession is far beyond that predicted by the Kepler-based Newtonian model and can only be accounted for via a relativistic model.

Elva Y. Lucero

Effects of minimum, maximum, and 24-hour thermal gradients on age and growth characteristics of the Black Crappie (Pomoxis nigromaculatus)

We have a poor understanding of how fish age and growth responds to a warming climate. Proper fisheries management requires us to quantitatively describe how age and growth characteristics (size at age, longevity, growth rate, etc.) change across a thermal gradient, but these data exist for only a few published species. We assessed 28 previously described populations of Black Crappie (*Pomoxis nigromaculatus*) with the goal to describe how their age and growth characteristics differ between three types of thermal gradient data; minimum mean annual temperature (MAT_{Min} °C), 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_{Min} °C, MAT_{24hr} °C, and MAT_{Max} °C were generated from the National Oceanic Atmospheric Administration (NOAA). We examined the relationships among MAT_{Min} / 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_{Min} / MAT_{24hr} / MAT_{Max} °C and total length ages 3, 4, and 6 years old, but significant negative relationships between longevity with MAT_{Min} / MAT_{24hr} / MAT_{Max} °C. There were significant positive relationships between MTL and MAT_{Min} / MAT_{24hr} / MAT_{Max} °C. Black Crappie in warm climates have a shorter lifespan but grow (faster) to longer lengths at ages 3, 4, and 6 years old. 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 management will need to consider that fishes respond to a thermal gradient in different ways.

Justin T. Ludwig

Data Analysis of Columbus Fire Department Call and Incident Logs

The Columbus Fire Department want an easy way to look at trends in the data they collect on their call and incident logs by seeing how many incidents happen at certain times of the day and where. This is accomplished by using Google Looker Studio to construct bar graphs, pie charts, tables, and a bubble map of Columbus, GA that can be easily filtered based on certain aspects of the data, such as date range, station, incident type, and hour of day. The fire department also want to see how long calls take to resolve. The average times and the 90th percentile of the times for Alarm Handling, Turn-out Time, Travel Time, and Total Response Time is calculated for easy analysis by the fire department.

Kaela M. Mercer

Agrochemical Effect on the pH of Soil and Groundwater

The rampant and irresponsible use of agrochemicals is harmful to many aspects of soil health and efficiency, and can result in groundwater contamination. The focus of this study is to determine whether or not a correlation exists between the pH of soil which has been treated with fertilizers and pesticides.

To examine this, I collected twenty total samples from ten local parks and recreational areas, one sample from a highly treated sports field, and one sample from a nearby untreated area. A ratio of 1 part soil to 2.5 parts water was used to simulate groundwater and analyze pH. It is important to note that, in comparison to other regions of the country, Georgia soils tend to naturally be acidic.

Analysis of soil samples revealed that samples from treated areas consistently had a higher pH than their untreated counterpart samples. This increase in pH is a potential indication that locally applied fertilizers tend to be more nitrogen-rich. Understanding how the application and composition of agrochemicals impacts the chemistry of local soil and thus groundwater as a non-point source is an important part of watershed management practices.

Andrew S. Munsey, Jaquarius Harrison

Physical Activity in Hypertensive Clients

Background: Hypertension (HTN), or high blood pressure (BP), is a condition in which the blood vessels are in a state of sustained vasoconstriction, thus increasing the resistance in the periphery. HTN is a silent disease as it does not show signs or symptoms typically until a cardiovascular disease (CVD) event occurs. Controlling HTN can be accomplished with lifestyle intervention including diet, stress management, and exercise. However, the state of physical activity can be limiting in resistance & flexibility training due to adverse effects from supine exercises. The purpose of this case study is to examine the impact of exercise prescription on hypertension.

Case Description: The client is an overweight, sedentary Hispanic woman who runs a very successful, high stress business. She has diagnosed hyperlipidemia, HTN, and a history of smoking. Our exercise prescription will consist of cycling, swimming, and resistance and flexibility training to gradually work up to meeting the evidence-based guidelines for physical activity.

Discussion: With a well-rounded exercise prescription, this client will lower her BP and body fat percentage. To prevent further increase in BP the Valsalva Maneuver should be avoided by using 60-70% 1RM and gradually progressing to higher percentages if the BP stays the same or decreases. Before ending exercise sessions, it is important for her BP values to return to baseline before she leaves, so a cooldown routine will be key for your HTN management.

Adopting and adhering to exercise and other lifestyle modifications can mitigate the development of HTN, CVD, and premature mortality.

Tamia P. Nelson

Podcasts By Kids, for Kids

Project based learning(PBL) is a student centered-method of teaching that focuses on learning through engaging activities. This form of education leads students to gain a deeper understanding of content knowledge. PBL combines critical thinking, collaboration, creativity and communication skills while encouraging student directed education. Using this education method, students demonstrate their knowledge and skills by creating a public product or presentation for a real audience. Podcasts are currently a trending platform that focus on a specific subject each episode. Creating a podcast for students gives them a platform to showcase informational reading and writing skills, along with oral communication skills. Students can exchange ideas and knowledge through the platform. PBL requires students to use higher-order thinking skills and learn to work as a team. These interactions are important for students to have; it prepares students for the exchanges that they will face in the real world.

Brian T. Nguyen

The Armed Riders Pitch Deck

For my presentation, I will present my Pitch Deck of The Armed Riders, a superhero franchise I created based on a Japanese Superhero franchise called Kamen Rider. This is not an adaptation of Kamen Rider. Instead, I am taking a few elements of the Kamen Rider Franchise, and using them to create a brand new franchise in America.

Normal people in a not-so normal world suddenly were given suits of armor, powered by the Rider System. In various worlds, Armed Riders either protect their worlds from threats, or use their powers for their own personal gain. I have 25 Riders premade, but my Pitch Deck will only showcase the first five Riders of my franchise, and how the rest of the franchise will go.

Caitlin S. Parker

Alzheimer's Disease: Next step for future synthetic work of alternative treatments of AD

Alzheimer's disease (AD) is a chronic, age-related neurodegenerative disease that affects memory, behavior and thinking. Patients who have progressed AD have severe psychological problems that can alter everyday basic life abilities such as breathing and swallowing, which can ultimately lead to death. As of 2020, 5.8 million Americans were living with Alzheimer's disease, affecting adults in the ages 60 and over. Age is the best known risk factor, however genetics can also give children/grandchildren of those who have previously been diagnosed with AD a larger risk for diagnosis. AD is extremely difficult to prevent before onset, as the brain has been affected before any signs or symptoms are present. AD is ranked 6th in leading cause of death

by disease, with cancer being second, and diabetes being 7th. According to the Center of Disease Control and Prevention (CDC), the number of Americans affected is expected to triple by the year 2060. Treatments can help manage the symptoms, however there is no known cure to prevent AD. Due to limited treatment options, many scientists have studied various ways to prevent AD. Some have found that diet and physical training can decrease the risk as age increases. This literature review is aimed at identifying a small molecule or organic class that the Taylor group will use as a target molecule to generate in the lab. The project is aimed to explore factors that impact AD (ie. diet, pathophysiology and pharmaceuticals) to provide preliminary steps for future synthetic work for creating an alternative for the treatment of AD. Select target molecules will be shown as next steps associated with this synthetic project.

Brittany M. Perez-Verdugo

Project Based Learning in Elementary Special Education: Books for Kids by Kids

The importance of project-based learning in Elementary Special Education cannot be understated as far as the lasting positive impacts it has on the students engaging in them. There are many benefits to this type of learning and how it can improve the lives of the students involved. An example of project-based learning is Books for Kids by Kids. In this type of project-based learning students are able to engage in activities that allow them to work together to make a book based off state learning standards from a variety of categories such as English, Science, and Math. Not only this, but these books are distributed to other students for them to read. The students working together to write these books are able to "master" the standards through real experiments, research, and peer review. The students reading the books are engaged in the topic as they are connected to the text through general companionship of their age and grade proving that they too are able to master other topics and as result, write their own book based off of them as well. Projects like these help students not only build their knowledge on their current grade standards but they also impact the students own social and mental health. Students are able to build lasting bonds with their peers through engaging in these learning processes. They are also able to build their own self-confidence on the topic as often their pride at the end of the project has a lasting engravement on their psyche.

Nicholas R. Phillips

How a coach's credentials and communication skills impacts an athlete's motivation to perform

Introduction: This paper examines the correlation between a coach's communication skills, accolades, and descriptive features with how it impacts the motivation an athlete feels to compete. The reason for this study is because the majority of the research in this field is over 10 years old. Also the subject body for these studies were at big Division 1 schools. This study will seek to find out if division level, added variables in the survey, and if a decade of time change will impact the results of this study.

Problem Statement: Coach's communication skills are key components in an athlete's performances. Research has shown that there is a connection between a coach's communication skill and an athlete's motivation to perform along with an athlete's satisfaction. Though researchers have limited research outside of the big Division 1 Universities and have limited variables to just the coach's communication skill.
Purpose Statement: The purpose of this study is to contribute a new perspective to previous research papers over coaches' communication skills and athlete's motivation levels to compete. This is because the majority of research papers on this subject base themself in a big Division 1 University, and only focus on the coach's communication skills. I intend to contribute to this field of research by focusing the subject body on a small division 2 university, and by adding more variables to the survey. Also by seeing how a decade of time will impact what motivates athletes and the level of communication skill coaches are at. The understanding of this new approach to coach communication will help a wider range of school rather than the power 5 universities.
Significance of the Study: The significance of this study is to see what other aspects of a coach can impact an athletes motivation to perform in competition and practice. The additional variables about the coach will be their gender, accolades, mode of communication, and amount of communication within a week. These added variables will help colleges and coaches with how to motivate their athletes to compete.

Gisele L. Pierce
The relationships between temperature and age and growth characteristics for populations of Spotted Bass (Micropterus punctulatus)
Fisheries biologists must understand the effects of temperature on age and growth characteristics to manage our fisheries resources in a warming climate. The Spotted Bass (*Micropterus punctulatus*) are an economically important and popular sportfish in the black bass family (Centrarchidae). However, despite their popularity as sportfish, little is known about this species age and growth characteristics (lifespan [longevity], size at sexual maturity, growth rate, ultimate size) and nothing is known about how they respond to climate change. Spotted Bass are native to the drainages from Ohio to Oklahoma and south to Texas and the Florida panhandle. I expected to find the relationships among mean annual air temperature (MAT_{24hr}) and longevity, maximum recorded total length, and total length (TL) at ages 3 and 5 years old (n = 17 populations), because there is a positive correlation between body temperature and metabolic rate for ectotherms (Q_{10} relationship). I found a negative relationship between MAT °C and longevity. There were no significant relationships between MAT °C and maximum recorded total length or total length at either age. Previously published literature about other species reported finding significant relationships between MAT °C and maximum recorded total length or total length at either age. I suggest that Spotted Bass are not greatly influenced by

MAT_{24hr}, which means that Spotted Bass size will not be influenced by a warming climate. However, Spotted Bass will experience shorter lifespans in a warming climate and therefore fewer reproductive attempts and number of offspring during their lifetime in places with increased warmth. Fisheries managers will need to stock more young into heavily fished water bodies on the northern end of their range and during a warming climate to maintain harvest at their current levels.

Katelynn B. Powell, Alisha Kennedy

Synthesis and biological activity of N-substituted-azolium salts against ALS-like cells and the TDP-43 Protein

Amyotrophic lateral sclerosis (ALS), also known as Lou Gehrig's disease, is a progressive neurodegenerative disease that damages motor neurons that run from the brain into muscles via the spinal cord. These neurons are what control voluntary muscle movements, such as the ability to eat, speak, and breathe. When damaged, these neurons no longer provide the ability for voluntary movement and are ultimately fatal. A hallmark feature in ALS and other neurodegenerative diseases is the presence of TDP-43 protein. When mutated, this protein aggregates and becomes cytotoxic, killing neurons and driving neurodegenerative disease. ALS currently does not have a cure, but there are treatment options to control symptoms of the disease. Riluzole, a benzothiazole compound, is one of two FDA-approved oral drugs for ALS. A series of substituted benzothiazolium salts have been synthesized, characterized. The ultimate goal of this research project is to test these compounds against a panel of transfected WI-38 (normal lung) and HEK (human embryonic kidney) cells with overexpressed TDP-43 protein to test the effectiveness of these organic compounds. The research presented here will show the feasibility of transfecting WI-38, U2OS, SH-SY5Y, and HEK cells with the TDP-43 protein. This research will also describe the results of cytotoxicity assays of both the aforementioned cells against several of the substituted benzothiazolium salts. This will be done by MTS assay. The result of the cytotoxicity tests will determine a structure-activity relationship (SAR) of the benzothiazole compounds against WI-38 and HEK cells.

Anterious D. Ridley, Quynh La

Multivariable Analysis on Popular Drugs

The study aims to provide a comprehensive understanding of the complex interplay between various variables associated with popular drugs, shedding light on their characteristics and potential implications. Drug prices have been steadily increasing throughout the years. The primary data will be collected through a review of statistical analysis of publicly available data. The research project will provide insights into the factors influencing drug pricing, the impact of drug pricing on patients and healthcare providers, and the role of government policies in regulating drug pricing. This article examines, collects, and analyzes how drug prices affect

consumers and the healthcare system. It will explore drugs that are harmful to health and those that are beneficial as well. Combined with the statistics, and the collected data, this study shows that drug prices are affected by many factors such as the price of raw materials for drug production, production technology lines, and drug prices imported. The research also examines potential confounding factors that may influence the observed relationships, such as geographical location, drug availability, and socio-economic factors.

Keywords: medications, drug, statistical analysis, drug costs, drug pricing, drug availability, government policies

Richard E. Rodgers

The Chattahoochee River Valley Story: From Columns of Smoke in 1865 to Whitewater Rafting

Introduction: The history of the Chattahoochee River Valley, where central Georgia meets Alabama, stems from a unique blend of classical southern charm and violence. The bridges that cross the whitewater rapids once connected two vastly different cities. The brick-and-mortar buildings that extend eastward from the riverwalk that began as textile mills are now repurposed as classrooms and offices. On land where cotton mills and warehouses once stood have been replaced by gleaming corporate offices. Things were much different here in the valley during the middle of the twentieth century. Workers from the cotton mills lived in company villages on both sides of the river. On one side organized crime and violence reigned. On the other, very much like a variety of cities throughout the south, took advantage of what was happening on the west side of the river. This thesis will explore how Phenix City fell under the grip of corrupt politicians and illegal enterprises and then recovered from its extraordinary past.

The Phenix City Story: Columbus and Phenix City rose from columns of smoke left behind after the U.S. Army Cavalry came to destroy the last remaining factories of the Confederacy. The final days of the Civil War left the citizens in the two cities in a state of chaos and confusion. Years before the war the lawlessness continued to expand in unrestrained areas remaining as indigenous people were forced to leave the river valley. This is a story about how pockets of lawlessness over a period of more than one hundred years paved the way for the criminal enterprises that trailed. Organized crime and corruption marked the middle of the twentieth century, primarily in Phenix City. The criminal enterprises that developed drew the interest of corrupt politicians, journalists who reported on them, and every level of law enforcement throughout the United States. Everything changed due to a crescendo of ruthlessness that shattered on one steamy hot summer night in 1954.

Conclusion: This is a brief narrative to describe the events that shaped and influenced the lives of people who lived in Phenix City and the Chattahoochee River valley during this extraordinary period. We will never really know what happened on that hot summer night in 1954. But we do

know it was a period of lawlessness that led to the murder of Albert Patterson and changed Phenix City forever.

Angelika Romo, Mary Claire Streat

The relationship between sounding data and large raindrop pools in thunderstorms crossing the Hudson River Valley, NY

Early in a storm's existence there is a tendency for larger raindrops to be the most concentrated towards the bottom of the storm and get lifted, or form, into pools at different depths in the storm cloud. TITAN storm tracking software is used to provide storm centroids of thunderstorms crossing over the Hudson River Valley in New York to extract the differential reflectivity (ZDR) relative to a storm's center. The elevations of large raindrops (high-ZDR pools) in the data from these centroids are plotted and compared with sounding data from the nearest sounding site to a storm case. This sounding data (temperature, dewpoint, wind speed, wind direction) and ZDR graphs are compared to the behavior of large raindrop pools. The resulting sounding data graphs are anticipated to propose a correlation in environmental conditions and ZDR modes, as well as a likelihood of those conditions influencing the behavior of the modes.

Timothy J. Sabau

Sino-American Competition in the Field of Artificial Intelligence

We have observed that a full-scale mobilization led China to catch and even surpass the US in some areas of Artificial Intelligence (AI). This research takes recommendations by the US National Security Commission on AI (NSCAI) and then applies them to grade current and proposed US AI policies. This research also provides background on the AI competition and compiles a broad range of phenomena indicative of AI progress between China and the US. We used dual scoring metrics based on the NSCAI proposed AI Stack and an original Stakeholder metric built to reflect our identified policy trends. We built a three-tiered system based on our dual-scoring metrics to judge the overall effect and likelihood of implementing policy proposals. Our analyses indicate that many highly effective policies are not massive in scope or unrealistic in implementation. Instead, they often just require awareness of the issue and relatively low-cost implementation. In fact, many good AI policies are universally good; they have not received the necessary attention or coordination until very recently. Finally, the results suggest that AI policy’s recurring shortcomings are not the lack of good ideas but disagreement or failure to implement those ideas synergistically.

Rohan M. Shah

Perspectives gained from a Civil Rights Odyssey

The purpose of this presentation is to share some of the discoveries I made during my explorations in the January 2023 course 'The Evolution of Health and Health Disparities: A Civil Rights Odyssey.' This was a study away course where I visited a collection of sites in Atlanta, Tuskegee, Montgomery, and New Orleans. I will discuss how I learned about some fascinating elements of the civil rights movement (e.g. the lynchings of African Americans, HeLa Cells, the Mothers of Gynecology), and the final conclusion I reached during my time at the Hurricane Katrina Memorial in New Orleans. After our visits had come to an end, I realized that these memorials are built not for those who passed on, but for those who remained.

Kaitlyn G. Shepherd, Hannah Trawick

Evidence-based Exercise Prescription: Physical Activity in Children with Autism Spectrum Disorder

Background and Purpose: Autism Spectrum Disorder (ASD) is a common condition that is estimated to affect 1 out of 100 children world-wide. Due to cognitive, motor, social, and behavioral impairments, physical activity can be more difficult for these students and impact them in group settings. Thus, ASD children typically have higher obesity rates. Children with ASD greatly benefit from an adapted physical activity program and intervention. The purpose of this case study is to examine the effects of ASD on children who have increasing activity goals.
Case Description: The client is a 15-year-old-male diagnosed with ASD. He receives 60 minutes of physical education in school but is sedentary outside of school. This is partly due to a lack of sensory and gross motor skills which are recognized by his occupational therapist. In particular, he lacks motor control during complex tasks. The client struggles with insomnia and takes medication to regulate his anxiety and sleep schedule. He is not hypersensitive to light but will intentionally spin and crash after extended periods of sedentary time. His exercise prescription will develop gross motor skills, strength building, and coordination.
Discussion: Sensory input, emotional control, coordination, and motor control are the main focus areas in occupational therapy. His prescription will also follow ACSM guidelines for bone and muscle strengthening and aerobic activity. This case study demonstrates the importance of adaptations for physical activity for individuals with ASD to deal with emotional and motor challenges that present during complex activity.

Adelheid L. Smith, Mia Dilmar, Kaela Holland, Katelynn Hoskins, Kirsten Ware

How Preservice Teachers Benefit From Project-Based Learning

The Exceptional Science Fair is a community based learning opportunity for students in self-contained classrooms. It provides these students with the chance to conduct and present their own Scientific study, as well as the chance to engage in Scientific experiments performed by

Preservice educators. We will examine the effectiveness of project-based learning on the outcomes of Preservice teachers in the areas of collaboration, lesson planning, leading groups, behavior management, and instruction differentiation. We will present a poster charting the results of the survey conducted to gain the feedback from preservice teachers.

Kendall L. Smith, Brittani Clary

Exceptional Science Fair at Oxbow Meadows: Providing Extracurricular Opportunities for Students with Disabilities

The Exceptional Science Fair at Oxbow Meadows is an outdoor experience offered to select schools for a chance to experience hands-on learning through stations and labs. These are Evidence-Based Practices (EBPs) that engage students in hands-on activities and experiments while exploring science-related content. Columbus State University's Teacher Education Program is partnering with Oxbow Meadows which is a non-profit organization dedicated to educating, inspiring, and empowering all people. The purpose of this Science Fair is to provide students with disabilities a chance to experience science and learn in an environment that is safe. Oxbow Meadows is providing a facility to host and present science experiments designed by students in the Teacher Education Program and modified to meet the needs of students with a range of exceptionalities and needs. The experiments will be led by college students and their professors. The science fair will take place over the course of a week and will be geared to accommodate the needs of most participants regardless of disability.

Elise R. Snow

Isolation of Secondary Metabolites in Eupatorium Serotinum

Phytochemistry, a subset of natural products chemistry, pertains to the study of chemical derivatives synthesized from plants and natural substances. Findings from this field can have important applications in the advancement of medicinal chemistry. The project works with Eupatorium Serotinum (AKA: late Boneset). This is an herbaceous plant found in the Eastern United States and was used by early settlers to reduce fevers. Isolation of the secondary metabolites found in Eupatorium Serotinum may reveal new compounds correlated to the plant’s medicinal properties. Through solvent extraction and purification with various solvation methods, we can isolate the secondary metabolites. Secondary metabolites correspond to natures reproductive, healing, and adaptive properties. Therefore, synthesis of these organic metabolites may aid in curing certain diseases and/or illnesses. Testing the extracted metabolites using enzyme-linked immunosorbent assays (ELISA) against E.Coli cells determines true bioactivity of the material.

Jonathan Stringfellow

Humor, the Last Service to Our Senseless Resolve – Satire in Anton Chekhov's Short Stories

This presentation examines the use of Humor in Anton Chekhov's short stories Joy and The Death of a Government Clerk to criticize humanity's propriety in class relations and the journey to self-actualization. Chekhov is recognized for his uncanny and simplistic ability to capture the inelegant and despondent lives of common bank clerks and lowly officials. His works continuously rear the subsequent generations of literary writers to further sift through the absurdity of our lives. One element of Chekhov's writing that accentuates the inane reality of his characters is his employment of humor. Chekhov's levity helps to remind his readers to retract our dour outlook on life – to have a momentary respite. However, I argue that he utilizes humor to lead his audience to acknowledge the methods they return to after having a good laugh at their ridiculous existence. This presentation will illustrate how Chekhov's humor points out and conducts his audience to view the social entrapment we will always return to.

Molly G. Thomas

The Zipless Fuck: A Vestige of "Love"

Isadora Wing, the narrator of Erica Jong's controversial 1973 novel Fear of Flying, describes and defines her concept of the "Zipless Fuck." It is characterized as an anonymous, passionate, and consequence-less sexual interaction with a man, often outside of an existing romantic relationship. This has expanded into the idea that casual sex is a way for women to engage their agency and subvert the patriarchy. In this presentation I will explore how the idea of the Zipless Fuck is not a subversion of patriarchal values, but in fact, an extension of the myth of love. To do so, I will deconstruct the foundational patriarchal ideas that lead to the concept of the Zipless Fuck; love is equated to sex, and sex is equated to worth. Therefore, by nature the Zipless Fuck is a part of these systems and upholds the patriarchal ideals it seeks to subvert. I will be looking at a study of gender differences in sex and a study of the effects of self-objectification on the well-being of women. Along with these studies, I will examine the concept of the Zipless Fuck through a Marxist Feminist lens and critical analysis, as well as a close reading of the first chapter of the novel.

Joysasha G. Tucker

Exceptional Science Fair

The purpose of this presentation is to share the benefits of a Science Fair for Exceptional Students. My class was split into groups to construct a science experience at Oxbow Meadows that Exceptional Students will be able to perform. Our experiments must be easy to perform and only take a few minutes to do. We are to provide written step-by-step instructions with pictures to show how to conduct the experiment.

Jiayu Wang

The effect of natural products on the growth of triple-negative breast cancer stem cells (mammospheres)

Breast cancer is the leading cause of death in women worldwide. 1 in 8 women are diagnosed with breast cancer,15 to 20 % of which are diagnosed with TNBC, triple-negative breast cancer (cancer cells lack three proteins estrogen receptor, progesterone receptor, and Her-2 which are known to fuel the breast cancer cells). It is a very aggressive form of breast cancer with a high chance of relapse. It is difficult to treat TNBC as targeted therapy is unavailable for TNBC. Chemotherapy is often not the best option because it cannot distinguish between healthy fast dividing cells and cancer cells. Patients receiving chemotherapy get very sick and die of the side effects of chemotherapy rather than cancer itself. We have some preliminary data showing the potential of natural products like ginger, garlic, blueberries, turmeric, grapefruit, and ashwagandha (herb) for the treatment of TNBC as natural products do not have side effects and are well tolerated. In this study, we are going to check the potential of natural products to kill TNBC stem cells. We are going to culture the cancer stem cells (mammospheres) and then check the effect of natural products on the growth of the TNBC stem cells.

John M. Ward

The "Dark Triad", Sexual Orientation, and Mate Selection

The Dark Triad is a set of three personality traits that are typically considered to be socially aversive and it consists of narcissism, Machiavellianism, and psychopathy. Sexual orientation is a person's sense of identity based on emotional, sexual, and romantic attraction to the sexes. Mate selection is defined as the evolutionary perspective that an individual will look for a partner who is kind, intelligent, healthy, fertile (attractiveness), and resource savvy (financial prospects). There is a lack of research on how the interaction between sexual orientation and dark triad traits could affect mate selection as the research tends to focus on heterosexual relationships and this study aims to fulfill this gap. The purpose of this study was to look at the interaction between dark triad traits and sexual orientation on long-term mate selection on college students.

William A. Wilbanks, Tristan Stanley

Burn Calories, not cigarettes

Background and Purpose: Pulmonary disease is a leading cause of morbidity and mortality in the United States. Individuals with pulmonary disease struggle to exercise due to restrictions of their airways and shortness of breath (i.e. dyspnea). Pulmonary rehabilitation with physical activity is necessary to see a decrease in symptoms. It is important that the individuals are focused on long term participation in exercise. The purpose of this case study is to examine the impact of exercise prescription on individuals with pulmonary disease.

Case Description: The patient is a 43-year-old female who has smoked 1 pack a day for the past 20 years with a significantly sedentary history. A recent maximal cycle test was stopped due to a complication of pulmonary disease which was dyspnea. Although she takes medication to reduce dyspnea, her fitness testing results show that she has fair cardiorespiratory fitness, very poor upper body strength, and well below average lower body strength. In order to see health benefits and reduced day-to-day symptoms, she will be prescribed common aerobic exercises for 5 days a week at an achievable intensity and duration to where she is asymptomatic. Research shows moderate and short durations of exercise with a gradual increase is effective in developing fitness.
Discussion: As this client continues exercise prescription and pulmonary rehabilitation, she should see health benefits including less symptoms during activities of daily living as well as having to take less medicine. Her continual participation in her exercise prescription will allow her symptoms to slowly diminish.

Gabriel K. Williams, Justin Ludwig
Variables Relating to Sports Teams Win/Loss Ratio
The ultimate goal of every sport is to be crowned as the overall winner, but there are many different factors and variables that every team, as well as every individual player, exhibits that can change the outcome of a game. We will be looking at three popular American sports: Major League Baseball, National Football League, and National Basketball Association, and use data from each league spanning the past five years to determine if height, weight, age, and team payroll have any significant correlation to a team's winning percentage. We will primarily be gathering data on players' height, weight, and age from sources such as Sports Reference, and then utilizing other sources such as HoopsHype and Spotrac to figure out what each team's estimated total payrolls are for each year. We will then do a regression analysis between each team's win/loss ratio and each of the four variables stated to determine their overall significance and impact.

Keywords: Sports, Statistical analysis, Regression, Win/Loss Ratio, Team Payroll

Alexandria M. Yarborough, Leigh Mccormick
Sexual Behavior During the Covid 19 Pandemic
Sexual behavior is a broad spectrum of behaviors in which humans display their sexuality. These behavioral expressions contain both biological elements and cultural influences and involve sexual arousal. The study of Human Sexuality has many methods for different research fields. The Greek Philosopher Aristotle made the first observations recorded for human understanding. Using information collected from the CDC, PubMed, and Google Scholar forms,

we will collect and synthesize data from peer-reviewed sources to assess the history, epidemiology, occurrence, cause, and results of sexual health in the community of Columbus State University and the United States population. It is hypothesized that people questioned their social lives and how they shared intimacy with someone. This study's findings show an increase in STDs and unplanned pregnancies during the Covid-19 pandemic. The lack of resources or facilities being closed due to the virus was detrimental to people who suffer from disparities and had a more difficult period.

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