Welcome to Tower Day 2024!

April 26

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 fifteen minute oral presentations, poster presentations, and five minute talks, both virtually and in person.

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

Program At-A-Glance

8:45am-9:20am — Welcome - Tower Day Conference Opening
Lite breakfast provided (Blanchard B/C)

FRIDAY MORNING SESSIONS

9:00am-11:00am — Student Poster Presentations
A series of brief talks about research and scholarly endeavors of faculty
Blanchard A

9:30am-11:30am — Oral Presentations- Session I
"Research Renaissance: Empowering Student Scholars Through Mentorship" - A series of brief talks about research and scholarly endeavors of faculty
Room 209/210

9:30am-11:30am — Oral Presentations- Session II
"Beyond Boundaries: Mentors-Student Partnerships in Solving Real-World Challenges" - A series of brief talks about research and scholarly endeavors of faculty
Room 215-216

9:30am-11:30am — Oral Presentations- Session III
"Cultivating Scholars: Student Research Excellence in Chemistry"
Room 310-311

9:30am-11:30am — Fine and Visual Arts- Session 1
A series of art demonstrations
Visual Art Displays
Room 214

9:30am-10:15am — Mentor-Led Session I
"Cultivating Scholars: Student Research Excellence in Chemistry"
Room 312/313

10:30am-11:30am — Mentor Led Session
"Cultivating Scholars: Student Research Excellence in Biology"
312-313

KEYNOTE LUNCHEON

11:30am-11:50am — Lunch

12:00pm-1:00pm — Keynote Session - *"Celebrating Undergraduate Research & Student Success"*
Cunningham Hall's Main Stage

12:00pm - 12:25pm — **Ms. Jacquelynne Jordan Regan**
Attorney at Kilpatrick Townsend & Stockton

12:30pm-12:55pm — **Dr. Joshua Fields**
Associate Professor of Biology at South College

FRIDAY AFTERNOON SESSIONS

1:00pm-3:00pm — Oral Presentations- Session IV
"Unleashing Curiosity: Mentor-Student Collaboration in Cutting-Edge Research" - A series of brief talks about research and scholarly endeavors of faculty
Room 209/210

1:00pm-1:50pm — Film
Cinematic short films
Room 312/313

1:00pm-3:00pm	Mentor Led Session "Cultivating Scholars: Student Research Excellence in Biology" Room 215/216

Detailed Schedule

Poster Presentations

Session I
TIME: 9:00-9:50 am – Blanchard A

PS1-1 Rahul Clamor
Methane Oxidation by Palladium Catalyst on Cerium Oxide-Aluminium Oxide Support [Abstract]
Mentor(s): Anil Banerjee
Major: Chemistry

PS1-2 Lance Crane, Jeremy Byrom
Exploring Novel 1,2,3 - Triazolium Salts as Potential Biological Agents [Abstract]
Mentor(s): Kerri Shelton Taylor
Major: Chemistry

PS1-3 Ta'Quarus Eberhart, Fiza Khan, Clareese Spahn, Kaela Mercer, Heather Tolbert, and Natalia Tolbert
Determining Population Density and Behavior of Ungulates in the Tuli Region using Game Drives [Abstract]
Mentor(s): Julie Ballinger
Major: Biology

PS1-4 Sarah Floyd, Hasan Imtiaz, Brianna Porter,
Redbreast Sunfish (Lepomis auritus) as Bioindicators for Pollution in Columbus, GA [Abstract]
Mentor(s): Michael Newbrey
Major: Biology

PS1-5 Jarrett Huckaby, Allison Malmin, Carloine Mobley, Alexis Sutcliff
Digital Image Analysis as a Method for Measuring the Effect of Diet on the Pigmentation of Crayfish [Abstract]
Mentor(s): Troy Keller
Major: Earth and Space Science

PS1-6 Kaela Mercer, Julia Wise, Rachel Barnett, Heather Tolbert, and Natalia Tolbert

Analyzing Population Density and Behavior of Tuli Region Wildlife using Camera Traps [Abstract]
Mentor(s): Julie Ballinger
Major: Earth and Space Science, Biology, Biology

PS1-7 Maddison Montgomery, Emily Knox
Activity of palladium catalysts for carbon monoxide oxidation [Abstract]
Mentor(s): Anil Banerjee
Major: Chemistry

PS1-8 Angelika Romo
An exploration of a possible connection between cosmic rays and terrestrial hail production [Abstract]
Mentor(s): Stephen Jessup
Major: Biology

PS1-9 Alyssa Schmitz, Presley Simmons
Experiment and Analysis of Splitting a Fingerprint for Toxicology and Arson [Abstract]
Mentor(s): Kerri Taylor
Major: Health Science and Chemistry

PS1-10 Presley Simmons
Synthesis, Characterization, and Cytotoxic Activity of Substituted THC Salts [Abstract]
Mentor(s): Kerri Taylor
Major: Chemistry

PS1-11 Haley Kubicek
Bridge the Gap Between Students & Employers: Career Engagement, Networking, and Exploration Strategies [Abstract]
Mentor(s): Jennafer Vondal
Major: Criminal Justice

PS1-12 Tyler Sierra
Climate Change Activism and Intelligent Sabotage [Abstract]
Mentor(s): Psychology
Major: Markus Weidler

PS1-13 Torie Hartis

Unveiling the Past: A Comparative Demographic Analysis of the Black Population in Columbus, Georgia with Other Contemporaneous Data (1700's to present) [Abstract]
Mentor(s): Michael Newbrey
Major: Biology

Session II
TIME: 10:00-10:50 am – Blanchard A

PS2-17 Emily Crews, Mary Lewza
Book Banning Across the Disciplines: A Critical Reflection [Abstract]
Mentor(s): Aaron Gierhart
Major: Biology, Elementary Education

PS2-18 Victoria Canedo, Najah Dixon, Schaefer Hogan
Prevention of Sexual Abuse in Children and Adolescents with High Functioning Autism Spectrum Disorder [Abstract]
Mentor(s): Rebecca Toland
Major: Health Sciences

PS2-19 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

PS2-20 Jose Hernandez-Mendoza, Stephanie Akehurst
Enhancing Quality of Life: The Importance of Exercise for the Elderly [Abstract]
Mentor(s): Rebecca Toland
Major: Health Sciences

PS2-21 Vinh Huynh, Rachel Bello, Zachary Griffith, Tyagjah Groce, Mariah Lewis, Nicole Paul, Lydia Rice, Karder Samson, Emily Urban, Jada Washington, Kensley Zieba
Servant Leadership: Empowering the Mill District Community of Columbus, Georgia [Abstract]
Mentor(s): Nico Moyer, Laura Pate, Courtney Loughlin
Major: Art, Biology, Criminal Justice

PS2-22 Alyssa Schmitz, Emily Urban
The Dangers of Pregnancy in Women Under 20 [Abstract]
Mentor(s): Rebecca Toland

Major: Health Sciences

PS2-23 Nora Wing, Karla Blanc,
The Effects of Guided Mediation on Mental & Physical Health through Matra and Mindfulness Practices [Abstract]
Mentor(s): Leslie Haines
Major: Criminal Justice

PS2-24 Zachary Brundidge
More Than Just Her Black Bottom: An Exploration and Analysis of the Legacy of Gertrude Ma Rainey [Abstract]
Mentor(s): Bryan Banks
Major: History

PS2-25 Ashton Johnson
The Revolutionary War: Effect on Georgia's People [Abstract]
Mentor(s): Laura Davis
Major: History

PS2-26 Sonya Mahon
Major Richard R. Hallock's Time in Korea [Abstract]
Mentor(s): David Kieran
Major: History

PS2-27 Felicity Acosta
Tiling Generalized Petersen Graphs with Cycles of lengths 4,6, and 8 [Abstract]
Mentor(s): Elizabeth McInnis
Major: Mathematics

PS2-28 Anastasia Robertson, Schae Morton, Allison Jordan
Event-Related Potentials in a Recognition Memory Task [Abstract]
Mentor(s): Mark Schmidt
Major: Psychology

Student Oral Session I

"Research Renaissance: Empowering Student Scholars Through Mentorship"
Time: 9:30 AM- 11:20 AM – Room: 209/210
Session Chair: Nadia Jacobs

OS1-1 9:30-9:45 Hayden Bennett-Coriell
Understanding the Scholarship of the Abbasids and Unraveling the Idea of the Golden Age of Islam [Abstract]
Mentor(s): Ryan Lynch
Major: History

OS1-2 9:45-10:00 Austin King
In the Name of Public Taste: Relations Between Art and Politics in the Early Soviet Period [Abstract]
Mentor(s): Ryan Lynch
Major: History

OS1-3 10:00- 10:15 Yasmin Mezayek
Lacanian Androgyny in Toni Morrison's Song of Solomon [Abstract]
Mentor(s): Judith Livingston
Major: English Literature

OS1-4 10:15-10:30 Rico Mora
An Ideal Outsider: the Legacy of the Byzantine Emperor Heraclius in Early Arabic Sources [Abstract]
Mentor(s): Ryan Lynch
Major: History

OS1-5 10:30-10:45 Logan Oliver
Ancient Athens: From Golden to Gone [Abstract]
Mentor(s): Ryan Lynch
Major: History

OS1-6 10:45-11:00 Nick Shattuck
The Legacy of the Steppes: The Timurid Rise and Decline [Abstract]
Mentor(s): Ryan Lynch
Major: History

OS1-7 11:00- 11:15 Elizabeth Woods
Analyzing Sir Gawain and the Green Knight according to feminist theory [Abstract]
Mentor(s): Judith Livingston
Major: English Literature

Student Oral Session II

"Beyond Boundaries: Mentors-Student Partnerships in Solving Real-World Challenges"
Time: 9:30 AM- 11:20 AM – Room: 215/216
Session Chair: Joseph Mends

OS2-1 9:30-9:45 Jiane Rabara
Fair Value Accounting-Based Enhancement of Real Estate Asset Valuation: An Accounting Perspective on Automated Valuation Models (AVMs) [Abstract]
Mentor(s): Fady Mansour
Major: Accounting

OS2-2 9:45-10:00 Jonathan Poisson
Follow Drone [Abstract]
Mentor(s): Mohammad Jafari
Major: Engineering

OS2-3 10:00- 10:15 Heather Chason, Michael Carter
Maintaining food security and conserving income during an era of high inflation, unexpected pandemics, and global geopolitical instability are essential [Abstract]
Mentor(s): Fady Mansour
Major: Social Sciences, Business Administration

OS2-4 10:15-10:30 Jonathan Robertson
An Anatomy of the Muscogee County Judicial System [Abstract]
Mentor(s): Edward Berry
Major: Social Sciences

OS2-5 10:30-10:45 Mick Etchison, Eric Spears
The connection between unethical behavior in businesses and governments and how it links to environmental destruction [Abstract]
Mentor(s): Eric Spears
Major: Interdisciplinary Studies

OS2-6 10:45-11:00 Kiara Clemons, Harold Sanders, Niyasia Williams, Amanda Candies
Experimentation with AI-Generated Malware Behavior and Various Detection Techniques [Abstract]
Mentor(s): Lydia Ray
Major: Computer Sciences, Information Technology, Cybersecurity, Information Technology

OS2-7 11:00- 11:15 Brian Ganzler
TweetHarvest: A Python-Powered Social Media Goldmine for Advertisers [Abstract]
Mentor(s): Lydia Ray
Major: Computer Sciences

Student Oral Session III

"Cultivating Scholars: Student Research Excellence in Chemistry"
Time: 9:30 AM- 11:20 AM – Room: 310/311
Session Chair: Evan Mathis

OS3-1 9:30-9:45 Josh Adams
Behavioral and Physiological Responses of Cyprinella venusta to Inter- and Intraspecific Acoustic Signals [Abstract]
Mentor(s): Daniel Holt, Clifton Ruehl
Major: Biology

OS3-2 9:45-10:00 Mitdalia Alonso
The effects of thermal gradient on the age and growth characteristics of Smallmouth Bass (Micropterus dolomieu) in a warming climate [Abstract]
Mentor(s): Michael Newbrey
Major: Biology

OS3-3 10:00- 10:15 Natalie Fleury
How age of the Tallow Tree Affects Surrounding Plant Growth [Abstract]
Mentor(s): Troy Keller
Major: BA Fine Arts

OS3-4 10:15-10:30 K'Niya Hancock
Quantity of E. coli Produced by Mill Creek [Abstract]
Mentor(s): Troy Keller
Major: Earth and Space Sciences

OS3-5 10:30-10:45 Kiley Nansel
Female Bluebird Health affected by leukocyte counts (H/L ratios) [Abstract]
Mentor(s): Jennifer Newbrey, Micheal Newbrey
Major: Biology

OS3-6 10:45-11:00 Zack Griffith
An Investigation Into Splicing Variation and Expression Patterns of Insulin-Like Peptide 4 (ILP4) Within the Drosophila Genus [Abstract]
Mentor(s): Brian Schwartz, Kevin Burgess
Major: Biology

OS3-7 11:00- 11:15 Jiayu Wang
The Effect of Natural Products on the growth of triple-negative Breast Cancer Stem Cells (Mammospheres) [Abstract]
Mentor(s): Ramneet Kaur, Monica Frazier
Major: Biology

Fine and Visual Arts

TIME: 9:30-11:30 am – Room 214
Session Chair: Celeste Grantham

VA1-1 9:30am- 9:50am
Kennedy Buckner, Rasheeda Phillips, Carrie Mae Weems, Toni Morrison
The Liminal South: Explorations of Black Time, Space, and Memory [Abstract]
Mentor(s): Ava Dixon
Major: English Literature

VA1-2 10:05am- 10:25am
Indigo Pullen
Fossil Records [Abstract]
Mentor(s): John Dodd
Major: Management

VA1-3 10:35am- 10:55am
Shu Lin Zheng
The Bell Ringers [Abstract]
Mentor(s): Samantha Yoo
Major: Art

VA1-4 11:05am- 11:25am
Vinh Huynh, Nick Miller
International Cultural Dialogue: Vietnamese Funeral Sculptures and Beyond a Culture [Abstract]
Mentor(s): Hannah Israel
Major: Art, Art History

Mentor-Led Session I

"Cultivating Scholars: Student Research Excellence in Chemistry"
Time: 9:30 AM- 11:15 AM – Room 312/313
Moderator: Daniel Holley

MS1-1 9:30-9:45 Nayton Garcia
Free Energy of Folding Red Fluorescent Protein [Abstract]
Mentor(s): Jonathan Meyers

MS1-2 9:45-10:00 Caitlin Parker
Rational Design and Anti-Proliferative Activity of Substituted Azolium Salts as Therapeutics [Abstract]
Mentor(s): Kerri Taylor

MS1-3 10:00-10:15 Kaitlyn Stringfellow
Insights into DNA Methylation in Human Tissue and Insulin Resistance [Abstract]
Mentor(s): Wade Holley

Mentor Led Sessions
"Cultivating Scholars: Student Research Excellence in Biology"
Time: 10:30 AM- 11:15 AM – Room 312/313
Moderator: Clifton Ruehl

MS1-5 10:30- 10:45 Aiden Rush
Internship: Monitoring neighborhood waters in Columbus, GA
Mentor(s): Micheal Newbrey, Ashley Desensi

MS1-6 10:45- 11:00 Emily Marin
Internship: Tracking pollution in the Chattahoochee River and its tributaries in Columbus, GA with the Chattahoochee Riverkeeper
Mentor(s): Micheal Newbrey, Ashley Desensi

MS1-7 11:00- 11:15 Abigal Teal
Veterinarian Internship: Carroll County Animal Hospital
Mentor(s): Micheal Newbrey, L. Willis

Keynote Luncheon

Theme: ***"Celebrating Undergraduate Research & Student Success"***

12:00pm-12:25pm Jacquelynne Jordan Regan, Alumna Keynote

12:30pm-12:55pm Joshua Fields, Alumna Keynote

History of Tower Day

The two speakers presenting today are Jacquelynne Jordan Regan and Joshua Fields. Both began in the first year of the Honors Program, making them uniquely qualified to talk at the 25th anniversary. Today, Jacquelynne is an attorney with the Kilpatrick Townsend & Stockton law firm in Atlanta and focuses her practice on trademark and copyright law. She received her law degree from William and Mary University and assists clients with protecting and enforcing trademark rights in the technology, entertainment, luxury goods, and hospitality industries with an emphasis on U.S. and worldwide trademark protection programs and enforcement strategies. Jacquelynne was pivotal in the inception of Tower Day.

The concept of the conference was suggested to Dr. Barbara Hunt, Honors College first Dean, in fall 2000 that the Honors Program should hold an undergraduate research conference, which began in spring 2001 as the Student Colloquium and developed into what is now Tower Day.

Speaker Biographies

Jacquelynne Jordan Regan focuses her practice on trademark and copyright law. She assists clients with protecting and enforcing trademark rights in the technology, entertainment, luxury goods, and hospitality industries with an emphasis on U.S. and worldwide trademark protection programs and enforcement strategies. Ms. Regan coordinates and oversees domestic and international contentious proceedings. She also represents clients in trademark disputes in opposition and cancellation proceedings before the Trademark Trial and Appeal Board, in UDRP proceedings, and in federal litigation.

Prior to joining the firm, Ms. Regan was an associate in the Atlanta, Georgia office of an international law firm where she concentrated her practice on the protection and enforcement of intellectual property rights with particular emphasis on trademark clearance, prosecution, monitoring, and enforcement. Previously, Ms. Regan practiced law with a full-service firm in Central Florida where she represented clients with various intellectual property issues in both litigation and transactional contexts.

While attending law school, Ms. Regan served as an extern for the Executive Office of the U.S. President, as a summer clerk for the U.S. Attorney's office in Atlanta, Georgia, and as a clerk extern for the Honorable Tommy Miller in the U.S. District Court for the Eastern District of Virginia. She was also Articles Editor for the Journal of Women and the Law.

In 2012, Ms. Regan was recognized as the "Most Productive Young Attorney in Florida" by the Florida Bar Young Lawyers Division and also as a "Leader in the Law" by the Florida Association for Women Lawyers.

Dr. Joshua A. Fields serves as an Associate Professor of Biology at South College, specializing in the disciplines of microbiology, immunology, biochemistry, and genetics. His academic journey began at Columbus State University, where he distinguished himself as a member of the inaugural cohort of the honors program. This pivotal experience catalyzed his passion for scientific research, laying the foundation for his subsequent academic and professional pursuits.

The honors program at Columbus State University proved to be a crucible for Dr. Fields's career, affording him the opportunity to delve deeper into scientific inquiry and benefit from the mentorship of esteemed faculty members within the biology department. These experiences have indelibly shaped his approach to research and pedagogy.

Upon completing his Bachelor of Science in Biology, Dr. Fields continued his studies at the Medical College of Georgia, where he was awarded a Ph.D. in biochemistry. He then continued his training completing a postdoctoral fellowship in cellular biology and anatomy at the same institution. Dr. Fields later joined the faculty of Georgia Military College, where his contributions transcended teaching; he played an instrumental role in the establishment of the GMC ethics and leadership program as the Assistant Chief Academic Officer. Following his tenure at GMC, he then accepted an appointment to the faculty of South College, where he continues to enlighten and mentor the next generation of scientists.

Student Film Session

TIME: 1:00-1:50 pm – Room 312/313
Session Chair: Celeste Grantham

CF1-1 1:00pm- 1:20pm
Ma Lon Lane
Quantitative and Qualitative Analysis of Lynnhaven Pond [Abstract]
Mentor(s): Clifton Ruehl
Major: Biology

CF1-2 1:30pm- 1:50pm
Rohan Shah
Exploring Artificial Intelligence and its Impacts on Creatives [Abstract]
Mentor(s): Adam Bova
Major: Communication

Student Oral Session IV

"Unleashing Curiosity: Mentor-Student Collaboration in Cutting-Edge Research"
TIME: 1:00 PM- 2:45 PM – Room 209/210
Session Chair: Evan Mathis

OS4-1 1:00-1:15 Brawner Rai
Factors Influencing Stream Macroinvertebrate Diversity [Abstract]
Mentor(s): Clifton Ruehl
Major: Biology

OS4-2 1:15-1:30 Anna Sims
The Affects of Eggshells on Lettuce Growth [Abstract]
Mentor(s): Troy Keller
Major: Earth and Space Sciences

OS4-3: 1:30-1:45 Elise Snow
Biochemical Analysis of Secondary Metabolites in Eupatorium Serotinum [Abstract]
Mentor(s): Daniel Holley, Jonathan Meyers
Major: Natural and Physical Sciences

OS4-4 1:45- 2:00 Johnny Cargill
Spinal Cord Stimulators and their Relationship with BMI [Abstract]
Mentor(s): Daniel Holt
Major: Health and Human Services

OS4-5 2:00-2:15 Declan McCahan
Observing Induced Pain in Athletes and a General Population [Abstract]
Mentor(s): Erica Taylor
Major: Health and Human Services

OS4-6 2:15-2:30 Hope Adams
Intimacy of Dress in Berthe Morisot's The Artist's Sister at a Window [Abstract]
Mentor(s): Claire B McCoy
Major: Art History

OS4-7 2:30-2:45 Campbell Eubanks
What Does it Mean to be a Human in the Age of Artificial Intelligence? [Abstract]
Mentor(s): Yuichiro Komatsu
Major: Art

Mentor-Led Session II

Mentor Led Sessions
"Cultivating Scholars: Student Research Excellence in Biology"
Time: 1:00 PM- 3:00 PM – Room 215/216
Moderator: Clifton Ruehl

MS2-1 1:00-1:15 JT Walker
Internship: Animal Care Clinic, Columbus, GA
Mentor(s): Clifton Ruehl, Dr. Carroll

MS2-2 1:15-1:30 Trayton Richburg

Infectious Disease Internship
Mentor(s): Daniel Holt, Elizabeth Klar

MS2-3 1:30-1:45 Blake Shytle
Infectious Disease Internship
Mentor(s): Daniel Holt

MS2-4 1:45-2:00 Love Patel
Wolman Pebble Counts Among Columbus, GA Streams
Mentor(s): Clifton Ruehl

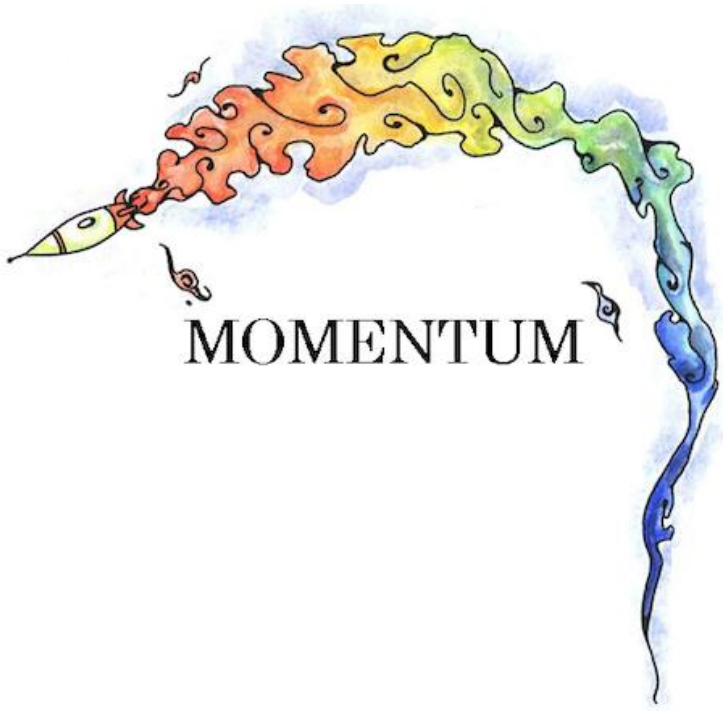
MS2-5 2:00-2:15 Zack Griffith
An Investigation Into Splicing Variation and Expression Patterns of Insulin-Like Peptide 4 (ILP4) Within the Drosophila Genus [Abstract]
Mentor(s): Brian Schwartz, Kevin Burgess
Major: Biology

MS2-6 2:15-2:30 Ethan Flores
My time as an Anesthesia Technician
Mentor(s): Daniel Holt, Julie Ballinger

MS2-7 2:30-2:45 Anna Grady
Cardiology Internship: Northside Hospital Cardiovascular Institute
Mentor(s): Daniel Holt, Micheal Newbrey

MS2-8 2:45-3:00 Kiley Nansel
Female Bluebird Health affected by leukocyte counts (H/L ratios) [Abstract]
Mentor(s): Jennifer Newbrey, Micheal Newbrey
Major: Biology

Momentum



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.

If you are interested in publishing your own research, email momentum at momentum@columbusstate.edu

Abstract Index

PS1-1 Rahul Clamor

Methane Oxidation by Palladium Catalyst on Cerium Oxide-Aluminium Oxide Support

Abstract: The main objective of this project is to ascertain the extent of methane oxidation at variable temperatures with a palladium catalyst supported on cerium-oxide-aluminum oxide. The catalyst is prepared by a modified impregnation method starting from palladium nitrate hydrate as the precursor and impregnating on a dual support of cerium oxide and aluminum oxide. The catalyst material was dried at 110°C followed by calcination at 500°C. The catalyst material contains 5 wt% palladium,16 wt% cerium and balance aluminum as elements. X-ray photoelectron spectroscopy revealed the composition of the catalyst as PdO, CeO2 and Al2O3. The activity of the catalyst is determined in a temperature-controlled quartz reactor at 280-500°C. The light-off temperature and T50 for the methane oxidation reaction with this catalyst are 350 °C and 370°C, respectively. The methane conversion reached almost 100 % at 500°C. The apparent low activation energy of 32.8 kJ/mol indicates a good promise for this catalyst for low temperature catalytic oxidation of methane. To improve the efficiency of the catalyst and to make it more economically viable, catalysts with lower Pd and Ce contents are prepared, and their relative activity measured. The effectiveness of different catalysts and the optimum conditions for maximum methane conversion will be presented in this poster.

PS1-2 Lance Crane, Jeremy Byrom

Exploring Novel 1,2,3 - Triazolium Salts as Potential Biological Agents

Abstract: Given the elevated mortality rate in the United States, there is a notable escalation in the commitment of researchers and scientists to intensify their scrutiny and exploration of alternative cancer therapy methods. The existing body of literature has underscored the multifaceted biological properties of 1,2,3-triazoles, including their anti-fungal, anti-bacterial, anti-tubercular, and anti-parasitic attributes. However, a substantial knowledge gap persists in our understanding of the impact of diverse molecular substitutions within this compound. The initial synthesis of the novel 1,2,3-bis-substituted triazolium salts has proven instrumental in creating finding a structure-activity relationship. Initial investigations unveiled that 1,2,3-bis(arylmethyl)triazolium salts are promising cancer-fighting agents. This project is poised to delve deeper into the synthesis and comprehensive characterization of a range of N-substituted 1,2,3-triazolium salts, with a primary focus on assessing their biological efficacy against prostate and breast cancer cell lines. Moreover, the scope of this project will extend to exploring variations in the R group at the C4 and C5 positions within the heterocyclic structure, aiming to elucidate further insights into their potential therapeutic applications.

PS1-3 Ta'Quarus Eberhart, Fiza Khan, Clareese Spahn, Kaela Mercer, Heather Tolbert, and Natalia Tolbert

Determining Population Density and Behavior of Ungulates in the Tuli Region using Game Drives

Abstract: Understanding the population dynamics and densities across different microhabitats within an area can be advantageous for both ecological research and wildlife management. Game drive counts are one of the most effective methods used to compare the number of individuals in varied species in a certain area. Three surveying groups drove from one side of a predetermined route, counting the different species in the desired ranges. The first group counted females. The second group counted males and the final group counted juveniles and unidentifiable animals. The number of animals found helps researchers compare population densities from previous years to better understand species demographics temporally. Comparing population densities in different locations helps observers understand the relationship between species density and the richness of their habitats. The results of a game drive may also help researchers defend claims on certain species' behavior such as reproduction and competition based on their external environments.

PS1-4 Sarah Floyd, Hasan Imtiaz, Brianna Porter

Redbreast Sunfish (Lepomis auritus) as Bioindicators for Pollution in Columbus, GA

Abstract: The health of freshwater organisms, such as native fish species, provides insight into the overall quality of urban freshwater ecosystems. The objective of this study was to use the age and growth characteristics, blood lymphocyte counts, and percent discoloration of Redbreast Sunfish (Lepomis auritus) to determine the health of three separate streams in the Columbus area. The site locations in this study were three urban creeks listed by the EPA as 303d or f streams: Lindsey Creek, Weracoba Creek, and Roaring Branch. For each fish collected we measured total length and weight, and ageing was done for each fish via otolith analysis. Blood samples were collected, lymphocyte counts were performed, and the percent epithelial discoloration was estimated. There were significantly more lymphocytes in Redbreast Sunfish from Roaring Branch compared to those of Lindsey and Weracoba creeks with no difference between the lymphocyte counts between Lindsey and Weracoba creeks. There is no relationship between age and lymphocyte counts for Roaring Branch Creek. There is no relationship between discoloration (%) and lymphocyte count. Redbreast Sunfish of age 2 are significantly smaller in TL from Roaring Branch compared to those of either Weracoba or Lindsey creeks. Redbreast from Weracoba Creek are significantly larger than those of either of the other creeks. Weracoba Creek had significantly more discoloration. The percent discoloration was significantly more common in downstream localities (92% with discoloration) compared to those of upstream localities (45% with discoloration) of Roaring Branch. The high percentage of epithelial discoloration is likely explained by chronically high levels of lead and copper in Weracoba Creek. The high levels of lymphocytes in Roaring Branch are likely indicative of high levels of dissolved manganese. Overall, this study provided insight into the effects of urbanization on freshwater environments.

PS1-5 Jarrett Huckaby, Allison Malmin, Carloine Mobley, Alexis Sutcliff

Digital Image Analysis as a Method for Measuring the Effect of Diet on the Pigmentation of Crayfish

Abstract: Color plays an ecological role for many animals as it can influence predator and prey interactions, mate selection, and communication. It also has economic ramifications for consumer choices (e.g., pet color). One of the more colorful crustaceans is the red swamp crayfish (Procambarus clarkii), which is an invasive species known to be detrimental to other aquatic taxa. Previous research in our lab has investigated the role a carotenoid-augmented diet has in determining the pigmentation of P. clarkii. Our goal is to adapt and apply digital image analysis techniques to quantify changes in crayfish color.

PS1-6 Kaela Mercer, Julia Wise, Rachel Barnett, Heather Tolbert, and Natalia Tolbert
Analyzing Population Density and Behavior of Tuli Region Wildlife using Camera Traps
Abstract: Understanding population density and distribution, interactions between species and the environment, and behavioral tendencies within a population are core facets of ecology. Additionally, these are all important aspects of conservation and wildlife management. Camera traps are beneficial tools for collecting this data, as they are less invasive, more durable, and can remain strategically placed in the field for an extended duration compared to a human observer. During an ecology study abroad in Botswana, students set out camera traps at high-traffic areas to collect population and behavioral data. Comparing population density and behavioral pattern at differing locations provides insights into the patterns and movement of common local wildlife.

PS1-7 Maddison Montgomery, Emily Knox
Activity of palladium catalysts for carbon monoxide oxidation
Abstract: Heterogeneous catalysts containing noble metals (palladium, platinum) on a support (aluminum oxide, cerium oxide, ceramic oxides) are effective for removing air pollutants (methane, carbon monoxide) from automobiles and transport vehicles through catalytic oxidation at temperatures 300 °C and above. Comparing the different percentages of palladium in the prepared catalysts help with determination of which catalyst produces the best activity results. Varying percentages of Pd or cerium-oxide alumina dual support catalysts (3Pd6CeAl, 1Pd3CeAl, and 1Pd6CeAl) were synthesized via a slurry-incipient vortex method. All catalysts were dried at 120 °C and calcined at 500 °C. The catalysts were held in a fixed-bed temperature-controlled catalytic reactor and a mixed gas (2% carbon monoxide, 4% oxygen, balance nitrogen) was passed through the reactor at steady state conditions at different temperatures. The catalytic activity (% carbon monoxide) was calculated from the concentrations (volume %) of carbon monoxide in the inlet and outlet gas feeds after the reaction. Results showed that different palladium and cerium percentages produced different catalytic activity results.

PS1-8 Angelika Romo
An exploration of a possible connection between cosmic rays and terrestrial hail production
Abstract: Cosmic rays reach the Earth from distant space whereas solar wind, high energy particles, directly flows from the sun's outer layer. High solar wind activity prevents cosmic rays from reaching the atmosphere and therefore increasing ice and lightning production. Hailstones

are formed from initial small ice particles, or "seeds," and can grow to a variety of large sizes if they continue to encounter more water droplets as they move within the thunderstorm. Consequently, large hail (3-4"+) is usually uncommon. Previous research has demonstrated an inverse correlation where high energy particles from high solar wind increase the ice crystal production in the upper atmosphere and increase lightning activity when the cosmic rays are low. However, a correlation between these sudden drops in cosmic rays and hail production has yet to be explored. Analysis of preliminary data for 2023 has established an association in strong solar wind producing large declines in cosmic ray flux, giving rise to ice production seen in 12 large hailstorms cases within 4 of the top 20 largest cosmic ray drops across the United States. The Neutron Monitor Database (NMDB) Event Search Tool (NEST) was used to acquire hourly and 3-hour cosmic ray fluxes within a 12-hour period for storm cases with reported hail (2"+) from the NOAA Storm Events Database. The resulting large hail cases and cosmic ray values for these incidents from multiple years are anticipated to suggest a connection between cosmic ray flux drops and ice production, further expanding our understanding of the connections linking space and terrestrial weather.

PS1-9 Alyssa Schmitz, Presley Simmons

Experiment and Analysis of Splitting a Fingerprint for Toxicology and Arson

Abstract: In this experiment, we are developing a series of experiments to assist the Georgia Bureau of Investigation (GBI) to divide a fingerprint on a glass bottle for dual analysis. The intention is to help understand how to "preserve" the composition of the fingerprint so it can be studied for toxicology purposes (chemical studies) and arson (heat and combustion). Variables like temperature, type of bottle, and time will be tested to see how the fingerprints composition changes. The bottle with the fingerprint will be heated, utilizing time as the dependent variable. After the bottle has cooled, we will use brushes with fine powder to stick to the oils in the fingerprint, a method known as dusting. Then, the fingerprint will be lifted and applied to transfer paper to analyze the level of degradation there is by testing the minerals, salts, amino acids, and lipids. This experiment will be a multi-step process over the academic year involving two CSU students, one faculty mentor, and a GBI mentor.

PS1-10 Presley Simmons

Synthesis, Characterization, and Cytotoxic Activity of Substituted THC Salts

Abstract: Cancer and bacterial infections have been evading effective, consistent treatment for centuries. As efforts to investigate their treatments increase, the pair combat research with a vehemence. However, as they evolve faster than modern medicine, unique solutions must be explored. THC is the psychoactive component of Cannabis sativa that contributes to its use as a recreational drug, resulting in its scientific antipathy. The chemical compounds present in cannabis though, like THC, have diverse medicinal benefits and should not be neglected in research. Literature has shown that many of the compounds, known as cannabinoids, have prominent antimicrobial activity, showing promising results when utilized in fighting cancer and ESKAPE pathogens. MRSA's rapidly increasing resistance to treatment is a threat to global health alongside cancer's high mortality, and cannabinoids could be efficacious in fighting both.

Science must take advantage of an accessible, under-researched frontier as prominent as cannabis. This project focuses on the characterization of cannabinoid-based systems and their biological efficacy against breast and prostate cancer cell lines and bacterial ESKAPE strains.

PS1-11 Haley Kubicek

Bridge the Gap Between Students & Employers: Career Engagement, Networking, and Exploration Strategies

Abstract: Employers continue to face staffing shortages across various disciplines, especially in the public service sector. Post COVID, students are struggling to reconnect with the real world which has created a challenge for employers. It is imperative that departments, not just universities, offer numerous student engagement and networking opportunities that introduce students to an array of career trajectories both inside and outside the classroom. These opportunities influence and inform students about their career choices while bridging the gap between students and employers. This study surveyed internship coordinators, departmental chairs and career center directors from 4-year universities with criminal justice related programs in the South. Results show that universities and departments are offering numerous career exploration, networking, and engagement opportunities to students. Criminal Justice programs provide a wide variety of these career readiness opportunities both inside and outside of the classroom.

PS1-12 Tyler Sierra

Climate Change Activism and Intelligent Sabotage

Abstract: Taking a critical thinking approach to climate change activism, the presentation focuses on the question of how to distinguish between eco-terrorism and ethically defensible forms of strategic intervention. To this end, it introduces the recent work of the Swedish researcher and public spokesperson Andreas Malm—and his controversial book How to Blow Up a Pipeline— with special emphasis on the notion of "intelligent sabotage" accompanied by his plea for resisting "the script of the enemy." Malm's work is important for consideration because it asks moral and ethical questions regarding the climate change crisis, for both sides. In this instance the two sides of the debate are not believers vs. deniers. Rather they are activists vs. facilitators. Protests at COP events have persisted, the nature of which exemplify the divisive partisan rhetoric that we now so often find ourselves taking part in, no matter the issue. The ultimate result of these events has been a null divide between the facilitators and the impassioned climate change activists. Where one side is charging ahead full speed, building more fossil fuel infrastructure and the other side fruitlessly shouting into the void. Malm's trenchant assessment and perspective is that in order to affect change on the current climate change crisis, activism needs to consider a different approach.

PS1-13 Torie Hartis

Unveiling the Past: A Comparative Demographic Analysis of the Black Population in Columbus, Georgia with Other Contemporaneous Data (1700's to present)

Abstract: An examination of African American demographic data (1700's to present) from the lens of Porterdale Cemetery reveals not only the stories, but the lower survivorship of slaves and free African Americans compared to Caucasians living in Columbus, GA. I compared data from two contemporaneous cemeteries in Columbus, Porterdale and Linwood cemeteries, and further compared the data to those of urban slaves from New Orleans. Cemeteries record birth year, death year, and gender information via their given name on many gravestones that are informative of survivorship in various time periods. I used SPSS to analyze the lifespans of 1400 African Americans from Porterdale Cemetery by gender to generate survivorship curves for 50-year time periods. The survivorship curves will be compared between African Americans and Caucasians. Survivorship trends will be examined by calendar year for each race using least squares regression. The survivorship of mixed-race children from urban slaves of New Orleans (1700-1800) were lower than those of Caucasian or African American children. African American women from 1700-1849 make up 54% of the survivors over 50 years of age found in Porterdale Cemetery. My data collection and analysis are ongoing at the time of writing this abstract, but I expect to find that the survivorship rates for the African American community will be lower than those for the Caucasian community overall.

PS2-17 Emily Crews, Mary Lewza

Book Banning Across the Disciplines: A Critical Reflection

Abstract: Book banning and censorship have increased in recent years, particularly in the United States, as conservative state governments target literature and wider discourse around various matters of diversity and identities within the education system. The team of authors – an honors scholarship mentor and two honors students – engaged in a critical reflection around the issue of book banning and its impact on their disciplines, teacher education, biology, and elementary education. Specifically, how can future teachers be prepared to foster a learning environment that meets the diversity and identities of each individual student while also conforming to Georgia laws on literature integration. The misinformation of COVID 19 pandemic and its impact on science as a field and the education system because of it. Lastly, how can elementary teacher candidates find their place in the teaching profession as novices when social and political forces restrict the ways they design and implement instruction. These impacts can be reflected and compared in the Georgia House Bill 1084, Georgia Senate Bill 226, Georgia House Bill 1176, and even in the aftermaths of COVID-19 pandemic and the FDA laws regarding pharmaceutics. In the authors critical self-reflections peer reviewed articles were utilized as well as interviews with educators and individuals from episodes of the lead author's podcast, some of which were facilitated by the honors students, and are cited to illustrate the authors' individual reflections. Conclusions and implications for the authors' future lines of inquiry and, more broadly, future practice in honors education at postsecondary institutions are disseminated.

PS2-18 Victoria Canedo, Najah Dixon, Schaefer Hogan

Prevention of Sexual Abuse in Children and Adolescents with High Functioning Autism Spectrum Disorder

Abstract: Autism can be defined as a neurodevelopmental disorder acquired by an interaction of genetic and environmental factors that interrupt typical communication patterns, coupled with specialized interests and repetitive behaviors (Hodges et al., 2020). In our research, we focus specifically on sexual abuse in high functioning autism spectrum disorder (HFASD), which is characterized by both the abilities to function independently and to communicate verbally. High-functioning individuals still possess a social, communicative impairment, but lack sufficient evidence of an intellectual disability (The Spectrum, 2019). Across the spectrum, autism does not biologically interfere with the development of sexual organs, however, it can affect manners of sexual expression and interaction styles in intimate relationships. The objective of our research is to analyze peer-reviewed articles and studies in order to discuss the efforts related to the education and subsequent prevention of sexual abuse in children and adolescents with HFASD. Sexual abuse can occur to any individual, regardless of whether they possess a form of disability or not. However, the rate of sexual abuse occurrences in young individuals with autism spectrum disorder (ASD) is higher than most acknowledge. According to a case-control study from self-reported ASD diagnoses, individuals experienced more sexual victimization when they were less knowledgeable on sexuality related topics (Brown-Lavoie et al., 2014). With the high prevalence of sexual abuse in those with ASD, some proposed solutions may aid in reducing the abuse. Broadening pedagogical approaches, such as increasing incorporation of varied visual aids, videos, stories, and specific facts and terminology, within sexual education courses, can help those with HFASD to more fully comprehend a healthy expectation of intimate relations (Planned Parenthood, 2017).

PS2-19 Gabrielle Dillard

The Effect of Natural Products on the Growth of Docetaxel-Resistant Triple-Negative Breast Cancer Stem Cells

Abstract: Triple Negative Breast Cancer (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 cancer cells, but some cells are resistant to docetaxel. These resistant cells survive, they express cancer stem cell markers 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 work with prominent chemicals in natural products like Withaferin A in ashwagandha, curcumin in turmeric, 10-Gingerol/Shigoals in ginger, etc. We have some preliminary data making use of the online molecular docking tool Patch Dock, and we have analyzed the data using a molecular visualization system called Pymol. We have found possible interactions between chemicals in the natural products and overexpressed proteins (CD24, KIF11, and KIF14) in docetaxel-resistant cells. We want to check the potential of these natural products to kill the docetaxel-resistant TNBC stem cells. The human body well tolerates natural products, and they will be a great substitute for chemotherapy which is toxic to the human body.

PS2-20 Jose Hernandez-Mendoza, Stephanie Akehurst

Enhancing Quality of Life: The Importance of Exercise for the Elderly

Abstract: The aging process presents a variety of challenges to physical and mental well-being, inevitably leading to a myriad of health issues. Among the many forms of interventions aimed at preventing and mitigating these challenges, exercise proves to be an important component in promoting healthy aging and improving the overall quality of life for the elderly. This research paper explores the significance of exercise for the elderly, detailing its physical, mental, and social benefits. Through a comprehensive review of existing literature, we highlight the impact of moderate physical activity on key aspects of overall elderly health, including cognitive function, musculoskeletal strength, cardiovascular health, mood regulation, and social activity. Furthermore, we discuss possible strategies for implementing exercise programs tailored to the physical and mental needs of elderly individuals, considering important factors such as safety and accessibility. By researching the interconnectedness of physical activity and the overall health benefits it contributes to aging, its importance becomes very evident and implementation of physical activity into public health plans can greatly aid the elderly population. Encouraging the elderly to stay active through specific exercise programs can greatly improve their health and help them stay independent and full of energy as they age.

PS2-21 Vinh Huynh, Rachel Bello, Zachary Griffith, Tyagjah Groce, Mariah Lewis, Nicole Paul, Lydia Rice, Karder Samson, Emily Urban, Jada Washington, Kensley Zieba

Servant Leadership: Empowering the Mill District Community of Columbus, Georgia

Abstract: Every year, the senior class of the undergraduate Servant Leadership Program at Columbus State University plans and executes a senior service project. The project is designed to provide seniors with an opportunity to apply the skills and knowledge they have acquired during the program to real-world problems or needs in the local Columbus community. The 2024 senior project class has identified several critical needs within the Mill District community of Columbus, Georgia, spanning the domains of health, wellness, education, and community participation. The overarching goal of this year's project is to create long-lasting positive impacts in the Mill District community by allocating time, materials, and human resources toward addressing these needs. Guided by the slogan "Expand, Equip, Expose" the 2024 senior project has entailed expanding opportunities in health, community participation, and education specifically planned to benefit the residents of the Mill District, with a particular focus on those served by Fox Elementary. Additionally, the project has focused on the facilitation of enduring engagement between Fox Elementary, community members, and community partners. The senior class of 2024 thus far has orchestrated a series of educational activities and community events at Fox Elementary, catering to both students and their families. Additionally, the class has facilitated the procurement and distribution of essential hygiene products, clothing, and various other materials to underserved individuals within the community. Moreover, the class has devoted substantial time volunteering alongside community partners including the Mill District Inc., Mercy Med, The Food Mill, Boys and Girls Club, and Fox Elementary. Lastly, the

class has generated $10,000 through their annual Uptown Tree Trail fundraiser, with proceeds dedicated solely to past and future project objectives. Moving forward, the class will spend their remaining time and efforts continuing to make lasting impacts on the community members of the Mill District of Columbus, Georgia.

PS2-22 Alyssa Schmitz, Emily Urban

The Dangers of Pregnancy in Women Under 20

Abstract: The following literature review investigates the dangers of pregnancy in women under the age of 20 compared to adults who are 20-35 years old. Adolescent mothers tend to face greater risks for a difficult and prolonged labor, toxemia, hemorrhage, anemia, disability, and death. The babies of teen mothers will have increased risk of low birth weight, preterm birth, and other sever neonatal conditions. After pregnancy, there are social and economic disadvantages to both the mother, her family, and the child. In the United States, the CDC reports southern states having higher teen pregnancies than the north due to the lack of efforts and resources into prevention. In southern states like Mississippi, they rely on abstinence only education versus northern states that start sexual education in middle school. The sexual education goes over contraceptive methods to prevent pregnancies, the importance of condom use to prevent sexually transmitted diseases, and resources available to sexually active teenagers.

PS2-23 Nora Wing, Karla Blanc

The Effects of Guided Mediation on Mental & Physical Health through Matra and Mindfulness Practices

Abstract: Guided meditations are a mind-body connection that allows us to alter our consciousness and focus on a single reference point. The main goal is to remove thoughts that are causing stress and anxiety, which may lead to future health problems. Some of the ways this can be avoided are through Mantra and Mindfulness meditation techniques. When done, they are known to boost mental health, improve sleep, and relax the mind. Our project is designed to help students self-regulate in times of stress so they may live healthier and more mindful lives. There are many occasions where we can easily get overwhelmed from school, work, or other occasions. At that moment, we need our bodies to relax. Unfortunately, on its own, the body is unable to do this, but with the aid of our mind, it can be accomplished. The way we can achieve this calm state is through Mantra and Mindfulness practices that are designed to take less than 10 minutes. All you need is a quiet space, and this works regardless of the situation. In that moment, you can focus on breathing, taking deep breaths in and out until you feel better. Or repeat a sound or phrase in your mind that is a personal goal or positive affirmation. Practicing Mantras and Mindfulness will give us the power to create peace. It can take the negative emotions we feel and turn them into something positive. The mind is a powerful tool that can be used; however, it cannot be utilized unless we expend that effort.

PS2-24 Zachary Brundidge

More Than Just Her Black Bottom: An Exploration and Analysis of the Legacy of Gertrude Ma Rainey

Abstract: The blues is a rich musical tradition based in the music styling of African Americans in the Deep South circa 1860. With origins in spirituals, work songs, and field hollers, the blues offers a glimpse into the lives and struggles of African Americans. One of the earliest pioneers in the blues was Columbus native, Gertrude "Ma" Rainey. Known as the "Mother of Blues", Ma Rainey left an indelible mark on audiences she performed for and musicians she worked with. However, when she passed away in her hometown of Columbus, Ga, a local newspaper obituary listed her occupation as a "housekeeper," completely minimizing her prowess as a successful blues singer and businesswoman. It also misrepresents how much the city of Columbus cares about Rainey. Ma Rainey's success is an incredible story that our community takes pride in, celebrating her with a museum and a school named after her. In reviewing the previous writings about Ma Rainey and her legacy, many historians tend to focus on the effect she had on other musicians during her life such as "Blues Empress" Bessie Smith or the ways in which her lyrics showcase aspects of feminism often not highlighted. There is a considerable lack of an updated, biographical look at Rainey's legacy or one that highlights her impact on her hometown of Columbus. In my paper, I seek to remedy both of these issues. Using primary sources provided by the Columbus State University Archives and media/literature from when Rainey was alive as well as supplementary secondary sources, I have attempted to provide a view of her legacy as it evolved overtime, comparing and contrasting Rainey's national legacy to her local legacy.

PS2-25 Ashton Johnson

The Revolutionary War: Effect on Georgia's People

Abstract: The Revolutionary War is one of the most important wars in our history, because it was the beginning of our country. We were the first colonies to revolt against our homeland, and it inspired many wars. However, what effect did this war have on our people? In my project, I am focusing on the effect the Revolutionary War had on Georgia's people. I plan to make a poster but am thinking about doing an oral presentation. This presentation is a preview of a project I am doing in my Historical Methods class, and I will be using that research to build this project. Georgia first started as a debtor's colony (a place where people in debt could get out jail and work their debt off), and when the Revolution drew near, many were hesitant to join because Georgia prospered under British rule. The people thought that they needed the protection of British troops against the natives. They didn't even send someone to the First Continental Congress. When the British captured Savanah, many people left Georgia, and they continued to leave as the British gained more control over Georgia. Schools were still around during the war, but there were fewer than in the pre-war period. Religion was also impacted as people were joining the war effort including clergymen. Recreation dwindled as well due to traveling entertainers being stopped by the war. The people of Georgia were greatly impacted by the Revolutionary War especially in terms of the economy, relations with the government, and rights, and I cannot wait to further research this topic.

PS2-26 Sonya Mahon

Major Richard R. Hallock's Time in Korea

Abstract: The Korean War is significant in American history, despite largely being regarded as "forgotten," because it resulted from rising tensions between North and South Korea over reunification in a post-colonial space and fundamentally changed the way in which war occurs on a global scale. 2023 marks the 70th anniversary of the armistice in Korea which ended the war. During the month of January 2024, I conducted primary source research in the CSU Archives and created an exhibit from the Colonel Hallock Papers for a Hallock Endowment Reception at the National Infantry Museum, showcasing the impacts made by the youngest battalion commander in Korea. By directly utilizing primary source materials, I could display artifacts of then Major Hallock's exemplary leadership of his battalion, of attached UN forces, and his development of a system to construct bunkers which would ultimately help turn the tide of war away from stalemate. While I was limited by my time constraint, I hope to expand this exhibit further for Tower Day. Then Major Hallock's innovative thinking and creative solutions to complex problems while in Korea demonstrate a kind of professionalism that could inspire a new generation, if they are able to see it. Thus, I would greatly enjoy the opportunity to once again display this research to a wider audience in order to bring awareness to both the Korean War anniversary and the accomplishments of Colonel Richard Hallock, so that fellow students may understand the legacy they follow by participating in events put on by the Hallock Endowment, as well as in seeking funding to do research, in studying abroad with us in Korea this summer, and beyond.

PS2-27 Felicity Acosta

Tiling Generalized Petersen Graphs with Cycles of lengths 4,6, and 8

Abstract: My project is on Tiling Generalized Petersen Graphs using cycles of lengths 4, 6, and 8. Tiling is a graph theory concept from Combinatorial Design Theory. We say that Graph C tiles Graph D if and only if Graph C is a subgraph of Graph D and there is a partition of vertices of Graph D into parts that each induce a copy of graph C. A cycle is set of vertices with edges connecting consecutive vertices in a closed loop. The Petersen graph contains 10 vertices and 15 edges, typically displayed with 5 vertices adjacent and arranged in a cycle surrounding the other 5, edges connected in a "star" design and each adjacent to one of the outside vertices, so that every inside vertex is connected to an outside vertex, and vice versa. This graph is generalized by changing the number of vertices on the outside and inside (must be equal) and changing how the inside vertices are connected. My research question, was can we tile Generalized Petersen graphs using cycles of length 4, 6 and 8? If so, is there a specific design or methodology? Some research context for this project is one of my lecturers, Elizabeth McInnis is involved with research into a similar question, focused on tiling generalized Petersen graphs with paths of varying lengths. The research methodology used for this project is based on the mathematical foundations of algebra, and some visual techniques commonly used in graph theory. We assume only axioms of graph theory and number theory. We determined some useful facts about the congruence classes of the number of vertices and their tilings. The

techniques of tiling we discovered for cycles of length 6 employ the "cone" design, then for cycles of length 8 we have two designs: the "hourglass" and the "megaphone".

PS2-28 Anastasia Robertson, Schae Morton, Allison Jordan

Event-Related Potentials in a Recognition Memory Task

Abstract: Familiarity and recollection are retrieval processes of recognition memory. This pilot study used event-related potentials of the brain (ERPs) to measure brain activity correlates of familiarity and recollection, and a third process, post-retrieval processing. The purpose was to design a valid and reliable experimental procedure that could be used for subsequent recognition memory experiments using ERPs in our lab. Brain activity was recorded using electroencephalography (EEG). Brain areas and processes were mid-frontal (familiarity), left-parietal (recollection), and right-frontal (post-retrieval). The EEG data were processed to get ERPs in response to previously studied old stimuli and unstudied new stimuli. More positive ERP waves were expected in response to correctly recognized old stimuli (old/new effect). Participants (n=12) were presented with study and test trials divided into five blocks. Stimuli consisted of photographs of objects from the Bank of Standardized Stimuli. We hypothesized that in each of the three brain areas, old/new effects would be detected. We found statistically significant effects at the mid-frontal and left-parietal (familiarity and recollection) but not at the right-frontal (post-retrieval). A larger sample size would likely have produced a significant effect at right-frontal. We conclude that the procedure and stimuli used in this pilot study are appropriate for designing subsequent recognition memory experiments using ERPs in our lab.

OS1-1 Hayden Bennett-Coriell

Understanding the Scholarship of the Abbasids and Unraveling the Idea of the Golden Age of Islam

Abstract: From the early eighth to late tenth centuries CE, the Middle East would undergo one of the most important scholarly moments in history. The Graeco-Arabic Translation Movement would begin within the streets of Baghdad and would be set apart from others like it by its ability to transcend religious and cultural boundaries. Central to this period was the Abbasid commitment to scholarship. The caliphate valued both the preservation of ancient works and their expansion by scholars and polymaths of the time regardless of their religious or ethnic identities. With Baghdad being the new seat of an evolving empire and sitting as a new crossroads of world trade, it was clear that the intersection of different religions, cultural groups, and government styles is one that only could have occurred there. The traditional western portrayal of the Abbasid's intellectual pursuits is a skewed one and often influenced by orientalism and oversimplification, it falls short of capturing the period's complexity. The translation movement was a multifaceted process which involved contributions from various communities within and without the caliphate. In reconsidering the historical narrative, this presentation will argue that it is crucial to acknowledge the intricate interplay of diverse influences and the collaborative efforts that shaped the intellectual landscape of the Abbasid Caliphate and the wider world as a whole. The so-called “Islamic Golden Age” cannot be viewed

as a monolithic era, but as a dynamic and multicultural period that defies simplistic categorization.

OS1-2 Austin King

In the Name of Public Taste: Relations Between Art and Politics in the Early Soviet Period

Abstract: The revolutionary period of the Russian Soviet Federative Socialist Republic (RSFSR) saw an explosion of artistic expression led by an ideologically committed coalition of avant-gardists, known contemporaneously as "futurists." Their rejection of traditional forms and artistic methods represented in microcosm a tendency of iconoclasm (symbolic destruction of traditional forms) which exemplified much of the spirit of the October Revolution of 1917. After a change in the political atmosphere following Vladimir Lenin's death in 1924, the Futurists began to fall out of favor with both the public and the Communist Party, and more traditional art groups, such as the Association of Artists of Revolutionary Russia, began a lengthy campaign of ideological criticism of Russian Futurism. By 1934, the Futurist tendency had been pushed into irrelevancy, in favor of a "socialist realism," which was declared the official style of the USSR that year. As it is presently uncommon to find analysis of the relations between Soviet art and politics, this presentation will discuss primary material such as contemporary speeches and journal articles, which outline the events from a personalized perspective. This material will be presented in a chronological manner, with analysis stretching from 1909 to 1934, illustrating the transformation of Soviet art and politics over time. Finally, this paper elucidates a change in Soviet ideology from a revolutionary iconoclasm to a conservative view of socialist construction rooted in traditionalism and populism.

OS1-3 Yasmin Mezayek

Lacanian Androgyny in Toni Morrison's Song of Solomon

Abstract: Toni Morrison's novel Song of Solomon traces the male protagonist, Milkman's, life from conception to eventual flight, documenting his quest for identity and self-determination as he reconnects with his past. Morrison argues that the solution to gender maladies is androgyny: inhabiting both genders to achieve completeness. She maintains that in Song of Solomon, the female character Pilate embodies those ideals, demonstrating androgyny's ability to free both men and women from the constraints of the patriarchy. Several secondary criticisms of Morrison's Song of Solomon have touched on the gendered relationships in the novel; however, none of the research has sufficiently evaluated the gender performances of female characters, such as Pilate and Hagar, and the implications their performance has on the novel's overarching theme of self-determination. The paper highlights the relentless nature of gender frameworks, as demonstrated by the characters' struggles, and calls for a nuanced understanding of gender dynamics in Morrison's Song of Solomon. Using the theoretical frameworks of Jaques Lacan's lacanian androgyny, Hélène Cixous's patriarchal binary ideology, and Judith Butler's gender performance, this paper argues that Milkman's acquisition of a dual-gendered gaze, which was afforded to him by androgynous women such as Pilate and Circe, is what allows him self-realization. The paper contends that androgyny is essential for self-actualization in male characters. However, it raises questions about the sufficiency of androgyny, particularly for

female characters like Pilate and Hagar, who, despite performing androgynously, face limitations imposed by rigid societal constructs.

OS1-4 Rico Mora

An Ideal Outsider: the Legacy of the Byzantine Emperor Heraclius in Early Arabic Sources

Abstract: In the 9th century CE, the Islamic scholar al-Yaqūbī recounts how the Emperor Heraclius (r. 610 CE – 641 CE), devout Christian and emperor of the Byzantine Empire, corresponded with the Prophet Muhammad. In this correspondence, Heraclius is reported to have embraced Islam. By the 9th century CE and with several centuries having passed, Heraclius gained an extensive reputation within early-Arabic and Islamic historiography as a just and noble ruler, but also as a supporter and alleged convert to the Islamic faith. Through careful analysis of the works of three early-Muslim authors (al-Tabarī, al-Yaqūbī, and al-Bukhārī) as well as secondary sources, this presentation will discuss the historical narrative concerning the legacy of Heraclius in Islam. It will discuss how this narrative originated from alleged correspondence between Heraclius and Muhammad, and it will also discuss the variations in how these sources present Heraclius' exposure to Islam. Finally, it will also reflect on Heraclius' character and personality traits as remembered by later Muslims as a means to demonstrate the positive position that the Byzantine ruler holds in Muslim memory.

OS1-5 Logan Oliver

Ancient Athens: From Golden to Gone

Abstract: This presentation analyzes the decline and ultimate demise of the Athenian city state amidst conflict with Sparta during the Peloponnesian War (circa 431-405 B.C.E). Contrary to many claims, a large portion of the weakening of ancient Athens can be attributed to internal struggles and flaws within their democratic system. These claims are supported by an analysis of the ancient historian Thucydides' "History of the Peloponnesian War" along with a discussion of modern scholarship on the topic. The presentation will conclude that the resulting demise of ancient Athens was not only achieved by the skill of the Spartan navy, but was assisted by a plague, the death of many prominent statesmen who also functioned as Strategos (military and naval generals), internal debates taking resources and attention from the war effort, and traitorous politicians. The plague that struck Athens did so early in the war when the vast populace of the region Attica was moved behind the city walls. Prominent leaders like Pericles, Cleon, and Nicias died, leading to a constant exchanging and weakening of power in the Athenian democracy. Lastly, internal disagreements, rivalries, debates, and a weakened faith in the established system eventually resulting in a coup in 411 B.C.E. These events firmly held Athens in a perpetual state of change and weakness which contributed to their eventual defeat by the Spartan navy.

OS1-6 Nick Shattuck

The Legacy of the Steppes: The Timurid Rise and Decline

Abstract: The Turko-Mongolian ruler Timur, sometimes known as "Tamerlane" in the West, was born on the plains of Transoxania in 1336 C.E. with freshly shed blood upon his palms. It

marked him as a future outlaw, butcher, or conqueror. Timur founded a dynasty known as the Timurid Mongols, which ruled much of Central Asia until the death of his grandson, Shah Rukh in 1447 C.E.. This research is centered around how a cripple of Turko-Mongolian descent rose to power through his own political maneuvering and charisma (qut), as well as, how some of the same factors which lead to the Timurid rise influenced their decline. Through an analysis of Ahmad ibn Muhammad ibn ʿ Arabsha's work in 1405 C.E. Tamerlane : The Life of the Great Amir, and comparisons to modern analyses by Maria Subtelny, Alan Shiu Cheung Kwan, and Ralph Kauz, this research will discuss how the abolition of practices held in high regard by the Turko-Mongolian populace of the Timurid Empire eroded the support that Timur and his descendants required to maintain control over their Empire, without making any meaningful gains with those whose support they did not already enjoy. Additionally, Timur's qut and the loyalty it afforded him personally did not extend to his heirs. This presentation will discuss that rule through charismatic strength served in both the founding, and eventual defeat of the Timurid Empire.

OS1-7 Elizabeth Woods

Analyzing Sir Gawain and the Green Knight according to feminist theory

Abstract: The Gawain poet's Sir Gawain and the Green Knight focuses on a chivalric knight of King Arthur's court that is put to the test by various adversaries. The biggest challenges that Gawain faces are created by women, yet the women in this story are often pushed to the background or ultimately not seen as important in Gawain's adventures. My research uses feminist theory to examine the relationship between these women, their roles in Gawain's adventures, and their roles within Arthurian legend. The women presented and those that I examine in the poem are Guinevere, Lady Bertilak, and Morgan le Fay. These three women invite individual criticism and analysis. Guinevere is seen as decoration in King Arthur's hall and to King Arthur himself. Lady Bertilak is used as a pawn in a game to further Gawain's quest and trials and is often seen as no more than a sexual object. Morgan le Fay is the most important woman to analyze in this poem. Morgan le Fay has gone through an evolution throughout Arthurian legend that changes her to accommodate the views held towards women in and around the Middle English period. In this poem, Morgan le Fay is revealed to be a powerful sorceress who can manipulate and control the larger narrative without having been mentioned until the very end. The end of Sir Gawain and the Green Knight is often seen as confusing and ambiguous when Morgan le Fay announces the reason for Gawain's quest was for Guinevere. This presents further analysis into the relationship between these two women.

OS2-1 Jiane Rabara

Fair Value Accounting-Based Enhancement of Real Estate Asset Valuation: An Accounting Perspective on Automated Valuation Models (AVMs)

Abstract: With the increasing influence of technology in the real estate market, digital platforms provide buyers with easier access to property information and market trends. Previous research highlighted the convenience of AVMs, which relied on databases of existing properties to facilitate transactions. Despite demonstrating effectiveness, perceptions about accuracy,

transparency, market volatility, and data limitations persisted. Empirical studies showed that AVMs could exhibit an upward bias, with over 90 percent of cases either confirming or surpassing the associated contract price. Meanwhile, fair value accounting principles were critical in ensuring an accurate representation of property value. The objectives of this study were twofold: (a) to measure the relevance of accounting in asset valuation; and (b) to enhance AVMs in real estate asset valuation and transactions through the application of fair value accounting principles. To foster a rational and unbiased estimation of the potential market price of a real estate asset, the objective was to ensure an accurate representation of property values within AVMs. This research used quantitative and qualitative methods to examine the deficiencies of AVMs and its cross-sectional relationship with accounting-based theories within the real estate market. Furthermore, this study concluded that integrating fair value accounting principles into AVMs would develop more precise analytics into real estate platforms and applications, thus improving overall transparency and accuracy in real estate transactions.

0S2-2 Jonathan Poisson

Follow Drone

Abstract: Finding your way to an intended destination in a new area has been a struggle for some individuals, even with the help of GPS systems not having the time to find the location of the area is a major factor. The area of this research is to be able to solve this problem, by creating a drone that will help an individual or a group of individuals to find what they are looking for in an efficient and timely manner. This drone will get the input of the user who will decide which building or room they decide to go to, and as soon as their response is registered it will guide them as fast, and as safely as possible without wasting time. To build this project, we will be testing different techniques that will enable the drone to operate in its environment. One of the methods we will be using is placing QR codes in specific areas, which will help the drone understand its precise location in a particular place. This will allow the drone to calculate the next move it needs to make to achieve its assigned task. Furthermore, the drone will be fitted with a display that will guide the user. This display will use clear and concise symbols to indicate the situation and help the user understand the path. The drone will be equipped with several safety features and programs to enhance the user's experience in interacting with it. In summary, this project aims to advance research in drone guidance and improve the interaction between humans and technology.

OS2-3 Heather Chason, Michael Carter

Maintaining food security and conserving income during an era of high inflation, unexpected pandemics, and global geopolitical instability are essential

Abstract: Maintaining food security and conserving income during an era of high inflation, unexpected pandemics, and global geopolitical instability are essential to preserving quality of life. Using data from the National Garden Association and experimentation with growing our own garden, May 2021 – September 2022, we investigate the cost-effectiveness and benefits of backyard farming as well as how this might reduce inflation and supply shortages ailing our country. Our results indicate that the ultimate savings from the produce harvested outweigh the

cost of purchasing from a store. Furthermore, the economic impact could be substantial. The increased income acquired by backyard farming savings fosters the idea of equitable income distribution by providing disadvantaged families the opportunity to generate wealth. We suggest that government programs promoting backyard farming, such as sponsoring exchange markets and granting tax exemptions, will stimulate economic growth, reduce the strain on national logistics, alleviate inflation, increase household income, and improve national security.

OS2-4 Jonathan Robertson

An Anatomy of the Muscogee County Judicial System

Abstract: The Judicial System of Muscogee County is only a small piece of the larger systems of justice within the state of Georgia and the United States. Understanding local judicial systems is the first step in appreciating and evaluating those which regulate the larger jurisdictions of the state and the nation. Without an understanding of the most local levels of justice, it is hard for citizens to feel confident in systems of a much larger scope which are of concern in many contemporary issues. Contrasted to the minimum attention the judicial branch receives in public education, high profile cases often garner attention in the form of headlines. Contemporary issues of discrimination, corruption, and other forms of misconduct are often evaluated in the courts, whether in civil suits or criminal cases. To help clarify characteristics of the courts within Muscogee County this paper will describe each court by detailing the location, jurisdiction, history and the judges and other administrators that preside over them. This paper will also seek to explain how citizens can find, read, and understand the laws of Muscogee County, Georgia, and the United States utilizing publicly accessible information. Other important concepts discussed include judicial accountability and appeals. As one of the three major branches of government and the deciding factor in how laws are enforced, every citizen owes it to themselves to be familiar with the basics of the judiciary. Navigating the complexities of the judiciary is a profession for a reason. It is a very complex thing to do. Although complex, American citizens cannot afford to be uninformed about the processes which deliver justice. It does not matter how well written or numerous society's laws are without an effective judiciary or without a populace familiar with the judiciary's function.

OS2-5 Mick Etchison

The connection between unethical behavior in businesses and governments and how it links to environmental destruction

Abstract: Bad ethics and environmental degradation are inextricably linked. Within the first decades of the 21st century, the existential threat of climate change along with other environmental catastrophes has shadowed every advancement of humanity. As global temperatures increase, and the general minutia surrounding the necessary changes to avoid 2–3 degree global temperature warming, vigorous discussion has taken place on the reasons for this. With this paper, I intend to research the common denominator of business and governmental bodies' failure to address ecological destruction: the lack of ethics and a fear of economic ruin from partaking in environmentally friendly actions. Hiding investments in fossil fuel companies, continuing to use materials that have been proven to disrupt both the human

body and natural environment, and the destruction of ancient habitats in pursuit of rare or common metals, are examples of ethical duplicity in action. These issues of bad ethics in corporations and governments can occur through ignorance or an acute knowledge of the issues but no interest in stopping the carbon emitting behavior. The core assumption of this paper is that the fear of losing market dominance, or even a place in the market, can drive anyone to desperate and destructive actions. This paper examines the link between bad ethics and environmental degradation and how a global readjustment in priorities can solve this problem.

OS2-6 Kiara Clemons, Harold Sanders, Niyasia Williams, Amanda Candies

Experimentation with AI-Generated Malware Behavior and Various Detection Techniques

Abstract: In the ever-evolving cybersecurity landscape, the emergence of malware generated by text-based artificial intelligence (AI) poses a formidable challenge. As the AI generated attacks get harder to detect, they will become undetectable by traditional security systems. AI-generated malware emphasizes its capacity for polymorphic transformations and adaptive features. By developing effective detection mechanisms against AI-generated threats it becomes essential to protect digital systems and data. Sandboxing environments and emulation tools serve as arenas for simulating real-world scenarios, so we can observe how malware will interact with the environment. Our project, a work in progress, delves into the analysis of AI-generated malware, employing a comprehensive array of detection methods. This study began with creating a System32 virus, an AI-generated malware, and creating a sandbox environment. We plan to observe, analyze, and use different detection methods through the use of a virtual machine. Using machine learning algorithms, the research aims to develop models capable of discerning patterns within the code structures to identify these malicious entities. The goal is to fortify traditional signature-based detection with behavioral insights, creating a robust defense mechanism against AI-generated threats. Ultimately, this approach aims to see how accurately traditional detection and AI detection methods are used to detect AI-generated malware.

OS2-7 Brian Ganzler

TweetHarvest: A Python-Powered Social Media Goldmine for Advertisers

Abstract: The Python application that I created can scrape through Twitter using two methods. The first method is using a keyword to query (search) recent posts that contain that keyword. The second method is to look up a user via their user ID or username. I have created a list of keywords that are commonly used to determine if someone would be interested in a particular market. These keywords are then used to find recent Twitter posts for users who would be interested in that category. Examples of keywords would be electronics, automotive and apparel. I can use the keyword "electronics" and search through Twitter for anyone that has used that word. I now have a list of people who would be most suited for advertisement from electronic companies such as Apple, Samsung, etc. I can also go in depth of each user since I now have their username and know they are active on Twitter and can look up their past Tweets to see if they occasionally talk about electronics or if it was a one-time Tweet. This application can be used by advertising agencies or companies who manage their own

advertisement. If a company wants to target an audience and have the best cost-effective return, they can utilize this program to find users who are interested in their product as well as are active on the platform. Companies can also target an audience that is interested in their competitors to try to win them over. An example is if Apple wanted to convince Samsung users to switch to iPhone, they would use the keywords like Samsung, S24, and Galaxy. Apple will now have users that they can advertise to try to win them over.

OS3-1 Josh Adams

Behavioral and Physiological Responses of Cyprinella venusta to Inter- and Intraspecific Acoustic Signals

Abstract: Fish communicate via various modalities, including visual, tactile, chemical, electrical, and acoustic signaling. Given the sometimes unfavorable conditions for visual and chemical communication in lotic ecosystems, sound has been adopted by a wide range of freshwater fish species. Sound production in fishes typically occurs during aggressive interactions, courtship, spawning, or foraging and conveys important information such as species identification or resource-holding potential to nearby individuals. In the genus Cyprinella, sounds are composed of low-frequency pulses produced either alone or in series (pulse trains). Although the association between sound types and behavioral context for Cyprinella has been described, few studies have investigated the functional significance of the sounds, and none have investigated interspecific responses to acoustic stimuli within Cyprinella. We explore the behavioral and physiological responses of C. venusta to unimodal playbacks of its own and of the co-occurring C. callitaenia's acoustic signals. We also measured auditory evoked potentials (AEPs) from C. venusta in response to pulse rates, mimicking calls from both C. venusta and C. callitaenia to determine whether C. venusta's hearing is tuned to its own pulse rate. We found that C. venusta showed elevated ventilation rates when exposed to both intraspecific and interspecific sounds when compared to silence, but no statistical difference in ventilation rate between signal type. We found an increase in escape behavior in response to aggressive sounds relative to non-aggressive sounds. Concerning their hearing, C. venusta showed less variation in latency between the onset of a pulse and the evoked potential from the brain when exposed to interspecific pulse rates relative to intraspecific rates. These findings provide insight into the functional significance and interspecific responsiveness of acoustic signaling in the genus Cyprinella.

OS3-2 Mitdalia P. Alonso

The effects of thermal gradient on the age and growth characteristics of Smallmouth Bass (Micropterus dolomieu) in a warming climate

Abstract: The age and growth characteristics of the popular freshwater sport fish, Smallmouth Bass (Micropterus dolomieu), are well studied. However, the relationship between age and growth characteristics and a thermal gradient are unclear, but these relationships are important to understand to effectively manage Smallmouth Bass in a warming climate. Therefore, we hypothesized that the age and growth characteristics of Smallmouth Bass should respond to a thermal gradient. Consequently, we examined correlations between age and growth

characteristics and three thermal gradients: minimum, maximum, and 24 hr. Smallmouth Bass ranges from southern Ontario/Quebec to Oklahoma/Georgia, USA, and their thermal gradient data ranged from 5.5 -15.9°C MAT24hr. We used the age and growth data (i.e., total length at ages 3, 5, and 8 years old, longevity) from 53 populations of Smallmouth Bass described in the published literature. In addition, we examined total length for 39 state records of Smallmouth Bass from 3.7-21.2°C MAT24hr. There were significant negative relationships between all three thermal gradients and longevity with fish in the south living to 4-8 years old and up to age 12 in cooler climates. We found significant positive relationships among MAT24hr and TL3,5,8 with larger fish found among higher mean annual temperatures. We found positive relationships between MATMax and TL3,5,8, and between MATMin and TL8. A small but significant positive relationship between MAT (minimum and 24hr) and ultimate TL was found in the analysis of state records. There was no significant relationship between MAT and maximum total length (MTL) of each population. Fishery managers need to know that Smallmouth Bass populations will exhibit fewer reproductive attempts (during their lifetime) in the warming climate of northern and central states.

OS3-3 Natalie Fleury

How age of the Tallow Tree Affects Surrounding Plant Growth

Abstract: Invasive species can be very harmful to regions that aren't their own, and can make it difficult for the other plants in the environment to grow around the invasive plant. The Tallow Tree is an invasive and fast growing species in many areas. This project is to determine the effects that the tree has on its surrounding environment as it gets older and grows. I'm going to see if there is a correlation between the tallow tree's size and the amount of surrounding plants growing around it. I hypothesize that there will be less and less plants growing around the tallow as it gets older and larger. I will be visiting Wren's Pond and identify several Tallow Trees of varying sizes growing in the area. I'll measure each Tallow's trunk at the base and chest level. I will then create a one square meter perimeter around the tree and count how many plants are growing within that area. I'll also take note of how many different species are growing in the area. The results did not show a clear difference. It would have been beneficial if another set of samples had been collected at a second location.

OS3-4 K'Niya Hancock

Quantity of E. coli Produced by Mill Creek

Abstract: A 1-week experiment was conducted to see the amount of Escherichia Coli (E. coli) carried from an off-shoot river in Phenix City, Alabama (Mill Creek) into the Chattahoochee River. The analysis of the results will help in identifying the water quality status of Mill Creek, the bacteria serving as an indicator of if further action needs to be taken on the rehabilitation of this stream. In the 5-day collection period, using a collection apparatus, cooler, and an Oakton device were used to collect samples each day at randomized times. The results of these samples thereafter indicated that there was no significant amount of E. coli coming from Mill Creek into the Chattahoochee River.

OS3-5 Kiley Nansel

Female Bluebird Health affected by leukocyte counts (H/L ratios)

Abstract: The objective of my research is to quantify age-related changes in the health of female Eastern Bluebirds (Sialia sialis) using white blood cell counts. Individuals within bird populations have been shown to exhibit age-related changes in behavior, survival, and reproduction, and reproductive success in many bird species declines with age. One way commonly used to quantify the health of a bird and the status of its immune system, is to count different types of leukocytes present in blood smears, specifically heterophils and lymphocytes. The blood smears I am using for my research were previously collected from 30 known-age female bluebirds that nested on the main campus of Columbus State University. Females were captured and a blood sample was collected. A drop of blood was smeared onto a microscope slide, allowed to air dry, and was then fixed in methanol and stained. I am examining the stained smears with a 1,000x oil immersion lens to identify 100 white blood cells in order to obtain the heterophil to lymphocyte ratio for each female. The expected results for this study are that as female bluebirds age, they will experience a decline in their immune system function, due to increased exposure to pathogens and senescence.

OS3-6 Zack Griffith

An Investigation Into Splicing Variation and Expression Patterns of Insulin-Like Peptide 4 (ILP4) Within the Drosophila Genus

Abstract: This ongoing research focuses on understanding the genetic mechanisms underlying acceptor site variant mutations in the insulin-signaling pathway in Drosophila, particularly within the Ilp4 gene. The study aims to elucidate the distribution of these mutations across various Drosophila species and explore sex-specific expression patterns of Ilp4. Additionally, it investigates the relative utilization of acceptor sites within the variant mutation and assesses the potential functionality of resulting isoforms. The insulin-signaling pathway plays a crucial role in regulating metabolic homeostasis in both humans and insects. Dysregulation of this pathway can lead to diseases such as diabetes mellitus and insulin resistance. In Drosophila, Ilp4 shares structural and functional similarities with mammalian insulin, making it an excellent model to study genetic variations in this pathway. This research proposes several key goals. First, it aims to uncover the genetic mechanisms behind the acceptor site variant mutation through phylogeny-aware sequence alignment. Second, it seeks to map the distribution of this mutation across different Drosophila species using genomic data. Third, the study explores sex-specific expression patterns of Ilp4 across species, employing RNA sequencing data, phylogenetic analysis, and the UCSC Genome Browser to view RNA-seq data and gene structure. Fourth, it analyzes the relative utilization of acceptor sites within the mutation using RNA-sequencing and splice junction data, validated by RT-PCR experiments. Finally, the research assesses the potential functionality of both isoform variants through prediction models and genomic data. This ongoing investigation into the Ilp4 gene's acceptor site variant mutation in Drosophila contributes to our understanding of the evolution of the insulin-signaling pathway and its impact on metabolic activities and nervous system function in insects. Additionally, it

sheds light on the splicing mechanisms that can lead to variations in gene products, potentially providing insights into similar processes in other organisms.

OS3-7 Jiayu Wang

The Effect of Natural Products on the growth of triple-negative Breast Cancer Stem Cells (Mammospheres)

Abstract: 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.

VA1-1 Kennedy Buckner, Rasheeda Phillips, Carrie Mae Weems, Toni Morrison

The Liminal South: Explorations of Black Time, Space, and Memory

Abstract: "The Liminal South: Explorations of Black Time, Space," and Memory is a series of photographs interrogating the relationship between time, space, and memory. Using black scholar Rasheeda Philips's work on black temporalities as the framework for this project, I will combine aspects of quantum physics, visual art, and literature to create a body of work that uniquely describes the connection between the South and the structure of the black family. Inspired by Toni Morrison's Song of Solomon and its commentary on intergenerational trauma, this project will use the characters of Milkman, Reba, Pilate, and Hagar as narrative figures to contextualize the effects of intergenerational trauma. These characters will be represented throughout the series of photographs as a progression of an understanding of self, contributing to black personhood. The visual aspect of this project features characteristics of Southern Gothic and black baptist culture, as the two act as homes for both black culture and the structure for black familial dynamics. The photos will be presented digitally and physically, as tangibility is an important aspect of memory, providing one with the freedom to physically commune and acknowledge the things that have contributed to their identity. In addition to exploring tangibility, this project will also pay homage to the traditions held by black families, speaking to their practices as a way to alchemize their pain into aesthetic grandeur. Ultimately, this project seeks to highlight how time, space, and memory contribute to black selfhood and identity in the South.

VA1-2 Indigo Pullen

Fossil Records

Abstract: Using shapes as the underlying theme in this piece, I wanted to create an abstract version of a skull with related organic themes throughout the background. Using only shapes and effects and a scanned imagery of pin needles, I created this interesting composition layering different effects to create my piece FOSSIL RECORDS.

VA1-3 Shu Lin Zheng

The Bell Ringers

Abstract: ShuLin Zheng's art is an exploration of narrative and symbolism. She draws inspiration from various sources, including personal experiences, social media, and contemporary design trends. Zheng uses graphic design and illustrations to tell stories that are deeply personal and universally relevant. In her illustrative works, figurative elements are often used to describe a narrative through their characteristics, expressions, and gestures. Zheng's current children's book, 'The Bell Ringers,' draws inspiration from the unique bell-ringing tradition in Utrera, Spain, where the ringers launch themselves onto the swinging bells. The book centers around three Bell Ringers and their observation of the people of Cantabella. The narrative follows the citizens' daily routines, from morning productivity to evening relaxation, signaled by bells. Through this charming narrative, Zheng expresses her appreciation for her readers, including the adults who might be reading the book alongside their children, acknowledging their efforts and hard work and wishing them well for the future. Inspired by artists such as Madeline Kloepper and Serena Mabilia, Zheng's color palette is soft and inviting, reflecting the warmth and kindness of the narrative. Although done digitally, the illustrations in 'The Bell Ringers' aim to create a cozy atmosphere using a sketchbook-like style by incorporating textures and mimicking pencil marks. The compositions are created with consideration for the placement of texts and strive to create something fun and dynamic. The Bell Ringers are depicted wearing similar uniforms, signifying their shared role while incorporating individualized details that reflect their personalities. Most illustrations occupy the entire spread so the readers can enjoy the beautiful sceneries and immerse themselves in the pictures. The Bell Ringers are lively, elf-like creatures. They playfully interact with their surroundings and bring a sense of imagination to the story, adding to the overall whimsical and enchanting mood of the book.

VA1-4 Vinh Huynh, Nick Miller

International Cultural Dialogue: Vietnamese Funeral Sculptures and Beyond a Culture

Abstract: Columbus State University Department of Arts' mission is to empower individuals to contribute to the advancement of local and global communities through an emphasis on excellence in teaching and research, lifelong learning, cultural enrichment, public/private partnerships, and service to others. YUU Organization is a youth-led non-profit organization working to empower ethnic minority children and youth in Central Highland of Vietnam through education, employment, and cultural conservation since 2017. In 2022-2023, the YUU Organization successfully created a cultural conservation project to preserve and promote the cultural beauty of the Bahnar and Jrai Tomb House Sculpture. The YUU organization organized

two exhibitions of Vietnamese Wooden Sculptures and several workshops showcasing the sculpture-making process and discussion about anthropology and cultural conservation in Ho Chi Minh City and Kontum, Vietnam. In collaboration with the Department of Arts of Columbus State University and YUU Organization, we created a dialogue program between cultures by introducing Vietnamese traditional wooden Art and discussing Anthropology and Arts. Specifically, the project takes an insight into funerary traditions in Jarain culture and other cultures, as well as many factors that impact communities and the effort of cultural preservation. Then, highlight the importance of cultural preservation. By sharing knowledge, comparing and contrasting essences in cultures, this project would contribute to non-western art history by informing and creating a topic and conversation for students, faculty, and other people in the community. This is an opportunity to bring community in Columbus together and exchange ideas. This project would also foster creativity, engage, and create inclusion for students as well as the community in Columbus.

CF1-1 Ma Lon Lane

Quantitative and Qualitative Analysis of Lynnhaven Pond

Abstract: Documentaries are a critical part of promoting elements of society, advances in areas of research, and encouraging critical thinking about humans and the world we inhabit. I use this form of expression to report on a biodiversity survey of a small reservoir, Lynnhaven Pond. Footage of project development including idea-generating sessions, equipment preparation and deployment was recorded. Collecting and cataloging biodiversity of different trophic levels in the ecosystem were documented. Results and conclusions of the study were reported through interviews, figures, and monologue. The final product is a ten-minute video describing all aspects of the project that should raise awareness of the power of collaborative research and the importance of biological surveys to understanding ecosystem services.

CF1-2 Rohan Shah

Exploring Artificial Intelligence and its Impacts on Creatives

Abstract: Artificial Intelligence is one of the hottest topics in the world right now, and I want to create a documentary that takes advantage of this buzz. I will first try to develop an understanding of Artificial Intelligence by interviewing at least one, if not more, professors and experts in the field. Then, I will use their comments and juxtapose them with interviews done with local creatives and get their perspective and insight on the topic as well. The piece will conclude with information regarding what the future of a world with Artificial Intelligence looks like.

OS4-1 Brawner Rai

Factors Influencing Stream Macroinvertebrate Diversity

Abstract: Poor water quality equates to a less healthy ecosystem, and one of the ways we can quantify this is by observing population evenness and richness. Current literature on this topic suggests that as water quality declines across an urbanization gradient, diversity will also decline, and my hypothesis was that this would be reflective of local waterways. This hypothesis

was tested by collecting samples of macroinvertebrates from seven different sites (Heiferhorn, Bull (Upper) 3, Flat Rock, Cooper, Lindsey, Weracoba, and Bull (Lower) 1), which were identified to their lowest required taxonomic level along an urbanization gradient to observe relative diversity with those effects in mind. My results showed that there was an observable trend from Heiferhorn and Bull Upper through Weracoba as the level of urbanization increased and diversity decreased, but Bull Lower was an outlier in this regard and had the highest diversity of all sites, which led me to consider which abiotic factors were causing this shift, and it was found that the flow rate of a site was the best predictor of diversity in aquatic macroinvertebrate systems.

OS4-1 Anna Sims

The Affects of Eggshells on Lettuce Growth

Abstract: This project seeks to answer the question of what method of eggshell fertilizer, powder or eggshell tea, is the best for the growth of Red Romaine Lettuce. Many home gardeners struggle finding fertilizer that is earth safe and budget friendly. The top fertilizer brands are made of chemicals and synthetic ingredients that are harmful to plant and human life. By using eggshell waste, home gardeners get every benefit of using store bought fertilizers, while also being kinder to the earth and their wallets. The calcium found in eggshells is important for root development, soil nutrients, and plant growth. This research is important, as it highlights how easy it is for gardeners to be sustainable by using materials that are readily available in their homes. To conduct this research, I created two sample groups and one control group. The fertilizer was applied over a period of 30 days, and I measured plant height every week. In this presentation, I will show that upon conclusion of this research, the eggshell tea method led to faster rates of growth in Red Romaine Lettuce.

OS4-3 Elise Snow

Biochemical Analysis of Secondary Metabolites in Eupatorium Serotinum

Abstract: Phytochemistry, a subset of natural products chemistry, pertains to the study of chemically derived products from natural substances. Findings from this field have important applications in medicinal research due to the distinctive properties of plant metabolites. Metabolites are produced by the metabolic cycle. Primary metabolites contribute to organism growth, development, and maintenance of energy. Secondary metabolites, however, are more specialized as they correlate to the defense mechanisms and natural disease resistance of plants. Typically, the secondary metabolites are found in very small quantities. Our project works with *Eupatorium serotinum* (Common name: Late Boneset). This is an herbaceous plant found in the Eastern United States and was used as a fever reducer by early Appalachian settlers. Isolation of the secondary metabolites found in *E. serotinum* reveal the compounds possibly correlated to the plant's medicinal properties. Dry Column Vacuum Chromatography (DCVC) separates the metabolites of interest through favorable interactions. The resulting fractions are then analyzed through Gas Chromatography/Mass Spectroscopy (GC/MS) to identify the molecular structures. The separated compounds are also tested for antibiotic

properties against *E.coli* cells in hopes of isolating and classifying a compound for medicinal use.

OS4-4 Johnny Cargill

Spinal Cord Stimulators and their Relationship with BMI

Abstract: Back pain is a prevalent issue affecting millions in the United States, contributing significantly to healthcare costs and missed workdays. Opioids are commonly prescribed for pain relief but pose risks of dependence and contribute to the opioid epidemic. Spinal cord stimulators (SCS) offer an alternative, with emerging technologies like dorsal root ganglion stimulation (DRG) and burst stimulation. This research explores the impact of postoperative body mass index (BMI) changes on the efficacy of SCS implants. A retrospective review, spanning January 2009 to June 2023, involved patients with SCS from major companies. Data included age, sex, race, BMI at surgery, BMI at follow-up, comorbidities, and outcome metrics like the Visual Analog Scale (VAS). Regression analyses examined the relationship between BMI change and VAS scores and the device's success in reducing pain. Results indicate no significant correlation between BMI change and VAS scores, challenging the hypothesis. Model simplicity, sample size, and unexplored variables may contribute to non-significant results. The analysis of device efficacy similarly revealed no significant impact of BMI change on pain reduction, suggesting a consistent device performance across BMI changes. Limitations, including sample size and variable omissions, are acknowledged. Future research should employ more sophisticated models and explore additional predictors to better understand the intricate relationship between BMI changes and SCS outcomes. Despite limitations, these findings contribute to discussions surrounding SCS utility and emphasize the need for further investigation into factors influencing their effectiveness in clinical settings.

OS4-5 Declan McCahan

Observing Induced Pain in Athletes and a General Population

Abstract: The purpose of this project is to see whether athletes have a higher pain tolerance and/or threshold than the general population. Everyone experiences pain, but individuals have different experiences that affect how they respond to pain. Athletes are a group who likely have increased exposure to pain due to training at a high level and an elevated risk for injury. Therefore, if coaches and exercise professionals have a controlled objective measure of how much pain an individual athlete is in, they can better assess their injury probability. The understanding that getting hurt, recovering from an injury, and living with or without pain is very personal. Yet time after time there is a struggle to find consensus on how much pain people are in compared to another individual in the same situation. Using a Cold Pressor Test to induce a onetime pain stimulus gives the objective measures in physical experience. While three simple questionnaires will be given before and after testing for subjective understanding. The expected results will be athletes having both higher pain tolerance and threshold when exposed to pain. They will do so in a manner that resembles a better drive to keep going despite comfortability. In conclusion, observing how athletes, as the testing group, deal with pain will

help coaches and practitioners alike in working with them to be good performers without having to sacrifice their bodies for it.

OS4-6 Hope Adams

Intimacy of Dress in Berthe Morisot's The Artist's Sister at a Window

Abstract: This painting, Portrait of the Artist's Sister at a Window, from 1869 by Impressionist artist Berthe Morisot depicts her sister Edma shortly after her marriage, during a visit back to the Morisot family home in Paris. Morisot constructs a quietly poignant and intimate scene with her sister as the focal point. She conveys this sense of intimacy through the arrangement of the scene, the portrayal of Edma's expression, and the depiction of her clothing. In this work, Edma wears a peignoir, a casual and comfortable day dress worn only at home around close friends and family. In understanding the significance of this outfit, we better appreciate the intimacy of the scene which contemporary viewers understood. Edma as the subject highlights the close relationship between the two sisters and the choices in life that lead them on different paths, one to a respectable marriage and husband, the other to a lifelong careful balance of an artistic career and duty to family and social acceptance.

OS4-7 Campbell Eubanks

What Does it Mean to be a Human in the Age of Artificial Intelligence?

Abstract: Campbell Eubanks' artwork reflects ideas surrounding the ever-growing complexities of human nature in the context of our growing world. She uses ceramics to investigate human purpose in a digital world by employing artificial intelligence along with her own skills and craft. Her work aims to challenge viewers to contemplate the intricate relationship between humans and artificial intelligence. During her research, Eubanks has looked towards other artists who invite AI into their traditional practices. Sougwen Chung is one example of this. Chung has trained AI robots to learn her style and works alongside them in performances to create collaborative gestural drawings. This innovative approach has encouraged Eubanks to embrace the advancements of AI, and to question the impact of collaborating with it. She is intrigued by the possibility of utilizing AI in her own artistic practice, while also examining the purpose of herself as an artist. Eubanks' current project includes three phases to better define the connection between humans and AI: collaboration, comparison, and distinction. While she has worked with multiple mediums, Eubanks finds that ceramics has been largely forgotten within artificial intelligence-generated content. Although three-dimensional printing has become more popular, most AI generators are used to create two-dimensional digital pieces. The work Eubanks creates explores the possibility of an intersection between ceramics and artificial intelligence. She is interested in combining the traditional and tactile nature of ceramics with the infinite possibilities of AI to create a body of work that questions each counterpart's significance. Eubanks' art allows viewers to confront their own biases and visualize a world educated with responsible usage of artificial intelligence. Although it teaches viewers how to sensibly integrate AI into everyday life, the work also embraces human-crafted qualities and emphasizes the irreplaceable role of the artist.

MS1-1 Nayton Garcia

Free Energy of Folding Red Fluorescent Protein

Abstract: Red Fluorescent Proteins are a common type of protein used to track gene expression within cells. The proteins release a signal when excited, allowing for easier visualization of gene transcription and expression. Just as with other proteins, RFPs undergo folding and unfolding in an equilibrium state, with the favorable state being determined by the free energy difference between the two states. This favorability is directly connected to the stability of the protein. While most proteins are stable and do not naturally unfold, these proteins can unfold when disturbed. This unfolding occurs very quick, posing a challenge to determine the free energy of folding. In order to determine the free energy of folding for RFP, UV spectrometry and other instrumental techniques are used to quantify the difference. By using a mathematical model developed to determine the free energy from data collected from spectrometry, the free energy of RFP folding was determined.

MS1-2 Caitlin Parker

Rational Design and Anti-Proliferative Activity of Substituted Azolium Salts as Therapeutics

Abstract Cancer is the second leading death rate in the United States, and researchers have increased their efforts to explore treatments for cancer therapy. Cancer therapeutics often compromise the immune system of patients, making microbial infections one of the most common complications during treatment (Rolston, 2017). Thus, researchers are motivated to develop treatments that serve a dual purpose: combating cancer and minimizing opportunistic infections for the immunocompromised. Treatments housing the imidazole moiety, like clotrimazole (antifungal) and dacarbazine (anti-cancer), are currently being used as both anti-tumor and antimicrobial agents (Bae et al. 2018). Literature has shown 1,2,3- and 1,2,4-triazoles to possess anti-fungal, anti-bacterial, anti-tubercular, and anti-parasitic properties. Also, the formation of N,N'-bis-substituted 1,2,3- and 1,2,4-triazolium salts have previously shown to have potential anti-tumor agents specifically for breast cancer cell lines. Patients who undergo chemotherapy have a decreased immune system to obtain bacterial infections, and it is important to include the expansion of review into other similar systems. Literature confirms the advantages of tuning the therapeutic efficacy of azole systems for the development of anti-cancer pharmaceuticals (Aggarwal et al. 2020). A previous study by the Taylor lab explored a series of N,N'-bis-substituted 1,2,4-triazolium bromide salts as anti-tumor agents against breast cancer (MDA-MB-468) and prostate cancer (PC-3) cell lines (Figure 1). Results indicated that the N,N'-bis-substituted 1,2,4-triazolium bromide salt 2, with the naphthylmethyl substituent, was comparable to the clinical standard tamoxifen, a known treatment for breast cancer (Lin et al. 2019). Further investigation into the substituent's effects on the aqueous solubility and anti-proliferative activity of the overall salt need executed, due to these azole compounds' potential use as anti-tumor and antimicrobial agents. Studies have observed a possibility of specifically using TDP-43 to disturb other degenerative cells through propagation (Hergesheimer et al. 2020). A symbiosis of the synthesized azole systems alongside TDP-43 propagation needs to be further investigated for use in simulated ALS environments. A series of N-substituted benzothiazole compounds will be synthesized, characterized and tested against H1299 lung

cancer cell line and WI38 normal cell line. This project focuses to further expand the study of azole family and will help provide a structure activity relationship (SAR) that could provide feedback to potential routes for safer cancer therapy.

MS1-3 Kaitlin Stringfellow

Insights into DNA Methylation in Human Tissue and Insulin Resistance

Abstract: DNA methylation is a key epigenetic mechanism involved in regulating gene expression patterns. Changes in DNA methylation at specific genome sites have been shown to be related to various aspects of T2DM pathophysiology, including insulin resistance2, β-cell dysfunction, and metabolic dysregulation. Perhaps the largest concern of patients with T2DM is insulin resistance, wherein the body shows reduced responsiveness to insulin signaling, leading to impaired glucose uptake and dysregulated glucose homeostasis3. Recent evidence suggests that atypical DNA methylation patterns contribute to the development of insulin resistance by influencing the expression of genes involved in insulin signaling pathways, adipocyte function, and inflammation4. Moreover, epigenetic modifications may serve as biomarkers for predicting T2DM risk, disease progression, and response to therapeutic interventions5, offering potential clinical use. This literature review aims to provide a comprehensive overview of the current understanding of epigenetic factors associated with T2DM, with a particular focus on DNA methylation alterations and their implications for insulin resistance.