20th annual

Carolyn & Norwood Thomas

UNC GREENSBORO
Undergraduate Research, Scholarship *and* Creativity Office

Undergraduate Research & Creativity Expo

Save the date!

April 7, 2026

UNC GREENSBORO
Undergraduate Research, Scholarship *and* Creativity Office

Dear Students, Colleagues, and Guests,

It is with great excitement that we welcome you to the 20th Annual Carolyn and Norwood Thomas Undergraduate Research and Creativity Expo! We are pleased to include 123 presentations by 141 students from various academic departments and programs.

Today is a day to celebrate your scholarly accomplishments! We would like to thank all students and their faculty mentors for taking the time to share your work with the university community. Many thanks go to the URSCO Leadership Committee, Dean Kimberly Petersen, the entire Ensemble staff of the Lloyd International Honors College, the Vice Chancellor for Research and Engagement, Dr. Sherine Obare, as well as the Provost, Dr. J. Alan Boyette, and Chancellor, Dr. Franklin Gilliam, for their support of URSCO and their dedication to student success. As always, special thanks go to Mrs. Carolyn Thomas for her generous contributions in support of the Expo and faculty-mentored undergraduate research. We would also like to thank Katherine Reese, Lee Cotton, and Hayden Yancey for their efforts to ensure the success of today's program.

I hope that you enjoy the 20th Annual Carolyn and Norwood Thomas Undergraduate Research Expo and encourage you to save the date for next year's Expo, which will be on April 6, 2027!

Sincerely,

Dr. Mitch Croatt
Director,
URSCO

Mrs. Traci Miller
Assistant Director,
URSCO

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Abstracts (Alphabetically by Student Last Name)

About the Cover Design

CAROLYN & NORWOOD THOMAS

Carolyn Styron Thomas graduated from Woman's College, now UNCG, in 1954 with a bachelor's degree in business. She is very committed to the success of her alma mater and believes strongly in the value of education. "The experience of obtaining my college degree at Woman's College gave me confidence throughout my life to face challenges, raise my family and serve my church and community, all leading to a very rewarding life," says Mrs. Thomas. To express their appreciation for Carolyn's education, the Thomases established an endowed fund in 1996 to support undergraduate and faculty research.

Mrs. Thomas has served on the board of directors for the UNCG Alumni Association and, most recently, the UNCG Board of Visitors. She is a member of the Harriet Elliott Society at UNCG. She has also been involved in numerous organizations in her hometown of Durham, NC, including the Junior League, the United Arts Council and the Methodist Retirement Home.

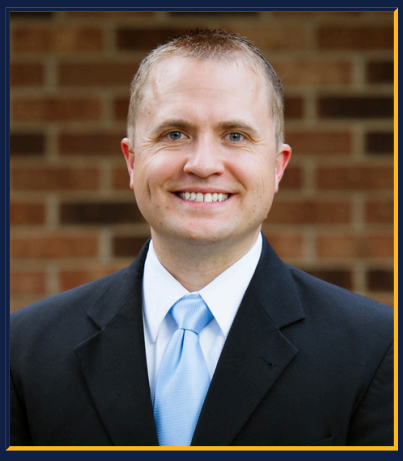
Her husband, the late Norwood A. Thomas, Jr., graduated from Duke University in 1955. The Thomases dated in college and were married for 46 years. Mr. Thomas retired from his position as Executive Vice President at Central Carolina Bank after 37 years. He later was a founding partner of the investment firm of Wilbanks, Smith & Thomas Asset Management of Norfolk, Virginia, where he worked for more than 10 years. Mr. Thomas was very active in community affairs in the Thomas' hometown of Durham.

2026 THOMAS UNDERGRADUATE RESEARCH MENTOR AWARDS

Dr. Jennifer Toller Erausquin, Public Health Education

2026 TURMA for Pre-Tenured Faculty

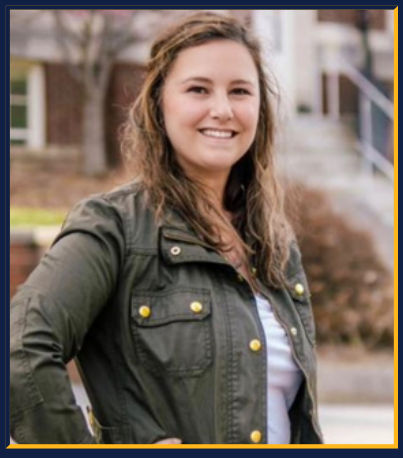
Read more about Dr. Erausquin's Mentoring →



Dr. Eric Drollette, Kinesiology

2026 TURMA for Tenured Faculty

Read more about Dr. Drollette's Mentoring →



Dr. Jessica Caporaso, Psychology

2026 TURMA for Professional Track Faculty

Read more about Dr. Caporaso's Mentoring →

SCHEDULE AT A GLANCE

20th Annual Carolyn & Norwood Thomas Undergraduate Research & Creativity Expo

Elliott University Center, Cone Ballroom
The University of North Carolina at Greensboro
April 7, 2026

8:30 AM Registration

9:00 AM Welcoming Remarks

Presentations		
9:15 AM - 10:15 AM	Session **A**	Mathematics, Life, and Physical Sciences
10:30 AM -11:30 AM	Session **B**	Mathematics, Life, and Physical Sciences
11:30 AM	Special Acknowledgements	
11:40 AM - 11:50 AM	Drama Performance	
12:00 PM - 1:00 PM	Session **C**	Visual Arts/Drama Posters and Exhibits
1:00 PM - 2:00 PM	Session **D**	Business, Economics, Education, Behavioral and Social Sciences
2:15 PM - 3:15 PM	Session **E**	Humanities

POSTER PRESENTATIONS
SESSION A

Cone Ballroom

A1	Nour Abouzeid	Biology	Gene Enrichment Hallmark Pathways show that Mamaki extract has anti-inflammatory effects on human aortic endothelial cells
A2	Justin Acheampong	Biology	Isolation and Characterization of Novel Arthrobacter globiformis Bacteriophage “Jollof”
A3	Eldeeb Ahmed	Biology	Uptake of Polystyrene Microplastics by Bone Marrow–Derived Macrophages
A5	Reina Bustamante	Biochemistry	CO2 Capture via N-Heterocyclic Carbenes
A6	Caitlyn Costello & Jhase Lynear	Biochemistry	Laboratory Scale-up of Fungal Secondary Metabolite, Wheldone, via Co-culturing.
A7	Himari Eriguchi	Chemistry	Development of Wire-Grid Concave Polarizers for a Confocal Fabry-Pérot Cavity
A8	Alayna Fawson	Biology	Recruitment of CMP7 in Schizosaccharomyces pombe when treated with 3,3'-Diindolylmethane (DIM)
A10	Kaitlyn Fox	Biochemistry	Optimization of the Eupenifeldin Succinate Reaction
A11	George Gil	Chemistry	Preliminary Investigation of Marine Filamentous Fungus, Clavatospora bulbosa (G944) for Anticancer Activity
A13	Jasmin Grillo	Biochemistry	Purification of the O-methyltransferase encoded by the spd7 gene from Pseudopithomyces chartarum involved in the Biosynthesis of Sporidesmin

A14	Liana Herrera-Sanchez	Biology	Examining the Potential of Ecotype Specific Allelopathy of Longleaf Pine (Pinus Palustris) on Switchgrass (Panicum Virgatum)
A16	Jaleeyhia Jennings	Biology	Membrane Topology and Closure Dynamics of the Forespore Membrane
A17	Citlaly Landin-Bermudez	Biology	Design and Preliminary Testing of a Novel Microwave “White Cell” Spectrometer for Molecular Rotational Spectroscopy
A19	Jana Yan & Miles Bellion	Chemistry	Transgenerational Effects of Microplastic Exposure on Tobacco
A20	Uryel Marquez Rodriguez	Biochemistry	Analyte Velocity as a Contributor to Band Broadening in Liquid Chromatography
A22	Liam Miles	Biology	Seasonal changes in the microanatomy of the gastrointestinal tract of wild-caught Permyscus maniculatus
A23	Namasvi Patel	Biology	Effects of long-term intake of māmaki (Pipturus albidus) tea extract on liver and kidney histomorphology in C57BL/6 mice
A25	Aamna Qaisar	Biology	Investigating Dehnel’s Phenomenon in North American Sorex Shrews
A26	Olivia Walker & Sage Benders	Biology	A potential role for the ESCRT-III nucleator, Alx1, in mitotic nuclear envelope sealing
A28	Kianna Satterwhite	Biology	Meiotic Nuclear Envelope Remodeling by ESCRT Machinery
A29	Aubrey Shehan	Biology	Soil Microbials and the Impacts of Nitrogen
A31	Jonah Tatsapaugh	Biology	"Filling in the Holes": A protocol for collecting microstructural variation data of sub-adult long bones
A32	Parker Till	Chemistry	Cross-section measurements of 191m^Ir production using a rapid irradiated target transfer system
A33	Elliot Turbeville	Biology	The role of nitrogen in prairie environments: Impacts of long-term elevated soil nitrogen on plant drought resistance
A34	Julianna Rodriguez	Biology	Nocturnal Insect Biodiversity Survey at UNCG
A35	Janae Wofford	Biochemistry	Addressing the Global Antibiotic Resistance Crisis: Isolation and Characterization of Antibacterial Metabolites from Fagus grandifolia
A36	Olivia Mahfoud	Biochemistry	Understanding Burptide Cyclases in Hibiscus syriacus

POSTER PRESENTATIONS
SESSION B

Cone Ballroom

B1	Nour Abouzeid	Biology	Investigating the Impact of Microplastic Exposure on Bone Marrow-Derived Macrophage Polarization
B2	Obinna Achumba	Biochemistry	Nanorobotics: Elemental Reinventions in Nanoengineering
B4	Olivia Burg	Biology	Dietary Plasticity of Co-occurring Shrew Species Living in Seasonal Environments
B5	Joshua Collins	Biology	Dietary Saturated Fat–Induced Microglial Activation in Dopamine-Rich Brain Regions: Implications for Inflammation and Satiety Regulation
B6	Lillian Douglass	Chemistry	Exploring Elephantopus Species as a Source of Antimicrobial Compounds
B7	Amber Fairchild	Biology	Functional Characterization of the TGW6 Gene for Grain Size Regulation in Eragrostis tef
B8	Kavion Foster	Biochemistry	Synthesis and Reactivity of Photocatalysts for Alkane Oxidation
B10	Nolan Garci	Chemistry	Study of Amines as Bases to Direct the Aromatic Claisen Rearrangement
B11	Keesha Jazzlyn Go	Computer Science	Computational prioritization of schizophrenia risk variants via integration of GWAS and open chromatin annotations
B13	Angie Guaglione	Biochemistry	Functional Characterization of a Non-Canonical BURP-Domain RiPP System in Eudicots
B14	Summer Hunter	Chemistry	Molecular Precursors to Bismuth Semiconductor Materials

B16	Sydney Jones	Biochemistry	Towards the Total Synthesis of the Novel Antifungal Natural Product Jesterone
B17	Sophia Lau	Biology	Developing a fluorescent reporter of nucleocytoplasmic integrity during meiosis
B19	Ashlee Maness	Physics	Order from Chaos: Planet Formation in a Triple Star System
B20	Alissa Martinez	Biochemistry	Discovery of RiPP-Derived Antimicrobials from Streptococcus mutans
B22	Brodie Nash	Biology	Native Plant Seed Germination with and Without the Introduction of Allelopathy of the Longleaf Pine to the Longleaf Pine Savanna
B23	Christopher Pilgrim	Biology	UBP22-Mediated Histone Modification and lncRNA Regulation Under Abiotic Stress in Arabidopsis thaliana
B25	Elanor Redinbaugh	Biochemistry	Coordination of Cyclic (Alkyl)(Amino) Carbenes (CAAC) to Metal Centers for Improved Alkane Oxidation Reaction
B26	Julianna Rodriguez	Biology	Effects of High and Low-Fat Diets on Lipid Peroxidation in Mouse Brain and Spleen
B28	Ibrahim Shahid	Other-Middle College Student	Age Dependent Transcriptomic Network Rewiring Within Murine Nephron Tissue Post Spaceflight
B29	Muhammad Tariq	Biology	Aptamer-Based Fluorescence Assay for the Detection of Environmental Polystyrene Microplastics
B31	Parker Till	Chemistry	Progress on trajectory simulations of neutral polar molecules through a novel analytical instrument called a Quadrupole Mass Starkometer
B32	Danielle Titus	Kinesiology	Fluid Intake and Resting Metabolic Rate in Black Emerging Adults
B33	Jadis Vang	Biology	In-Silico Modeling of Naringenin’s Antidiabetic Mechanisms
B34	Eva Ward	Biology	Investigating the role of Vps4 in ESCRT-mediated membrane remodeling
B35	Celleste Wohlfarth	Biology	Aging Exacerbates Autophagy-Linked Wasting in Tumor-Bearing Mice: Implications for Early Noninvasive Diagnosis
B36	Ryan Zhang	Biology	A DNA Aptamer-Based Reaction Gate Cascade for Microplastic Detection: A Fluorescence Kinetic Study

DRAMA PERFORMANCE

Cone Ballroom

Student Presenter(s)	1st Student's Major	Title
Ainsley Goodyear & Caleb Van	Drama	Reset Day

POSTER PRESENTATIONS
SESSION C

Cone Ballroom

C1	Poster	Peyton Hiller	Theatre	How does the research process of costume design impact the renderings for queer characters in a global context?
C4	Poster	Jay Smith	Drama	The People v. Antigone Harding
C13	Poster	Gemma Carioti & Maya Monteverd	Interior Architecture	The Orange Hotel: A Green Book Revival
C16	Poster	Bella Estrada	Art Education	Exploring the Impact of the Five Core Social Emotional Learning Competencies in K-12 Art Classrooms
C25	Poster	Summer Null	Interior Architecture	The Hour of Bloom Birth Center
C28	Poster	Aspen Solis	Art Education	Implementing Social Justice in Elementary Art Curriculum
C31	Poster	Sophia Weaver	Interior Architecture	Repurposing furniture project
C37	Exhibit	Mallory Cox-Shreffler & Aminah Coppage	Art	CVPA Pollinator Garden: Polishing Polly
C38	Exhibit	Madison Karan	Music	Apotheosis: the Making of a Multimedia Narrative
C39	Exhibit	Johnny Monroe	Media Studies	Gate City: Playable Space Internship
C40	Exhibit	Shayla Scales	Art	A Southern Love Letter
C41	Exhibit	Cole Smith	Media Studies	Community Hub: Entrepreneurship and Black Los Angeles

POSTER PRESENTATIONS
SESSION D

Cone Ballroom

D1	Ellie Acree & Ramon Almeida	Political Science	Cold War Alignments and Constitutional Design in Post-Independence African State Formation: Liberia, Angola, Tanzania
D2	Julie Amani	Anthropology	Investigating the Water, Energy, Food Nexus in Chatham County, North Carolina
D4	Jayla Bailey	Psychology	When “Non-Supportive” Becomes Protective: Rethinking Emotion Socialization in Cultural Context
D5	Alundra Carter & Kazimieras Morrison	Kinesiology	Mind in Motion: How Mindfulness-Enhanced Physical Activity Improves Children’s Inhibitory Control
D7	Ava Cherry	Psychology	Habitual Caffeine Use Moderates the Association of Subclinical Depression Symptoms with Cortisol Reactivity to Lab-Based Stress
D8	Emma Church	Art Education	Implementing Art Therapy Practices into the K-12 Classroom
D9	Anthony Congdon	Biochemistry	Associations among childhood surgency and adolescent risk health behaviors: The moderating influence of socioemotional adjustment
D10	Jordan Curbeam & Andrea Dela Cruz	Human Development and Family Studies	Understanding Overrepresentation: Examining Racial Disproportionality in Special Education Pre Service Teachers
D11	Daijah Elliott	Public Health Education	The Burden of Being the “Only One”: Hyper-Visibility and Invisibility in the Career Trajectories of Black Women Physician Assistants with Doctoral Degrees
D13	Claudia Fader	Psychology	Dimensional Perception across Acculturation in the US
D14	Madison Freitag	Art Education	Pedagogical Framework Paper; Community Based Art Education
D16	Camden Gaddy	Psychology	Examining Triggers of Trauma-Related Dissociation in Daily Life
D17	Roba Hussein	Psychology	The Mediating Role of Shame in the Development of Adolescent Internalizing in Children with Externalizing Behaviors
D18	Ashley Leonard	Psychology	Effects of Age-Related Differences in the Correction of False Claims

D19	Clara Lussier	Psychology	An examination of the Batman Effect on children's peer conflict resolution abilities
D20	Zion Raczenski	Psychology	ADHD Symptoms and Mind Wandering During More Versus Less Engaging Reading Tasks
D21	Annika Redmond	Psychology	The Effects of Microinvalidations on Mental Health
D22	Emony Richardson	Psychology	Examining the Potential Moderators Between Preparation for Bias and Adolescents' Proactive Coping with Discrimination
D23	Alejandro Robles	Psychology	Digital Communication, Digital Pressure, and Externalizing Behaviors in Emerging Adults
D24	Marcus Roman	Kinesiology	Sleep quality, APOE-ε4, and cognition in middled-aged adults at elevated risk for Alzheimer's disease
D25	Raeyan Saleh	Public Health Education	Va Meh Du and Refugee Youth Mental Health
D26	Cade Scott	Public Health Education	Mapping Language and Gaps in Services for Low-Income Asian American Communities of Refugee-Origin (LIAACRO)
D27	Emma Ruth Sharpe	Kinesiology	Sedentary time, APOE-ε4 dose, and episodic memory in middle-aged adults at elevated risk for Alzheimer's disease
D28	Christian Sharpe	Psychology	Culturally Relevant Coping Profiles Among College Students of Color: The Role of Discrimination and Ethnic-Racial Identity
D29	Alan Shaw & Ajah Lewis	Psychology	Mind the Gap: Association Between Gold Standard Life Stress Interview Chronic Stress and Personality Traits
D30	Jordan Sides	Psychology	Parents' Use of Internal State Language in Naturalistic Contexts: The Role of Toddler Distress
D31	Serena Silmser	Human Development and Family	Does Attentional Control Link Maternal Reminiscing to School Readiness?: A Mediation Analysis
D32	Kennedy Strong	Human Health	Created for Us, by Us: The Construction of Sexual Health Education [SHE Rises] Intervention for Sexual Violence among Black Women
D33	Samiah Young	Biology	Are We Testing What We Teach? Evaluating Alignment Between Instruction and Assessment in Teaching Molecular Symmetry
D34	Nikolai Tassin	Psychology	Testing the impact of a self-regulation-based micro intervention on depression and subjective well-being
D35	Nikolai Tassin	Psychology	Holding Fast or Letting Go: Grit and Goal Adjustment and Daily Goal Pursuit
D36	Michelle Yang	Psychology	The Effects of Biculturalism and Racial-Ethnic Identity in Discrimination Stress and Proactive Coping Among Asian American Adolescents

POSTER PRESENTATIONS
SESSION E

Cone Ballroom

E1	Bashar Al-Janabi	Political Science	In God's Name: Christianity's Role in Shaping American Society
E2	Cecil Barlow	Classical Studies	Fatal Flaw? Being A Woman! Analyzing Women's Positionality in Athenian Tragedy as It Affects Their Fate.
E4	Keagen Buckley	Classical Studies	Using Experimental Archaeology to Study Ancient Roman Coin Counterfeiting
E5	Keagen Buckley	Classical Studies	Through the Looking Glass: Symbol, Function, and Form in Ancient Animal-Shaped Vessels
E7	Victoria Charles	Liberal and Interdisciplinary Studies	How It's Made: The Craftsmanship and Daily Use of the of Etruscan Bronze Mirror
E8	Austin Collum	Classical Studies	The Evolution of Myth in the Ancient World
E10	Kayla Cooper	Anthropology	Ancient Israeli Foodways
E11	Elias Downing	Liberal and Interdisciplinary Studies	Rituals and Ceramics: Pottery Analysis and the Creation of Minoan Social Identities in the Late Bronze Age (1675-1430 B.C.E)
E13	Jamie Gross	Classical Studies	The Migration of the Sybil: The Reasonings for the Relocation of the Sibylline Books
E14	Jamie Gross	Classical Studies	The Frenzied Prophetess: The Use of Bacchic Cognates to Describe Cassandra in Euripides
E16	Kasey Johnson	Public Health Education	Language Access: A Key to Health Equity in Local Immigrant and Refugee Communities
E17	Sheza Khurram	Archaeology	The Write Way: Re-Evaluating Writing Systems on Palm Leaves
E19	Lizeth Olvera Chavez & Paris McCollum	Psychology	Do Neuroticism and Internalizing Symptoms Predict Perceived Negative Evaluation in Three Lab Based Stress Conditions

E20	Alex Parsons	Nursing	Minerva Mobile Health Unit (MMHU): Sustainable Mobile Health Care Delivery
E22	Kristina Perdue	Classical Studies	The Amazonian Myth and Male Authorship in the Greek East
E23	Jynia Phelps	Social Work	Big Problems, Personal Power: Confronting Inequities Through a Black Maternal Health Lens
E25	Briana Potts-McLaughlin	Classical Studies	Owning the Inevitable: Fate, Identity, and Agency from Greek Tragedy to Modern Retellings
E26	Jada Raudales & Sarah Serran	English	Women's Health History Digital Exhibit
E28	Jason Rich & James Cappola	Interior Architecture	Design as Cultural Preservation: Reimagining the Orange Hotel in East Wilson
E29	Mason Rico, Lawrence Fountain & Natsuki	Kinesiology	Beyond Just Exercise: The Cognitive Benefits of Combining Mindfulness and Physical Activity in Youth
E31	Greyson Rupert, Sheza Khurram, Erin Hooks & A.J. Ross	History	The Deep River Podcast: How podcasting is shaping conservation in the 21st century.
E34	Lila Thomas	Arts Administration	The Value of The Nutcracker: An Exploration of the Value That the Asheville Ballet's Nutcracker Creates & Captures
E35	Valeria Villon	Sociology	Buffering the Effects of Discrimination: Familism and Private Regard as Protective Factors for Latinx Youth
E36	Nigel Yeboah	Biology	The Poplar project: Exploring the Antimicrobial properties of Liriodendron tulipifera

ABSTRACTS

Gene Enrichment Hallmark Pathways show that Mamaki extract has anti-inflammatory effects on human aortic endothelial cells
Student Presenter(s): Nour Abouzeid, Senior (Biology)
Faculty Mentor(s): Zhenquan Jia (Biology)

Māmaki (Pipturus albidus) a Hawaiian Native plant, traditionally used for its medicinal properties, including cholesterol-lowering and anti-inflammatory effects. Despite its extensive traditional use, the molecular mechanisms behind its anti-inflammatory properties remain relatively unknown. Cardiovascular diseases, especially atherosclerosis, are often exacerbated by chronic inflammation of vascular endothelium and are one of the leading causes of death worldwide. This study investigated the mechanism of action of Māmaki extract on human aortic endothelial cells (HAECs). HAECs were cultured and treated and cultured with 50 µg/ml of Māmaki extract for 24 hours, RNA was isolated and sequenced, then differential gene expression analysis was performed. Gene set enrichment analysis (GSEA) was conducted in the control and māmaki-treated groups to identify significantly enriched hallmark pathways. Results showed the hallmark inflammatory response pathways were significantly downregulated in the Māmaki-treated group compared to the control group. Māmaki regulated several signature genes set enriched pathways, such as inflammatory response, cholesterol homeostasis pathways, and ROS. These findings suggest that Māmaki extract may exhibit anti-inflammatory properties in HAECs by modulating characteristic pathways associated with inflammation and endothelial function.

Investigating the Impact of Microplastic Exposure on Bone Marrow-Derived Macrophage Polarization
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Faculty Mentor(s): Zhenquan Jia (Biology)

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Isolation and Characterization of Novel Arthrobacter Globiformis Bacteriophage "Jollof"
Student Presenter(s): Justin Acheampong, Sophomore (Biology)
Faculty Mentor(s): Rodney Lee (Nursing)

Bacteriophages are the most abundant biological entities on Earth and play a major role in shaping microbial ecosystems. Despite their prevalence, much of phage diversity remains uncharacterized, representing an important resource for microbiology, biotechnology, and medicine. This study aimed to isolate and characterize a novel bacteriophage infecting Arthrobacter globiformis, a soil bacterium commonly used in phage discovery. Soil samples were collected and processed through direct isolation and enrichment. Phage presence was confirmed using plaque assays demonstrating lytic activity. A clonal phage, designated Jollof, was purified and amplified to generate high titer lysates. Infectivity was validated through serial dilution and webbed plate assays. Restriction digest analysis suggested a unique genomic profile. Transmission electron microscopy revealed Siphoviridae morphology with an icosahedral capsid and flexible tail. These results confirm Jollof as a novel bacteriophage and contribute to expanding knowledge of phage diversity associated with A. globiformis.

Nanorobotics: Elemental Reinventions in Nanoengineering
Student Presenter(s): Obinna Achumba, Sophomore (Biochemistry)
Faculty Mentor(s): Suzanne Ahmed (Joint School of Nanoscience & Nanoengineering), Blair Hall (Joint School of Nanoscience & Nanoengineering)

This work presents a nanorobotic system designed to achieve precise and flexible control over multiple modes of motion within a single platform. The system uses an ultrasonic and approach, allowing nanorobots to move and transition between different types of motion while maintaining independent control over their position and behavior. This dual-actuation strategy enables greater versatility than traditional nanorobotic systems, which typically support only limited movement patterns. The proposed system demonstrates the ability to coordinate both translational and rotational motion in a controlled and repeatable manner, offering improved adaptability for complex tasks. In addition to motion control, the nanorobots can be guided to specific locations and manipulated remotely, highlighting the system's potential for targeted and precise operation. Importantly, the nanorobotic platform is designed to be biocompatible, making it suitable for future biomedical applications. As proof of concept, the system is demonstrated in a model environment that mimics small biological channels, where the nanorobots are used to assist in the removal of obstructions. Overall, this study introduces a versatile and controllable nanorobotic framework that supports multiple motion behaviors and expands the functional capabilities of nanoscale robotic systems for future medical and engineering applications.

Cold War Alignments and Constitutional Design in Post-Independence African State Formation: Liberia, Angola, Tanzania
Student Presenter(s): Ellie Acree, Senior (Political Science), Ramon Almeida, Senior (Political Science)
Faculty Mentor(s): Michael Broache (Political Science)

How did Cold War alignment influence constitutional provisions in newly independent African states? We hypothesize that states aligned with a superpower would include constitutional structures reflective of their patron, whereas non-aligned states would exhibit constitutional independence. Our comparative case study used a point-based system which awarded similar constitutional provisions one point and independent provisions zero points. Our comparative analysis is consistent with our hypothesis. It provides quantitative evidence that alignment resulted in direct constitutional similarities between African states and Cold War counterparts. Liberia's constitution reflects the US's constitution of democratic principles, separation of powers, and civil and human rights protections. Angola's constitution emulates the USSR's constitution through party-state fusion, democratic centralism, and single-party rule. Tanzania's constitution reflects neither superpower, instead defined by principles of Ujamaa and self-reliance. Aligned states scored higher, demonstrating constitutional similarities, whereas non-aligned Tanzania's score of zero reflects independence. Our research demonstrates how Cold War alignment shaped constitutional design in Africa and contributed to institutional constraints that influence current governance. These findings highlight how foreign aid produces dependency and institutional fragility. This offers important lessons for policymaking, empowering lawmakers with the knowledge to create foreign aid policies that prioritize domestic investment and break reliance on foreign powers.

Uptake of Polystyrene Microplastics by Bone Marrow-Derived Macrophages
Student Presenter(s): Eldeeb Ahmed, Senior (Biology)
Faculty Mentor(s): Zhenquan Jia (Biology)

Microplastics (MPs) are pervasive environmental pollutants that have recently been detected in human blood and tissues, raising concerns about their potential contribution to atherosclerosis. Macrophages play a central role in the development of atherosclerosis; however, their capacity to internalize MPs and the mechanisms underlying this process remain unclear. This study investigated the uptake of polystyrene microplastics by bone marrow–derived macrophages (BMDMs). BMDMs were exposed to varying concentrations (0–100 μg/mL) of fluorescently labeled polystyrene microplastics for 24 hours. Microplastic uptake was quantified using flow cytometry and a fluorescence microplate reader. To elucidate the uptake mechanisms, BMDMs were pretreated with pharmacological inhibitors targeting clathrin-mediated endocytosis, caveolae-dependent uptake, and macropinocytosis. Preliminary results demonstrate dose-dependent internalization of microplastics. Inhibitor studies indicate that active endocytic pathways facilitate microplastic entry into macrophages. Together, these findings provide mechanistic insight into how environmental microplastics interact with macrophages and may modulate inflammatory processes relevant to cardiovascular disease risk.

In God's Name: Christianity's Role in Shaping American Society
Student Presenter(s): Bashar Al-Janabi, Senior (Political Science)
Faculty Mentor(s): Michele Lemonius (Department of Peace and Conflict Studies)

This research examines how Christianity has normalized and established patriarchal structures in the United States. Motivated by ongoing gender inequity and the cultural power of religion, the research hypothesizes that Christianity's influence helped justify male authority in U.S. culture and legal systems by using scriptural interpretation and religious authority to portray it as divinely ordained. Using a qualitative approach, I analyzed 20 academic sources and conducted 11 interviews with churchgoers. Three dominant patterns emerged: (1) Christianity's reinforcement of male authority as divine order, (2) its institutional influence in areas such as government chaplaincies and courtroom rituals, and (3) its disproportionate burden on marginalized communities. Key scholarship, including Mary Daly's feminist theology, Malory Nye's work on the intersectionality of Christianity, and legal analysis from the Harvard Law Review, provided insight into how patriarchy, culture, and governance intersect in sustaining these systems. The findings suggest that without critical theological reflection and policy reform, patriarchal structures will remain embedded in American society. Future research should broaden the scope to include more perspectives from churchgoers and other younger generations to understand how these structures are being navigated and contested.

Investigating the Water, Energy, Food Nexus in Chatham County, North Carolina
Student Presenter(s): Julie Amani, Senior (Anthropology)
Faculty Mentor(s): Cassandra Workman (Anthropology)

Abstract: Concurrent water, energy, and food insecurities are under-investigated in high-income countries. Scientific research has outlined their interdependence on production scales, but there is little research that examines peoples' awareness of these connections and the lived reality of intersecting resource insecurities across household and multi-scalar contexts. Utilizing semi-structured interviews and a concept mapping activity, this study examines urban cluster and rural Chatham County residents' experiences in meeting their water, energy and food needs and explores their understanding of the policies and systems that govern this nexus on a broader scale. Findings show varied degrees of security amongst water, food and energy attributed to current political and structural factors as well as local access to food resources. Results also suggest connections between tap water source and perceived resource security, as well as awareness of water, energy and food interconnectivity on local and larger scales. Well water users tended to have greater perceived security and systems literacy than municipal water users. Findings add to research about resource insecurities in North Carolina and call for more study regarding knowledge and proximity of water-energy-food systems and policy.

When "Non-Supportive" Becomes Protective: Rethinking Emotion Socialization in Cultural Context
Student Presenter(s): Jayla Bailey, Senior (Psychology)
Faculty Mentor(s): Susan Keane (Psychology), Phil Lamb (Psychology)

Children's social–emotional development is strongly influenced by parent emotion socialization (ES) practices, particularly parental responses to children's negative emotions. Supportive responses are generally linked to positive adjustment, whereas non-supportive responses are associated with poorer outcomes; however, most evidence is based on European American families. Emerging research suggests that ES practices may function differently across racial groups, with African American families sometimes using minimization or emotional suppression to protect children from racial bias. The current study examined whether race moderates the relationship between maternal ES practices and child internalizing and externalizing outcomes. Data were drawn from a community-based study of 233 children (53% female; 30% African American). Mothers reported supportive, non-supportive, and minimizing responses to their 5-year-old children's negative emotions, and kindergarten teachers reported children's internalizing and externalizing problems. Twelve exploratory OLS regression analyses tested moderation by child race. Significant race-based moderation emerged for non-supportive and minimizing reactions predicting internalizing problems. Higher levels of non-supportive and minimizing responses predicted lower internalizing among African American children but were unrelated to internalizing among White children. These findings suggest that parenting practices traditionally viewed as maladaptive may be contextually adaptive for African American families.

Fatal Flaw? Being A Woman! Analyzing Women's Positionality in Athenian Tragedy as It Affects Their Fate.
Student Presenter(s): Cecil Barlow, Senior (Classical Studies)
Faculty Mentor(s): Michiel Van-Veldhuizen (Classical Studies)

Within Athenian tragedy, signs pertaining to fate are accessed and understood by women in ways that imply that they have an intrinsic natural connection to fate that is not accessible to those surrounding them, specifically men. This is seen in Clytemnestra's knowledge of the beacon-fire signaling the fall of Troy, and Hecuba knowing that her son Polydoros was dead from her 'black-winged dream'. The connection between women's positionality, their apparent knowledge of, and the negative consequences of fate they face will be illuminated through analyses of three parallel pairings of six women: Clytemnestra and Deianeira, Hecuba and Polyxena, & Cassandra and Helen. Through these women's interactions with signs otherwise unseen to other agents within their stories, direct binaries—male versus female, agency versus passivity, learned expectation versus concrete reality—are all drawn. "Existing" in this world, these women experience the push and pull of these binaries (Foley, 2001) and their lives and choices are therefore shaped by them. These binaries and their effects on women's lives allow them to "see" signposts connected to their fate as being such. Furthermore, I will be highlighting specific aspects of these women's positionality and how it affects their overall fate in Athenian tragedy.

Using Experimental Archaeology to Study Ancient Roman Coin Counterfeiting
Student Presenter(s): Keagan Buckley, Senior (Classical Studies)
Faculty Mentor(s): Robyn Le Blanc (Classical Studies)

Counterfeiting was a persistent feature of the ancient Roman economy, but very few aspects of this production method have been studied. By examining archaeological site excavations in Roman Britain, archaeologists have found many clay coin casting molds, particularly for counterfeit silver-plated bronze coins. It is assumed that all these molds were made for one use only, i.e. after the coin was created, they were thrown away. However, this research project investigates if Roman ceramic counterfeit molds were reused. This project combines archaeological methodology with experimental archaeology. Published and museum-held molds were examined for evidence of reuse, such as repairs, multiple metal residues, or repeated thermal exposure. We recreated experimental clay molds based on examples acquired from Lingwell Gate in Britain and cast bronze coins in those molds, to determine their potential for reuse.

Through the Looking Glass: Symbol, Function, and Form in Ancient Animal-Shaped Vessels
Student Presenter(s): Keagen Buckley, Senior (Classical Studies)
Faculty Mentor(s): Maura Heyn (Classical Studies)

This project focused on a 3rd century CE Roman glass flask designed to resemble a dormouse in the Metropolitan Museum of Art to better understand the function and significance of zoomorphic vessels in ancient Roman culture. This flask includes animal sculpture and snake thread decoration; the latter being considered a rare and difficult decorative quality of glassmaking. A close visual examination and photographic comparison of other examples of Roman glassware were done in order to gain an understanding of how the glassmakers combined decorations and structural elements together into the same design. In addition, the creation of the flask and its animal symbolism was further examined to determine if the vessel was used for the purpose of storing perfume or kohl, if it was simply a luxury item for display or if it was a funerary object, and how it might have represented status and identity through its shape within the context of Roman daily life.

Dietary Plasticity of Co-occurring Shrew Species Living in Seasonal Environments
Student Presenter(s): Olivia Burg, Senior (Biology)
Faculty Mentor(s): Bryan McLean (Biology)

Shrews in the genus Sorex are among the smallest mammals and maintain extremely high metabolisms, necessitating near-constant foraging and year-round activity. However, we do not know how communities of shrews co-exist in resource-limited seasons (particularly winter). The co-occurring shrew species Sorex fumeus and S. cinereus are presumed to have similar diets throughout the year in the Southern Appalachian Mountains. Our goal in this study was to study the interplay between co-existing species and the biotic factors important to their survival, therefore enhancing our ability to conserve their populations and ecosystem integrity. Using stable isotope analysis of carbon and nitrogen in liver tissue from wild-caught shrew specimens, we characterized the diet of both species over an entire year. Preparation of samples involved freeze-drying the tissue, grinding it into a powder and performing lipid extraction via a chloroform-methanol mixture, and analysis using mass spectrometry. We analyzed the trophic level of the shrews from each season, used ANOVAs to compare results, and tested the hypothesis that diets of both species change to include at least some plant-based material in winter, but that niche separation is maintained by S. fumeus having a less specialized diet than S. cinereus, based on preliminary data.

CO2 Capture via N-Heterocyclic Carbenes
Student Presenter(s): Reina Bustamante, Sophomore (Biochemistry)
Faculty Mentor(s): Daniel Nascimento (Chemistry & Biochemistry)

Sustainability is the central challenge facing society and modern chemistry today. For society to survive and thrive in the 21st century, chemists must work outside of conventional bounds to expeditiously identify efficient catalytic processes for the capture and transformation of abundant feedstocks. With pressing concerns of global pollution from anthropomorphic CO2 liberation, identification of sustainable and practical means of utilizing these common feedstocks for generating desirable chemicals is imperative. A current technology deployed at scale is the so-called "amine scrubbing", in which amines chemically react with CO_2 to form carbamates. The captured CO_2 can then be released by heating the carbamate to approximately 150 °C under reduced pressure for several hours. Although this process is mature and effective, its high energy demand limits broader applications. Consequently, there is a strong incentive to develop milder and more energy-efficient CO_2 capture strategies. N-heterocyclic carbenes have emerged as promising alternatives to amine-based reagents for the reversible capture and release of CO_2. These species exhibit strong affinity toward CO_2, forming zwitterionic carbene–CO_2 adducts. We will discuss the synthetic route to classic "Arduengo" carbenes, their ability to bind CO2 and the reversibility of the carbene-CO2 bond, which will be investigated via infrared spectroscopy.

The Orange Hotel: A Green Book Revival
Student Presenter(s): Gemma Carioti, Senior (Interior Architecture), Maya Monteverde, Senior (Interior Architecture)
Faculty Mentor(s): Asha Kutty (Interior Architecture)

Green Book sites were vital resources for Black travelers during segregation, identifying safe hotels and essential destinations within one trusted guide. These places transform ordinary stops into spaces of safety and belonging — One being the Orange Hotel in Wilson, North Carolina. This project reimagines the historic Orange Hotel as a contemporary cultural destination honoring African American resilience, creativity, and community life. Developed in collaboration with community partner Natalie Miller, owner of the Magnolia House in Greensboro, it represents the second proposal in a design series dedicated to revitalizing Green Book sites across North Carolina During segregation, Green Book hotels offered refuge within an unequal landscape. This design preserves memory through interior architecture while shaping future narratives rooted in cultural pride. Inspiration sparks from the Harlem Renaissance, gathering its cultural spirit and artistic icons to deepen the spatial story, while subtle Art Deco elements reflect the eras of creative influence through geometry, pattern, and modern expression. The work also honors the Black women proprietors who sustained the Orange Hotel, recognizing their entrepreneurship as an act of resistance. Archival storytelling and local history are embedded into the material language, positioning heritage as a foundation for a more equitable future.

Mind in Motion: How Mindfulness-Enhanced Physical Activity Improves Children's Inhibitory Control
Student Presenter(s): Alundra Carter, Post-Bac (Kinesiology), Kazimieras Morrison, Freshman (Human Health Sciences)
Faculty Mentor(s): Eric Drollette (Kinesiology)

A growing body of research affirms that a single bout of physical activity (PA) improves cognition in children. Emerging evidence further suggests that mindfulness PA (MPA) may produce additive cognitive benefits. However, these effects remain largely unexplored in children, which may be crucial for childhood development. This study investigated the effects of a short (10-min) single bout of PA and MPA on inhibitory control in children. Thirty-six preadolescent children (9-12 years) engaged in 15 minutes of training sessions (mindfulness or health education) prior to completing 10 minutes of a single bout of PA, MPA, and seated rest on different days. Inhibitory control was measured using a flanker task, including response accuracy and reaction time (RT) for congruent and incongruent trials, assessed before and after each condition. Results revealed faster RT for both congruent and incongruent trials after MPA. In addition, response accuracy was significantly reduced for congruent trials following the rest of the session. These results indicate that MPA, a combination of physical and mental training, offers synergistic effects on inhibitory control in children. Incorporating mindfulness elements into school-based PA may therefore represent a promising strategy for supporting cognitive performance and promoting healthy development outcomes during childhood.

How It's Made: The Craftsmanship and Daily Use of the Etruscan Bronze Mirror
Student Presenter(s): Victoria Charles, Senior (Liberal & Interdisciplinary Studies)
Faculty Mentor(s): Robyn Le Blanc (Classical Studies)

While the Etruscan culture did not leave behind large marble monuments or colossal amphitheaters, the remains of these civilizations are studied through their large tumulus tombs and grave sites filled with goods often of exquisite craftsmanship. Among the most important artifacts found in Etruscan graves are bronze mirrors. This project investigates the Etruscan bronze mirror using experimental archaeology to better understand how these objects functioned in daily life beyond their symbolic or funerary contexts. By recreating the mirrors using similar tools and processes such as a lost-wax casting method, this study examines the physical labor, craftsmanship, and technological choices involved in their production. These mirror replicas will then serve as the basis for a series of tests including reflection quality, magnification, weight, lighting conditions, and cleanliness which aim to illustrate how an Etruscan person might have used and experienced a bronze mirror as a household object. Because scholarship has mostly focused on mirror iconography and imagery, this project expands the methodological conversation by emphasizing material practice and user experience. Findings will contribute to broader discussions of Etruscan technology, daily life, and engagement with the bronze mirror.

Habitual Caffeine Use Moderates the Association of Subclinical Depression Symptoms with Cortisol Reactivity to Lab-Based Stress
Student Presenter(s): Ava Cherry, Senior (Psychology)
Faculty Mentor(s): Suzanne Vrshek-Schallhorn (Psychology)

Habitual caffeine use is linked to lower depression risk; the hypothalamic–pituitary–adrenal axis is implicated. We previously demonstrated caffeine use weakens the relationship between trait rumination and cortisol reactivity; here we extend this to subclinical depression symptoms. We predict a curvilinear association of symptoms with cortisol reactivity as lab-stressor condition intensifies, with caffeine users showing a weaker depression–cortisol relation. Participants (N=127) completed self-report measures of depression and habitual caffeine use and completed one of three conditions in a modified Trier Social Stress Test (TSST)—control, intermediate, or explicit negative evaluative stress. Regression tested caffeine, depression, and condition as predictors of cortisol's Area Under the Curve with respect to Increase (AUCi), including curvilinear effects of condition. We observed the expected significant Depression x Caffeine Use x Condition2 effect ($t=2.70$, $p=.008$). Caffeine non-users showed a significant curvilinear effect of condition on the depression-cortisol reactivity relationship ($t=-2.18$, $p=.032$), but caffeine users did not ($t=1.65$, $p=.103$). Results suggest caffeine use is associated with mitigated negative effects of subclinical depression on cortisol reactivity. Overall, results provide preliminary evidence that cortisol functioning may help explain caffeine's protective effects against depression. Future research should examine caffeine dose and timing.

Implementing Art Therapy Practices into the K-12 Classroom
Student Presenter(s): Emma Church, Senior (Art Education)
Faculty Mentor(s): Maria Lim (K-12 Art Education)

Integrating art therapy practices into the K-12 art classroom to promote emotional awareness, mindfulness, and SEL competency can be a challenge, and this literature review aims to provide solutions to those challenges. The hurdles for this integration can be, but are not limited to, ethical and legal, time management, and student engagement. The analytical methodology for this paper involved gathering around ten total scholarly sources relating to this topic and then using a system of coding and decoding to create overarching themes that were found throughout those articles to deduce common solutions to the question and topic at hand. While collaboration between art educators and art therapists, as well as utilizing the art-as-therapy approach, can be useful solutions for some art educators, this paper also focuses on flow theory and flow activities, as well as problem-solving art, and how to promote authentic artistic engagement within the classroom for therapeutic effects.

Dietary Saturated Fat-Induced Microglial Activation in Dopamine-Rich Brain Regions: Implications for Inflammation and Satiety Regulation
Student Presenter(s): Joshua Collins, Senior (Biology)
Faculty Mentor(s): Steve Fordahl (Nutrition)

Obesity is a growing global crisis associated with metabolic dysfunction and linked to reports of impaired dopamine signaling. Diets high in saturated fat may disrupt dopamine-associated reward circuitry through neuroinflammatory mechanisms, yet it remains unclear whether increasing saturated fat directly promotes microglial activation within dopamine-rich regions such as the nucleus accumbens (NAc) shell. This study examines whether elevated saturated fat intake enhances microglial activation and its spatial relationship to dopamine terminals in the NAc shell. Mice were fed a control-fat (10%), moderate-fat (30%), or high-saturated-fat (60%) diets for six weeks. Brains were extracted, coronally sectioned, and immunolabeled for tyrosine hydroxylase (TH) to identify dopamine terminals, CD11b to identify microglia, and Iba1, a protein marker of microglial activation. Microglial density and Iba1/CD11b colocalization were quantified by quantifying antibody fluorescence using ImageJ. We hypothesized that high-saturated-fat exposure would increase Iba1 microglial density and also increase Iba1/CD11b colocalization compared to low-fat controls, along with greater spatial overlap between activated microglia and TH-positive dopamine terminals. Our preliminary findings indicate a high-fat diet-dependent modulation of microglial and neuroimmune activation within the NAc shell while preserving dopamine terminal density.

The Evolution of Myth in the Ancient World
Student Presenter(s): Austin Collum, Senior (Classical Studies)
Faculty Mentor(s): Michiel Van-Veldhuizen (Classical Studies)

When we think of myth, we are probably thinking of a particular version of the myth that we grew up with or heard, a "canon" version. But in reality, there is no such thing. Myth in the ancient world was a vibrant and diverse field, where multiple different authors tackled these stories in their own unique ways, with sometimes seemingly minor details affecting how we, and the audience of the time, interpreting the work. My interest stems from these changes. How they happened, why they happened, and what the intended purpose was. The aim is to not only better understand these stories within their own context, but to also examine their reception in the modern world and how we choose to interpret and to write our own stories today.

Associations among childhood surgency and adolescent risk health behaviors: The moderating influence of socioemotional adjustment
Student Presenter(s): Anthony Congdon, Post-Bac (Biochemistry)
Faculty Mentor(s): Jessica Dollar (Psychology)

Identification of early-occurring predictors of adolescent engagement in risky health behaviors is essential. Temperamental surgency, characterized by high activity, approach, positivity, and low shyness, is linked with risk-taking behaviors. Questions remain, however, about how surgency predicts later risky psychological and physical health behaviors and what moderating factors may ameliorate risk. This study fills this gap by examining the moderating influence of socioemotional competence on the longitudinal associations between childhood temperamental surgency and adolescent psychological and physical health risk behaviors in adolescence. Children participated in a longitudinal study (N=447; 58% female, 60% Caucasian). At age 5, parents reported on children's surgency. At ages 15 and 17, adolescents reported risk of taking, sleep, diet quality, and physical inactivity. Preliminary results revealed that highly surgent children at age 5 are more likely to engage in risk-taking behaviors (e.g., violence, substance use; $r=.13$, $p<.05$), have friends who engage in risky behaviors ($r=.15$, $p<.05$), have worse food-related choices ($r=.21$, $p<.05$), and poorer sleep ($r=.19$, $p<.01$) at age 17. Future analyses will examine childhood self-regulation and peer relationships as moderating these associations. This study will help identify which risky health behaviors surgent children are likely to engage in and important entry points for intervention efforts.

Ancient Israeli Foodways
Student Presenter(s): Kayla Cooper, Senior (Anthropology)
Faculty Mentor(s): Charles Egeland (Anthropology)

Understanding how foodways shape and reflect identity is a valuable means of gaining insight into the daily lives of past peoples. Approached from a zooarchaeological perspective, analyzing foodways can provide insight into potential ethnic markers, interactions between ancient people, and past environments. The goal of our project is to analyze Crusader-era faunal remains at Caesarea Maritima(Israel) to investigate foodways and their relationship to ethnic interaction among Jewish, Muslim, and Christian communities. Building on the 2023 season of the Coastal Caesarea Archaeological Project (CCAP), bones were identified to their respective taxa and examined for taphonomic damage, including butchery patterns, burning, and other evidence of processing and consumption. Preliminary analysis suggests patterned differences in species representation and carcass processing that may reflect distinct culinary traditions and cultural practices within Crusader-period Caesarea. By reconstructing foodways from material remains, this study contributes to broader discussions of reconstructing ancient foodways and ethnic identity.

Laboratory Scale-up of Fungal Secondary Metabolite, Wheldone, via Co-culturing.
Student Presenter(s): Caitlyn Costello, Sophomore (Biochemistry), Jhase Lynear, Junior (Biology)
Faculty Mentor(s): Huzefa Raja (Chemistry & Biochemistry), Nicholas Oberlies, (Chemistry & Biochemistry)

Co-culturing fungi is crucial for studying microbial interactions, diversifying metabolite production, and discovering new bioactive secondary metabolites. Wheldone, a secondary metabolite produced by co-culturing Aspergillus fischeri and Xylaria flabelliformis, demonstrates cytotoxic effects against melanoma, ovarian, and breast cancer cell lines. To advance pharmacological testing and obtain new analogues, a large yield of wheldone is necessary for further studies. This study aimed to scale up the production of wheldone over the course of a year. Aspergillus fischeri and X. flabelliformis were transferred to a yeast extract soy peptone dextrose liquid medium in shaking incubators. After five to seven days, the cultures were transferred to sterilized oatmeal-based solid media and incubated for three weeks. The chemistry team then isolated and purified wheldone from the solid-state fermentation cultures. In 2025, a total 210 Erlenmeyer flasks (250 ml each) of the co-culture were grown, resulting in 450 mg of wheldone. In addition, to wheldone, our team has isolated four new analogues of wheldone and their structural characterization is ongoing. Access to wheldone through this project will assist our lab's progress toward further pharmacological studies. Wheldone has the potential to contribute to innovative drug discovery, particularly in advancing cancer treatments.

CVPA Pollinator Garden: Polishing Polly
Student Presenter(s): Mallory Cox-Shreffler, Senior (Art), Aminah Coppage, Senior (Art)
Faculty Mentor(s): Tara Webb (Theater), Kaira Wagoner (Biology)

Aminah and Mallory have been bringing Polly the CVPA Pollinator Garden back in blossom, planting dozens of native pollinator plants, keeping the weeds out, and introducing a certified wildlife habitat to Peabody Park. Both art students had big plans of how to incorporate their mediums into the area, Aminah is creating a mural using animal/insect friendly paints that will hold Mallory's ceramic bird bath that was made with natural clay found in Peabody. With help from Professors Tara Webb, Kaira Wagoner, and Leah Sobsey, the students were able to transform the once quaint space to almost double the size, get a wildlife habitat certification, contain over 100 plants, and meet the bee campus USA requirements!

Understanding Overrepresentation: Examining Racial Disproportionality in Special Education Pre Service Teachers
Student Presenter(s): Jordan Curbeam, Senior (Human Development & Family Studies), Andrea Dela Cruz Pelen, Junior (Elementary Education)
Faculty Mentor(s): Ebony Lassiter (Education)

Student researchers contributed to a systematic literature review by supporting key phases of the review process. Students engaged in article screening using predetermined inclusion and exclusion criteria, followed by full-text evaluations to assess relevance and quality. Their work helped narrow a large initial pool of sources to the final set of included studies. Through this experience, students gained hands-on skills in evidence-based research methods.

Exploring Elephantopus Species as a Source of Antimicrobial Compounds
Student Presenter(s): Lillian Douglass, Junior (Chemistry)
Faculty Mentor(s): Nadja Cech (Chemistry & Biochemistry)

Bacterial infections remain a major global health concern, driving continued interest in natural products as potential sources of new antibiotic leads. This project investigated two understudied North Carolina species, Elephantopus tomentosus and Elephantopus carolinianus, with the goal of identifying novel metabolites and evaluating their antimicrobial properties. Plant material was collected in the Guilford woods and subjected to solvent extraction and partitioning to separate chemical compounds of interest from their matrixes. Resulting partitions were tested in microbial assays against Staphlococcus aureus and analyzed using LCMS to refine samples for further study. Because E. carolinianus has been chemically underexplored, the phytochemical investigation focused on this species rather than E. tomentosus. Active and chemically complex partitions were fractionated using flash chromatography, followed by HPLC purification to obtain individual compounds. Structural elucidation was then performed using proton and carbon NMR spectroscopy to determine the unique structures of isolated compounds. Although antimicrobial activity was limited, potentially unreported metabolites were detected and are being isolated and characterized. These findings expand the phytochemical understanding of E. carolinianus and provide a foundation for future evaluation of their biological properties. This groundwork also paves the way for a metabolomics comparison of E. carolinianus and E. tomentosus in future studies.

Rituals and Ceramics: Pottery Analysis and the Creation of Minoan Social Identities in the Late Bronze Age (1675-1430 B.C.E)
Student Presenter(s): Elias Downing, Post-Bac (Liberal and Interdisciplinary Studies)
Faculty Mentor(s): Georgios Doudalis (Ancient Mediterranean Studies and Archaeology)

Feasting was an important part of ritual practice in the Late Bronze Age because of its relation to social and economic activities within communities. Recent publications indicate that Minoan ritual activity, both public and private, was a key factor in building communal and political bonds between the social elite and the people, while codifying social differentiation. Through the collection and analysis of published, and unpublished, material from Mochlos, Palaikastro, Gournia, Knossos, and Juktas, this project looks at a wide array of settlement types across Crete in hopes of understanding local and regional expressions of identity in ritual practice. By analyzing ceramic consumption patterns in these ritual spaces, this project aims to compare social dynamics on a local and regional scale with a focus on access to space and material.

The Burden of Being the "Only One": Hyper-Visibility and Invisibility in the Career Trajectories of Black Women Physician Assistants with Doctoral Degrees
Student Presenter(s): Daijah Elliot, Senior (Public Health Education)
Faculty Mentor(s): Andrea Lewis (Public Health Education)

Black women are critically underrepresented in the Physician Assistant (PA) profession, comprising less than 4% of PAs nationally. Those who earn doctoral degrees often occupy leadership roles, yet their professional experiences are largely undocumented. This qualitative study explores the career trajectories of 15 Black women PAs with doctoral degrees to illuminate their educational and professional journeys through semi-structured interviews. Data were analyzed using Braun and Clarke's reflexive thematic analysis. This presentation focuses on one of five themes: The Burden of Hyper-Visibility and the "Only One" Experience. This theme captures the compounded- psychological and professional weight carried by participants as one of few Black women in their professional spaces. All participants described a juxtaposed experience of hyper-visibility, where they were highly scrutinized, and invisibility, where their expertise was dismissed. This "intersectional identity burden" was characterized by tokenism and immense representational pressure. These findings suggest that institutional structures in healthcare education and practice perpetuate conditions that marginalize Black women PAs. The dual experience of being simultaneously watched and ignored creates a unique strain with profound implications for career advancement and retention. Understanding this dynamic is critical for developing interventions to foster more equitable and supportive environments for Black women.

Development of Wire-Grid Concave Polarizers for a Confocal Fabry-Pérot Cavity
Student Presenter(s): Himari Eriguchi, Junior (Chemistry)
Faculty Mentor(s): Liam Duffy (Chemistry & Biochemistry)

Custom wire-Grid concave polarizers were first fabricated in Dr. Liam Duffy 's lab to enable a confocal Fabry-Perot cavity for spectroscopy in the THz / sub-THz region. Spectroscopic sensitivity is limited in this frequency range due to the lack of strong sources and highly sensitive detectors. By using a cavity, the intensity of the radiation and the measurement sensitivity can be dramatically increased. However, we have another limitation in making cavities in the THz region, which is the lack of high-reflectivity, partially transmissive concave dichroic mirrors at these wavelengths. To support ongoing cavity development, a reproducible, step-by-step process was developed to replicate the prior wire-grid polarizers after previous students did not leave a reproducible protocol. The fabrication process uses vacuum-assisted adhesion of photoresist film, and a lithographic technique mainly used in printed circuit board fabrication, enabling 200um wire resolution. After extensive experimentation, this work determined a robust reproducible method for producing concave wire-grid polarizers and supports future experiments using these polarizers to observe polaritons in the THz / sub-THz region with gas-phase molecules. A video was also created to show the step-by-step process.

Exploring the Impact of the Five Core Social Emotional Learning Competencies in K-12 Art Classrooms
Student Presenter(s): Bella Estrada, Senior (Art Education)
Faculty Mentor(s): Maria Lim (Art Education), Sunny Spillane (Art Education)

This study examines how integrating SEL in art classrooms affects K-12 students' development in the five core SEL competencies. Using the Thematic Analysis Method, this study analyzes the benefits and challenges for students and teachers brought by SEL. The research shows success in student productivity, mental health, and peer relationships. There is also evidence of teacher stress reduction, better student-teacher relationships, and lower job anxiety and depression. By exploring the combination of SEL principles and art education, the study seeks to determine how much more valuable this approach is for student growth. Incorporating SEL into curricula not only improves student development but also supports educators, contributing to a more balanced educational experience. Incorporating SEL into art education not only enhances students' social-emotional skills but also creates a supportive environment for teachers. These benefits highlight the potential of SEL pedagogy to contribute to a more balanced educational experience and foster a more empathetic future generation.

Dimensional Perception across Acculturation in the US
Student Presenter(s): Claudia Fader, Junior (Psychology)
Faculty Mentor(s): Frances Lobo (Psychology), Gabriela Stein (Psychology)

It is known that certain factors influence the acculturation of immigrant groups in the US. According to Stein et al., those factors are the language barrier, anxiety over new challenges ahead, generational gaps, and experiences of ethnic-racial discrimination. The purpose of this study is to find out if Asian and Latinx parents perceived open communication with their child, ethnic-racial identity, and experience with ethnic racial socialization and discrimination in their lifetime are associated with their level of acculturation. For this study, 245 primarily first-generation immigrant parents (97 Asian and 148 Latinx; Mage = 41.82 years, range = 29-56 years) reported on their levels of ethnic-racial identity, exposure to discrimination, lifetime exposure to socialization about their own race and ethnicity, their ability to communicate openly with their children, and their acculturation.
For Asian families, higher lifetime experience of RES and open communication with their child were associated with higher acculturation. For Latinx families, higher discrimination experiences (being labeled as a foreigner) were associated with higher acculturation, whereas being a mother or being older was associated with lower acculturation. Research is needed on factors that influence the acculturation process in order to provide support and help facilitate this process for immigrant families.

Functional Characterization of the TGW6 Gene for Grain Size Regulation in Eragrostis Tef
Student Presenter(s): Amber Fairchild, Senior (Biology)
Faculty Mentor(s): AyaLew Ligaba-Osena (Biology)

Tef (Eragrostis tef) is a drought-tolerant C_4 cereal central to food security in the Horn of Africa. In Ethiopia, Tef is grown by approximately 6.6 million producers and occupies over one-fifth of arable land. Despite its agronomic importance, tef produces the smallest grain among domesticated cereals—a trait that hampers yield and mechanized processing. As an orphan crop, there is little research on the genetic determinants of grain size regulation. Drawing on insights from rice, where the TGW6 gene acts as a negative regulator of grain size, this study contributes to the functional characterization of TGW6 in tef through transgenic overexpression. Using Agrobacterium-mediated transformation with vectors carrying TGW6 under a constitutive maize promoter, alongside regeneration-enhancing genes maize BABY BOOM and WUSCHEL2, T_1 transgenic lines were generated and have yielded seeds for preliminary phenotypic assessment. Flag leaf samples have been harvested for DNA extraction to verify successful transformation and proper excision of the regeneration-enhancing genes, which may interfere with normal plant growth and development. T_2 lines will be generated for evaluation of grain morphology and associated physiological traits. The findings will provide mechanistic insights into grain development in under-researched cereals and provide a foundation to improve yield potential in climate-resilient crops.

Recruitment of CMP7 in Schizosaccharomyces pombe when treated with 3,3'-Diindolylmethane (DIM)
Student Presenter(s): Alayna Fawson, Junior (Biology)
Faculty Mentor(s): Alayna Fawson (Biology)

In Schizosaccharomyces pombe, a fission yeast model organism, DIM treatment appears to disrupt the nuclear envelope. 3,3′-Diindolylmethane (DIM) is a compound derived from cruciferous vegetables and is being investigated for its anti-cancer properties. However, the mechanisms of nuclear envelope repair following DIM-induced damage in S. pombe have yet to be explored. In this study, we aimed to determine whether the ESCRT-III protein CMP7, which aids in nuclear envelope repair, is recruited to sites of DIM-induced nuclear envelope disruption. Using fluorescence microscopy, we observed that upon DIM treatment, CMP7 relocalizes to discrete foci at the nuclear envelope.These findings suggest that CMP7 is recruited to sites of nuclear envelope damage and may play a role in the repair process following DIM-induced disruption. Understanding this response may provide insight into the consequences of DIM exposure as well as mechanisms of nuclear envelope repair.

Synthesis and Reactivity of Photocatalysts for Alkane Oxidation
Student Presenter(s): Kavion Foster, Sophomore (Biochemistry)
Faculty Mentor(s): Daniel Nascimento (Chemistry & Biochemistry)

Modern society relies heavily on crude oil for the production of everyday goods. However, this dependence is unsustainable and has resulted in significant environmental consequences, including ecosystem degradation, contamination of water resources, and the release of greenhouse gases. To reduce reliance on crude oil as a chemical feedstock, methane has emerged as an attractive alternative carbon synthon for the production of value-added chemicals. Methane is particularly appealing due to its abundant daily extraction and the well-established infrastructure for its transport and distribution. Despite these advantages, existing methods for methane conversion to valuable products typically require harsh reaction conditions and multistep processes, limiting their sustainability and economic viability. Our approach to methane activation leverages photochemical strategies to enable milder, more efficient, and environmentally responsible transformations. Specifically, we will design and synthesize a series of transition-metal complexes that function as chromophores. Tailored ancillary ligands will be prepared and coordinated to the metal centers to generate photocatalysts, which will be evaluated in alkane oxidation reactions. Liquid alkanes will serve as model substrates for reaction optimization before extending the methodology to methane oxidation.

Optimization of the Eupenifeldin Succinate Reaction
Student Presenter(s): Kaitlyn Fox, Senior (Biochemistry)
Faculty Mentor(s): Nicholas Oberlies (Chemistry & Biochemistry)

Eupenifeldin is a fungal secondary metabolite with strong cytotoxic activity against numerous cancer cell types. However, the material has been shown to have low solubility in in vivo studies against cancer cell lines, limiting its translational potential. To combat this challenge, the Oberlies group conducted a study to determine which analogues would improve the compound's solubility. Of the 29 analogues synthesized and evaluated, the eupenifeldin succinate reaction was chosen as the derivative with the greatest improvement in solubility while maintaining cytotoxic activity. In this study, we are interested in scaling up the reaction for in vivo studies and in analyzing its stability in different vehicles. The reaction is completed through the selective esterification of the tropolone hydroxy groups, forming a mono-succinate derivative. Experimentally, eupenifeldin is treated with succinic anhydride under mild basic conditions containing pyridine and di-methyl amino pyridine. The organic layer containing our desired analogue is partitioned out using chloroform and a formic acid-water solution. The compound is structurally confirmed through nuclear magnetic resonance (NMR) analysis. Our current results confirm that the succinate derivative displays improved solubility and formulation compatibility. This study seeks to optimize and scale the eupenifeldin succinate reaction for future in vivo studies.

Pedagogical Framework Paper; Community Based Art Education
Student Presenter(s): Madison Freitag, Senior (Art Education)
Faculty Mentor(s): Maria Lim (Art)

The pedagogical framework I have chosen to research is community-based art education. “As explained in “Community-Based Art Education Across the Lifespan: Finding Common Ground”, community-based art education, or CBAE, involves providing opportunity for different communities to come together to participate in critical discourse surrounding resolving issues creatively (Harris, 2019).” I chose to pursue this pedagogical framework due to my desire to work within underserved rural communities as an art educator. In my personal experience, I have found that community and cultural connection to art can be an incredibly important bridge for reaching underserved students. If students can connect with each other, as well as their community, they are able to engage with learning and art-making more fully. Through CBAE, I aspire to expose students to new opportunities, cultures, and thinking that will support them as artists and learners as they grow.
Harris Lawton, P., 7001 Walker, M., 7001 Green, M., & Gude, O. (2019).

Examining Triggers of Trauma-Related Dissociation in Daily Life
Student Presenter(s): Camden Gaddy, Junior (Psychology)
Faculty Mentor(s): Blair Wisco (Psychology)

Introduction: Trauma-related dissociation is a distressing psychological response involving detachment from one’s body or surroundings during or after trauma exposure. It affects approximately 4% of the U.S. population and up to 20% of individuals with PTSD, yet moment-to-moment processes underlying dissociation remain poorly understood. Prior research suggests trauma cues, negative emotions, and situational stress may trigger dissociation; however, most studies rely on laboratory designs with limited ecological validity. Ecological momentary assessment (EMA) offers a novel approach to examining dissociation in daily life. The present study examines dissociation reactivity to trauma cues, negative emotions, and situational stress in trauma-exposed individuals. Method: Participants (n≈235) were trauma-exposed undergraduates recruited from the UNCG Psychology Research Pool. Over 14 days, participants completed up to five smartphone-based surveys per day assessing trauma cues, negative emotions (sadness, fear, anger), situational stress, and momentary dissociative symptoms using 7-point Likert scales. Multilevel modeling will analyze whether within-person increases in trauma cues (H1), negative emotion (H2), or situational stress (H3) predict greater-than average dissociation. Results: Data collection is complete. Analyses are ongoing, and findings will be presented at the Expo. Discussion: Findings are expected to clarify real-world triggers of dissociation and inform assessment and intervention efforts for trauma survivors.

Study of Amines as Bases to Direct the Aromatic Claisen Rearrangement
Student Presenter(s): Nolan Garci, Junior (Chemistry)
Faculty Mentor(s): Mitchell Croatt (Chemistry & Biochemistry)

The Claisen rearrangement is an instrumental carbon-carbon bond forming reaction used to produce distinct regioisomers from a parent molecule. This pericyclic reaction has proven crucial in the synthesis of various natural products and drug molecules in the pharmaceutical industry and beyond. In response to the high selectivity potential of the Claisen rearrangement that was discovered by the Croatt Group, an investigation was conducted. It is theorized that installing an internal amine base to a parent compound could influence the rearrangement to favor a specific regioisomer over its counterparts. To accomplish this undertaking, a multi-step pathway was pursued with the parent molecule, 7-allyloxy-1-tetralone, acting as a synthetic scaffold. All products throughout this pathway were analyzed using 1H and 13C nuclear magnetic resonance (NMR) and necessary purification of compounds was meticulously conducted through flash column chromatography. Efforts are still on-going to optimize the current pathway through experimenting with various solvents, alkylating agents, and conditions. Although, similar allyl ether analogues have been successfully synthesized and thermalized to facilitate the Claisen rearrangement. The resulting ratios of products in each experiment supported theories to the factors that influence regioselectivity of the Claisen rearrangement.

Preliminary Investigation of Marine Filamentous Fungus, Clavatospora bulbosa (G944) for Anticancer Activity
Student Presenter(s): George Gill, Senior (Chemistry)
Faculty Mentor(s): Nicholas Oberlies (Chemistry & Biochemistry), Huzefa Raja (Chemistry & Biochemistry)

Aquatic fungi are an important ecological group that are poorly investigated for natural products chemistry to find new treatment modalities. Our research group is interested in screening filamentous fungi in search for anticancer leads. Clavatospora bulbosa was isolated from submerged wood from a saltwater pond in Georgia, USA. It is a species of marine fungus within the family Halosphaeriaceae, Ascomycota commonly found in marine and brackish environments. As a quest for discovering anticancer drug leads from aquatic fungus, Clavatospora bulbosa (Strain G944) was grown on rice for 3 weeks and the culture was extracted using an organic solvent system. The extract was subjected to flash chromatography, and fractions were collected. Both the extracts and the fractions showed micromolar cytotoxicity against ovarian and breast cancer cell lines. Future studies will focus on growing large-scale fermentations of this fungal strain for extraction, isolation and structural characterization of isolated compounds using a set of spectroscopic and spectrometric techniques, and in vitro cytotoxic bioassays.

Computational prioritization of schizophrenia risk variants via integration of GWAS and open chromatin annotations
Student Presenter(s): Keesha Go, Junior (Computer Science)
Faculty Mentor(s): Sarah McClymont (Biology)

Schizophrenia is a genetic neuropsychiatric disorder characterized by psychosis, disorganized behavior, and cognitive impairment. Many common genetic variants have been associated with schizophrenia, and it is necessary to prioritize such variants for further study to better understand the causes and mechanisms of the condition. This project uses computational methods to intersect regions of accessible chromatin with genetic risk variants identified by genome-wide association studies (GWAS) to efficiently identify variants for functional follow-up. We downloaded the lead variants identified in a multi-ancestry schizophrenia GWAS, utilized analysis tool, LDproxy, to include variants in high linkage disequilibrium with those variants, and downloaded publicly-available ATAC-seq data from human iPSCs, neural stem cells, and differentiated neurons. From 313 lead variants, we found 100,512 variants in high linkage disequilibrium ($r^2>0.1$). Of these implicated variants, 3,390 overlap at least one accessible region in any assayed cell type and 1,133 uniquely overlap neural stem cell regions. This project has developed a pipeline for computationally prioritizing genetic risk variants and provides leads to future studies in testing whether these variants are causal to schizophrenia and how. Additional work with colocalization approaches, pathway analyses, and quantitative trait loci analysis may lead to further meaningful insights.

Reset Day
Student Presenter(s): Ainsley Goodyear, Junior (Drama), Caleb Van-Doornewaard, Junior (Drama)
Faculty Mentor(s): Mya Brown (Theater)

This scene is an excerpt from a larger work I've been working for about a year and a half. It explores the interaction of emotional distress and art. Unintentionally, the main character in the piece, Dylan, mirrored my personal distress while I was writing the play and adopted my coping mechanism of using art for catharsis and release through his own lens of the constant sculpting of clay. I'm intrigued by this device in theatrical literature as an actor and as an audience member for how it allows the actor/character to have a consistent action/objective and how it influences the other characters in the scene. I'm interested in exploring the staging of the scene and how much it is influenced by the real time manipulation of clay on a stool. The scene is shared between two siblings, Amara and Dylan, both home on their respective college winter breaks. Dylan has been in his room all day sculpting in the dark, and Amara has been tasked with getting him to stop.

Purification of the O-methyltransferase encoded by the spd7 gene from Pseudopithomyces chartarum involved in the Biosynthesis of Sporidesmin
Student Presenter(s): Jasmin Grillo, Senior (Biochemistry)
Faculty Mentor(s): Jason Reddick (Chemistry & Biochemistry)

Sporidesmin is a natural product produced by the fungus Pseudopithomyces chartarum, commonly found in the southern hemisphere, and is known to infect livestock. Although Sporidesmin's adverse impacts on livestock have been thoroughly investigated, the biosynthesis of Sporidesmin has remained unstudied other than the characterization of the 21 genes (spd) responsible for its biosynthesis. The spd7 gene is a homolog of O-methyltransferase that is hypothesized to be responsible for at least one of Sporidesmin's methyl groups. This project aims to test Spd7 O-methyltransferase's ability to methylate simple structures that mimic the complex intermediates of Sporidesmin's biosynthetic pathway. To achieve this, a synthetic spd7 plasmid was designed for optimal expression in E. coli. During testing, it was observed that the Spd7 protein was successfully expressed but precipitated as inclusion bodies, so maltose-binding protein (MBP) was added as a fusion to spd7 through Gibson Assembly. Currently, protein purification experiments are being optimized by adjusting environmental factors. Once the correct approach is identified, we will be able to study Spd7's enzymatic activity in vitro. These experiments will help explain one of the steps in the biosynthetic pathway of Sporidesmin and potentially add a new catalyst for the methylation of other unrelated, potentially medicinal compounds.

The Frenzied Propheteѕs: The Use of Bacchic Cognates to Describe Cassandra in Euripides
Student Presenter(s): Jamie Gross, Senior (Classical Studies)
Faculty Mentor(s): Michiel Van-Veldhuizen (Classical Studies)

Cassandra, the prophetic daughter of Hecuba, is a common character within the corpus of Athenian tragedy. In line 121 of Hecuba, Euripides uses the surprising noun βάκχη to describe Cassandra. According to the Cambridge Greek Lexicon, the most basic definition of βάκχη is a "female devotee of Bacchus, Bacchant." However, as an Apollonian priestess, Cassandra does not fit this description. Since Hecuba was first produced and performed sometime around 424 B.C.E., this is likely the earliest instance of Cassandra being described with a word of Bacchic origin. Euripides would continue to describe Cassandra with Bacchic cognates in the Hecuba and later plays. Why would Euripides repeatedly use Bacchic terms to describe Cassandra, a character associated with Apollo as both priestess and seer and therefore lacking an inherent association with Dionysus? I propose that Euripides used Bacchic-associated words to describe Cassandra because of Dionysus' association with madness and the Attic association of Dionysus as a foreign deity. I argue that Euripides employed Bacchic cognates to describe Cassandra, serving as adjectives of inspired divination that combine the qualities of μάντις, a seer or prophet, and μανία, madness or inspired frenzy.

The Migration of the Sybil: The Reasonings for the Relocation of the Sibylline Books
Student Presenter(s): Jamie Gross, Senior (Classical Studies)
Faculty Mentor(s): Jonathan Zarecki (Classical Studies)

The Sibylline books were a set of prophetic texts that were used to guide the Roman people throughout their history. During his time in power, the emperor Augustus relocated the Sibylline books in 12 B.C.E. to the newly constructed Temple of Apollo Palatinus from their previous location in the Temple of Jupiter Capitolinus on the Capitoline Hill. This paper will examine the purpose of Augustus' relocation of these sacred texts from the Temple of Jupiter Capitolinus to the Temple of Apollo Palatinus. I argue that Augustus relocated the Sibylline books as part of his propaganda strategy to promote stability throughout the Roman world. To achieve this, I will first examine the history of the Sibylline books and their impact on Roman stability, then how the stability of the Roman state was expressed in Augustan propaganda, and finally how the relocation of the Sibylline books contributed to Augustus' message of stability. For my examinations, I will utilize literary sources from authors such as Livy, Suetonius, and Dionysius of Halicarnassus, and Augustan period structures such as the Ara Pacis and the Temple of Apollo Palatinus.

Functional Characterization of a Non-Canonical BURP-Domain RiPP System in Eudicots
Student Presenter(s): Angie Guaglione, Senior (Biochemistry)
Faculty Mentor(s): Jonathan Chekan (Chemistry & Biochemistry)

Ribosomally synthesized and post-translationally modified peptides (RiPPs) are natural products that play important roles in plant defense and stress responses. Burpitides are a class of plant RiPPs characterized by aromatic cross-links installed by BURP-domain peptide cyclases (BPCs). In canonical burpitide systems, precursor peptides contain multiple leader–core repeats, allowing enzymatic modification and proteolytic processing to generate several small molecule products from a single transcript. Recent bioinformatic analysis in the Chekan laboratory identified a non-canonical precursor architecture distributed across eudicot species. These precursor peptides contain a single predicted core region rather than multiple repeats and display stress-associated expression patterns. This structural difference challenges the traditional model of burpitide small molecule biosynthesis. Through bioinformatic, comparative genomic, and biochemical approaches, this work evaluates whether BURP-domain enzymes in this system generate a discrete small molecule product or instead catalyze post-translational modification of a full-length protein substrate. Clarifying the functional outcome of this pathway will expand current understanding of BURP-domain enzymology and plant stress-response mechanisms.

Examining the Potential of Ecotype Specific Allelopathy of Longleaf Pine (Pinus Palustris) on Switchgrass (Panicum Virgatum)
Student Presenter(s): Liana Herrara-Sanchez, Senior (Biology)
Faculty Mentor(s): Sally Koerner (Biology)

Known for its high species diversity and economic importance, the longleaf pine ecosystem has been significant for decades. However, due to anthropogenic factors, this ecosystem is now one of the most endangered in the United States, with only 3% of its natural stretch remaining. Due to the rapid habitat loss of this ecosystem, restoration efforts are extremely significant and understanding the ecological interactions that sustain it are crucial. This study aims to examine ecotype specific allelopathic effects that longleaf pine (Pinus palustris) trees have on switchgrass (Panicum virgatum) germination. Longleaf pine seedlings from North Carolina and Florida were positioned above pots containing Switchgrass seeds and were provided with 300 mL of water which drained into the soil below, daily. This experiment measured germination day, height at germination day, root length, and the weights of above- and belowground biomass. During our pilot study, we performed an ANOVA and Tukey's HSD to analyze results. These results showed no significant differences between germination times of treatments; thus, the experiment is currently being repeated with higher replication to increase statistical strength.

How does the research process of costume design impact the renderings for queer characters in a global context?
Student Presenter(s): Peyton Hiller, Senior (Theatre)
Faculty Mentor(s): Clare Parker (Theater)

The reason I posed this question as an independent study was to further explore an underrepresented group. As well as, to gain further understanding of global impacts on queer fashion; and how this translates into costuming characters. I choose three plays to dive deeper into the exploration of different queer identities between Europe, America and Asia. These plays took place in different times throughout history as well, so I dug deeper into queer fashion, not only in different cultures but different time periods. I learned about the nuances of symbolism queer women tended to have in the 1900s, usually involving flowers. As well as the major differences in how western culture views non-binary characters versus how Bengali culture embraces non-binary characters. Overall, through this exploration I discovered how queer characters in these plays tend to bend the typical gender binary or have symbolic motifs of queer people during their time period. It was intriguing to me to explore different cultures and how it can be reflected in costuming queer characters.

Molecular Precursors to Bismuth Semiconductor Materials
Student Presenter(s): Summer Hunter, Junior (Chemistry)
Faculty Mentor(s): Dan Rabinovich (Chemistry & Biochemistry)

N-heterocyclic thione (NHT) and selone (NHSe) ligands exhibit well-documented coordination behavior and provide useful sulfur- and selenium-donor groups for main-group metal chemistry. This work focuses on the preparation and complete characterization of bismuth (III) complexes incorporating chalcogenone ligands, which can serve as molecular precursors to semiconductor materials. More specifically, the thermal decomposition of the thione complexes may yield bismuth (III) sulfide (Bi2S3), an inorganic compound that exists in nature as the mineral bismuthinite and is known for its unique electronic and optical properties, and applications such as solar cells and thermoelectric devices. Similarly, bismuth (III) selenide (Bi2Se3) could be prepared from the thermal decomposition of the selone derivatives. Preliminary structural studies suggest a flexible coordination environment at the bismuth center, consistent with the stereochemical influence of the bismuth (III) $6s^2$ lone pair. Comparisons between sulfur- and selenium-containing ligands further indicate an important role for donor softness and relativistic effects in shaping Bi–E (E = S, Se) bonding interactions. This work contributes to a broader understanding of bismuth–chalcogen coordination chemistry with potential applications in the semiconductor industry.

The Mediating Role of Shame in the Development of Adolescent Internalizing in Children with Externalizing Behaviors
Student Presenter(s): Roba Hussein, Junior (Psychology)
Faculty Mentor(s): Susan Keane (Psychology)

Externalizing problems are categorized as disruptive and rule-breaking behaviors (Achenbach, 2001; Achenbach et al., 2016). Children who display externalizing symptoms earlier in life are more likely to face peer rejection and negative social feedback than non-externalizers (Beauchaine et al., 2017). This can ultimately lead to a negative self-concept and internalizing problems in adolescence (Lee & Stone, 2012). Shame, one aspect of negative self-concept, is defined in the literature as a strong negative emotion characterized by a devaluation of oneself (Tangney & Dearing, 2002) and has been linked to negative social and emotional outcomes, including the emergence of internalizing problems (Paulo et al., 2020). Although research has established that both externalizing behavior and negative self-concept are associated with later internalizing outcomes, there is less known specifically about the unique role of shame as a mechanism through which externalizing behaviors are associated with later internalizing behaviors. Understanding shame as a potential mediator would not only inform us further about the mechanisms behind the trajectory of externalizing to internalizing but would also identify its potential importance as a treatment target. The present study investigates whether shame mediates the relationship between early externalizing symptoms and the development of later internalizing symptoms. We hypothesized that children exhibiting externalizing behaviors at age 7 would show internalizing behavior at age 15 because they experienced shame at age 10.
Participants (N=296, 54% female, 66.2% White, 27.5% Black) were recruited for a longitudinal study examining behavioral, social, and emotional functioning across development.

Membrane Topology and Closure Dynamics of the Forespore Membrane
Student Presenter(s): Jaleeyhia Jennings (Biology)
Faculty Mentor(s): Nick Ader (Biology)

Cellularization requires coordinated growth [OBJ], expansion and the closure of newly formed membranes, which create cellular compartments. Understanding the process of [OBJ] cell membrane closure, growth and expansion is crucial for grasping the integrity of cells, sealing, and their overall functionality. Despite the progress in imaging, microscopy, and tomography, the sealing of the Forespore Membrane still remains poorly understood. This project seeks to address a major gap in knowledge, which is how cells build and spatially organize a new membrane during cellularization. By determining the membrane topology of the forespore membrane using segmentation, it provides insight into the mechanisms underlying membrane formation. Particularly, [OBJ] I am segmenting electron tomograms that reveal the 3-dimensional makeup of the membrane using reconstructed tomographic data. With this, I am able to analyze and evaluate the membrane's contours, continuity, and work to produce a pseudo timeline of its closure. The results reveal correlated localization of cellular components, including vacuoles and lipid droplets, prior to membrane sealing, suggesting their involvement in the closure process. These structural insights provide a framework for understanding membrane assembly during cellularization and may inform broader studies of membrane fission, repair, and disease-related membrane dysfunction.

Language Access: A Key to Health Equity in Local Immigrant and Refugee Communities
Student Presenter(s): Kasey Johnson, Senior (Public Health Education)
Faculty Mentor(s): Sharon Morrison (Public Health Education)

Immigrants and refugees introduce cultural languages that enhance the social vibrancy of the Piedmont Triad region. Unfortunately, language remains a barrier to integration, affecting access to healthcare and health outcomes for households with limited English proficiency (LEP). Despite federal requirements for language access services, ongoing gaps persist in the availability and distribution of interpretation and translation services for households where schoolchildren reside. This study provides baseline information on the challenges faced by LEP households with children in the school system. We performed a secondary analysis of publicly available data, such as the National Center for Education Statistics, local education, and health databases. We used descriptive statistics and mapping to identify patterns and trends in language diversity and service accessibility. About 120 languages are spoken by school children. Children often act as interpreters for their parents because of few professional interpreters in schools. Our research also revealed a significant mismatch between the needs of language communities and the services provided, with limited funding for supporting LEP households with schoolchildren. Findings have implications for evidence-based advocacy on regional language access coordination, sustainable funding, and the integration of language access planning into health equity strategies.

Towards the Total Synthesis of the Novel Antifungal Natural Product Jesterone
Student Presenter(s): Sydney Jones, Senior (Biochemistry)
Faculty Mentor(s): Mitchell Croatt (Chemistry & Biochemistry)

Jesterone is a novel natural product that was investigated for its anti-cancer activity due to its antifungal properties, which were found to be similar to those of Taxol, a common chemotherapy drug. Studies have reported that the compound shows promising anti-tumor activity towards human breast and leukemia cells. Based on the group's previous work on the regioselectivity of the aromatic Claisen rearrangement, it was hypothesized that the synthetic pathway towards Jesterone could be optimized using this reaction. My work focuses on successfully performing and optimizing the reaction steps of this pathway by utilizing skills in reaction set-up, column chromatography, and Nuclear Magnetic Resonance (NMR) data analysis. So far, we have successfully performed a lactonization of gentisic acid, followed by an allylation of the phenol and an aromatic Claisen rearrangement of the allyl group to the right side of the molecule. The current goals are to perform a second allylation and Claisen rearrangement of the additional allyl group, followed by a Grubbs' metathesis. Optimization and completion of this synthesis could create a pathway for Jesterone that is fewer steps, more affordable, and allows for this compound to become more accessible for cancer research.

Apotheosis: The Making of a Multimedia Narrative
Student Presenter(s): Madison Karan, Sophomore (Music)
Faculty Mentor(s): Frances Bottenberg (Residential Colleges)

Apotheosis is a multimedia fiction novel that combines photography, wearable art, prose, and music to detail the evolution of artificial intelligence. The story explores themes of humanity and their interactions with technology while challenging readers to conceptualize narrative modes outside the norm. Apotheosis was first conceived as a response to the gradual seeping of generative artificial intelligence into the arts and humanities. As a primary witness to the impact of AI in these fields, the author's use of each medium prompts the viewer to reflect upon their use of the technology and on creation and emotion as fundamental aspects of the human experience. Apotheosis was created with the support of the Pubantz Artist-in-Residence program and faculty mentor Dr. Frances Bottenberg. The project will culminate in a manuscript with the non-textual elements embedded as photographs and QR codes. During the exhibition, the audience will be able to interact with her presentation through printed and digital copies of the story itself, as well as the visual art included in the narrative. Central to the author's vision is her creative process, which will be exhibited in dialogues with visitors.

The Write Way: Re-Evaluating Writing Systems on Palm Leaves
Student Presenter(s): Sheza Khurram, Senior (Archaeology)
Faculty Mentor(s): Geoffrey Hughes (Anthropology)

This project seeks to evaluate the impact of materiality on writing systems and orthography in South Asia, specifically testing the claim that letter shape for scripts in the region is determined by the practice of inscribing text on palm leaves, creating palm leaf manuscripts. By testing this claim through experimental archaeology, important dimensions of cultural anthropology and historical linguistics can be revealed. Historical methods of production can be utilized to show the efficacy of treatment, material, and tools employed in the creation of texts in different scripts (Hindi, Latin) along the same medium (palm leaves). 3D photogrammetry and cross section analysis can be used to compare artifacts created in this way with data collected under museum studies, to normalize results. This methodology allows for a robust and comparative set of data, with room for expansion in future projects. It is suggested that future research concentrate on the variation of chemical treatments before and after inscription, as this could affect plasticity of the material, preservation of the fibers, and provide a way of determining provenance (as preferred treatments vary by location and workshop). This research opens up an underexplored field of study and creates a foundation for further experimental works.

Design and Preliminary Testing of a Novel Microwave "White Cell" Spectrometer for Molecular Rotational Spectroscopy
Student Presenter(s): Citlaly Bermudez-Landin, Post-Bac (Biology)
Faculty Mentor(s): Liam Duffy (Chemistry & Biochemistry)

Pure rotational spectroscopy offers the potential for precise, in-field spectroscopic analysis due to advances in detector technology and portable microwave sources. To explore these opportunities, a novel-case White cell (multipath) system is being developed to detect volatile organic compounds (VOCs) released by plants under stress- such as drought, pest activity, or overwatering, before visible signs occur. While White cell spectrometers exist for infrared wavelengths, their use at millimeter wavelengths has not been previously demonstrated. This is probably because it is difficult to create collimated mm-wave beams. Our system features custom-designed off-axis parabolic mirrors that collimate the mm-waves before they enter the White cell, enabling an innovative long pathlength instrument capable of sensitive gas phase spectroscopy. The 25m path-length White cell, salvaged from an old tobacco factory, was disassembled, cleaned, mirrors re-silvered, and repaired to restore vacuum capability. Two off-axis parabolic mirrors were then custom-designed and fabricated for the microwave horn, producing a laser-like beam that traverses the full path and reflects multiple times within the cell.

Developing a fluorescent reporter of nucleocytoplasmic integrity during meiosis
Student Presenter(s): Sophia Lau, Sophomore (Biology)
Faculty Mentor(s): Nick Ader (Biology)

Compartmentalization of cell organelles relies on functional, yet flexible membrane compartments. Maintaining these compartments in the nuclear envelope ensures the conservation of genetic material to the nucleus. Understanding this process in meiotic yeast will provide insight into chromosomal damage, infertility, still births, and germ-cell related errors. In mitosis, we know that endosomal sorting complexes required for transport (ESCRTs) function as molecular grommets and are key to sealing the NE after division. However, in meiosis the nucleus undergoes division twice. During Meiosis II there is a virtual nuclear envelope breakdown (vNEBD), where we cannot visualize if the nucleus seals, stays open, or leaks its contents into the cytoplasm. We have addressed this gap in knowledge by creating fluorescent reporters of nucleocytoplasmic integrity using MGM4, ribosomal Subunits tagged with GFP, and tracking the presence of ESCRT-III proteins throughout meiosis I and II. Imaging has been done on wild type yeast Schizosaccharomyces Pombe, ESCRT-III knockouts, and the aforementioned fluorescent reporters. Our hypothesis is that the ESCRT-III machinery is present throughout the entirety of meiosis I and II, meaning the NE does not seal between the two phases. Regardless of what is found, these results will move the field of cellular biology forward.

Effects of Age-Related Differences in the Correction of False Claims
Student Presenter(s): Ashley Leonard, Senior (Psychology)
Faculty Mentor(s): Christopher Wahlheim (Psychology)

In everyday life, people are exposed to false claims that are later corrected, but remembering both the claim and its correction can be difficult. Age-related declines in associative memory may impair the ability to link false information with subsequent corrections, raising the possibility that corrections that repeat false claims, which benefit younger adults, may be less effective or even impair memory for older adults. The present study tested whether the benefits of repeating false claims during correction generalize to older adults and persist after a delay. Younger and older adults read true and false social media headlines, after which false headlines were corrected either with or without repetition of the false claim. Immediately (Experiment 1) and following a 30-minute delay (Experiment 2), participants recalled the correct information, rated their belief in the recalled details, indicated whether the statement was corrected, and, if so, recalled the false details. Reminder-based corrections improved memory for both false and true details in both age groups. However, older adults showed poorer memory for the occurrence of corrections and rated both false and true details as more accurate. Overall, these findings show that older adults can benefit from reminder-based corrections despite age-related impairments in associative memory.

An examination of the Batman Effect on children's peer conflict resolution abilities
Student Presenter(s): Clara Lussier, Senior (Psychology)
Faculty Mentor(s): Jessica Caporaso (Psychology)

Previous research has shown us that, in general, younger children tend to make more aggressive responses than older children (Caporaso et al., 2019) and that boys are more likely to choose aggressive responses than girls are (Ostrov, & Keating, 2004). Today's study predicts that children who are self-distanced will make less aggressive responses than kids acting as themselves. Seventy-two 4-to 5-year-old children were first inducted into two conditions: First-person and Exemplar. In the First-person condition, participants were instructed to act as themselves when answering questions (e.g., "What would you do after..."). In the Exemplar condition, participants were prompted to act as popular cartoon characters (e.g., "What would Ryder [Paw Patrol] like to do...") and they were able to see themselves as the character on a tablet screen using facial filters. Following induction, participants completed the Virtual School Game (VSG; Caporaso & Marcovitch, 2021), which presents participants with six peer conflict (e.g., "Tommy kicked Ryder in the sandbox") and three neutral (e.g., "Stacy offers you a pencil") scenarios. Participants can choose one of six responses following each scenario: three competent and three aggressive. Scores are the total number of aggressive responses participants chose across all nine scenarios. Data collection is ongoing.

Understanding Burptide Cyclases in Hibiscus syriacus
Student Presenter(s): Olivia Mahfoud, Senior (Biochemistry)
Faculty Mentor(s): Jon Chekan (Chemistry & Biochemistry)

Ribosomally-Synthesized and Posttranslational Modified Peptides, or RiPPs, are a class of natural products that are found across all domains of life. Burptides are a newly discovered class of RiPP natural products. The Burptide class of natural products has a variety of applications, which are analgesic, anticancer, and antimicrobial. These natural products are characterized by a cross-linkage of aromatic residues and nearby amino acids. These cross-linkages are catalyzed by Burpitide Cyclase or BpCs, which are copper-dependent enzymes found widely across plants. These BpCs can be seen to have a variety of cyclizations; in cyclopeptide alkaloids (C-O cross-linkages), and in hibispeptin type (C-C cross-linkages). This class of enzymes can exhibit catalytic activity under different reaction conditions. This work focuses on characterizing four different enzymes found in the Hibiscus syriacus genome, which are co-localized near precursor peptides. The reaction conditions will be optimized and analyzed using LC-MS. LCMS stands for Liquid Chromatography-Mass Spectroscopy, which separates mixtures based on interactions with the mobile and stationary phases, along with analyzing the mass-to-charge ratio. The reaction conditions include substrate scope, buffers, copper amount, and reducing agent. The modifications will be confirmed using NMR. This analysis will help understand the chemistry of these enzymes.

Order from Chaos: Planet Formation in a Triple Star System
Student Presenter(s): Ashlee Maness (Physics)
Faculty Mentor(s): Alicia Aarnio (Physics and Astronomy)

Advances in high-resolution imaging techniques have revealed many stars once thought to be alone actually have at least one, if not more, companions. Meanwhile, our Earth appears to orbit an anomalous lone star, and our models of planet formation attempt to reproduce our own system, despite it potentially being an outlier. GW Ori is a recently discovered system with three stars, each with their own misaligned disk, which may be hiding planet formation. We have analyzed multiple epochs of spectra for this system, searching for signs of planets' orbital motions. We present our combined data set, analysis methods, and discuss the results and limitations of our approach. This study could inform future research on planetary formation around multiple-star systems.

Analyte Velocity as a Contributor to Band Broadening in Liquid Chromatography
Student Presenter(s): Uryel Marquez-Rodriguez, Senior (Biochemistry)
Faculty Mentor(s): Nadja Cech (Chemistry and Biochemistry)

Chromatography is a crucial analytical technique used throughout science fields to separate complex mixtures into individual components. A limiting factor in chromatography separation is band broadening, which limits resolution of closely eluting analytes. When chromatography theory is taught, it typically attributes band-broadening in later-eluting analytes to diffusion and mass transfer effects during column migration. However, because every analyte spends the same amount of time in the mobile phase under isocratic conditions, the extent to which diffusion alone explains increasing peak width across the chromatogram requires further investigation. We hypothesize that peak broadening in later-eluting molecules is primarily influenced by changes in analyte velocity and detection compared to earlier analytes. Through isocratic separation using liquid chromatography-mass spectrometry, this project aims to isolate the effects of velocity by calculating the spatial bandwidth using temporal chromatographic data. Preliminary data collected showed band broadening using an isocratic method of different analytes with similar diffusion coefficients. Next, representative analytes were chosen, and the behavior of these analytes when separated under different isocratic conditions is being compared. By redefining the fundamental factors that limit resolution, this research seeks to refine our understanding of chromatographic resolution and improve separation efficiency for solving scientific and medical challenges.

Discovery of RiPP-Derived Antimicrobials from Streptococcus mutans
Student Presenter(s): Alissa Martinez, Junior (Biochemistry)
Faculty Mentor(s): Jonathan Chekan (Chemistry & Biochemistry)

Ribosomally synthesized and post-translationally modified peptides (RiPPs) are a diverse class of bioactive natural products with significant therapeutic potential, including antimicrobial activity. A recently identified RiPP subclass, daptides, is structurally distinct due to a dual positively charged termini and has demonstrated both antimicrobial and hemolytic properties. However, some of the biosynthetic pathways responsible for daptide production remain largely uncharacterized.The oral pathogen Streptococcus mutans, a major contributor to dental caries, produces numerous secondary metabolites whose biological roles are not fully understood. Bioinformatics analysis of publicly available genomes has revealed RiPP-like gene clusters predicted to encode enzymes involved in daptide biosynthesis. Experimental validation of these pathways is necessary to link genetic predictions to functional chemical products. This project aims to functionally characterize a putative daptide-modifying methyltransferase encoded by the smuM gene. The enzyme will be heterologously expressed in Escherichia coli, purified using affinity and size exclusion chromatography evaluated through in vitro assays with a precursor peptide substrate S-adenosyl-L-methionine (SAM). Reaction products will be analyzed by LC-MS to detect methylation consistent with daptide formation. Confirming this activity will provide insight into daptide biosynthesis and advance understanding of bioactive metabolite production in S. mutans.

Seasonal changes in the microanatomy of the gastrointestinal tract of wild-caught Peromyscus maniculatus
Student Presenter(s): Liam Miles, Senior (Biology)
Faculty Mentor(s): Bryan McLean (Biology)

Gastrointestinal tract (GIT) plasticity has been shown to exist in mammals in response to changing energetic demands, but this knowledge is mostly limited to the macroscopic level. Eastern deer mice (Peromyscus maniculatus) have been shown to increase their GIT length during the colder months, when the mice will partially decrease trophic levels due to the paltry nature of food in winter. The GIT will then increase back in size during the summer months when more food of higher quality is available. We sampled Eastern Deer Mice from Virginia across five seasons and captured multiple changes in their GITs. Histological preparations were prepared, enabling quantification of villus morphology, including length and surface area measurements. We found that villi in the small intestine increased in area during the winter and decreased in the summer. The increase in the size of the villi corresponds to the winter months. These changes occurred in parallel with summer decreases in the total length of the GIT, indicating that major remodeling occurs in both macro- and microscopic traits. Extending our understanding of gastrointestinal flexibility is important as it allows us to better understand how these organisms adapt to outside energetic stressors put upon them.

Gate City: Playable Space Internship
Student Presenter(s): Johnny Monroe, Senior (Media Studies)
Faculty Mentor(s): Jennida Chase (Media Studies), Hassan Pitts (Media Studies)

Gate City: Playable Space was an exhibition held at the Greensboro Cultural Center's GROW residency. The space was awarded to UNCG professors Jennida Chase and Hassan Pitts. The exhibition focused on experimental video; using archival footage given to us by the Greensboro History Museum and contemporary footage collected by us. The exhibition poses questions on how transportation has changed? And how does transportation both connect us and keep us apart? Through a series of projections, we focused on creating a spatial experience for viewers. Incorporating different kinds of audio and fabric material to create an exhibit in which viewers are not only watching these video pieces but immersed in them. We used music and collected sound of cars, trains, etc. As well as cheese fabric to create depth through projected light. Thinking about the nature of the space was integral to the process of projecting in the allotted environment. As an intern, I helped set up and break down equipment, collect both audio and visual material, as well as create my own pieces to be presented in the space with feedback from Professor Chase and Pitts.

Native Plant Seed Germination with and Without the Introduction of Allelopathy of the Longleaf Pine to the Longleaf Pine Savanna.
Student Presenter(s): Brodie Nash, Senior (Biology)
Faculty Mentor(s): Sally Koerner (Biology)

Allelopathy, is the effect of plant exodus on the surrounding plants in the ecosystem. This can be beneficial or a hinderance to the surrounding species. This study focuses on the long leaf pine savanna. Using the plant exudates of the longleaf pine to water native plant grasses and forbs, will the allelopathic affects, change the germination period of the native plant species. The longleaf pine is a keystone species to the understory grasses and forbs which are crucial for the savannah ecosystems' health. By determining if the long leaf pines allopathic effects change germination period, this can influence which plants way or may not be planted beside or grown beside the long leaf pines. This is important for efficient restoration of the savanna. Early tests conclude there may be correlation between the allelopathic effects, five native species were chosen for a scaled up second study.

The Hour of Bloom Birth Center
Student Presenter(s): Summer Null, Senior (Interior Architecture)
Faculty Mentor(s): Asha Kutty (Interior Architecture)

Located in Durham's historic Hayti community, this birthing center responds to both demographic need and cultural identity by creating a healing, community-centered environment for mothers and families. Serving a diverse population of over 120,000 residents, including significant African American and Hispanic/Latino communities, the design reframes birth as a culturally grounded, empowering experience rather than a purely clinical event. The built environment plays a critical role in maternal well-being. Research shows that light, acoustics, color, spatial control, and sensory comfort influence stress levels, pain perception, and emotional safety during pregnancy, labor, and postpartum recovery. This is particularly urgent given persistent racial disparities in maternal mortality among African American mothers, rooted in long histories of systemic inequities in healthcare. Through engagement with Maya Jackson of Maame Durham, the project integrates midwifery and doula-centered models of care that prioritize trust, advocacy, and community support. Warm daylight, woven textures, nature integration, and culturally symbolic materials foster belonging and continuity between ancestry and modernity. By aligning interior design with environmental psychology, behavior, and cultural relevance, this project proposes a community-rooted model of maternal healthcare, one where space itself becomes a partner in healing, dignity, and holistic care.

Do Neuroticism and Internalizing Symptoms Predict Perceived Negative Evaluation in Three Lab Based Stressed Conditions
Student Presenter(s): Lizeth Olvera Chavez, Senior (Psychology), Paris McCollum, Senior (Psychology)
Faculty Mentor(s): Suzanne Vrshek-Schallhorn (Psychology)

Depression symptoms and trait neuroticism predict higher perceived stressful life event ratings of standardized vignettes (Cole et al., 2025). However, no one has examined our hypothesis that neuroticism and subclinical depression symptoms both predict perceived stress (perceived negative evaluation) to lab-based stress and interact with lab stressor severity. Emerging adults (n = 140) were randomly assigned to a non-stressful control or an explicitly negative-evaluation condition of the Trier Social Stress Test (TSST). Participants completed questionnaires to capture depression and neuroticism. Clinically depressed participants were excluded from analysis. Multiple linear regression tested the main effect of TSST condition, vulnerabilities, and their interaction to predict perceived negative evaluation. Neuroticism, General Distress, and Anhedonia did not predict perceived negative evaluation in main effect (all p's > .20; partial η^2 <.005) and did not significantly interact with TSST condition. However, across all models, TSST condition significantly predicted negative evaluation in main effect (all p's <= .043; η^2 ~ .30). Thus, contrasting prior stress perception findings from other settings (Conway et al., 2016; Xin et al., 2017), our results did not illustrate that individual traits or symptoms drive perceived stress evaluations of lab-based stressor, and instead suggested the centrality of environmental features.

Minerva Mobile Health Unit (MMHU): Sustainable Mobile Health Care Delivery
Student Presenter(s): Alex Parsons, Senior (Nursing)
Faculty Mentor(s): Tiffany Gibson, (Nursing), Sarah Apel, (Nursing)

The School of Nursing's Minerva's Mobile Health Unit (MMHU) was launched in August 2023 to expand access to care for rural and underserved communities. At its inception, Chancellor Franklin D. Gilliam, Jr. emphasized MMHU's role in delivering meaningful, real-world impact through student, faculty, and staff engagement.
MMHU is supported by an initial $3.8 million HRSA grant. Since implementation, MMHU student scholars have logged thousands of hours of community centered clinical care and consistently report valuable learning experiences. This project examines student scholars who have participated in MMHU clinical experiences addressing holistic nursing care and the social determinants of health (SDOH). Qualitative student testimonials describing clinical learning, community engagement, and opportunities for research are presented in a poster-based format.
MMHU is an innovative nurse-led model delivering care to underserved populations in Greensboro and surrounding areas. In addition to clinical services, MMHU distributes essential items such as clothing, blankets, eyeglasses, and medical supplies. The program received the 2025 NCNA Best-in-Practice Award. MMHU has the potential to advance health equity, improve outcomes for vulnerable populations, and serve as a replicable, sustainable model for community-based care and research at the local and state levels.

Effects of long-term intake of māmaki (Pipturus albidus) tea extract on liver and kidney histomorphology in C57BL/6 mice
Student Presenter(s): Namasvi Patel, Senior (Biology)
Faculty Mentor(s): Zhenquan Jia (Biology)

Māmaki (Pipturus albidus), a shrub native to Hawai'i, has been traditionally used for its anti-inflammatory and antioxidant properties. Rich in phenolic acids, catechins, and flavonoids, māmaki has demonstrated the ability to neutralize reactive oxygen species and reduce oxidative stress. Despite its growing popularity as a functional food ingredient, limited research has examined its long-term safety, particularly regarding liver and kidney health - organs central to metabolism and detoxification. This study investigates whether chronic dietary supplementation with māmaki extract influences liver and kidney histomorphology in male C57BL/6 mice. We hypothesized that long-term māmaki supplementation will preserve or improve tissue architecture and cellular integrity due to its antioxidant properties. Eighteen six-week-old mice were assigned to either a modified AIN-93G control diet or the same diet supplemented with 2.0% māmaki extract for 16 weeks. At 24 weeks of age, liver and kidney tissues were collected, fixed, paraffin-embedded, sectioned, and stained using hematoxylin and eosin. Histological analysis was conducted to assess tissue architecture, cellular integrity, and pathological alterations. Findings from this study will contribute to understanding the biomedical safety and potential therapeutic applications of long-term māmaki consumption.

The Amazonian Myth and Male Authorship in the Greek East
Student Presenter(s): Kristina Perdue, Senior (Classical Studies)
Faculty Mentor(s): Robyn Le Blanc (Classical Studies)

This presentation examines how myths of the Amazons, particularly Penthesilea, reflect the values, fears, and gender ideologies of ancient Greek patriarchal society, as presented in Quintus of Smyrna's 4th century epic Posthomerica. Although inspired by the historical Scythian and Sauromatai tribes of modern-day Iran and Ukraine, Amazon depictions are largely fictional, shaped by male authors' anxieties about female power and masculinity. Penthesilea, an Amazonian queen who fought for Troy, exemplifies this tension. She is described using both masculine (warlike, strong) and feminine (modest, beautiful) traits. Her death at the hands of Achilles symbolizes the subconscious need of Greek authors to conquer female masculinity, restoring patriarchal order.
I argue that the Amazons are only permitted to express masculinity if they meet one of three conditions: they are divine, have mythological exceptions, or are ultimately "conquered" through death or marriage. Penthesilea fulfills all three. Even in death, she is feminized and sexualized, becoming an object of Achilles' remorse and desire.
These narratives serve to both titillate and warn; while warrior women are alluring, they are dangerous and must be subdued to maintain male dominance. The Amazons, therefore, are not just mythical enemies, but embodiments of male anxiety over gender roles. Through myth, Quintus of Smyrna negotiated his simultaneous fascination with and fear of female agency.

Big Problems, Personal Power: Confronting Inequities Through a Black Maternal Health Lens
Student Presenter(s): Jynia Phelps, Senior (Social Work)
Faculty Mentor(s): Beth Webb (Social Work)

Black maternal health disparities reveal the deep intersections of race, gender, and systemic oppression. This workshop utilizes Black maternal health as a case study to explore how social workers can address and disrupt inequities across healthcare and other social systems. Participants will examine historical and structural factors that shape oppression, reflect on their own positionality, and engage with critical consciousness as a tool for meaningful action. Through interactive discussion and case-based learning, attendees will gain strategies to advocate for equity and justice, not only for Black birthing communities but for all marginalized groups impacted by systemic harm.

UBP22-Mediated Histone Modification and lncRNA Regulation Under Abiotic Stress in Arabidopsis thaliana
Student Presenter(s): Christopher Pilgrim, Senior (Biology)
Faculty Mentor(s): David Remington (Biology)

Long noncoding RNAs (lncRNAs) are emerging regulators of chromatin state, transcription, and stress adaptation. In Arabidopsis thaliana, UBP22, a putative ortholog of mammalian USP22, functions as a histone H2B deubiquitinase that removes H2Bub1; however, its influence on lncRNA transcription under abiotic stress remains poorly understood. To investigate this relationship, we performed RNA-seq on wild-type and ubp22 knockout plants under control conditions and combined cold and drought stress. Differential expression analysis revealed genotype- and treatment-associated transcriptional remodeling, with the ubp22 mutant exhibiting an expanded stress- responsive transcriptome. Integrating transcript-level differential expression with StringTie assemblies and CantataDB annotations identified 182 high-confidence lncRNA candidates that are differentially expressed in ubp22 and overlap annotated lncRNA loci, representing a core set of UBP22-associated candidates. These findings support a model in which UBP22 contributes to lncRNA regulation during abiotic stress. We are currently assessing H2Bub1 enrichment at candidate loci, evaluating predicted secondary structure and positional features, and comparing these characteristics to USP22-associated lncRNAs in mammals. Additionally, we are examining potential lncRNA-miRNA interactions to assess how UBP22-linked lncRNAs may contribute to stress-responsive regulatory networks. Together, this study establishes a foundation for uncovering chromatin-associated cross species principles of lncRNA regulation.

Owning the Inevitable: Fate, Identity, and Agency from Greek Tragedy to Modern Retellings
Student Presenter(s): Briana Potts-McLaughlin, Freshman (Classical Studies)
Faculty Mentor(s): Derek Keyser (Classical Studies)

This poster investigates how Greek tragedy and modern mythological retellings negotiate the tension between fate and human agency. In classical literature, fate (moira) structures existence without erasing meaningful choice. Through close readings of Sophocles' Oedipus and Homer's Iliad, the project argues that prophecy functions as revelation rather than control: Oedipus's pursuit of truth and Achilles acceptance of early death demonstrate that inevitability intensifies identity. Modern adaptations translate divine fatalism into emotional and psychological experiences. Madeline Miller's The Song of Achilles and Circe renders destiny as intimate foreknowledge of loss and as a struggle for selfhood within divine hierarchies. These characters confront scripts they cannot fully rewrite, yet none are passive; their choices define them even when outcomes remain fixed. Fate and free will emerge not as opposites but as a dynamic relationship: fate sets boundaries; agency determines how they are inhabited. Modern authors transform gods into metaphors for internal pressure, preserving the ancient question of how humans live meaningfully within inevitable suffering. By placing ancient and contemporary narratives in dialogue, the poster suggests that myth endures as a poetic philosophy of limits, where characters forge their identities not by escaping fate but by responding to it on their own terms.

Investigating Dehnel's Phenomenon in North American Sorex Shrews
Student Presenter(s): Aamna Qaisar, Junior (Biology)
Faculty Mentor(s): Bryan Mclean (Biology)

Phenotypic plasticity allows organisms to modify traits in response to changes in environmental conditions, including helping them cope with seasonal and climatic challenges. Shrews (genus Sorex;body mass 2-15g) are widely distributed in the Northern Hemisphere, have extremely high metabolic rates, and remain active year-round. To maintain a high level of activity in the winter, some Sorex shrews employ Dehnel's phenomenon, a reversible seasonal reduction in body, braincase, and brain size, which reduces total energetic demands during winter. While this phenomenon is well documented in European populations, it remains poorly studied in North America. To address this gap, museum specimens of shrews collected in Pennsylvania over four years were scanned using micro-computed tomography (micro-CT) to generate three-dimensional models. Digital measurements of the braincase, a common proxy for Dehnel's phenomenon, were taken to assess seasonal changes. Our results show evidence of Dehnel's phenomenon in this region that varies from previously studied populations in North Carolina. These findings expand our understanding of seasonal plasticity in North American shrews to a new site and demonstrate the usefulness of CT-based methods for morphological analysis. Future work comparing populations across greater latitudinal gradients may reveal how more extreme seasons influence the magnitude of seasonal shrinkage.

ADHD Symptoms and Mind Wandering During More Versus Less Engaging Reading Tasks
Student Presenter(s): Zion Raczenski, Senior (Psychology)
Faculty Mentor(s): Michael Kane (Psychology)

Mind-wandering, when our attention shifts from the external environment to our internal environment, is a phenomenon that most of us experience as we navigate daily life. Some people mind-wander significantly more than others; individual differences in executive attention capabilities predict how often the mind meanders away. Attention-deficit/hyperactivity disorder (ADHD), which often entails impairments in executive attention, has also been linked to a propensity for mind-wandering. However, prior research has shown that in circumstances they find more engaging, participants with ADHD tend to mind-wander at a similar frequency as controls. The present study is using a motivational task paradigm, wherein mind-wandering rates measured using unpredictably appearing "thought probes" will be compared during an engaging self-directed task versus an unengaging task. I am assessing ADHD symptomatology via self-report questionnaires to investigate how it is related to mind-wandering frequency during these tasks. I hypothesize that task engagement is particularly key for people with higher ADHD symptomatology in directing their attention, and so I predict that mind-wandering rate will have a weak to moderate correlation with ADHD symptomatology ratings during the unengaging task, whereas in the engaging task, I predict that mind wandering will have a null or very weak correlation with mind-wandering rates.

Women's Health History Digital Exhibit
Student Presenter(s): Jada Raudales, Junior (English), Sarah Serran, Junior (Media Studies)
Faculty Mentor(s): Heather Adams (English), Richard Cox (University Libraries)

Our research foregrounds historical oral contraceptive advertisements from the 1960s through a public facing, digital exhibition. This work highlights the rhetorical perspectives being distributed at the time about a women's right to health education and personal patient autonomy. Our research process included media retrieval and categorization into metadata and item tags, the design of a creative and cohesive digital exhibit using the digital platform Omeka, and the conduction of an online user-test to ensure our website meets accessibility standards and provides an appealing user experience. Our findings showcase targeted language and visual imagery against female patient autonomy featured in the historical texts. This triangular collaborative experience including a faculty member has bonded our team through our shared commitment to reliability, attention to detail, and professionalism.

Coordination of Cyclic (Alkyl)(Amino) Carbenes (CAAC) to Metal Centers for Improved Alkane Oxidation Reaction
Student Presenter(s): Elanor Redinbaugh, Sophomore (Biochemistry)
Faculty Mentor(s): Daniel Nascimento (Chemistry & Biochemistry)

Current methods of converting alkanes into valuable chemicals are not environmentally friendly, as they rely on energy-intensive processes and harsh conditions. Recently, photochemical processes have emerged as viable alternatives to traditional thermal reactions. Photochemistry leverages light to enhance the reactivity of certain substances, called photocatalysts. A well-studied class of photocatalysts includes metal-chloride salts. To date, few studies have investigated the effect of carbenes on the reactivity of metal-chloride salts towards alkane oxidation. Carbenes are neutral compounds containing a divalent carbon atom with a six-electron valence shell. This incomplete octet, combined with coordinative unsaturation, makes them Lewis acidic as well as Lewis basic. A class of carbenes of interest are the cyclic (alkyl)(amino) carbenes (CAACs). CAACs have long been used to stabilize transition metal complexes and increase activity in catalytic reactions such as olefin metathesis and hydroamination of inactivated alkynes and allenes. We will describe the synthetic procedure of these carbenes and their coordination to metal-chloride salts. Their effect on alkane oxidation reaction will be disclosed.

The Effects of Microinvalidations on Mental Health
Student Presenter(s): Annika Redmond, Sophomore (Psychology)
Faculty Mentor(s): Frances Lobo (Human Development & Family Studies)

Microinvalidations are subtle acts of racial-ethnic discrimination that can erode an individual's mental health (Jones, 2022). Amidst discrimination, there are other factors that exacerbate or protect youth from its harmful effects. Families experiencing higher economic hardship were more likely to experience discrimination (Stokes et al., 2020). However, higher racial-ethnic identity and receiving parents' ethnic-racial socialization (ERS; messages building their pride or preparing them for bias) may help youth feel positive and confident in their self-identity despite negative comments (Umaña-Taylor & Hill, 2020). This study investigated the relationship between microinvalidations and college students' depression, and whether economic hardship, ERS, and racial-ethnic identity moderate this association. Participants (N = 327; 78% female, 1% non-binary) identified as Black/African American (n=149), Multiracial (n=85), Latinx (n=52), Asian American (n=27), Native American (n=6), Arab/Middle Eastern (n=4) and Native Pacific Islander (n=2).Microinvalidations and economic hardship were positively associated with their depressive symptoms, whereas centrality was negatively related to their depressive symptoms. There were no moderation effects. ERS had no association with youth symptoms. While economic hardship was a risk factor, it may be important for parents to build their child's racial-ethnic identity and pride to support better mental health.

Design as Cultural Preservation: Reimagining the Orange Hotel in East Wilson
Student Presenter(s): Jason Rich, Senior (Interior Architecture),
James Cappola, Senior (Interior Architecture)
Faculty Mentor(s): Asha Kutty (Interior Architecture)

Developed in collaboration with community partner Natalie Miller, owner of the Magnolia House in Greensboro, a restored Green Book hotel, this project analyzes how interior architecture can serve as a tool for cultural conservation and economic restoration. The project reimagines the Orange Hotel in Wilson, North Carolina, one of the few surviving structures in East Wilson, a formerly thriving Black business district diminished by urban renewal and redlining.
Built in 1906 by educator and civic leader Samuel H. Vick, the hotel provided safe lodging for Black travelers and musicians during Jim Crow, including early touring artists such as B.B. King. Despite its significance, the building's stories and the wider narrative of Green Book travel remain underrepresented in preservation practice until recently.
This flexible reuse proposal restores the historic structure while introducing a new early 20th-century inspired carriage house as an event center and additional lodging, reestablishing the hotel as a cultural and economic anchor uplifting the local community. Three guest room collections: Jubilee, Delta, and Heritage translate archival research into spatial storytelling. By positioning design as both preservation strategy and cultural advocacy, the project demonstrates in what way adaptive reuse can repair erased histories while generating sustainable community investment.

Examining the Potential Moderators Between Preparation for Bias and Adolescents' Proactive Coping with Discrimination
Student Presenter(s): Emony Richardson, Senior (Psychology)
Faculty Mentor(s): Frances Lobo (Humans Development), Michaeline Jensen (Psychology)

Parents' messages preparing youth for bias may shape the way that minoritized adolescents cope with discrimination, but findings are mixed (Salcido & Stein, 2024). Other factors may shape how supportive these messages are for coping. Salcido and Stein (2023) found that when parents reported higher cultural socialization, higher preparation for bias predicted higher Latinx youths' academic motivation. Preparation for bias may also better support youth coping if parents and adolescents have a positive relationship. This study examines the relationship between parents' preparation for bias and adolescents' proactive coping with discrimination, and the role of cultural socialization, positive relationship quality, and open parent-adolescent communication in moderating these associations. I extend the current literature by examining this question in multiple minoritized groups. Participants include 369 racially-ethnically minoritized parents (294 mothers, Mage = 41.4 years) and children (Mage = 12.2 years). Preparation for bias, open parent-adolescent communication, and positive relationship quality were positively associated with adolescents' proactive coping. Higher cultural socialization significantly moderated the association between higher preparation for bias and higher youth coping. This research gives helpful insight into the ways in which parents-adolescent relationships contribute to youths' responses to discrimination.

Beyond Just Exercise: The Cognitive Benefits of Combining Mindfulness and Physical Activity in Youth
Student Presenter(s): Mason Rico, Senior (Kinesiology), Lawrence Fountain, Junior (Kinesiology), Natsuki Badilla, Freshman (Kinesiology)
Faculty Mentor(s): Praveen Pasuthapi (Kinesiology)

Error awareness is the ability to identify and correct mistakes to prevent them from happening again during everyday tasks. This is crucial for developing children to foster critical thinking, mental health, and well-being. Despite the significance, there has been little research into the effects of health behaviors such as physical activity (PA) and mindfulness-based activities on error monitoring in children. This study explores the effects of short bouts (10-min) of PA and mindfulness meditation (MM) and mindful PA (MPA) on error awareness. Children between the ages of 9 and 12 (n = 36) completed four conditions (MM, MPA, PA, and rest) on two separate days. The flanker task was used to assess post-error accuracy and post-error reaction time (RT) before and after each experimental condition. Results revealed greater post-error accuracy and faster post-error RT following MPA conditions. These findings did not hold for other conditions. This evidence of enhanced error awareness following MPA highlights that being mindful during PA enhances awareness of thoughts that improve behavioral actions. Our data suggests that MPA will not only benefit physical well-being but also support critical thinking and mental health in developing children.

Digital Communication, Digital Pressure, and Externalizing Behaviors in Emerging Adults
Student Presenter(s): Alejandro Robles, Senior (Psychology)
Faculty Mentor(s): Jessica Caporaso (Psychology), Michaeline Jensen (Psychology)

Emerging adulthood (ages ~18-29) is a developmental stage characterized by transitions, including the parent-emerging adult relationship. Emerging adulthood also sees escalations in externalizing behaviors such as substance use (Arnett, 2000; Patrick et al., 2025; Miech et al., 2025). Positive and healthy communication with support networks often serve as a protective factor against externalizing behaviors (Adabla & Nabors, 2022). However, ubiquitous mobile device use can also increase feelings of pressure to be digitally available which may result in higher rates of depression symptoms (Erdem et al., 2025) and comorbid externalizing problems such as alcohol and substance misuse (Hamdi & Iacono, 2015; Liu et al., 2017). We will utilize survey responses from 136 undergraduate college students who each filled out surveys in 2019-2021 on digital communication with friends and family, perceived digital pressure, and externalizing behavior in the form of illicit substance and alcohol use. We hypothesize that more frequent parent and peer digital communication will be associated with fewer externalizing behaviors, that more perceived digital pressure will be associated with more externalizing behaviors, and that the benefits of digital communication may be attenuated in the presence of high digital pressure.

Nocturnal Insect Biodiversity Survey at UNCG
Student Presenter(s): Julianna Rodriguez, Senior (Biology)
Faculty Mentor(s): Malcolm Shug (Biology), Kaira Wagoner (Biology)

The consensus among biologists, ecologists, and environmental scientists suggests that Earth is currently experiencing its sixth mass extinction, or at least that human activity is driving ecosystems toward collapse. Insects represent one of the most significantly affected organism classes susceptible to anthropogenic influence. Numerous short- and long-term studies conducted globally have assessed population declines across the 26 insect orders, with the majority of findings indicating substantial reductions in both abundance and diversity. However, considerable data gaps persist, as regional variation can strongly affect population composition. To address this gap, the present study investigates the population and behavior of nocturnal insects on the University of North Carolina at Greensboro (UNCG) campus, an area that remains largely understudied. This year-long study employs the established entomological method of blacklighting, in conjunction with photography, to establish a baseline for future research and conservation initiatives within the community and to compare insect population composition across different habitat types.

Effects of High and Low-Fat Diets on Lipid Peroxidation in Mouse Brain and Spleen
Student Presenter(s): Julianna Rodriguez, Senior (Biology)
Faculty Mentor(s): Keith Erikson (Nutrition)

Oxidative stress is a biochemical condition that occurs when there is an imbalance between the production of reactive oxygen species (ROS), made up of free radicals and non-radical reactive molecules, and the antioxidants the body produces to neutralize them. Under normal cellular conditions, ROS plays an essential role in cell signaling. However, when ROS levels exceed antioxidant defense, oxidative damage to cellular structure and tissue can occur. One of the major consequences of oxidative stress is lipid peroxidation. This occurs when ROS attack membrane lipids, leading to a variety of pathological conditions such as inflammatory and neurodegenerative diseases. This study aims to determine how variations in dietary fat intake influences levels of oxidative stress in different tissues. Using a well characterized rodent model, we assessed the extent of lipid peroxidation using the ThioBarbituric acid reactive substances assay (TBARS), which measures the byproducts of lipid peroxidation. Preliminary results suggest an effect of high dietary fat on increased lipid peroxidation in vulnerable tissues.

Sleep quality, APOE-ε4, and cognition in middled-aged adults at elevated risk for Alzheimer's disease
Student Presenter(s): Marcus Roman, Post-Bac (Kinesiology)
Faculty Mentor(s): Jennifer Etnier (Kinesiology)

Poor sleep quality is a modifiable risk factor for cognitive decline and Alzheimer's disease (AD). However, it remains unclear if apolipoprotein E-ε4 (APOE-ε4), a genetic risk factor for AD, modifies the relationship between sleep quality and cognition during midlife. Participants were cognitively unimpaired, middle-aged adults (n=176; Mage=56.1±6.3 years; 89% female) with a family history of AD. APOE genotype was determined from saliva samples (APOE-ε4 carriers n=74, APOE-ε4 non-carriers n=102). Sleep quality was assessed using the Pittsburgh Sleep Quality Index, with higher scores indicating poorer sleep quality (M=7.1±3.0). Cognitive performance measures were: Symbol Digit Modalities Test (SDMT; Written, Oral, and Sum) and Complex Figure Task (CFT; Immediate and Delayed Recall). Linear regression models tested main and interaction effects of sleep quality and APOE-ε4 carrier status. A significant main effect of sleep quality was observed for CFT-Immediate Recall, with poorer sleep quality predicting worse memory performance (p=.026). A significant APOE-ε4×sleep quality interaction was found for SDMT-Oral (p=.036): poorer sleep quality was associated with worse processing speed in APOE-ε4 carriers (p=.044) but not non-carriers (p=.464). Poor sleep quality is associated with worse cognitive performance, and this may be more important for the individuals at elevated genetic risk for AD.

The Deep River Podcast: How podcasting is shaping conservation in the 21st century
Student Presenter(s): Greyson Rupert, Senior (History), Sheza Khurram, Senior (Archaeology), Erin Hooks, Junior (History), A.J. Ross, Senior (Philosophy)
Faculty Mentor(s): Heather Adams (English)

What if we treated a river not just as a resource, but a story? As interns of the Deep River Keeper, we have explored this through three big projects: a podcast, visual designs, and a scavenger hunt. As humanities students, we believe we have a unique ability to bring the sciences to life, connecting these important matters of water quality and public health to people in a way that is engaging, relatable, and inspiring. The Deep River podcast gives a voice to the Deep River, making it relevant to the lifelong audience of today and tomorrow. By approaching sustainability through storytelling, we create personal narratives that make complex issues accessible to broader audiences. In our visual designs, we bring species on the Deep River to life and make them visible and present in the public imagination. Through our scavenger hunt, we reach a younger audience, building a sense of stewardship and immersion in the natural world. The result bridges science, community engagement, and creative media. By "giving voice" to the river in various ways, the projects demonstrate how the humanities can be used to bridge the sciences and the public, creating broader engagement in nonprofit work.

Va Meh Du and Refugee Youth Mental Health
Student Presenter(s): Raeyan Saleh (Public health Education)
Faculty Mentor(s): Ana Sucaldito (Public health Education)

Refugee youth are at high risk for depression and anxiety. Social determinants like income, language barriers, and culturally incompetent care affect quality mental health promotion/care for refugee families. Va Meh Du, a community-based participatory research program, provides culturally relevant mental health education for Karenni refugee boys, 8-16, and coaches, 18-23 years old. My role was to clean collected data and perform preliminary analyses. Using Qualtrics and the NIH Pediatric Toolkit, we measured social connectedness and coping in adults and children using the Social Connectedness Scale, NIH Pediatric Relationship, CSI-16 and KIDCOPE respectively. Psychological well-being was measured in both populations via WHO-5 and Flourishing Scale. 45% of kids (n=37) and 100% of coaches (n=9) were foreign born and over 80% of kids and coaches were comfortable speaking English. The mode of monthly household income was $2000-2999. Baseline, the average coach had a social connectedness score of 94.89, WHO-5 74.67, CSI-16 28.44 (engaged) and Flourishing 44.78. Baseline, the average child had a KIDCOPE score of 14.91, WHO-5 75.57 and Flourishing 43.76. Income and language barriers shouldn't prevent families from receiving mental health support. Va Meh Du's an important resource for this local refugee community.

Meiotic Nuclear Envelope Remodeling by ESCRT Machinery
Student Presenter(s): Kianna Satterwhite, Senior (Biology)
Faculty Mentor(s): Nick Ader (Biology)

Nuclear division requires dynamic membrane remodeling to segregate nuclear chromatin using cytoplasmic machinery. While the membrane-remodeling endosomal sorting complexes required for transport (ESCRT) proteins have been shown to play a role in mitotic nuclear division, the mechanisms of meiotic NE remodeling remain unclear. Unlike mitosis, meiosis requires two rounds of nuclear division with unique motor proteins and mechanical stresses. In this study, we used the model fission yeast Schizosaccharomyces pombe and live-cell fluorescence microscopy of GFP-ESCRT proteins to determine their role in NE remodeling during meiosis. We determine that GFP-ESCRTs are recruited to a meiotic NE hole following the extrusion of the spindle pole body, the microtubule-organizing center, in both meiosis I and meiosis II. These ESCRT proteins that are recruited to the NE fenestration site are recruited temporally in distinct waves, as similarly observed in mitosis. Specifically, Cmp7 was recruited first in early anaphase B, followed by Vsp32 and Ist1 in late anaphase B, roughly at the same time, and lastly Vps24 during post-meiosis. Our results indicate that the ESCRT machinery likely resets after meiosis I before entering meiosis II, as ESCRTs exhibit a similar trend of recruitment during meiosis II. These findings suggest a sealing event between meiosis I and meiosis II. These findings enhance our understanding of meiotic NE dynamics and nucleocytoplasmic compartmentalization.

A Southern Love Letter
Student Presenter(s): Shayla Scales, Senior (Art)
Faculty Mentor(s): Jennifer Meanley (Art)

I am a mixed-media artist whose work revolves around finding the balance between 2d and 3d. My love for painting is the foundation of all my art, since coming to college, though I have been trying to find new ways to invent them. I was studying abroad in Italy, and this was a very big factor in reaching this project's conclusion. I want to represent the flooding emotions of religion in a traditional way but put a spin on it. This body of work is about being black in the South and being rooted in the bible. I have combined wood relief and painting.
Specifically, this will look like paintings in high contrast between light and shadow, wood reliefs/sculptures with the influence of the Renaissance and the Baroque periods.

Mapping Language and Gaps in Services for Low-Income Asian American Communities of Refugee-Origin (LIAACRO)
Student Presenter(s): Cade Scott, Senior (Public Health Education)
Faculty Mentor(s): Sharon Morrison (Public Health Education)

The Piedmont Triad region has been a hub for Asian/Southeast Asian refugees. These multitribal refugees contribute to the linguistic diversity of the region. While they contribute to the diversity of the region, health and social systems fail to accommodate language differences in service delivery. This failure is often correlated with access and utilization barriers. This study examines connection/disconnection between language diversity and service disparities faced by local LIAACRO population. The guiding questions are: 1)What does the spatial distribution of language diversity among LIAACRO reveal about their proximity to health and social services? 2) How do geographic and structural factors shape disparities in health access for these communities? We conducted secondary data analysis of publicly available data sources, environmental scans, geo-mapping to compile a spatial overlay between language dense area and services accessed. Analysis reveals that LIAACRO languages are highly connectrated in census tracts 103,164.07 low-income areas). The tracts have bus routes that are less convenient for appointment scheduling and adherence to follow up primary care and social service visits. This information represents new disaggregated data on Asian Americans as a heterogenous linguistic population and useful for strategic provision of language access resources.

Age Dependent Transcriptomic Network Rewiring Within Murine Nephron Tissue Post Spaceflight
Student Presenter(s): Ibrahim Shahid, Freshaman (N/A)
Faculty Mentor(s): N/A (N/A)

Astronauts exhibit elevated nephrolithiasis risk post spaceflight, with 1 year post flight rates reported as 2–7x more than preflight estimates. Prior works link spaceflight to distal nephron and transporter dysregulation, raising inquiry on whether microgravity alters regulatory coordination among genes mechanistically responsible for distal convoluted tubule ion transport, specifically the NCC-WNK axis, beyond mean expression changes, and if this differs by age and sampling timepoint. We analyzed OSD-771 (RRRM-2) bulk kidney RNA-seq from 80 female C57BL/6NTac mice under a 2×4×2 design (Age × Environment × arm: ISS-T vs LAR). To mitigate bulk tissue confounding, nephron segment proportions via single-cell reference deconvolution were estimated and adjusted with respect to compositional and technical structure while preserving biological contrasts. To test coordination shifts, sample-specific co-expression networks were inferred on a shared space sparse edge backbone standardized within experimental design cells, enabling comparable rewiring estimates across all conditions. Edgewise models were then fit on the full 2×4×2 design to quantify flight effects within age and arm strata and to test age*flight interactions, resulting in model-based contrast specific networks. These networks are further embedded and aligned to derive gene-level rewiring scores for each biological contrast. Genes showing large network context shifts, but minimal changes in mean expression are identified as “silent shifters” and represent candidate regulatory drivers of DCT remodeling. This framework provides estimates of age-dependent spaceflight networking rewiring, isolating perturbations in the NCC-WNK pathway to guide precise countermeasure development for post-flight renal dysfunction.

Sedentary time, APOE-ε4 dose, and episodic memory in middle-aged adults at elevated risk for Alzheimer's disease

Student Presenter(s): Emma Ruth Sharpe, Junior (Kinesiology)
Faculty Mentor(s): Jennifer Etnier (Kinesiology)

Apolipoprotein E ε4 (APOE-ε4) and sedentary time (ST) are risk factors for Alzheimer's disease (AD). Examining interactions between ST and APOE-ε4 dose (ε4dose) may clarify genotype specific differences in memory performance. Self-reported ST was assessed in 142 cognitively unimpaired midlife adults with a family history of AD (FH+). Two-way ANCOVAs examined effects of ε4dose (noncarriers, heterozygotes, homozygotes) and ST (<480min/day [LowST] or ≥480min/day [HighST]) on memory. Significant ε4dose*ST interactions were found for Auditory Verbal Learning Test Delayed Recall (AVLT-DR; p=.042) and Immediate Recall (AVLT-IR; p=.036). HighST noncarriers outperformed LowST noncarriers (p=.011, p=.005). Within HighST AVLT-DR, noncarriers outperformed heterozygotes (p=.021). Within HighST AVLT-IR, noncarriers tended to outperform heterozygotes (p=.060) and homozygotes (p=.054). Trends for ε4dose*ST interactions were observed for Logical Memory Delayed Recall (LM-DR; p=.076) and AVLT Learning Summary Score (AVLT-LSS, p=.098). HighST noncarriers outperformed LowST noncarriers (p=.019, p=.008). Within HighST LM-DR and AVLT-LSS, noncarriers tended to outperform heterozygotes (p=.053, p=.050). Across these memory outcomes, noncarriers consistently outperformed ε4 carriers under HighST, while within noncarriers, HighST was associated with better performance than LowST. In middle-aged cognitively unimpaired adults with FH+, these findings suggest ε4dose-dependent memory differences may emerge primarily under HighST conditions, alongside unexpected advantages among noncarriers that warrant further investigation.

Culturally Relevant Coping Profiles Among College Students of Color: The Role of Discrimination and Ethnic-Racial Identity

Student Presenter(s): Christian Sharpe, Senior (Psychology)
Faculty Mentor(s): Frances Lobo (Psychology)

Coping refers to how individuals manage stress, and Skinner et al. (2023) framework highlights common coping behaviors, including problem-solving, seeking support, distraction, and adaptation. However, most coping research overlooks how students of color use culturally relevant coping when facing discrimination. This study addresses this gap by examining profiles of culturally relevant coping among college students of color and exploring whether discrimination and ethnic racial identity (ERI) are associated with coping patterns. Participants included 327 college students identifying as Black/African American (n=149), Multiracial (n=85), Latinx (n=52), Asian American (n=27), Native American (n=6), Arab/Middle Eastern (n=4), and Native Hawaiian/Pacific Island (n=2). They completed online surveys assessing culturally relevant coping strategies, discrimination experiences, and ERI (i.e., centrality, private regard, and public regard). Latent profile analysis identified three coping profiles: Shift and Persisters, Distraction Copers, and High Copers. Profiles did not differ in reported discrimination or public regard. However, individuals in the High Copers profile reported significantly higher ERI (centrality and private regard) than other groups. A stronger racial-ethnic identity may promote culturally grounded coping strategies and help individuals better make sense of discrimination and related stressors.

Mind the Gap: Association Between Gold Standard Life Stress Interview Chronic Stress and Personality Traits

Student Presenter(s): Alan Shaw, Senior (Psychology), Ajah Lewis, Junior (Psychology)
Faculty Mentor(s): Suzanne Vrshek-Schallhorn (Psychology)

A recent meta-analysis, Luo et al. (2022), tested relationships between personality traits and stress exposures, mostly using studies relying on self-report life event checklists, which have known validity drawbacks (Monroe et al., 2008). We examined our hypothesis that Luo et al's (2022) findings linking neuroticism to greater stress exposure would extend to gold-standard interview measures of interpersonal and non-interpersonal chronic life stress. Diverse emerging adults (N=166) completed the UCLA Life Stress Interview (LSI; Hammen et al., 1987), in which interviewers rate past-year chronic stress in 10 life domains to create interpersonal and non-interpersonal chronic stress composites. Traits were measured using the International Personality Inventory Pool representation of the NEO Personality Inventory-Revised (IPIP NEO; Goldberg, L.R., 2001). Path analysis tested associations between stress composites and traits, covarying gender. Significant findings were followed with life-domain-level analyses. Neuroticism (but not other traits) was associated with both interpersonal (p<.001) and non-interpersonal (p=.001) chronic stress. In post-hocs, social life, romantic relationships, and family relationships, chronic stress drove interpersonal findings, while academic and personal health drove non-interpersonal chronic stress findings. Thus, we extended the neuroticism findings of Luo et al. (2022) from checklist life stress measures to an interview measure of chronic life stress.

Soil Microbials and the Impacts of Nitrogen
Student Presenter(s): Aubrey Shehan, Senior (Biology)
Faculty Mentor(s): Sally Koerner (Biology)

Soil is a foundational part of terrestrial ecosystems and is critical for their functioning, playing an important role in nutrient cycling, carbon storage, plant productivity, and water filtration. Without healthy soil, soil-dwelling micro-organisms cannot properly grow and flourish, which has negative implications for these critical soil functions they are a part of. Nitrogen addition to soil from sources such as fertilizer can negatively impact these micro-organisms and soil health, thereby affecting plant communities and overall ecosystem health. To determine how nitrogen alters soil microbial communities and whether these changes go on to affect plant communities, I collected soil microbial data from nitrogen-treated and control plots in tallgrass prairie and related this to plant community data available from these same plots. I hypothesized that nitrogen would decrease microbial diversity and that plant diversity would correlate with this change. This project will provide a better understanding of how ecosystem health will be affected by the impacts of nitrogen on soil microbial communities and the tightly linked plant communities that rely on them.

Parents' Use of Internal State Language in Naturalistic Contexts: The Role of Toddler Distress
Student Presenter(s): Jordan Sides, Senior (Psychology)
Faculty Mentor(s): Margaret Fields-Olivieri (Psychology)

Internal state language (ISL) refers to speech that describes mental states, including emotions. Surprisingly, few studies have examined parental ISL during naturalistic interactions or when children are distressed. To address these gaps, we compared parental ISL within high- and low-distress communication samples collected from 25 one-year-olds and their parents using Language Environment and Analysis (LENA), an audio-recording technology that recognizes child verbalizations, cries, and adult speech. LENA identified two 10-minute clips per participant (high and low in toddler distress) from daylong naturalistic audio recordings. Parent speech towards the toddler was coded for ISL. We predicted that parents' ISL would be higher in low-distress communication samples. References to goals/desires/preferences were the most common ISL type, followed by cognition words. Parents used emotion labels and physiological labels infrequently. There were minimal differences in ISL use between low- and high-distress clips. Parents used cognition labels marginally more frequently in low-distress clips, $t(24)=1.814$, $p=.082$, with no other significant differences. Our results address important gaps in knowledge about parents' ISL use in everyday settings. Determining toddlers' goals and desires may be salient within everyday interactions, whereas emotion socialization may not be a high priority. Toddlers' calm states may create more opportunities to comment on cognitions.

Does Attentional Control Link Maternal Reminiscing to School Readiness?: A Mediation Analysis
Student Presenter(s): Serena Silmser (Human Development & Family Studies)
Faculty Mentor(s): Jennifer Coffman (Human Development & Family Studies)

Attentional control is a component of early self-regulation that supports children's ability to manage attention during everyday tasks (Reese et al., 2018) and may contribute to school readiness. Maternal reminiscing, when mothers discuss past events with their children, has been associated with children's cognitive development, including self-regulatory skills (Waters et al., 2019). This study examined whether attentional control functions as a mechanism linking maternal reminiscing to school readiness. The sample included 41 preschool-age children with data on maternal reminiscing, attentional control, school readiness, and maternal education. Ordinary least squares regression was used to estimate a mediation model controlling for education. The indirect effect was evaluated using a Sobel test. Maternal reminiscing significantly predicted attentional control ($b = .05$, $SE = .02$, $p = .021$). However, attentional control did not predict school readiness ($b = 1.26$, $SE = 5.49$, $p = .82$), and the total effect of maternal reminiscing on school readiness was not significant ($c = 1.15$, $SE = .72$, $p = .12$). The indirect effect was not significant (Sobel $z = .23$, $p = .82$), suggesting attentional control did not explain an association between maternal reminiscing and school readiness. Overall, findings did not support attentional control as a mediating mechanism linking maternal reminiscing and school readiness. This indicates that pathways to school readiness may operate through more complex processes than maternal reminiscing and attentional control alone.

Community Hub: Entrepreneurship and Black Los Angeles
Student Presenter(s): Cole Smith, Senior (Media Studies)
Faculty Mentor(s): Paula Damasceno (Media Studies)

Community Hub: Entrepreneurship and Black Los Angelos [WORKING TITLE] is a work-in-progress feature/short documentary that follows Debra and James Smith as they talk about their experiences as restaurant owners, confronting financial stress, struggles with the community, and even historical events like the 1992 LA Riots. Moving between Houston, TX (1984-1987), Los Angelos, CA (1987-1993), and Greensboro, NC (1993-onward). The film explores the idea of perseverance, integrity and family values through interviews and archival photos and footage, asking the big question, "How did they do it?" and "What kept them going?" as we trace through the events that took place in their lives. During a research and shooting trip to Los Angelos in Late February to Early March 2026, we plan on filming an interview from a family member that worked with James and Debra Smith. We also gathered various archives and records that deepened the project's investigation into what the Smiths had gone through and experienced before their success. New footage would include footage of the restaurants that were once owned and operated by the Smiths and the areas that were affected by the Riots revealing how much has changed in the 30 years since they left as well as expanding the film's emotional and political terrain. Formally, Community Hub: Entrepreneurship and Black Los Angelos blends interviews, archival footage and images as well as visual images to accompany certain moments to create an engaging viewing experience. The project is currently around the halfway mark; next steps include further shooting and research in Los Angelos and editing the footage gathered. Ultimately, the film offers insight into a black couple who persevered through difficult circumstances that were happening around them like car jackings, robberies, and most notably the 1992 LA Riots, to become the successful business owners that they became.

The People v. Antigone Harding
Student Presenter(s): Jay Smith, Senior (Drama)
Faculty Mentor(s): Janet Allard (Theater)

The People v. Antigone Harding is a contemporary adaptation of Sophocles' Antigone, set in 2025 in Thebes, Illinois. After twin brothers Ethan (a police officer) and Caleb (a protester) are killed in a protest-turned-riot, Mayor Creon Ashland signs an executive order declaring there will be no mention of, memorial for, or mourning of Caleb Harding, with violations prosecuted. Their sister, high-school senior Antigone Harding, refuses erasure, igniting a student movement which she calls "Truth is Not a Crime" forcing the town to confront what it is and is not willing to silence. As leaked footage and a hidden body-cam recording threaten the official narrative, Antigone's unsanctioned vigil becomes a national flashpoint. In a collision of grief and government, the play puts free speech, civic duty, and moral law on trial, and asks what a community owes the dead when power demands silence.

Implementing Social Justice in Elementary Art Curriculum
Student Presenter(s): Aspen Solis, Junior (Art Education)
Faculty Mentor(s): Maria Lim (Art)

This presentation will examine research on the pedagogical framework of Social Justice in Elementary Art Education (SJAE), and its implementation in elementary-level visual arts curriculum. This is a framework that fosters critical thinking skills, promotes collaboration and community connections in and outside of classroom environments, and allows students to effectively analyze global issues and empower their artistic voices. Common benefits and challenges, as well as personal and professional justifications associated with the framework, will be discussed. This presentation also will discuss how this pedagogical framework enhances and supports professional development. This presentation will contain an overview of practices for aligning lesson planning with reference to this specific framework, that showcase the effects on student engagement, critical thinking, and artistic growth while meeting [state and national] edTPA (the assessment segment of lesson planning) requirements. As well as examples of intended lessons for future reference/use. This presentation will discuss a variety of strategies for incorporating this contemporary conceptual framework into lesson planning, ensuring that this pedagogical approach remains impactful in today's educational landscape.

Created for Us, by Us: The Construction of Sexual Health Education [SHE Rises] Intervention for Sexual Violence among Black Women
Student Presenter(s): Kennedy Strong, Post-Bac (Human Health Sciences)
Faculty Mentor(s): Andrew Lewis (Public Health Education)

Sexual violence is a serious epidemic that disproportionately affects Black women, starting at a young age, Black women are 1.8 times more likely to experience child sexual assault in comparison to White women (Amodeo et al., 2006). We created a day-long intervention targeting educational healing and empowerment for survivors of sexual violence. Participants were Black women ages 18-25 who were enrolled at a large public HBCU or a mid-sized MSI in the southeastern region of the US. Initially, we created a community-based needs assessment to understand Black women's experiences and knowledge with sexual violence. Results from our day-long intervention show significant improvements in emotional well-being, $t(15) = -4.58$, $p = .001$, and greater comfort discussing boundaries, $t(15) = -3.09$, $p = .004$, and contraception, $t(15) = -3.48$, $p = .002$. Participants also demonstrated enhanced perceptions of control over sexual decisions, $t(15) = -1.78$, $p = .048$, and improved ability to achieve sexual and reproductive health goals, $t(15) = -2.08$, $p = .027$. Results from qualitative data show our lesson on "consent" resonated most with participants. These findings support the importance of creating a culturally tailored and intersectional project to target sexual violence education and healing among Black women.

Aptamer-Based Fluorescence Assay for the Detection of Environmental Polystyrene Microplastics
Student Presenter(s): Muhammad Tariq, Post-Bac (Biology)
Faculty Mentor(s): Zhenquan Jia (Biology), Tianqi Song (Joint School of Nanoscience & Nanoengineering)

Microplastics has become a prominent topic in mainstream media and public discourse. Since the 1940s, global plastic production has increased dramatically, reaching an estimated 400.3 million tons in 2022 (Pilapitiya & Ratnayake, 2024). Due to pollution, plastic degrades into microplastics that are widely distributed across ecosystems and detected in the human body. As a result, the scientific community has expressed concern about their potential health effects. Toxicological studies suggest that microplastic exposure may induce oxidative stress, inflammation, and reproductive toxicity (Khan & Zaidi, 2025). Polystyrene is the most common type of microplastic in the environment, making its detection especially important. DNA aptamers are single-stranded DNA molecules that fold into structures capable of binding targets with high affinity and specificity. This experiment explores an aptamer-based fluorescence assay for detecting polystyrene microplastics. The aptamer anchors a DNA hairpin to the polystyrene surface, which upon activation replaces the quenching strand of the fluorophore-quencher reporter complex. This anchors the fluorophore to the microplastic surface for flow cytometry detection. The optimized assay showed that the fluorescence intensity of microplastic samples was significantly higher in the presence of the aptamer system than the control samples, demonstrating that DNA aptamers provide a feasible and sensitive detection strategy.

Testing the impact of a self-regulation-based micro intervention on depression and subjective well-being
Student Presenter(s): Nikolai Tassin, Senior (Psychology)
Faculty Mentor(s): Kari Eddington (Psychology)

Goal pursuit is a fundamental human process that can provide people with positive consequences. Clinical depression can impact the ability of a person to effectively pursue their goals due to a lack of motivation and lack of positive emotion. Self-system therapy (SST) is a short-term intervention for depression that has been shown to significantly increase positive emotional experiences for depressed people by building self-regulation and goal pursuit skills. The present feasibility study uses one component of SST in the form of a novel "micro-intervention," which focuses on goal commitment to isolate and assess the impacts of this micro-intervention on depression levels and subjective well-being in a depressed student sample. The micro-intervention (or control condition) is provided daily for 14 days via smartphone morning and evening surveys, and both depression and well-being are assessed at pre- and post- intervention. It is expected that participants randomly assigned to the SST micro-intervention will show better goal-related outcomes along with a significant decrease in depression levels and an increase in well-being. This poster/presentation will present preliminary findings including rates of compliance with the micro-intervention (including an examination of reasons for noncompliance), pre- and post-intervention depression and well-being, and goal-related outcomes.

Holding Fast or Letting Go: Grit and Goal Adjustment and Daily Goal Pursuit
Student Presenter(s): Nikolai Tassin, Senior (Psychology)
Faculty Mentor(s): Kari Eddington (Psychology)

Grit and goal adjustment capacities are both trait-like aspects of goal pursuit style. The aim of this study is to analyze the predictive capabilities of these trait measures for rates of self-reported daily goal pursuit. The subscales of both trait measures will be used, including perseverance of effort and consistency of interest for grit, and goal disengagement and goal reengagement for goal adjustment. Using secondary data analysis from a sample of university students, various statistical models will be tested to assess relationships between the grit and goal adjustment and how well they predict the frequency of negative/positive affect and high rates of daily goal pursuit. This study has three core hypotheses it aims to test. 1) Grit and goal adjustment will predict daily goal pursuit experiences; goal adjustment will be a better predictor of daily goal pursuit than grit. 2) Grit and goal adjustment will correlate with one another significantly but will not be essentially equivalent. 3) Both grit and goal adjustment will relate to low levels of daily negative affect, high positive affect, and low depression scores overall. The implications of the potential findings of this study are fundamental to creating a baseline in continuing research on goal pursuit.

"Filling in the Holes": Protocol for collecting microstructural variation data of sub-adult long bones
Student Presenter(s): Jonah Tatsapaugh, Post-Bac (Biology)
Faculty Mentor(s): Gwen Schug (Biology)

Although there has been considerable interest in studying bone quality in adults, little research has examined how compact bone develops in infants and children. Consequently, a significant gap remains in our understanding of cortical bone ontogeny during early development. According to Wolff's law, bone shape and density change based on how they are used. Because of this, it is reasonable to assume that the transition to bipedalism influences the morphology and density of leg bones in predictable ways, as they respond to movement and body weight. This study introduces a standardized protocol using Dragonfly 3D World to facilitate accessible, high-resolution imaging of bone development. Our findings have demonstrated that this method produces consistent 2D and 3D metrics across diverse samples, culminating in a comprehensive (N=28) reference database of normal bone growth spanning infancy (3 months) through adolescence (18 years). This framework will continue to grow and provide a necessary baseline for future investigations into pediatric pathologies and nutritional deficiencies.

The Value of The Nutcracker: An Exploration of the Value That the Asheville Ballet's Nutcracker Creates & Captures
Student Presenter(s): Lila Thomas, Junior (Arts Administration)
Faculty Mentor(s): Marian Taylor-Brown (Art)

The Asheville Ballet performs The Nutcracker annually, selling out every show and funding the rest of the season. No other ballet or performance is as financially successful, which is a common phenomenon for ballet companies across the US. To learn why this occurs, Asheville Ballet's Nutcracker and the value creation process was explored. Value creation is an arts administration principle that examines how an organization can transform the artistic resources it has into a product that is more valuable than those resources themselves. Value goes beyond the literal performance, a revelation discovered through personal interviews with experts: the dancers, choreographers, and director of Asheville Ballet. A list of questions was offered to these participants, and their audio recorded responses were combined into a video that focused on their key words that clued to greater values including community, artistic training, monetary support, holiday cheer, magic, and an opportunity to connect with themes about the human experience. Ballet is a vehicle for unspoken storytelling, and this format gave participants flexibility and a voice. Using this information, explorations of new audience engagement and marketing strategies will take place to help the company boost audiences and create more meaningful experiences throughout the season.

Progress on trajectory simulations of neutral polar molecules through a novel analytical instrument called a Quadrupole Mass Starkometer
Student Presenter(s): Parker Till, Senior (Chemistry)
Faculty Mentor(s): Liam Duffy (Chemistry & Biochemistry)

The Stark Quadrupole Guide is a new analytical instrument which our group has been developing in our lab at UNCG. This micro structured device utilizes powerful rapid pulsing electric fields to guide neutral polar molecules in gas phase through the chamber. This device will ultimately be used to separate conformers/isomers of molecules by mass to dipole moment ratio. The timing and field strength must be finely tuned to prevent molecules from crashing into electrodes, allowing them to successfully pass through the chip. Current focus has been on using SIMION ion trajectory software to simulate the trajectory of neutral molecules going through the device at variable voltage and switching frequency. This poster will present the collective efforts that have been made towards developing simulations and what we have learned from the current simulated data. Simulations were run on cis and trans isomers of 3-aminophenol which has corresponding dipole moments of 0.7D and 2.3D. The trans-3-aminophenol reached a maximum transmittance at a switching frequency of 40 KHz, while cis-3-aminophenol has maximal transmittance at 75 KHz.

Cross-section measurements of 191m^Ir production using a rapid irradiated target transfer system
Student Presenter(s): Parker Till, Senior (Chemistry)
Faculty Mentor(s): Sean Finch (Duke department of Physics)

The 191Ir(n,n'γ)191mIr reaction cross section has never been directly measured due to its short 4.9 s half-life. Iridium was used as a neutron fluence monitor during weapons tests and recent neutron dosimetry applications in the stockpile stewardship field have called for improved cross section measurements on iridium. A natural iridium target was activated using monoenergetic neutrons from the TUNL tandem accelerator. Following irradiation, the rapid belt-driven irradiated target transfer system (RABITTS) would transfer the Ir foils to a counting station where two HPGe detectors would measure the gamma rays emitted by the decay of the isomeric state 191mIr. The irradiation and counting cycles were repeated for hours to accumulate data, and the resulting photopeak yield is used to calculate the isomer production cross section. The measured cross sections have an average uncertainty of 4.5% and compare well to previous measurements done at Los Alamos National Laboratory, which relied on nuclear models to assess the feeding of the 11/2- isomeric state.

FLUID INTAKE AND RESTING METABOLIC RATE IN BLACK EMERGING ADULTS
Student Presenter(s): Danielle Titus, Sophomore (Kinesiology)
Faculty Mentor(s): Jessica McNeil (Kinesiology)

Adequate fluid intake may support metabolic processes, where greater fluid intake increases resting metabolic rate (RMR). Black emerging adults (18-28 years) are at a greater risk for both underhydration and related diseases, such as obesity and hypertension, yet few studies have examined these relationships. This analysis assessed associations between habitual water intake with RMR in a sample of Black emerging adults from the Sleep, Health Outcomes, and Body Weight (SHOW) study. Seventy-seven participants (53 females; age, 20 years; BMI, 27.2±7.2 kg/m2) completed a 7-day measurement period. Total water intake (mL) was calculated as the sum of plain water intake, plus water content from self-reported food and other fluid intake and averaged over the study period. RMR (kcal/day) was measured via indirect calorimetry following an overnight fast. Associations between total water intake with RMR were assessed with Spearman correlations. RESULTS: Total water intake was 1751±1030 mL/day and RMR was 1769±394 kcal/day. Greater fluid intake was significantly associated with greater RMR ($r=0.35$, $p<0.01$). CONCLUSIONS: These findings suggest that an increase in water fluid intake may have beneficial effects on resting metabolic function. Support: NIH Grant R01HL163804.

The role of nitrogen in prairie environments: Impacts of long-term elevated soil nitrogen on plant drought resistance
Student Presenter(s): Elliot Turbeville, Senior (Biology)
Faculty Mentor(s): Kimberly Komatsu (Biology)

This study investigates how long-term nitrogen (N) addition influences drought resistance in two dominant prairie species. The research addresses two main questions: (1) How does N addition affect plant drought resistance? and (2) Which physiological and morphological traits are altered by N under drought conditions? I hypothesize that N will initially enhance drought resistance by promoting growth and photosynthetic capacity, but long-term enrichment may reduce ecosystem resilience by favoring fast-growing species over conservative, drought-tolerant ones. To test this, plants will be harvested from long-term N addition and control plots at the Konza Prairie LTER site in Kansas and grown in a 24-week greenhouse experiment. Two species (24 replicates each; N=192) will be subjected to drought and control treatments in deep PVC pots. Droughting will occur between weeks 16–20, with weekly measurements of height, leaf number, water potential, stomatal conductance, chlorophyll content, and photosynthetic rate. At harvest, biomass, root traits, proline accumulation, water content, and tissue nutrients will be assessed. Mixed-effects models will evaluate the effects of N and drought on plant performance. This work will clarify how chronic N enrichment interacts with drought stress, informing predictions of grassland resilience under future global change.

In-Silico Modeling of Naringenin's Antidiabetic Mechanisms
Student Presenter(s): Jadis Vang, Senior (Biology)
Faculty Mentor(s): Yashomati Patel (Biology)

Diabetes is a chronic disease that has risen to 830 million cases in 2022, and the number only continues to grow worldwide. Type 2 diabetes is characterized when the body no longer responds to insulin. Type 2 diabetes is often associated with conditions such as obesity and heart disease. Obesity is characterized by an accumulation of adipocyte size and number. There are currently 6 prescription drugs that treat obesity which is barely a handful of options. (National Institute of Diabetes and Digestive and Kidney Diseases, 2024) A potential lead to a new approach is naringenin, a citrus flavonoid that has shown to regulate glucose and lipid metabolism. (Alam, 2014) Utilizing previous data from our lab collected via phage display resulted in the identification of numerous protein candidates that interact with naringenin, leading us to investigate further technology to narrow the pool of potential protein candidates. Computational modeling in bioinformatics utilizes algorithms, statistics, and simulations to analyze and predict biological systems at molecular levels can be used to identify specific target proteins. The models combine protein behaviors and allow predictions to be visualized. (National Institute of Biomedical Imaging and Bioengineering, 2025) We will use In-Silico software to predict the 3D rendering of protein interactions with naringenin. Which can be used to identify protein targets and facilitate how naringenin alters adipocyte metabolism.

Buffering the Effects of Discrimination: Familism and Private Regard as Protective Factors for Latinx Youth
Student Presenter(s): Valeria Villon, Junior (Sociology)
Faculty Mentor(s): Frances Lobo (Humans Development & Family Studies), Paula Sanchez-Hernandez (Humans Development & Family Studies)

Research indicates that discrimination and chronic stress negatively affect the psychological health and overall well-being of Latinx youth (Umaña Taylor et al., 2024). However, cultural assets such as familisms and ethnic racial identity may buffer these effects (Stein et al., 2023) few studies examine how they operate amidst stressors, including discrimination, economic hardship and acculturative stress (Stein et al., 2023). This study examined whether distress severity from discrimination is revealed to anxiety and depression among Latinx adolescents, and whether familism and private regard moderate these associations while controlling for gender and generational status. Participants were Latinx youth ages 13-18 (Mage= 12.31, SD= 0.95, range= 11-14; 58 boys,51 girls, 3 non-binary; 60% second generation. who completed surveys assessing discrimination, psychological well-being, familism and ethnic racial identity. Higher generational status being male (versus female), and higher familism were associated with lower depression. We found one interaction. When private regard was low, higher discrimination distress was associated with higher depression; however, this effect was buffered private regard was higher. Supporting ethnic racial identity development may help protect Latinx adolescents from the harmful psychological effects of discrimination (Neblett et al., 2012). Findings underscore the importance of culturally competent school-based mental health programming.

A potential role for the ESCRT-III nucleator, Alx1, in mitotic nuclear envelope sealing
Student Presenter(s): Olivia Walker, Senior (Biology), Sage Benders, Senior (Biology)
Faculty Mentor(s): Nick Ader (Biology)

The nuclear envelope (NE) is responsible for maintaining genomic integrity and by compartmentalizing chromatin. In the fission yeast Schizosaccharomyces pombe, a transient mitotic hole in the NE is created to allow insertion of the yeast microtubule organizing complex, the spindle pole body (SPB). We have shown that members of endosomal sorting complexes required for transport (ESCRT) machinery are responsible not only for sealing this NE hole, but for acting as a molecular grommet to maintain mitotic nuclear compartmentalization. Notably, recruitment of ESCRT-III subunits to this hole depends on the NE-specific ESCRT Cmp7, bypassing the need for canonical ESCRT-I/II machinery. Recent work has suggested that other ESCRT-III initiators, such as Alx1, may be involved in nuclear envelope sealing. We examined the localization of endogenously tagged Alx1-GFP, finding this protein specifically localized to the site of NE SPB extrusion with the ESCRT protein Cmp7. However, NE localization was dependent on Cmp7. We determined the approximate copy number of Alx1 to be between 70 and 80 molecules at a NE sealing site using ratiometric quantification of live-cell microscopy images. To ascertain the extent to which Alx1 acts as a nucleator at the NE, we analyzed the recruitment of GFP-ESCRT subunits in an alx1Δ background.

Investigating the role of Vps4 in ESCRT-mediated membrane remodeling
Student Presenter(s): Eva Ward, Junior (Biology)
Faculty Mentor(s): Nick Ader (Biology), William Howlett, (Biology)

Vps4, an AAA-ATPase involved in the building of intraendosomal vesicles (IEVs) and the disassembly of multivesicular bodies (MVBs), is responsible for recycling endosomal sorting complex required for transport (ESCRT) proteins. It is known that ESCRT-IIIs, a subcategory of ECSRTs involved in membrane maintenance and remodeling, assist in sealing the nuclear envelope (NE); however, the time at which Vps4 is involved, and the nature of its association with specific ESCRT-III subunits remains unknown. We hypothesized that Vps4 is required for the assembly of ESCRT-IIIs at a mitotic NE hole and for the sealing of this hole by the ESCRT machinery. To test our hypothesis, we observed the recruitment of GFP-tagged ESCRT-III proteins to a mitotic NE sealing site in Schizosaccaromyces pombe following the depletion of Vps4 using an auxin-induced degron (AID) system. Our studies show that the depletion of Vps4 correlates to the abnormal recruitment of ESCRT-III. This includes a loss of Ist1-GFP and an aberrant accumulation of Cmp7-GFP at a nuclear envelope sealing site. These findings suggest that ESCRT-IIIs are dependent on Vps4 for the assembly and disassembly of subsequent subunits.

Repurposing furniture project
Student Presenter(s): Sophia Weaver, Junior (Interior Architecture)
Faculty Mentor(s): Cameron John (Interior Architecture)

This project explores the creative and sustainable practice of repurposing discarded or outdated furniture into functional, aesthetically refreshed pieces. By combining restoration techniques with innovative redesign, the work aims to extend the lifespan of existing materials, reduce waste, and demonstrate the value of resourceful craftsmanship. The project documents each transformation—from initial assessment and material recovery to design planning, refinishing, and final presentation—highlighting both the artistic and environmental impact of repurposing. Ultimately, this project shows how thoughtful intervention can turn overlooked items into purposeful.

Addressing the Global Antibiotic Resistance Crisis: Isolation and Characterization of Antibacterial Metabolites from Fagus grandifolia
Student Presenter(s): Janae Wofford, Senior (Biochemistry)
Faculty Mentor(s): Nadja Cech (Chemistry and Biochemistry)

The rise of antibiotic resistance is a pressing global health challenge that threatens the effectiveness of current treatments for bacterial infections. Discovering new antibiotics is crucial to ensure we can continue to combat infections that would otherwise become untreatable and potentially deadly. Natural products offer a promising solution to this issue, as they are a rich source of novel compounds with diverse and often synergistic mechanisms of action. In search of these compounds, we explored Fagus grandifolia (American beech) collected from the Guilford Woods in Guilford County, NC. The F. grandifolia methanolic extracts of the leaves were fractionated using flash chromatography, and the resulting fractions were tested for antimicrobial activity. Multiple fractions from the leaf extracts were found to have antimicrobial activity against methicillin-resistant S. aureus (MRSA). Our ongoing work focuses on isolating the active compounds through bioassay-guided fractionation, liquid-liquid partitioning, and further fractionation of the resulting partitions. These efforts, combined with LC-MS analysis, will aid in identifying bioactive molecules that contribute to the antibacterial properties of F. grandifolia. This research advances our understanding of natural product chemistry while addressing the urgent need for new antibiotics to combat drug-resistant pathogens.

Aging Exacerbates Autophagy-Linked Wasting in Tumor-Bearing Mice: Implications for Early Noninvasive Diagnosis
Student Presenter(s): Celleste Wohlfarth, Senior (Biology)
Faculty Mentor(s): Traci Parry (Kinesiology)

Cancer cachexia, a metabolic disorder resulting in severe muscle wasting and functional decline, is more prominent in older patients with more aggressive and advanced stages of cancer. Unfortunately, cancer cachexia is underdiagnosed and undertreated due to the lack of clear standardized diagnostic criteria. Development of noninvasive fatigue and function-based criteria may improve early diagnosis. Therefore, the purpose of this study was to evaluate muscle and fatigue declines of an aged preclinical cancer model. METHODS. Aged male C57/BL6 mice (16-18 months old) were randomly assigned to tumor-bearing (T: LLC 5x10^5 in flank) and non-tumor bearing (NT) groups. Skeletal muscle function, cardiac function, muscle masses, and fatigue were followed throughout the study. RESULTS. The combination of aging and tumor bearing resulted in significant muscle wasting. Mice in the T group exhibited significantly lower body, skeletal muscle, and cardiac muscle mass compared to NT controls ($P<0.05$). This coincided with muscle dysfunction which exacerbated whole-body fatigue in the T group vs the NT group ($P<0.05$). CONCLUSIONS. These findings demonstrate that tumor burden causes significant wasting of heart and skeletal muscle, which results in whole-body wasting, fatigue and muscle dysfunction. These findings highlight the need for standardized noninvasive diagnostic criteria that could ultimately save lives.

Transgenerational Effects of Microplastic Exposure on Tobacco
Student Presenter(s): Jana Yan, Post-Bac (Chemistry), Miles Bellion, Junior (Biology)
Faculty Mentor(s): Jim Coleman (Biology)

Microplastic contamination in soil has been shown to negatively impact plant growth and germination. Despite microplastic presence increasing in terrestrial systems, its effects on plants and the following plant generations is not well studied. In a previous study we conducted, we found that Nicotiana tabacum seeds grown in soil containing 10% polyamide microplastics had significantly lower germination rates compared to seeds grown in control soil. In a follow-up second-generation experiment, seeds from plants first grown in control soil and then exposed to microplastics showed reduced germination. However, seeds exposed to microplastics for two consecutive generations recovered to germination rates similar to the control group, suggesting a possible transgenerational response. To further investigate this pattern, we propose a third-generation study using eight exposure histories across three generations (control [c] or microplastic-contaminated [m] soil): c–c–c, m–m–m, c–c–m, c–m–c, c–m–m, m–m–c, m–c–m, and m–c–c. For each treatment, five seeds from five individual plants will be germinated in five replicate trays under standardized greenhouse conditions. We will measure germination rates, record flowering time, and count the number of seed pods produced. The data will be analyzed using ANOVA to compare differences among groups, followed by Tukey's post-hoc tests to determine which treatments differ significantly. Overall, this study aims to determine whether long-term exposure to microplastics leads to continued suppression, recovery, or improved plant performance, and whether microplastics may act as a selective pressure in terrestrial ecosystems.

The Effects of Biculturalism and Racial-Ethnic Identity in Discrimination Stress and Proactive Coping Among Asian American Adolescents
Student Presenter(s): Michelle Yang, Senior (Psychology)
Faculty Mentor(s): Michaeline Jensen (Psychology), Frances Lobo (Psychology)

Biculturalism has increasingly been viewed as a developmental asset among Asian American youth, particularly in contexts where discrimination is present. Looking into resilience frameworks, this study examined whether biculturalism and racial-ethnic identity can serve as forms of identity resilience, that buffer against the detrimental effects of discrimination on proactive coping among Asian American adolescents. Participants were 91 Asian American youths (M age = 12.21 years, SD = 0.86; range = 11-14; 43 boys, 48 girls; 71% second generation). Using a cross-sectional survey design, adolescents completed self-report measures that assessed their perceived stress severity from ethnic-racial discrimination, proactive coping, and identity resilience (i.e., biculturalism and racial-ethnic identity). Results indicated a contextually dependent pattern. When discrimination stress severity was low, higher biculturalism was associated with greater proactive coping, which suggests that holding both Asian heritage and American identities can promote coping; however, there was no association when discrimination stress severity was high. However, it was also found that higher discrimination, stress severity, and higher biculturalism were linked to lower proactive coping. Discrimination could strain the benefits of identity resilience; if youth feel they are being targeted because of one of their identities, this may inhibit their self-esteem and coping. These findings suggest that biculturalism is a contextual and complex factor when it comes to resilience for Asian American youth, impacted by the severity of discrimination in a youth's environment. Additionally, when identity is considered a psychological consideration, its protective function could be impacted through the severity of discrimination in a youth environment.

The Poplar project: Exploring the Antimicrobial properties of Liriodendron tulipifera
Student Presenter(s): Nigel Yeboah, Junior (Biology)
Faculty Mentor(s): Nadja Cech (Chemistry & Biochemistry), Warren Vidar (Chemistry & Biochemistry)

Antimicrobial resistant bacteria have been associated with 1.27 million annual deaths globally, a number that's risen to nearly 5 million in 2019. The goal of this research is to explore new strategies for treating antimicrobial resistance using natural products from plants. Using an antimicrobial guided assay fractionation process, this project has explored the efficacy of the leaves of Liriodendron tulipifera (tulip poplar) tree against methicillin-resistant Staphylococcus aureus (MRSA). After liquid-liquid partitioning, we observed antimicrobial activity in the chloroform partition against a clinically relevant strain of MRSA. A flash chromatography system was then used to further fractionate the active partition. Of the fractions produced, fraction 3 inhibited the growth of MRSA by 61%. Chromatography, mass spectrometry, and NMR approaches will be employed in our ongoing efforts to isolate and identify the active compounds present in this fraction.

Are We Testing What We Teach? Evaluating Alignment Between Instruction and Assessment in Teaching Molecular Symmetry
Student Presenter(s): Samiah Young, Senior (Biology)
Faculty Mentor(s): Mia Popova (Chemistry & Biochemistry)

Clear alignment between learning objectives and assessments is essential for any instruction, yet this alignment is rarely systematically examined in undergraduate chemistry education. This study investigates how inorganic chemistry instructors communicate learning objectives when teaching molecular symmetry, and the degree to which their assessments reflect those objectives. Course artifacts, including instructional and assessment materials such as syllabi, lecture slides, assignments, quizzes, and exams, were collected from fourteen inorganic chemistry instructors across the United States. We explored multiple analytical frameworks, including Bloom's Taxonomy and the Structure of Observed Learning Outcomes (SOLO) Taxonomy, to evaluate the cognitive demands of stated objectives and assessment items. This process raised important methodological considerations about how existing taxonomic frameworks apply – or fall short – when analyzing discipline-specific chemistry content. We discuss the affordances and limitations of each analytical approach, lessons learned in developing a robust coding scheme for chemistry education research, and how this groundwork positions the project for continued investigation. This work contributes to a broader conversation about instructional design in STEM and the methodological challenges inherent in chemistry education research.

A DNA Aptamer-Based Reaction Gate Cascade for Microplastic Detection: A Fluorescence Kinetic Study
Student Presenter(s): Ryan Zhang, Junior (Biology)
Faculty Mentor(s): Tianqi Song (Joint School of Nanoscience and Nanoengineering), Zhenquan Jia (Biology)

The accumulation of microplastics (MPLs) in human tissues and their potential to cause a range of serious health effects has emerged as a critical concern in environmental toxicology. To better understand the potential health implications of MPL exposure, there is an urgent need for effective detection methods. Current techniques for detecting MPLs include visual classification, spectral analysis, mass spectrometry, and density separation, but each method has significant limitations. Visual classification typically has low accuracy and reliability; spectral analysis methods can be affected by particle shape, size, moisture content, or fluorescent dyes; the diversity of plastic densities limits density separation; and mass spectrometry has limited processing speed and is not well-suited for complex samples. This study designed a DNA-based biomolecular reaction network using DNA aptamers targeting microplastics. A three-gate system consisting of addressing and reaction modules achieved cascade activation via chain substitution. Fluorescence kinetics measured by a microplate reader showed faster fluorescence activation than in the negative control, confirming the functional cascade reaction and the gating design.

COVER DESIGN

This year's Expo cover art was designed by UNCG junior and History major, Natalie Pugh.