Table of Contents

Map of Main Campus Student Center

DINING

EVENT SPACES

RETAIL

SERVICES

STUDENT AFFAIRS

EVENT SPACES

STUDENT AFFAIRS

EVENT SPACES

SERVICES

STUDENT AFFAIRS

Research and Creative Achievement Week Invitation

ECU's Graduate School and Office of Research, Economic Development and Engagement are excited to partner each year for **Research and Creative Achievement Week (RCAW),** which will take place April 1-5, 2024. This week has been set aside to highlight the extraordinary accomplishments of our students in research and creative activities. This year's theme is **Create & Innovate,** and the week includes in-person podium presentations, poster sessions, performances, and showcases, as well as virtual posters featuring the research and creative activities of our undergraduate and graduate students and postdoctoral scholars from across ECU.

These events are a great experience for our students to share their research and creative activity with the university and the eastern North Carolina community. The event will certainly highlight the success of our students and the faculty that work with them. Additional information can be accessed at the RCAW website. Any questions can be sent to this year's co-coordinators of the event. Graduate students should contact Faculty Fellow Dr. Michelle F. Eble. Undergraduate students should contact Director of Undergraduate Research Dr. Tuan Tran.

We look forward to seeing you at the Main Student Center and participating in these events.

Special Thanks to Sponsors, Partners, Organizers, and Mentors

Academic Affairs
Research, Economic Development, and Engagement (REDE)
      Office of Undergraduate Research
      Office of Postdoctoral Affairs
Graduate School

Organizers & Partners

Tuan Tran, RCAW Co-Chair, Director of Undergraduate Research
Michelle F. Eble, RCAW Co-Chair, Faculty Fellow, Graduate School

Tuan Tran, Organizer, Capture 180 Research Challenge
Karen Litka & Robert Hughes, Organizers, LaserTag Capturing the Art of Science Image Competition
Nehad Elsawaf, Chair & Organizer, International Scholars' and Students' Symposium
Stephen Moysey & Grace Gavigan, Organizers, Water Resources Center Stakeholder Summit

Tania Alvarez, Executive Assistant, Graduate School
Marquerite Bond, Administrative Support Associate, Graduate School
Alexis Morris, Business Officer, Graduate School
Anyah Born, Social Media & Admissions Administrator, Graduate School
Taylor Johnson, Social Media Intern, Graduate School
Margaret Macready, Executive Assistant, REDE
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Pamela Hopkins, Director, Center for Communication Excellence
Amy Curtis, Science Librarian, ECU Libraries
University Writing Center
Water Resources Center & Community Partners
Office of Engaged Research

Neuroscience Student Association

George Cherry Jr.	Isaiah Landry
Lawson Cross	Cindy Martines
Cami Fox	David Menjivar
Essence Hopkins	Dalton Rolls
Michelle Jacobs	Yakira Striblin
Aida Khalifa	Ysabella Villacorte
Allie Kondrack	

Thanks to Faculty, Staff, Graduate Students, and Community Partners for serving as moderators and judges.

List of Mentors

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Taylor, Alan
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Tisnado, James R
Tran, Tuan D
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Tutor, Robin Parker
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Vermiglio, Andrew J

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Wilson-Okamura, David
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Xu, Lei
Yang, Li
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Zhang, Yan

Research and Creative Achievement Week Schedule of Events

Monday, April 1, 2024

Capture 180 Research Challenge
2:00-4:30 PM
Preliminary Rounds: MCSC 249 and 253
Final Round: MCSC Black Box Theatre

Tuesday, April 2, 2024

Undergraduate Student Day
8:30 AM-4:30 PM
MCSC Ballrooms A, B, & C
MCSC 253, 249, and Black Box Theatre
MCSC 237

Wednesday, April 3, 2024

Graduate Student & Postdoctoral Scholars Day
8:30 AM-4:30 PM
MCSC Ballrooms A, B, & C
MCSC 253, Black Box Theatre
MCSC 249, 9:00 AM-1:00 PM
MCSC 125, 11:00 AM-3:00 PM

Water Resources Center Stakeholder Summit
1:00 PM-4:30 PM, MCSC 249

Water Resources Center and Community Partner Posters
2:30-4:30 PM
Ballrooms A, B, C

Thursday, April 4, 2024

Capturing the Art of Science /Laser Technologies Application Group (Tag) Keynote
"Understanding the Forces that Divide a Mother Cell – 70 Years of Microscopy"
Caroline Laplante, PhD
Molecular Biomedical Sciences Department
College of Veterinary Medicine, North Carolina State University
11:00 AM
Black Box Theatre

International Scholar and Student Symposium
2:30-5:30 PM
Black Box Theatre

Friday, April 5, 2024

RCAW Awards Ceremony/Luncheon
12:00-1:30 PM, Ballroom A

Small Island Big Song Discussion Panels
Climate Change: Our Response as Artists
1:30-3:00 PM, Black Box Theatre

Indigenous Women Making Traditional Culture Relevant
3:30-5:00 PM, Black Box Theatre

Saturday, April 6, 2024

Small Island Big Song
hosted by S. Rudolph Alexander Performing Arts Series (SRAPAS)
7:30 PM, Wright Performing Arts Center

ABOUT CAPTURE 180

The Capture 180 Research Challenge tasks undergraduates to describe their work in 2-3 minutes, using one static slide or prop. It is based on the popular 3MT® competition for graduate students.

JUDGING & PRIZES

Capture 180 judges are students, community partners, and leaders within various ECU units. They are charged to use the judging criteria of:

- Impact, Comprehension, and Content
- Audience Engagement
- Communication

The challenge is divided into two rounds, a preliminary round with two groups carrying out their presentations in parallel, and a final round. The field is reduced in half after the preliminary round. The final round is composed of presenters who have advanced from the preliminary round. Presenters who do not advance to the final round are cordially invited to attend the final round. In the final round, the presenter who ranks first according to the judges will be the Overall Champion. The audience will have an opportunity to complete an online survey with the same criteria. The presenter who ranks first according to the audience's rating will be the People's Choice winner. Both winners are announced afterwards and receive paperweight awards.

Main Campus Student Center
April 1st, 2024 | 2:00 PM - 4:30 PM

Capture 180 Research Challenge

EVENT ITINERARY

Preliminary Round

1:45 PM – 2:00 PM	Check-In with Moderators
	Group A MCSC 249
	Group B MCSC 253

2:00 PM – 2:45 PM	Presentations
2:45 PM – 3:00 PM	Judge Deliberations
	Final Round Presenters Announced

Final Round MCSC 200

3:15 PM – 3:30 PM	Check-In and Introduction
3:30 PM – 4:15 PM	Final Round Presentations
4:15 PM – 4:30 PM	Judge & Audience Deliberations
	Winners Announced

ACKNOWLEDGEMENTS

Final Round Judges

Dr. Bevley Green
Director of Student Professional Readiness
Academic Affairs

Mrs. Elizabeth McCallister
Director of the Center for Pre-Professional Advising

Ms. Ellen Sheffer
ECU Class of 2013, Psychology BA
Owner, Southern Soleil

Preliminary Round Judges

| Bradly Boaz | Corrina Miller | Kristen Sansone | Carly Villegas |
| Class of 2024 | Class of 2024 | Class of 2024 | Class of 2024 |

Preliminary Round Moderators

| George Cherry Jr. | Ahmad Richardson |
| Class of 2024 | Class of 2024 |

Video and Onsite Assistance

Aida Khalifa
Class of 2026

Group A PRELIMINARY PRESENTATIONS
MCSC 249 1:45 PM -3:00 PM
Moderator: George Cherry Jr.

1. Fibrinogen: The Mastermind Behind Thrombosis in Pregnant Women
Exploring the relationship between fibrinogen and blood clots.
Maria Gonzalez Mundarain (Biology)
Nathan Hudson (Mentor)

2. Trading Light for Food: Bacteria and Squid Team Up to Camouflage with Moonlight
How determining the structure of a protein will aid in developing anti-Vibrio drugs.
Aliza Bista (Biochemistry)
Morgan Eilise Milton (Mentor)

3. Exploring Opportunities for Growth in Mental Health Courts in North Carolina
The NC mental health courts offer additional support for justice-involved induvial experiencing mental illness. Analysis of interviews was conducted to explore how to improve the reach of such courts.
Tierney Reardon (Political science)
Mitzi Pestaner (Mentor)

4. NPCs are the Last Thing You Want Bugged in the Brain Game
Investigating how the brain's neural progenitor cells (NPCs) are impacted by Tuberous Sclerosis, contributing to neurodevelopmental disorders such as autism and epilepsy.
Robin Thomas (Biology with a concentration in Molecular/Cell Biology)
Karen Litwa (Mentor)

5. Emotional Laboring Through Birth: Insights from Doula Volunteers
Mothering the mother and other forms of emotional labor done by doulas. I examine how doulas support patients in the labor and delivery unit to enhance the birthing experience emotionally and physically by navigating pain perception.
Rachana Charla (Biology)
Kristen Myers (Mentor)

6. Examination of Novel Small-Molecule Modulators in Mitigating Learning Deficits in a Mouse Model of Alzheimer's Disease
Not so small: Small-molecule modulators that play a BIG game in learning and memory.
Esha Shah (Neuroscience, Psychology)
Tuan Tran (Mentor)

7. Tracking Cloud Coverage in Matlab
Weather is an important factor in atmospheric acoustic transmission loss. Clouds specifically influence the temperature profile which affects sound propagation at the coast.
Sophie Arruza (Engineering with Electrical and Industrial Concentrations)
Teresa Ryan (Mentor)

8. Nourishing Knowledge
Development and assessment of the Impact of low-health literacy tailored nutrition and healthy living educational handouts in group diabetes management class settings.
Aaditi Kulkarni (Public Health)
Lauren Sastre (Mentor)

Group B PRELIMINARY PRESENTATIONS
MCSC 253 1:45 PM - 3:00 PM
Moderator: Ahmad Richardson

1. Novel Nanoantibiotic Inhibits Pseudomonas Aeruginosa Infections in Muco-Obstructive Lung Diseases
Using amino-functionalized silver nanoparticles (NH2-AgNPs) as breakthrough therapy against tobramycin-resistant P. aeruginosa in COPD and cystic fibrosis patients.
Lauren Garcia (Environmental Health)
Lok R. Pokhrel (Mentor)

2. A Closer Look at Mothers in Rural North Carolina
To provide comprehensive and effective maternal and child healthcare, learning stories from mothers about their experiences can work to improve rural healthcare.
Simona Adhikari (Public Health)
Alice Richman (Mentor)

3. Sustainable Transformation of Fast Fashion Supply Chains: Challenges, Innovations, and Ethical Imperatives
The Fast Fashion Industry has gained widespread attention for its negative impacts on the environment, labor practices, and social responsibility. This project is intended to explore two key challenges associated with the fast fashion supply chains and propose innovative strategies for making them more sustainable for the environment, ethical in their practices while maintaining highest efficiency.
Madison Nay (Supply Chain Management)
John Kirchoff (Mentor)

4. Cell Adhesion Defects in Skin Fragility Disorders
Investigating the molecular mechanisms contributing to skin fragility in two types of ectodermal dysplasias.
Isaiah Proctor (Biochemistry)
Maranke Koster (Mentor)

5. Did You Know That Microplastics Glow?
Quantifying microplastic density in surface and sediment samples in the Tar-Pamlico River and Pamlico Sound using fluorescence microscopy.
Christine Chan (Biology, Environmental Studies)
Rebecca Asch (Mentor)

6. Identifying Molecular Signals that Influence the Assembly of a Stem Cell Microenvironment in Fruit Flies
I study the development of the stem cell niche, a specialized environment, using the fly testis. Specifically, if signals from a group of male specific cells influence niche localization within the testis.
Amanda Rommel (Biology)
Lauren Anllo (Mentor)

7. Predictors of Cognitive Functioning in Infants Visiting the NICU Follow-Up Clinic
How well are your baby's problem-solving skills after staying in the NICU?
Katelynn Teli (Neuroscience, Psychology)
Lauren Sastre (Mentor)

8. Combining Forces Against the Opioid Crisis: Pioneering a Path to Minimize Dependency
Alleviating opioid withdrawal symptoms by harnessing the power of a novel drug combination.
Josie Smith (Neuroscience, Biochemistry)
Kori Brewer (Mentor)

FINAL ROUND PRESENTATIONS
MCSC 200 (Blackbox Theatre) 3:30 PM – 4:30 PM

Capturing the Art of Science

Keynote Address

Dr. Caroline Laplante

Assistant Professor
College of Veterinary Medicine
North Carolina State University

"Understanding the forces that divide a mother cell –
70 years of microscopy"

Caroline Laplante, Ph.D.

📅 Thursday, April 4, 2024

🕐 11:00 AM – 12:00 PM

📍 Main Student Center
Black Box Theatre

Individuals requesting accommodation under the Americans with Disabilities Act (ADA) should contact the ADA Coordinator at least 48 hours prior to the event at 252-737-1018 / ada-coordinator@ecu.edu

Laser Tag Capturing the Art of Science Keynote Address

International Scholars' & Students' Symposium
Thursday April 4th, 2024, 2:30-4:00 PM
Black Box Theater, Main Campus Student Center (200)

The purpose of the International Scholars' & Students' Symposium is to advance ECU's mission of internationalization by fostering research among ECU faculty, students, and scholars. The symposium will not only serve as a platform to provide visibility to international scholars and students, but non-international scholars are also cordially invited to showcase the research that they conduct through international partnerships and collaborations.

2:30-2:40
Opening Remarks: Dr. Nehad Elsawaf – International Scholars' & Student' Symposium Chair and Organizer.

2:45- 3:00
Hemp, The Plant Base Solution to the Reduction of Toxic Construction Debris
Carol Massarra, and Kevin Savidge, Department of Construction Management, East Carolina University, Greenville, NC, 27858

3:00-3:15
Identifying Protective Factors in Primary Care to Mitigate Adverse Childhood Experiences: A Systematic Review Using Ungar's Model
Betül Küçükardalı-Cansever, Abby Elizabeth Caldwell, Natalia Sira, and Angela Lamson, Department of Human Development and Human Performance, East Carolina University, Greenville, NC, 27858

3:15-3:30
Juggling Genre Knowledge in Theses, Dissertations, and Research Articles in Applied Linguistics
Mina Bikmohammadi, Department of English, East Carolina University, Greenville, NC, 27858 And Mahsa Alinasab, Urima University, Urima, Iran.

3:30-3:45
Latino Parents' Experience and Recommendations For Bridging the Gap within Public Schools in Rural Communities in the US
Gibely Cisneros-Estrada and Dr. Bernice Dodor, Department of Human Development and Family Sciences, East Carolina University, Greenville, NC, 27858

3:45
Concluding remarks: Dr. Nehad Elsawaf

Abstracts

Hemp, The Plant Base Solution to the Reduction of Toxic Construction Debris, Carol
Massarra, and Kevin Savidge, Department of Construction Management, East Carolina University,
Greenville, NC, 27858

Conventional construction materials such plaster and drywall, are typically non-toxic; however, they
become breeding grounds for bacteria and toxic mold after becoming inundated with flood water.
These materials are manufactured with gypsum which generates hydrogen sulfide gas as it
decomposes in the landfills. This will increase the generated carbon emissions. Therefore, the need
to implement alternative construction materials that are biodegradable, eco-friendly, and plant-based
are highly needed. This paper aims to assess the reduction of carbon emissions for exterior walls
three types of exterior walls materials (i.e., Common Vinyl Siding wall, Common Brick wall, Hemp
block wall, Hempcrete wall). Six categories of one-story single-family houses in Greenville, NC are
used as a polit study. Global warming potential over 100-year timescale (GWP_{100}) is used to calculate
the generated CO_{2eq}. Thevalues are then compared, and the reduction of carbon emissions is
calculated. Results show that exterior walls made from Hemp Block and Hempcrete release less
CO_{2eq} than common Vinyl Siding and Brick walls. Because of Hemp's unique ability in reducing
CO_{2eq}, Hemp can be considered an ideal material for manufacturing drywall, insulation, and
sheathing products. The use of Hemp in the production of drywall, insulation, sheathing, and
roofing can reduce the amount of toxic construction debris from entering the landfill and prevent
the contamination of the aquifers. This becomes more important in hurricane region areas as
buildings get inundated and more construction waste is generated. In addition, the development of
such products can reduce the financial cost to the homeowners, insurance companies, and federal
government as well as limiting environmental impact that is associated with the recovery process.

**Identifying Protective Factors in Primary Care to Mitigate Adverse Childhood Experiences:
A Systematic Review Using Ungar's Model,** Betül Küçükardalı-Cansever**,** Abby Elizabeth
Caldwell, Natalia Sira, and Angela Lamson, Department of Human Development and Human
Performance, East Carolina University, Greenville, NC, 27858

Adverse childhood experiences (ACEs) profoundly impact physical and mental health throughout
one's lifespan. While research reports on assessment of ACEs in primary care (PC), less is known
about protective factors – crucial for fostering resilience. Using Ungar's Socio-ecological resilience
model, this systematic review investigated how protective factors are assessed within PC screening
for ACEs and their potential to influence patient/health outcomes. PubMed, PsycINFO, and
CINAHL from database inception were searched up until September 30, 2022. Studies without
language and country restrictions were included. A comprehensive search strategy across multiple
databases yielded 764 initial studies. Following duplicate removal and a two-stage review process
with the inter-rater agreement (Cohen's $\varkappa$ = .583, .677), 27 articles met the inclusion criteria. Each
screened adult patients ($\geq$18 years) for ACEs within PC settings and/was assessed for at least one
protective factor. The results were synthesized qualitatively. Studies varied widely in the specific
protective factors that were measured. Based on Ungar's model of resilience, individual factors such
as relationships, identity, and power/control were frequently assessed, in addition to
community/social factors such as cohesion, material resources, and social justice. Only two articles
meaningfully addressed cultural adherence. These findings reveal potential gaps in understanding
how certain protective factors may promote better biopsychosocial-spiritual health for patients in

PC settings, especially within diverse cultural contexts. This review highlights the need for PC research to broaden its focus on a wider spectrum of protective factors, addressing their potential to mitigate the effects of ACEs. It underscores the importance of Ungar's Socio-ecological model for its comprehensiveness yet calls for more culturally sensitive assessment tools and interventions. Understanding which protective factors are most potent within PC settings could enable targeted support and optimize patient health outcomes

Juggling Genre Knowledge in Theses, Dissertations, and Research Articles in Applied Linguistics, Mina Bikmohammadi**,** Department of English, East Carolina University, Greenville, NC, 27858 And Mahsa Alinasab, Urima University, Urima, Iran

This research explores the complex domain of genre knowledge across theses, dissertations, and research articles (RAs) within the field of Applied Linguistics. This study highlights the juggling act that postgraduate students perform in navigating these academic genres. Rooted in Tardy's (2009, 2020) multifaceted framework of genre knowledge, the study investigates the re-positioning and application of genre-specific knowledge (GSK) by master's and doctoral students in an English as an Additional Language (EAL) context in Iran. Through an exploratory qualitative design, which incorporates literacy narratives, sample writings with annotations, and semi-structured interviews, this research seeks to uncover how postgraduate students differentiate and apply their understanding of genre intricacies when writing theses, dissertations, and RAs. Key findings reveal that students struggle with the demands of shifting across genres, facing particular challenges in adhering to genre conventions and expectations. The study identifies significant trajectories of GSK re-positioning, illustrating how students' genre knowledge evolves and adapts to meet the requirements of diverse academic texts. Moreover, the research highlights the pedagogical implications of these findings, suggesting a need for more targeted support and instruction in genre knowledge for EAL students engaged in higher education By mapping out the contours of genre knowledge application across these critical academic texts, the study contributes to our understanding of academic writing in applied linguistics. Also, the study offers insights into the challenges and strategies of postgraduate students dealing with the demands of genre versatility.

Latino Parents' Experience and Recommendations For Bridging the Gap within Public Schools in Rural Communities in the US, Gibely Cisneros-Estrada and Dr. Bernice Dodor, Department of Human Development and Family Sciences, East Carolina University, Greenville, NC, 27858

This qualitative study delves into the intricate experiences and challenges faced by Latino parents as they navigate participation in their children's education within the public school system. A nuanced understanding of the barriers to parental involvement emerged through three focus groups involving 37 participants across elementary, middle, and high school levels. The findings underscored pervasive issues such as language barriers, inadequate access to interpreters, and a prevailing sense of unwelcomeness in schools, which hindered effective communication and engagement. Of particular concern was the prevalent practice of using children as interpreters, highlighting systemic shortcomings in facilitating meaningful communication between schools and Latino parents. Drawing from participant narratives, the study suggests practical interventions to address these challenges, including the provision of interpreters, dissemination of school-related information in Spanish, and the establishment of Latino parent committees within schools. Moreover, the study emphasizes the importance of fostering cultural competency among school staff and administrators

to create an inclusive environment where Latino parents feel valued and respected. Recommendations for systemic reforms at the administrative and policy levels are proposed to address the root causes of these barriers and promote meaningful parental engagement. In conclusion, this research underscores the imperative of bridging the communication gap between schools and Latino parents to enhance educational outcomes for Latino students. By implementing targeted interventions and systemic changes, schools can create a more welcoming and supportive environment, ultimately fostering academic success and reducing educational disparities among Latino students. Further research into parental involvement models and the efficacy of Latino parent committees is recommended to inform evidence-based practices and policy reforms aimed at promoting equity and inclusion in education.

Undergraduate Podium Presentations Tuesday, April 2, 2024

MCSC 249 | **Biomedical Sciences**   **9:00 AM - 10:45 AM**
              Human Health

UPM01 9:00-9:15   *Isaiah Proctor,* Downregulation of Desmosomal Genes Contributes to Skin Fragility in AEC Syndrome

UPM02 9:15-9:30   *Saumya Vithalkar,* Exploring the Connection Between Neurons and Germ Cell Maintenance

UPM03 9:30-9:45   *Kayleigh Fields,* Naloxone Availability in Retail Pharmacies Across the United States

UPM04 9:45-10:00   *Briana Lewis,* Implementation of Medication Disposal Boxes in Pharmacies Across the United States

UPM05 10:00-10:15   *William Outlaw,* Investigating the Role of SRPK on Germline Stem Cell Number in the *Drosophila* Germarium

UPM06 10:15-10:30   *Katherine Freakley,* Digging into the Taphonomy of Human Subadult Remains Interred in Iron Coffins from the Rhem Family Vault, New Bern, North Carolina

UPM07 10:30-10:45   *Nandini Vishwakarma,* Discovering the Mysterious Effects of Intracardiac Dopamine Receptor Signaling

Moderator: Dr. Taylor Johnson
Judge: Dr. Xian Wu

MCSC 253 | **Engineering**   **9:30 AM - 11:00 AM**
              Technology and Computer Sciences

UPM08 9:30-9:45   *Heath Faircloth,* Material Property Investigation of Common 3D Printer Filaments

UPM09 9:45-10:00   *Austin Patrey,* Affordable Pop-Up Homes

UPM10 10:00-10:15   *Kenechukwu Nwadiaro,* Using Computational Fluid Dynamics to Simulate Blood Flow Through Different Banding Geometries of Arteriovenous Fistulas

UPM11 10:15-10:30   *Benjamin Damm,* Revitalization of Legacy Cities Utilizing Sustainable Design Practices

UPM12 10:30-10:45   *Wyatt Searles,* Deployment of EV Charging Stations in Commercial Applications Using Photovoltic Canopies

UPM13 10:45-11:00   *Elizabeth Lambert, Samantha Knox, Oasis Lopez, Alexander Harris*
              Live Light Research Analysis

Moderator: Aadam Bodunrin
Judge: Dr. Suranga K Gunerathne

MCSC 200 | **Business, Community Engagement**   **10:00 AM - 11:45 AM Education, Humanities**
              Interdisciplinary Innovation, Visual Art and Design

UPM14 10:00-10:15   *Jade McNeill,* Amplifying Our Voices: Exploring Black Women Student Leaders Experiences at East Carolina University

UPM15 10:15-10:30   *Brady McKay,* Using Drone Imagery to Analyze Post Disaster Recovery

UPM16 10:30-10:45   *Mackenzie Hudson,* Beyond the Game: Analyzing Fan Bases and Sponsorship Landscapes in North Carolina's Sports Teams

UPM17 10:45-11:00   *Arthur Schupbach,* "It's not that simple. With the Joker, it never is." Othello and The Dark Knight

UPM18 11:00-11:15   *Evan Thornton,* The Convertibility Theory and Privation of Evil, An Analysis of Arguments

UPM19 11:15-11:30   *Hayley Whoolery,* The Individual Village: Exploring Stylization Through 3D Modeling

UPM20 11:30-11:45   *Meredith Wells,* Responding to Student Housing Insecurity at East Carolina University

Moderator: Dr. Randall Etheridge
Judge: Dr. Dennis McCunney

MCSC 249 | **Natural Sciences**   **1:00 PM - 3:30 PM**

UPM21 1:00-1:15   *Eden Stainback,* Courting Male Ruff Sandpipers (*Philomachus pugnax*): Do Males Vary Their Tactics in the Absence of One Morph?

UPM22 1:15-1:30   *Mason Verhaeghe,* Critical Analysis of the Impact Inherent and Applied Tension Have on Fibrinolysis

UPM23 1:30-1:45   *Cameron Grey,* Sexual Dimorphism, Throat Coloration, and the Evolution of Gene Expression in Threespine Stickleback Brain Tissue

UPM24 1:45-2:00   *Charles Brooks,* Examining Population Genetics and Disease Incidence in Local Grass Shrimp Species

UPM25 2:00-2:15   *Kai Davis,* Evaluating Plant-Microbe Associations in Response to Environmental Stressors to Enhance Wetland Restoration

2:15-2:30   **BREAK**

MCSC 249 | **Natural Sciences (cont'd)**   **2:30 PM - 3:30 PM**

UPM26 2:30-2:45   *Stefan Boromisa,* Effects of Auxin and Cytokinin on Cotton Shoot Proliferation *In Vitro*

UPM27 2:45-3:00   *Amelia Moore,* Causes and Consequences of Timing of Ornamental Plumage Molt and Courtship in Captive Ruff Sandpipers (*Philomachus pugnax*)

UPM28 3:00-3:15   *Victoria Gonzalez Mundarain,* Examining Human Fibrinogen's Molecular Structure Using Electron Microscopy

UPM29 3:15-3:30   *Charlotte Grimes,* Effects of Oyster Reef Sanctuaries on Fish Abundance in Pamlico Sound

Moderator: Dr. Juan Beltran-Huarac
Judge: Dr. Adam Offenbacher

MCSC 200 | **Social Sciences**   **1:00 PM - 3:30 PM**

UPM30 1:00-1:15   *Caramia Landis,* Stantonsburg Station: Transforming an Eastern North Carolina Historical Site

UPM31 1:15-1:30   *Noah Walker,* College Students and Sharing Fake News on Social Media

UPM32 1:30-1:45   *Macie Yao,* What Makes a Happy Couple? The Impact of Body Image, Attachment Style, and Mating Motives on Relationship Satisfaction

UPM33 1:45-2:00   *Evan Thornton,* Overcoming Disparities in Disciplinary Practices in Rural Schools

UPM34 2:00-2:15   *Mary Archibald,* Balancing Growth and Heritage: Affordable Workforce Housing's Role in Sustaining Small Town Charm and Economic Development in Beaufort County

2:15-2:30   **BREAK**

UPM35 2:30-2:45   *Grace Messaoui,* The Impacts of Tourism on Jamaican Farming

UPM36 2:45-3:00   *Taylor Smith,* The Effectiveness of Trauma Informed Strategies Training on Teachers Knowledge, Attitudes, and Interactions with Students in Rural Schools

UPM37 3:00-3:15   *Cassidy Fitz-Randolph,* Rape Myth Adherence Among University Students

UPM38 3:15-3:30   *Rachana Charla,* Emotional Laboring Through Birth: Insights from Doula Volunteers

Moderator: Abdulahi Opejin
Judge: Dr. Kirk Miller

Undergraduate Poster Presentations (In-Person) Tuesday, April 2, 2024

Ballrooms | Biomedical Sciences	9:30-11:30 AM

UPR1 9:30-11:30 Force Production of Diverse Populations, Sanderson, Macy Hannah Elizabeth Vanstaalduinen

UPR2 9:30-11:30 C. elegans PUF-9 protective role against stress, Tiet, Alex

UPR3 9:30-11:30 Intrarater and Interrater Reliability in the Analysis of Immunohistochemical Data, Carter, Hayden

UPR4 9:30-11:30 Novel nano-antibiotic inhibits recurrent_*Pseudomonas aeruginosa*_infections in chronic muco-obstructive lung diseases, Garcia, Lauren

UPR5 9:30-11:30 Investigating the role of ElpB and ElpQ paralogs in complement evasion by Lyme disease spirochetes, Matulina, Lara Marie

UPR6 9:30-11:30 Transcriptional control of lipid metabolism in response to traumatic brain injury and aging, Weglarczyk, Paulina

UPR7 9:30-11:30 Quantifying different _-Synuclein oligomeric protein forms, Patel, Mithil

UPR8 9:30-11:30 Colloidal stability of magnetic nanoformulations and their therapeutic properties to treat cancer via magneto-mechanical actuation, Abhulimen, Oisediamehi, Jarrett Douglas, Nagy, Samuel Minier, Yara Fareez Maayah

UPR9 9:30-11:30 Mobile Sensorimotor Integration Assessment Following Repetitive Sub-Concussive Loading, Nelson, Kendall

UPR10 9:30-11:30 Assessing the Role of the Endocannabinoid System in Arsenic Induced Developmental Neurotoxicity, Cross, Monica

UPR11 9:30-11:30 Signals Inducing Gene Expression During Stem Cell Niche Assembly in *Drosophila melanogasterr,* Naumuk, Kirklan

UPR12 9:30-11:30 Evaluating The Stability of In-Vitro Calbindin-D28k, Perretta, Cole

UPR13 9:30-11:30 Perfusing Profusely, a Novel Approach to Sperm Motility Analysis, Harrison, Logan

UPR14 9:30-11:30 Computational Analysis of Fibrin Formation with Light Sheet Microscopy, Miller, Dylan

Ballrooms | Human Health	9:30-11:30 AM

UPR15 9:30-11:30 Preliminary comparison of temporal measures between symptomatic and asymptomatic people with cricopharyngeal dysfunction, Wysor, Wilson

UPR16 9:30-11:30 Evaluating Harm Reduction Services and Opioid Use Disorder Outcomes in Eastern North Carolina Communities: A Research Proposal, Rahilly, Virginia

UPR17 9:30-11:30 Ronald Mcdonald House Strengthening Families During Hospitalization, Soth, Jany

UPR18 9:30-11:30 Influence of Exercise Types during Pregnancy on Maternal Cardiometabolic Profiles, Biancofiore, Grace

UPR19 9:30-11:30 Self-Efficacy and Performance Over Various Trials in a Soccer Shooting Drill, Green, Mary Sophia Elizabeth Fisher

UPR20 9:30-11:30 Comprehension of verb tense in aphasia: Evidence from event-related potentials, McCauley, Colin

UPR21 9:30-11:30 Reliability and Patient Compliance for Nasopharyngoscopy in the Assessment of Velopharyngeal Insufficiency: A Literature Review, Stewart, Emma

UPR22 9:30-11:30 A Neurological Study on the Effect of the Cingulate Cortex in Determining Food Choice in Individuals with Eating Disorders and Active Individuals, Mayo, Caitlyn

UPR23 9:30-11:30 A Closer Look at Mothers in Rural North Carolina, Adhikari, Simona

UPR24 9:30-11:30 Using Film to Understand Nursing Students' Perception for the Care of the LGBTQ+ Patient, Lockhart, Ryan

UPR25 9:30-11:30 Exploring Intercultural Nutrition Guidance Through International Virtual Exchange,

Briggs, Lauren

UPR26 9:30-11:30 Comparison of Heat Stress Risk Within Crops Rows to Perimeter in Sweet Corn and Tobacco Fields, Lanier, Noel Ryan Michael Edwards

UPR27 9:30-11:30 My Experience as a Social Work Student in Carteret County Schools and the Risk for Substance Abuse Within the School System, Ellsworth, Kearstyn

UPR28 9:30-11:30 Expanding Naloxone Access in Rural Communities in North Carolina, Guter, Meghan

UPR29 9:30-11:30 The Effects of Commercial Grade E-Cigarette Chemical Ratios and Nicotine Strength on the Gravimetric Filter Correction Factors and Real-Time Measurements, Walker, Daniel

UPR30 9:30-11:30 Educational Program Development for Parkinson's Disease and Parkinson's Disease with Dementia Caregivers, Chen, Bonnie

Ballrooms | Education	**9:30-11:30 AM**

UPR31 9:30-11:30 Evaluation of MagicSchool AI-Generated Elementary Teaching Materials: A Self-Study, Carr, Leah

UPR32 9:30-11:30 A Counting Lesson Ending in Defeat, Lozner, Alexis

UPR33 9:30-11:30 Initial Evaluation of an After-school Reading Tutorial for 2nd and 3rd Grade Students: Lessons Learned and Next Steps, Williams, Caroline

UPR34 9:30-11:30 Development of a Student-Led, Student-Focused Mentorship Program for the ECU Honors College Perkins, Kasey Whitley Lauren McCoy, Kylie Wynn Murray

UPR35 9:30-11:30 Is the Goldman Fristoe Test of Articulation an unbiased assessment of speech sound production skills for Southern American English children ages four to five, Whitley Dockery, Sarah Nasser

UPR36 9:30-11:30 How has the community school framework impacted family support for learning at P.W. Moore Elementary?, Day, Jamie Brooklyn Emily Buchanan, Remington P Sullivan"

UPR37 9:30-11:30 Is there a bias against Southern American English (SAmE) speakers in an undergraduate college classroom, Williams, Abigale Reagan Danielle Hall

UPR38 9:30-11:30 Enhancing Electrical Systems Technology Education: A Study on Virtual and Augmented Reality Integration in Community Colleges, Hada, Dhwaniben Kailee Ann Grubbs, Jameson Johnson Gerdts, Aliah Mikelle Spencer, Stephanie Marie Stewart

Ballrooms | Natural Sciences	**9:30-11:30 AM**

UPR39 9:30-11:30 Characterizing Inherited Patterns of Nicotine Use Behavior using a *c.* elegan Transgenerational Model, Yendamuri, SriPallavi

UPR40 9:30-11:30 An Update to Expression and Purification of Cryptochrome 4 from Bacterial Cultures, Burris, Alyssa

UPR41 9:30-11:30 Novel Synthesis of Biologically Significant Beta-Carbolines, Fisher, Alexander

UPR42 9:30-11:30 Hypofibrinolytic defect affects on natural fibrin fiber digestion. , Sowers, Hannah

UPR43 *Withdrawn*

UPR44 9:30-11:30 Understanding the role of translation factor eIF4G in germ cell and embryo protein synthesis. , Barker, Brooke Chloe Wethington Cannon

UPR45 9:30-11:30 Using Biodiversity to Assess Restoration Success and Monitoring Effectiveness, Mendoza, Ulises

UPR46 9:30-11:30 Evaluation of High-Performance Liquid Chromatography Column Health Using the Hydrophobic-Subtraction Model Following Controlled Degradation, Ocampo, Carlos

UPR47 9:30-11:30 Characterization of background dependent effects of *zfl1;zfl2* double mutants in maize development, Pakulniewicz, Emma

UPR48 9:30-11:30 Nutrient enrichment effects on wetland soil bacterial traits, Kidimbu, Glory

Ballrooms | Multidisciplines   10:00 AM-12:00 PM

UPR49 10:00-12:00 Sustainable Horizons: Exploring design initiatives to shape vibrant college town, Greenville, NC., Lopez, Oasis

UPR50 10:00-12:00 Autism Intervention Awareness in Eastern North Carolina, Sydney Grace Faulk, Hannah Claire Davis

UPR51 10:00-12:00 Teaching Fraud Prevention to Seniors That email may not be your grandson; check it first, Clinefelter, Austin

UPR52 10:00-12:00 Depth-based Action Recognition for Home Health Care Applications, Reyes, Saul

UPR53 10:00-12:00 Eternal Light: Two Holocaust Survivors' Stories Of Perseverance, Meltsner, Jack

UPR54 10:00-12:00 EdAccess: A Resource Compilation for English Learners (ELs) and People With Intellectual Disabilties (ID), Adgate, Sophie

UPR55 10:00-12:00 Knife Building Creative Portfolio, Watkins, Noah

UPR56 10:00-12:00 Innovation Project: Designing an App to Help with Household Inventory, Dixon, Sydney

UPR57 10:00-12:00 Railcare Health: An undergraduate-led mobile health clinic, Juhl, Benjamin

UPR58 10:00-12:00 How Preferred, Neutral, and Disliked Music Affect Entrainment and Heart Rate in Adults, Miller, Corrina

UPR59 10:00-12:00 AI Enhanced Brain Signal Location, Schulteis, Sariah

UPR60 10:00-12:00 Exploring Text Animation in Motion Graphics,Berkman, Thomas

UPR61 10:00-12:00 Analysis of the Factors Influencing the Adoption of Telehealth Services among Acute Care Hospitals in the U.S, Boaz, Bradly

UPR62 10:00-12:00 Typographic Experimentation and Creative Expression, Cook, Sydney

Ballrooms | Human Health   10:00 AM-12:00 PM

UPR63 10:00-12:00 Understanding the role of dental providers in Human Papillomavirus (HPV) prevention, Bowen, Mackenzie

UPR64 10:00-12:00 Barriers and Facilitators to Rural Opioid Harm Reduction Programs, Dracup, Erin

UPR65 10:00-12:00 Student Perceptions of Major Health Needs Among Adult Refugees from Ukraine, Makanangot, Neha

UPR66 10:00-12:00 Heterogeneity in cancer burden and control among black immigrants in the US: A systematic review of the literature, West, Tyler

UPR67 10:00-12:00 Mini Pantry at Carol G. Belk, Williams, Iyaira

UPR68 10:00-12:00 What types of physical activity do postpartum women engage in?, VanWynsberg, Aubrey

UPR69 10:00-12:00 Education and Confidence of Nursing Care for Patients with Autism, Arensman, Rebekah

UPR70 10:00-12:00 Impact of Aerobic Exercise on Blood Pressure, Faulmann, Emma

UPR71 10:00-12:00 Fostering Trust and Enhancing Vaccine Equity within Spanish Speaking Populations, Puente-Herrera, Mariana

UPR72 10:00-12:00 Utilizing the Health Belief Model to Optimize Patient Education Within FSPRx, Siddiqi, Imaan

UPR73 10:00-12:00 Volumetric Measurement of the Tensor Veli Palatini in Children: A Preliminary Normative Study, Gillespie, Julia

UPR74 10:00-12:00 The Influence of Brain Stimulation on Social Language Processing: A Focus on the Right Temporo-Parietal Junction, Burney, Jewlia

UPR75 10:00-12:00 Determination of PFAS Concentration using LC-MS/MS analysis, Carter, Lauren Riley Lauren Frechette

UPR76 10:00-12:00 The Effects of Power Settings and Liquid Flavors on the Gravimetric Filter Correction Factors and Real-Time Measurements, Piner, Emma Gabriela (Gaby or Gabriela) Nicole Perez

UPR77 10:00-12:00 Evaluating access to oral healthcare in pregnant patients., Sheaffer, Lucy Anna

UPR78 10:00-12:00 The Effect of Preparatory Hip Muscle Activation on Lower Extremity Biomechanics during a Vertical Drop-Jump Task, Kim, Katherine

UPR79 10:00-12:00 Parent Perspectives on Speech-Language Therapy Delivered via Telehealth During and After the Pandemic, Fromm, Caitlin

Ballrooms |Social Sciences   **10:00 AM-12:00 PM**

UPR80 10:00-12:00 Perceptions of Later Life Physical Activity in Former Black Male College Athletes, Lawton, Darius

UPR81 10:00-12:00 Young Adults' Use of Technology for Finding and Maintaining "Talking", Dating and Committed Relationships, Kibler, Kristy Chloe Anne Cooper,Allison Kelly Robinett"

UPR82 10:00-12:00 Are they thinking about me? The impact of age metastereotypes on threat and avoidance, Cannon, Kaitlyn Isamar Ponce Ponce, Thomas M Evans, Matthew Brice Nobles

UPR83 10:00-12:00 Autism Traits Influence Neural Correlates of Sarcasm Processing: Evidence from Event-Related Potentials, Povlich, Rindi

UPR84 10:00-12:00 Nourishing Knowledge: Development and Assessment of the Impact of Low-Health Literacy Tailored Nutrition and Healthy Living Educational Handouts in Group Diabetes Management Class Settings, Kulkarni, Aaditi

UPR85 10:00-12:00 Physical Activity Programming for Underserved Patients, Tarkington, Kensey

UPR86 10:00-12:00 Evaluating the Impact of Social Media Influencers on Exercise Addiction in College-Aged Women, Darby, Leah

UPR87 10:00-12:00 Effects of Relaxation on Adults, Juergens, Eleanor

UPR88 10:00-12:00 Adjective Comprehension in aphasia: Evidence from eye-tracking, Evans, Grace

UPR89 10:00-12:00 Barriers and Motivators for Participating in Mindfulness-Based Interventions in Emerging Adults from Underrepresented Racial/Ethnic Group, Signorelli, Jordan

Ballrooms | Biomedical Sciences   **1:00-3:00 PM**

UPR90 1:00-3:00 Mammalian Sperm Heterogeneity During Capacitation in *mus musculus*, Charles, Aidan

UPR91 1:00-3:00 Source Localization of Event-related Components for Lexical Decision Tasks, Leland, Margaret

UPR92 1:00-3:00 In vivo interaction between SARS-CoV-2 and alpha synuclein performed fibrils, Omair, Ayesha

UPR93 1:00-3:00 *Time of Day Effect on Knee Osteoarthritis Loading*, Morgan, Daniel

UPR94 1:00-3:00 Immunotoxicity of understudied PFAS found in North Carolina, Wittenborn, Matthew

UPR95 1:00-3:00 Analyzing the Impact of Pain Medication Usage on Antibiotic Resistance Patterns, Bista, Aliza

UPR96 1:00-3:00 The Role of Myoferlin and SREBP2 in HTLV-1-Infected T-Cells: Implications for Adult T-Cell Leukemia (ATL) , Kalu, Anyanso

UPR97 1:00-3:00 A Rapid Review of Parental Bereavement Interventions and Implications for Clinical Practice, Ramkumar, Rhea Abigail (Abby) Joan Floyd

UPR98 1:00-3:00 Estimating the spermatogonial stem cell population in adult mice based on response to retinoic acid, Thomas, Matthew

UPR99 1:00-3:00 How can two different microscopes image the same cell differently, Lilley, Rosario Sierra Nicole Carr, Kendall Marie Wilkerson

UPR100 1:00-3:00 Magnetic Control of Protein Expression Via Magneto-Mechanical Actuation, Dedakia, Dhanushi Amara Ysabella Moeller

UPR101 1:00-3:00 Adhesion-Mediated Synapse Formation in Developing Neural Networks, Desert, Gaelle

UPR102 1:00-3:00 Unraveling the Role of Mitochondrial Cofilin in Apoptosis Regulation, Pizani, Bruno

UPR103 1:00-3:00 Examination of Novel Small-Molecule Modulators in Mitigating Learning Deficits in a Mouse Model of Alzheimer's Disease, Shah, Esha Marcus Jizong Apodaca, George Cherry

Ballrooms | Human Health   1:00-3:00 PM

UPR104 1:00-3:00 Measurement of Nursing Faculty Informatics Competency, McCunney, Nora
UPR105 1:00-3:00 The Relationship between Level of Physical Activity (LPA)_vs. Speech Perception
Abilities, Gavankar, Marysa
UPR106 1:00-3:00 Motivational Climate Development During Shooting Performance, Urbanski, Rachael
Sydney Alexandra McIntyre, Elliott Brogden Jones, Robert (Blake) Blake Birdsong, Stephanie Joyce
Flores, John Carlo Mallett
UPR107 1:00-3:00 Nurse Retention in the Acute Care Setting, Thomas, Emma
UPR108 1:00-3:00 Complexity of Walking With and Without Balance Perturbations, Blackburn, Hannah
UPR109 1:00-3:00 The Impact of Sustained Phonation on the Velopharyngeal Mechanism: A Literature
Review, Jones, Loghan
UPR110 1:00-3:00 Spring Evaluation and Calibration of Low-Cost Aerosol Sensors, Brannin, Michael Sarah
Elizabeth Fresquez
UPR111 1:00-3:00 Hand Arm Bimanual Intensive Therapy Improves Spatiotemporal Characteristics of
Bimanual Coordination in Children with Unilateral Cerebral Palsy, Donnelly, Holly
UPR112 1:00-3:00 Do Developmental Factors Impact Interpretability of Nasopharyngoscopy
Data?, LaFevers, Lydia
UPR113 1:00-3:00 Characteristics of Critically Ill Hemodialysis Patients with a Pressure Injury, Stafford,
Briley
UPR114 1:00-3:00 A Volumetric Analysis of the Buccal Fat Pad in Children with a Repaired Cleft Palate,
Apodaca, Marcus
UPR115 1:00-3:00 The influence of maternal exercise types on one-month infant body composition and
blood lipids, Beaman, Meredith
UPR116 1:00-3:00 More Than Words Program and Its Associated Benefits: A Review of the Literature,
Connor, Sarah Mckenzie
UPR117 1:00-3:00 Stressors and their Effects on Students Living in Dorms on Campus at ECU,
Whittington, Crosby Donald Tyler Luckett, Silvia (Silvia-Aurora) Aurora Perez-Deluna

Ballrooms | Natural Sciences   1:00-3:00 PM

UPR118 1:00-3:00 Synthesis of Biembellin, Geib, Matthew
UPR119 1:00-3:00 Determining The Best Housing Practices For Guinea Pigs, Rats, and Rabbits, Mozingo,
Macey
UPR120 1:00-3:00 Investigating Cadmium, Lead, and Calcium Binding to Full-length Human Cardiac
Troponin C Using Intrinsic Fluorescence, Ashton Fields, Rudy Sengelmann, Riley Warfel, Mac
Harrison, and Anne Spuches
UPR121 1:00-3:00 Polygraph tests, Khanmohammadi, Saba
UPR122 1:00-3:00 The Effect of Fiber Tension on Blood Clot Digestion (Fibrinolysis), Packard, Joshua
UPR123 1:00-3:00 Investigating the spread and infection prevalence of a marine
parasitic bopyrid (*Aporobopyrus curtatus*) within its non-native host, the green porcelain crab
(*Petrolisthes armatus*) , Zamudio-Jimenez, Enrique
UPR124 1:00-3:00 Examining the diet of a watchlist bird, the prothonotary warbler (*Protonotaria citrea*), using
DNA barcoding techniques, Strandberg, Anna
UPR125 1:00-3:00 Title: Quantum Tunneling Effects in Rice Lipogeneses (OsLOX) Herring, Madeline
UPR126 1:00-3:00 Separation and Quantification of 15d-PMJ2 in Micelle Samples As an Anti-Cancer
Therapeutic Using LC-MS/MS, Hindi, Malak
UPR127 1:00-3:00 Impact of Ship-Channel Dredging on Zooplankton Abundance and Species Composition
in Summer Months in Beaufort Inlet, North Carolina, Johnson, Taniya Lulea Dai Adams,Abigail
Faith Alford

Ballrooms | Social Sciences   1:00-3:00 PM

UPR128 1:00-3:00 Understanding voluntary self-exclusion across the U.S.: A comparative analysis of state-wide voluntary self-exclusion applications for individuals seeking to limit access to gambling, Morrison, Cassidy

UPR129 1:00-3:00 LISTEN, BREATHE, MOVE - A PILOT WORKSHOP FOR INFORMAL/FAMILY CAREGIVERS, Dickerson, Ashby Margaret (Maggie) Grace Ford

UPR130 1:00-3:00 Wearable Device Use and Mental Health, Chapman, Kimbal

UPR131 1:00-3:00 Trait mindfulness and its effect on the use of conflict resolution strategies in close relationships and subsequent relationship satisfaction, Soto-Garcia, Nancy

UPR132 1:00-3:00 Is the Organization Keeping their Promise? The role of Aging and Stereotypes in Psychological Contracts, Branch, Melanie Gillian Kay Christman, Kaitlyn Paige Cannon, Isamar Ponce Ponce, Matthew Brice Nobles, Melanie Alice Branch"

UPR133 1:00-3:00 New team tug-of-war task communication and effort based on individual social identity, Nixon, Samantha

UPR134 1:00-3:00 Exploring Opportunities for Growth in Mental Health Courts in North Carolina, Reardon, Tierney

UPR135 1:00-3:00 Pirate Swap, Burcham, Macie Natalie J Martin, Lawrence Meshaun Newkirk,Anna Katherine Thomas, Amy Michelle Fadelici, Tia Shum

UPR136 1:00-3:00 Modernization and Human Growth in Milan, Italy, Curtis, Eleanor

Ballrooms | Interdisciplinary Innovations   1:00-3:00 PM

UPR137 1:00-3:00 Human Nature and Human Action: A Collaborative Approach to Decision Making, Evans, Ayri

UPR138 1:00-3:00 A Praxeopsychological Approach to Online Marketing and Content Creation, Seawell, Elise Daniel Christopher Franklin

UPR139 *Moved to Wednesday, 2:30-4:30, Writing Resources Center Poster*

UPR140 1:00-3:00 Exposure of Undergraduate Nursing Students to Translational Science: A Quantitative Study, Asby, Bryce

UPR141 *Moved to Wednesday, 2:30-4:30, Writing Resources Center Poster*

UPR142 *Moved to Wednesday, 2:30-4:30, Writing Resources Center Poster*

UPR143 1:00-3:00 T-Shirts to Totes: How T-Shirts Impact the Environment, Johnston, Jessica

UPR144 1:00-3:00 Innovation in Medical Education: Crafting a 3D Printed Female Pelvic Model, Mathew, Joanna Yanni Peter Pavlikianidis

UPR145 1:00-3:00 Diurnal concentrations of eDNA of threatened juvenile river herring species in the lower Roanoke River, Bailey, Camden

UPR146 1:00-3:00 An Efficiency Analysis of Intercollegiate Athletics Hefner, Claire

UPR147 *Moved to Wednesday, 2:30-4:30, Writing Resources Center Poster*

Ballrooms | Engineering   1:30-3:30 PM

UPR148 1:30-3:30 Analyzing Aesthetic and Material Properties in Product Design, Mata-Delgado, Yasmin

UPR149 1:30-3:30 Using the Critical Path Method CPM (CPM) for Evaluating Allocation Potential of Temporary Housing Unit Design, Wilson, Josey

UPR150 1:30-3:30 LoRaWAN Solution for Automated Water Drainage of Agricultural Fields, Exum, Cris

UPR151 1:30-3:30 Utilizing 3-D Building Information Modeling (BIM) Approaches to Propose Novel Post-Disruption Housing Designs using the Modularity of Recycled Shipping Containers, Boardman, Stavros Josey Marie Wilson

UPR152 1:30-3:30 Supercritical Water Desalination Technology, Hindi, Alqasem

UPR153 1:30-3:30 Constructing a Prototype for a Flow Reactor Prototype for Continuous Flow Catalysis, Akinbanjo, Awesome

UPR154 1:30-3:30 Simulation of Student Traffic, Arruza, Sophie

UPR155 1:30-3:30 Neural Identification of Design Fixation using Functional Near-Infared Spectroscopy, Rumble, Leah

UPR156 1:30-3:30 Vertical Axis Wind Turbine Active Blade Pitch Control and efficiency, Graham, Matthew

UPR157 1:30-3:30 Mix Optimization and Final Compressive Strength Prediction of Geopolymer Concrete, Ellis, Robert

UPR158 1:30-3:30 Identifying Optimal Workflow in Pulmonary Hypertension Patients, Simpson, Lauren

Ballrooms | Social Sciences   1:30-3:30 PM

UPR159 1:30-3:30 Soul Food: An Examination on the Physical Activity of Black Women, Walker, Jalen

UPR160 1:30-3:30 Personality and Aggression, Graham, Ethan

UPR161 1:30-3:30 Dentists and HPV Prevention: Understanding how dental providers can help reduce HPV-related head and neck cancers, Bagwell, Faith

UPR162 1:30-3:30 Trauma Center Trauma-Sensitive Yoga Programs on Campus: Student Needs, Interest, and Preferences, Buford, Aaliyah

UPR163 1:30-3:30 Predictors of Cognitive Functioning in Infants Visiting the NICU Follow-Up Clinic, Teli, Katelynn

UPR164 1:30-3:30 Examining Levels of Loneliness and Social Anxiety in College Students and Their Relationship Across Different Phases of The Pandemic, Signorelli, Jordan

UPR165 1:30-3:30 Relationships of Self-Construal with Reporting Symptoms of Anxiety and Depression, Kinnaman, Kolby

UPR166 1:30-3:30 GENDER DIFFERENCES IN TEACHER RATINGS OF ANXIETY IN ELEMENTARY SCHOOL, Farrar, Owen

UPR167 1:30-3:30 Investigating the Impact of Childhood Social Support and Environmental Unpredictability on Adult Attachment Styles: An Online Survey Analysis, Harris, Nevaeh

UPR168 1:30-3:30 Defining Passionate Leadership: An Assessment of Effectiveness, Fleishman, Lindsey

Ballrooms | Natural Sciences   1:30-3:30 PM

UPR169 1:30-3:30 Preliminary Assessment of Flood Potential and Treatment of Sediment by Dry Detention Basins in Greenville, NC, Landreth, Camryn Paige Elise Brown

UPR170 1:30-3:30 Optimizing the Expression and Purification of the C-terminal Domain of Human Cardiac Troponin C for Fluorescence Studies with Calcium and Cadmium Binding, Sengelmann, Rodolfo

UPR171 1:30-3:30 Can you make me stronger?: Antibiotic resistance of *Pseudoalteromonas spp.* & *Bacillus spp.* to prevent corrosion on micro-ecosystems, Amick, Savannah

UPR172 1:30-3:30 Embedding Acid Scavengers into Melamine/ Formaldehyde Polymers Morales, Rodriguez, Yasmin

UPR173 1:30-3:30 Seedbank analysis of invasive and native plant species found in the soils of a local greenway, Nieves, Kayleah Amelia Claire Moore

UPR174 1:30-3:30 Kinetic Investigations of Solvent Effects on Human Epithelial 15-Lipoxygenase-2 (15-LOX-2), Patel, Soham

UPR175 1:30-3:30 Fibrinogen: The Mastermind Behind Thrombosis in Pregnant Women, Gonzalez Mundarain, Maria

UPR176 1:30-3:30 Illuminating Collagen: Exploring Triple Helix Formation with Fluorescence Kinetics, Smith, Rachel

UPR177 1:30-3:30 Investigating the restoration success of living shorelines using parasites, Zango, Louise

UPR178 1:30-3:30 Soil seedbank study of a recovering meadow community of pollinator-friendly species,

Butts, Carson

UPR179 1:30-3:30 The Effect of Knee Extension at Impact from Landing on Femoral Cartilage Thickness in Recreationally Active Adults, Goodwin, Connor

UPR180 1:30-3:30 Protein Biomarkers for Mitochondrial Dynamics in the Forebrain of Aging Rats, Phipps, Mary

UPR181 1:30-3:30 The importance of the novel desiccation tolerance factor *dtpC* in *Acinetobacter baumannii*, Li, Gary

UPR182 1:30-3:30 Neuroimmunotoxicological effects of short-term exposure to PFAS found in North Carolina surface waters, West, Yveonna

UPR183 1:30-3:30 The Detection of Heavy Metals in Teeth Using XRF Measurements, Wells, Mary

UPR184 1:30-3:30 Structural abnormalities that result in functional impairments due to metabolic disease, Castro, Jasmine

UPR185 1:30-3:30 Developing a systematic review of the neurotoxic effects of per- and polyfluoroalkyl substances, Moore, Ashanti

UPR186 1:30-3:30 How does anxiety influence shooting performance? , Cleary, Ellie

UPR187 1:30-3:30 Identifying compounds that block HTLV-1 infection and pathogenesis, Gibson, Gabiel

UPR188 1:30-3:30 The Efficacy of Blue Light in Decreasing Physiological Fear Responses, Muhammad, Kamilah

UPR189 1:30-3:30 Determining the Effect of Sex on Femoral Cartilage Thickness (FCT) Changes Following Drop Jumping Activities in Healthy Individuals, Vesper, Starrett

UPR190 1:30-3:30 Development of novel molecular optogenetic tools to study Hirano body formation in neurons, Becton, Maelee

UPR191 1:30-3:30 MADCAM-1 and TNF-α Expression Reduced in GPR4 Knockout Mice Given Immune Checkpoint Inhibitor Immunotherapy, Boldt, Lucas

UPR192 1:30-3:30 Mineralizing a Dentin-like Structure for Clinical & Educational Applications with Calcium Phosphate and gelMA, Gentle, Bailey

Undergraduate Online Poster Presentations (Synchronous via MS Teams)

Undergraduate Online Poster Presentations (Synchronous via MS Teams)
TUESDAY 4.2.24

1:00 PM - 4:10 PM

UOP01 1:00-1:15
Social Sciences

Jillian Conroy
Assessing First-Year Physician's Assistant Students About Physical Activity
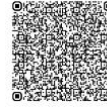
UOP02 1:25-1:40
Social Sciences

Allison Davis
The Influence of Multisensory Spaces on the Physiological Stress of Individuals with Autism/Sensory Processing Disorder

UOP03 1:50-2:05
Business

Bryce Herring
Beyond the Ledger: Exploring Student Perspectives of Accounting and Investigating the Growing Shortage of Accounting Professionals

UOP04 2:15-2:30
Interdisciplinary
Innovation

Carson Allred
Micro-Influencer Marketing in the Fashion Industry:
The Effectiveness of Tik Tok Campaigns Among College Females

Undergraduate Online Poster Presentations (Synchronous via MS Teams)
TUESDAY 4.2.24

1:00 PM - 4:10 PM

Scan a QR Code next to presenter's talk. This leads to the presenter's Microsoft Teams Meeting link. Links are also embedded in the QR codes. Simply click.

UOP05 2:40-2:55
Human Health

Rachael Kluge
Teaching Strategies for Developing Emotional
Intelligence in Nursing Students: An Integrative Review
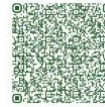
UOP06 3:05-3:20
Human Health

Nathan Mizell
Digital Technology and Resource Provision to Advance
Digital Equity in Eastern North Carolina
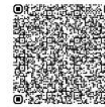
UOP07 3:30-3:45
Social Sciences

Lindsay Hamilton
Assessing Undergraduate Student Nurses Perception of Quality
Improvement
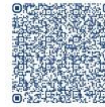
UOP08 3:55-4:10
Human Health

Riley Houser
The Effects Pediatric Simulation Has on the Confidence and
Physiological Processes of Accelerated BSN Students
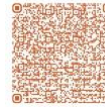
Graduate Student Podium Presentations Wednesday, April 3, 2024

MCSC Black Box Theatre | Fine Arts, Visual Art, and Design   9:00 AM - 10:15 AM

GPP 9 9:00-9:15   Visceral Narrative, Haley Mcelroy
GPP 10 9:15-9:30   Unveiling Ornamentation in Public Spaces: A Jeweler's Perspective, Chase Shotton
GPP 11 9:30-9:45   77%, Tamla Boone
GPP 12 9:45-10:00   Dueling Identities: An Exploration Within and Beyond Twinship, Haleigh Brewer
GPP 13 10:00-10:15   Exploring Tourette Syndrome with Analog Photography, Katelyn Brewer

MCSC 249 | Natural Sciences   9:30 AM – 11:00 AM

GPP 58 9:30-9:45   Biodiversity and habitat complexity as indicators of community assembly following oyster reef restoration, Grace Loonam
GPP 59 9:45-10:00   Using the Population Genetic Structure of a Unique Parasite to Investigate Diamondback Terrapin Dispersal, Garrett J. Maggio
GPP 60 10:00-10:15   Parasite component community structure within an epiphyte-grazing host indirectly influences the productivity of a seagrass ecosystem, Meghan A. Nadzam
GPP 61 10:15-10:30   Surface modification of magnetic nanoparticles for cancer treatment through magneto-mechanical actuation, Jarrett Nagy
GPP 62 10:30-10:45   Mean System Energy for Particle Pairs in High Energy Physics, Okey Ohanaka
GPP 63 10:45-11:00   Comparing the Optically Stimulated Luminescence Response of Quartz for Beta Irradiation and X-ray Irradiation., Noah Pope

MCSC 253 | Education   9:30 AM – 10:30 AM

GPP 6 9:30-9:45   Examining the Effect on Beginning Teacher Self-Efficacy through Culturally Responsive Teaching Prodessional Development, Kirby A. Maness
Virtual Poster   Virtual Simulations in the Science Classroom: Investigating the influence of Gizmo's based experiments on student's misconceptions, Elizabeth Proctor
GPP 8 10:00-10:15   Understanding Student Support Needed and Provided by Ph.D. Programs in Rhetoric, Composition, and Technical Communication, Mina Bikmohammadi

MCSC Black Box Theatre | Fine Arts, Visual Art, and Design   10:30 AM – 11:45 AM

GPP 14 10:30-10:45   Investigation of Materials and Processes, Katelyn Davis
GPP 15 10:45-11:00   Trends in Handedness: conceptual Fine Art exploration in Textile Art through comparative data study, Paul Edwards

GPP 16 11:00-11:15   Critical Design Thinking in Practice, Parker Estes
GPP 17 11:15-11:30   Placebos and Panaceas, Nick Fowler
GPP 18 11:30-11:45   Debunking Phallacies, Michael Gaines

MCSC 253 | Biomedical Sciences & Human Health   10:45 AM – 12:00 PM

GPP 24 10:45-11:00   Combating bacterial biofilms: Investigating unconventional regulatory
                     proteins SypA and SypE in Vibrio fischeri, Elody Bensch
GPP 25 11:00-11:15   The Effect of Trunk Strength on Knee Biomechanics During a Single Leg
                     Landing Task, Jonathan Radilla Cortez, Anthony S. Kulas, Zac Domire,
                     Patrick Rider
GPP 26 11:15-11:30   The Effects of Helmet Loads and Disc Degeneration on Cervical Spine
                     Biomechanics, Mackenzie Hoey
GPP 27 11:30-11:45   Ecdysone signaling in the *Drosophila* germline regulates a stem cell
                     transcriptional program, Lauren Jung, Alexandria Warren
GPP 28 11:45-12:00   Young female EDS mice show increased detrusor sensitivity and contraction
                     to muscarinic stimulation, Soumya Kamath, Andrew Readyoff, Nick
                     Williamson, Everett Minchew, Espen E. Spangenburg, Johanna L. Hannan

MCSC 125 | Engineering, Technology, and Computer Science   11:15 AM – 12:30 PM

GPP 1 11:15-11:30   Assisting Large Equipment Transportation with AR Applications for
                     Existing Facilities, Lijun Liu
GPP 2 11:30-11:45   High Spatial Resolution Long-Term Temperature Profiling to Inform Near-
                     Shore Atmospheric Sound Propagation, Matthew Stengrim, Andrea
                     Vecchiotti, Jeff Foeller, Diego Turo, Joseph Vignola
GPP 3 11:45-12:00   Satellite-Based Rainfall Datasets and Autocalibration Techniques'
                     Effects on SWAT+ Flow Prediction, Mahesh R Tapas, Randall Etheridge
GPP 4 12:00-12:15   Evolving PITON: AI-Driven Simplification of IoT Data Access, Colby
                     Sawyer
GPP 5 12:15-12:30   Automated Garment Measurements in the Wild via Landmark and Depth
                     Estimation, Cris Zbavitel

MCSC 249 | Social Sciences   11:30 AM – 1:00 PM

GPP 45 11:30-11:45   Does My Friend Like My Romantic Partner? Links Among Relationship
                     Work With Partners and Friends and Physiological Implications, Siera Kee,
                     Jakob Jensen, Kayla Reed Fitzke, Matthew Fish
GPP 46 11:45-12:00   Assessing bias in personal exposure estimates when indoor air quality is
                     ignored: A comparison between GPS-enabled mobile air sensor data and
                     stationary sensor network data, Abdulahi Opejin
GPP 47 12:00-12:15   Relationships among Cumulative Life Stress, Interoception, and
                     Psychological Presentations with Somatic Features, Alia Simon

GPP 48 12:15-12:30 Adverse Childhood Experiences, Risk Taking, and Protective Factors, Daniel Stickel
GPP 49 12:30-12:45 Intentions Defined: How Students' Entrepreneurial Attitudes and Perceptions Are Shaped From a Student Consultant Internship Program, Seth Jones, Toan Tran
GPP 50 12:45-1:00 Development of a Socio-Hydrological Model for a Coastal Watershed: Using Stakeholders' Perceptions, Randall Etheridge

MCSC Black Box Theatre | Natural Sciences   **12:00 PM – 1:00 PM**

GPP 64 12:00-12:15 Benchmarking charge and baryon stopping in isobar collisions with AMPT, Mason Ross
GPP 65 12:15-12:30 Using electrical resistivity tomography (ERT) to investigate the role of artificial channels onsaltwater transport, Hyde County, NC, Elnaz Pezeshki, Matthew Sirianni, Stephen Moysey, Alex Manda, Andrea Gibbs
GPP 66 12:30-12:45 Rewilding the River: Assessing the Environmental Effects and Regulatory Influences of the Condit Dam Removal Process, Neda Safari, Jacob Petersen-Perlman
GPP 67 12:45-1:00 Exploring Climate Resilience Planning in Lower-Income Small-Scale Fishing Communities, Zack Shepard, Daniel Walker, Marissa Diaz, Braden McPhillips, Eric Wade

MCSC 253 | Natural Sciences   **12:15 PM - 2:00 PM**

GPP 51 12:15-12:30 Using Gafchromic films for dosimetry of low-energy protons produced in the ECU accelerator laboratory, Homeira Faridnejad
GPP 52 12:30-12:45 Behavioral and survival impacts of salinity on white shrimp *Penaeus setiferus*, Chloe Gabriel, Amy Fowler, James Morley April Blakeslee
GPP 53 12:45-1:00 Time-Resolved Spectroscopic Analysis of Avian Cryptochrome 4 Reveals Key Features in Electron Transport Chain Critical for Magnetoreception, Wyatt Guy
GPP 54 1:00-1:15 Biochemical and structural studies of unusual lipoxygenases from pathogenic fungi, S. Gage Hill
GPP 55 1:15-1:30 Constraints on subvolcanic magma plumbing system evolution from crystal size distribution analysis of igneous groundmass, Henry Mountains, Utah, Tess Oldroyd-Johnson
GPP 56 1:30-1:45 Cryptic cohabitation: The quest to divulge arthropod communities and plant selection in the nests of the Prothonotary Warbler (*Protonotaria citrea*) in eastern North Carolina, Skadi Kylander
GPP 57 1:45-2:00 Predator effects on prey communities differ based on predation strategy and spatial scale, Jasper Leavitt

MCSC 125 | Biomedical Sciences & Human Health   **12:45 PM - 2:15 PM**

GPP 33 12:45-1:00   Myoferlin regulates integrin α4 expression to promote invasion by HTLV-1-infected T-cells, Kawsar Sarker, Nicholas Polakowski, Kimson Hoang, Isabelle Lemason

GPP 34 1:00-1:15   Increased Sensitivity to Postural Perturbation Following COVID-19 Infection, Brittany Trotter, Kendall Nelson, Mackenzie Hoey

GPP 35 1:15-1:30   The pH-sensing G protein-coupled receptor GPR68 is a novel controller of vascular smooth muscle cell phenotype, Madison D. Williams, Joshua S. Morgan, Cere E. Poovey, Kristen R. Carraway, Kyle D. Mansfield, and David A. Tulis

GPP 36 1:30-1:45   Infant Mesenchymal Stem Cell Response to Chronic *in Utero* Metformin Exposure from GDM Pregnancies, Ericka M. Biagioni, John C. Rowe IV, Sripallavi Yendamuri, Breanna L. Wisseman, Donghai Zheng, Kelsey H. Fisher-Wellman, P. Darell Neufer, Linda E. May, Nicholas T. Broskey

GPP 37 1:45-2:00   Occupational Therapy and the Americans with Disabilities Act: Examining Practitioners' Knowledge, Attitudes, and Implementation, Ellen Cahoon

GPP 38 2:00-2:15   Impact of Fatigue on Metatarsophalangeal Joint Loads During Load Carriage, Ankur Padhye, Stacey Meardon, Junfei Tong, Jaques Reifman, and John Willson

MCSC Black Box Theatre | Biomedical Sciences   2:00 PM - 3:00 PM

GPP 29 2:00-2:15   Magneto-mechanical cellular cytoskeletal disruption of breast cancer c, Yara Maayah, Mahboubeh Nabavina, John Cooper, Juan Beltran-Huarac

GPP 30 2:15-2:30   Magnetic extracellular vesicles as therapeutic agents to treat breast cancer, Samuel Minier

GPP 31 2:30-2:45   Exploring the Role of a Putative *Brucella* Exopolysaccharide Biosynthetic Pathway in *Brucella* Virulence, Jodi M. Ogle, Dariel A. Hopersberger, Ian S. Barton, Connor B. Cribb, Clay Fuqua, R. Martin Roop II

GPP 32 2:45-3:00   TP63 mutations cause defects in keratinocyte cell-ECM adhesion and migration, Maddison N. Salois, Saiphone Webb, Maranke I. Koster

MCSC 253 | Social Sciences   2:15 PM – 3:45 PM

GPP 39 2:15-2:30   Mining for Cryptocurrencies, Extracting from Communities: A Case Study of Belvoir, Victor Ihuka

GPP 40 2:30-2:45   Buyout programme experiences and perspectives of local public officials in eastern North Carolina, Nelson Adeniji, Anuradha Mukherji, Scott Curtis, Jennifer Helgeson, Jamie Kruse and Meghan Millea.

GPP 41 2:45-3:00   Does elderspeak facilitate comprehension in older listeners? Evidence from eye-tracking, Rose Baker, Matthew Walenski

GPP 42 3:00-3:15   Perceived Competence, Achievement Goal Orientations, and Psychological Outcomes in PE, Stephanie Fuller

GPP 43 3:15-3:30   Unveiling the Intersection: Campus Climate and Mental Well-being Among LGBTQ College Students, Haiden Hice

GPP 44 3:30-3:45   Subjective Age and Effective Leadership: Age-Differentiated Perspectives on Employee Motivations, Seth Jones

MCSC Black Box Theatre | Fine Arts, Visual Art, and Design   3:15 PM - 4:30 PM

GPP 19 3:15-3:30   Examining the Limitations of Weaving with a TC2 Jacquard Loom, Rachael
                         Lowman
GPP 20 3:30-3:45   Artistic Resilience, Tansy Obryant
GPP 21 3:45-4:00   *Canceled Presentation*
GPP 22 4:00-4:15   *Canceled Presentation*
GPP 23 4:15-4:30   *Canceled Presentation*

Graduate Student, Postdoctoral Scholar, and Water Resources Center Poster Presentations (In-Person) Wednesday, April 3, 2024

Ballrooms | Biomedical Sciences	9:30-11:30 AM

GP 7
Effects of social dominance on the morphological and functional activity of the hypothalamic A11 dopaminergic nucleus, Carrie Adams

GP 8
Effects of perfluorooctanoic acid or high fat diet on whole body metabolism

Aya Ahmed[1], Matthew Wittenborn[1], Jamie DeWitt[2], Tracey Woodlief[1–]
Pharmacology & Toxicology, Brody School of Medicine, East Carolina University, Greenville, NC[1], Environmental & Molecular Toxicology, College of Agricultural Sciences, Oregon State University, Corvallis, OR[2]

GP 9
Estrogen-Dependent Upregulation of Cardiac Per2 and Heart-specific miRNAs are associated with Decreased Blood Pressure and Myocardial Oxidative Stress in Ovariectomized Rats

Syed Anees Ahmed[1], Baohong Zhang[2], Abdel A. Abdel-Rahman[1][1]Department of Pharmacology and Toxicology, Brody School of Medicine, [2]Department of Biology, Life Sciences and Biotechnology Building, East Carolina University, Greenville, North Carolina, United States

GP 10
Enhancing Neuroimaging Data Integrity: A BIDS and MRIQC-Based Pipeline for Quality Control and Standardization

Bo Ao[1], Itza Sanchez Moncada[1], Giulianna Catalano[2,3], Dhwani Hada[2], Francis A.M Manno[1]
[1]Department of Physics, East Carolina University, Greenville, NC
[2]Department of Psychology, East Carolina University, Greenville, NC
[3]Department of Biology, East Carolina University, Greenville, NC

GP 11
Optimizing the isolation of meiotic spermatocytes and post-meiotic spermatids from the mammalian testis

Heather A. Belcher, Bryan A. Niedenberger, Emma A. Gilbert, and Christopher B. Geyer

GP 12
Utilizing murine models of pertussis to evaluate a novel mRNA diphtheria, tetanus, and pertussis vaccine

Bitzer GJ[1,2,#], Wolf MA[1,2], DeJong MA[1,2], Fitzgerald NA[1,2], Boehm DT[1,2], Hall JM[1,2], Bevere JR[1,2], Barbier M[1,2], and Damron FH[1,2]
[1]West Virginia University School of Medicine, Department of Microbiology, Immunology, and Cell Biology, Morgantown, WV, USA.
[2]Vaccine Development Center, West Virginia University, Morgantown, WV, USA.
[#]New institution: East Carolina University, Brody School of Medicine, Department of Microbiology and Immunology, Greenville, NC, USA.

GP 13
Sexually Divergent Estrogen-dependent Regulation of Cardiopulmonary Connexin-43

Collin Brinkley, Syed Anees Ahmed, Abdel A. Abdel-Rahman

Ballrooms | Education   9:30-11:30 AM

GP 28
Adjusting Curriculum Based on Student Needs
Elizabeth Browning

GP 29
Utilizing Feminist Rhetoric to Foster Engagement in First-Year Composition Courses
Jackie Derritt

GP 30
Do Fidgets Improve Classroom Behaviors?
Amber Ellis

GP 31
Investigating Factors that Influenced the Motivation and Accountability of Seventh Grade Middle Schoolers
Tara Forehand

GP 32
Fostering Team Science Competencies within CUREs: Analysis of biology student writing prompts
Fiona Freeland, Heather Vance-Chalcraft

GP 33
¡Bienvenidos a ECU! Increasing Hispanic enrollment at ECU.
Rich Klindworth

Ballrooms | Human Health   9:30-11:30 AM

GP 41
Comparison between WBGT App Prototype and WBGT Monitor to Assess Heat Stress Risk in Groundskeeping in an Eastern North Carolina University Setting
Bridget Angol

GP 42
Feasibility and acceptability of a mindfulness-based virtual reality program to promote mental health in older adults
Marcos Ardon Lobos, Jaehyun Kim, Matthew Fish

GP 43
Primary Tracheal Cancer: An Exploration Into the Treatment Outcomes, Demographic Trends, and Histology in the United States from 2000 – 2018

Kristen Armel[1]*, Taylor Stamey[1], Andrew W. Ju[2], James E. Speicher[3], Musharraf Navaid[4], Aidan M. Burke[2], Michael C. Larkins[1]¶ & Arjun Bhatt[1]¶
[1]Brody School of Medicine, East Carolina University (ECU), Greenville, NC, United States
[2]Department of Radiation Oncology, ECU, Greenville, NC, United States
[3]Department of Cardiovascular Sciences, ECU, Greenville, NC, United States
[4]Division of Hematology/Oncology, Department of Internal Medicine, ECU Greenville, NC, United States
¶These two authors contributed equally to this work.
Taylor Brooke Stamey

GP 44
Self-Objectification in Collegiate Female Athletes
Rebekah J. Bergquist, BS & Bhibha M. Das, PhD, MPH, FACSM

GP 45
Unveiling Sperm Capacitation Dynamics: A Novel Spectral Flow Cytometry and Stochastic Modeling Approach

Benjamin Brisard[1], Aidan Charles[1], Ivie Henslee[1], Paul Vos[2], Debajit Bhowmick[3], Cameron A. Schmidt[1,4]
1 Department of Biology, East Carolina University, Greenville, NC
2 Department of Public Health, East Carolina University, Greenville, NC
3 Flow Cytometry Core, Brody School of Medicine, East Carolina University, Greenville, NC
4 Department of Physiology, Brody School of Medicine, East Carolina University, Greenville, NC

GP 46
Injuries and Fatalities in NC Farming, Logging, and Fishing: 2017-2023

Anna Doub - East Carolina University, Brody School of Medicine, Department of Public Health, Student
Robin Tutor Marcom - North Carolina Agromedicine Institute, East Carolina University, Brody School of Medicine, Department of Public Health, Mentor

Ballrooms	Natural Sciences	9:30-11:30 AM

GP 60
Development of 2D environmental dose-rate mapping of rock materials for OSL-dating
Mohammad Nazmul Alim

GP 61
The Investigation of the Soil Seedbank in a Long-term Mowing and Fertilization Experiment
Skyler DeWall

GP 62
OptoProfilin: A Single Component Biosensor of Cellular Stress
Jahiem Hill, Noah Mann, Kenneth Wang
Mentor: Robert Hughes

GP 63
Facile Synthesis of Beta Cyclodextrin Derivative
Yongtao Hu, Greyson Sanchez, Robert M. Hughes

GP 64
Structure and Dynamics of 15-Lipoxygenase-2

Andrew Jakobowski, East Carolina University, Department of Chemistry, Student
Adam R. Offenbacher, East Carolina University, Department of Chemistry, Mentor

Ballrooms	Social Sciences	9:30-11:30 AM

GP 71
Voices of Student Parents at East Carolina University
Madison Dickson and Dr. Sharon Ballard

GP 72
The Physical and Mental Health Care Outcomes of Integrated Care: A Systematic Review
Rylan Hellstern

GP 73
Mindfulness-Based Virtual Reality in Combination With Expressive Writing to Determine the Impact on Anxiety and Mental Health in College Students
Lyndsee M. Holder, Dr. Matthew Fish, Dr. Bhibha M. Das, Dr. Jaehyun Kim

GP 74
The relationship between isotopic evidence of childhood diet and childhood rickets in a 19th century Jordanian Bedouin population
Delphi Huskey, Megan Perry, Robert Tykot

GP 75
Cervical Cancer Prevention Behaviors in Black Women
Angela Johnson, MA, Brianna Bush, BS, Emma Muscari, MA, Michelle Ruiz, MA,
Laura Palmo, MS, Lisa C. Campbell, PhD

GP 76
Serious Games in Support of School Consultation: An Examination of a Novel Approach to Behavior Intervention in Middle School Classrooms
Kelly Lojinger (B.A.), Abby Miller (B.A.), Brandon Schultz (Ed.D.), Steven Evans (Ph.D.)

Ballrooms | Engineering, Technology, Computer Science, & Interdisciplinary Innovation   **10:00 AM-12:00 PM**

GP 1
Hemodynamics analysis in a patient with end stage renal disease under hemodialysis via arteriovenous fistula with pulmonary hypertension
Fatemeh Bahmani (1), Kaitlin Southern (1), Alex Vadati (1), Veeranna Maddipati (2),
Stephanie M. George (1)
(1) Department of Engineering (2) Internal Medicine, Brody School of Medicine

GP 2
ANALYZING THE EFFECT OF REBAR HEATING ON BRIDGE STRUCTURES: SURFACE TEMPERATURE IMPLICATIONS
Pablo Nunez Hernandez, B.S.
Suranga Gunerathne, Ph.D.,P.E.
Amin K. Akhnoukh, Ph.D., P.E., A.C.

GP 3
On Time in Game-Based Education: An Educator's Experience Desining an Adult Educational Game
Lina Flowers, Adult Education

GP 4
Assessing Land Cover Change Land Cover Use (LCCLCU) In Jamaican Mangroves: A 30-year assessment of drivers of ecosystem gains and losses.
Maria Gomez Saldarriaga

GP 5
Combining Style Transfer capabilities with the Segment Anything Model, Seyedhadi Seyed

GP 6
The Perils of Generative Model Inbreeding: Evaluating the Consequences of Cross-Model Training in Large Language Models, Gabrielle Stein, Nic Herndon

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Ballrooms | Biomedical Sciences   10:00 AM-12:00 PM

GP 14
Oligomannose N-glycans Promote Invasiveness and EGF Stimulated Growth in Neuroblastoma
Burch AP, Hall MK, Schwalbe RA

GP 15
Investigating the role the polar autotransporter adhesin genes encoded by *Brucella* have on crossing mucosal barriers and virulence.
Connor B. Cribb, Graham J. Bitzer, Ian S. Barton, Daniel W. Martin, R. Martin Roop II

GP 16
Higher Sensitivity of Sprague-Dawley Rats Sub-strain to Vascular Endothelial Cell Growth Factor Receptor Inhibition Leads to Pulmonary Arterial Hypertension.
M.K. Donovan and Abdel A. Abdel-Rahman

GP 17
SK1 Is Upregulated Following Spinal Cord Injury in Zebrafish Affecting Recovery and Regeneration
Patrick Garrett

GP 18
Tissue-Intrinsic Signaling Effects on Niche Formation in Drosophila Gonads
Ariel Harrington and Lauren Anllo

GP 19
Quantification of Neutrophil Morphology through Diffraction Imaging
Ismail Ibrahim

GP 20
The pH-sensing G protein-coupled receptor GPR68 directs vascular proteome remodeling
Madison D. Williams[1], Kristen R. Carraway[2], Kyle D. Mansfield[2], Tonya N. Zeczycki[2], and David A. Tulis[1]
Department of Physiology, Brody School of Medicine, East Carolina University, Greenville, NC[1]
Department of Biochemistry and Molecular Biology, Brody School of Medicine, East Carolina University, Greenville, NC[2]

Ballrooms | Human Health   10:00 AM-12:00 PM

GP 47
Social anxiety in People Who Stutter
Amber Faircloth, M.S., CCC-SLP (1)
Patrick Briley, PhD, CCC-SLP (1)
1 Department of Communication Sciences and Disorders, East Carolina University

GP 48
Association of Timing and Displacement Measures with Bolus Clearance Ratio following Intensive
Prophylactic Therapy in Head and Neck Cancer Patients
Mark Gardener, BFA, BM, MM[1]; Deirdre Larsen, PhD[1,2,3]

GP 49
Effects of Maternal Exercise on Infant Mesenchymal Stem Cell Mitochondrial Functioning, Content, and
Infant Body Composition in Early Infancy
Filip Jevtovic, Alex Claiborne, Kara Kern, Breanna Wisseman, Ericka Biagioni, Dylan Steen, Linda May, Alex
Claiborne, Kara Kern

GP 50
Skeletal muscle metabolism inconsistent with whole-body metabolic flexibility in overweight, nondiabetic
individuals
Polina Krassovskaia, Filip Jevtovic, Marta Chorzepa, Terry Jones, Charles Tanner, Donghai Zheng, Walter
Pories, Lynis Dohm, Joseph Houmard, Nicholas Broskey

GP 51
Exploring Protective Factors Against Adverse Childhood Experiences in Primary Care: A Systematic Review
Based on Ungar's Socio-Ecological Resiliency Model
Betül Küçükardalı-Cansever, MA, PhD Candidate in Medical Family Therapy
Abby Elizabeth Caldwell, BS in Biology
Natalia Sira, PhD, MD
Angela Lamson, PhD, LMFT

GP 52
Soleus Cross-Sectional Area and Fiber-Type Shift at the Intersection of Age and Exercise
Justin McCrary[1],*, Anna Webster[1],*, Emily Bowser[2], Emily Rust[2], Ted G. Graber[1,2,3,4]
*=equal contributions
 Affiliations:
1 Ecu Dept, of Physical Therapy, 2 ECU Dept. of Kinesiology, 3 ECU Dept. of Physiology, 4 East Carolina
Diabetes and Obesity Institute

GP 53
Tensor Veli Palatini Differences Between Children With and Without Cleft Palate: A Preliminary Volumetric
Analysis
McKenzie Perry, BS; Julia Gillespie; Imani R. Gilbert, MS; Taylor D. Snodgrass, MS; Jamie L. Perry, PhD

Ballrooms | Social Sciences	10:00 AM-12:00 PM

GP 77
Multiple Group Categorical CFA: Comparisons of NC and SC Elementary Students on Social Emotional
Health Survey-Primary
Kaitlynn Carter, Brandon Schultz, EdD, NCSP, Alexander Schoemann, PhD, Mark Weist, PhD

GP 78
Disparities in anxiety, depression, and perceptions of school climate between Latino English Language
Learners (ELL) and Latino non-ELL students.
Abby Miller, Kelly Lojinger, Dr. Brandon Schultz, Dr. Mark Weist

GP 79
Exploring the Impact of Pre-Medicare Coverage Gaps on Healthcare Utilization Among Older Adults: A
Study of Medicare Enrollees in the United States
Jada L. Morris, Dr. Dmitry Tumin, Dr. Yan Zhang, PhD

GP 80
Where the 'Middle' is Our Specialty: The Tuscarora as Middlemen at Fort Neoheroka
Mallory Purser

GP 81
Using stable carbon and nitrogen isotope values to estimate exposure to agricultural chemicals among green
monkeys (Chlorocebus sabaeus) in St. Kitts
Emilia N. Rose & James E. Loudon

GP 82
Mental Health Concerns and Help Seeking Behavior among Latinx College Students
Michelle Ruiz
Angela J Johnson, Laura Altagracia Palmo

GP 83
Exploring Literature on Black Women's Experiences with Perinatal Loss, Grief, and Coping
Annagrace Saufley and Sandra Lookabaugh, Ph.D.

GP 84
Pouring Over the Past: Interpreting Life at a Colonial Tavern
Addison Siemon

Ballrooms	Education	1:00-3:00 PM

GP 34
Parental Involvement with Homework During Elementary Years
Elizabeth Lasson

GP 35
The Link between Consistent Social Emotional Learning and Student Academic Performance
Jenna McLawhorn

GP 36
Cancelled

GP 37
Creative Atmospheric Conditions Presentations Through the Use of Guided Research Inquiry-Based
Instruction: Action Research Proposal
Zion Streeter

GP 39
Parents' and Teachers' Perceptions of the Effectiveness of Preschool in Terms of Mathematical Kindergarten
Readiness
Stephanie Wood

GP 40
Effects on Student's Performance from Parent Knowledge of Self-Contained and Inclusive Classrooms
Sonomia Lewis

Ballrooms	Biomedical Sciences	1:00-3:00 PM

GP 21
Development of novel compact wind tunnel for testing efficacy of insecticide formulated products in mosquitoes
Will Murray[1,2], Sinan Sousan[2,3], Avian White[1,] Kaya Peyton[4], Raven Slade[1,] Stephanie Richards[1,5]
[1]Environmental Health Science Program, Department of Health Education and Promotion, College of Health and Human Performance, East Carolina University
[2]Department of Public Health, Brody School of Medicine, East Carolina University
[3]North Carolina Agromedicine Institute
[4]Department of Environmental, Earth, and Geospatial Science, College of Health and Sciences, North Carolina Central University
[5]Project Mentor

GP 22
Physical Characterization and Cellular Testing of Polymeric Micelle Formulations for Intravenous Delivery of Hydrophobic Anticancer Drugs
Ashton Norris, Tyler King, Rukiyah Van Dross, Kathleen Thayne, Colin S. Burns

GP 23
Modeling of blood pressure wave propagating in artery
Yonghong Qin

GP 24
Deciphering the Role of Renin-Angiotensin-Aldosterone System in Hypertension: A Comprehensive Study on Receptor Dynamics and Left Ventricular Function
Berwin Singh Swami Vetha, DaQuan Rudolph Mebane

GP 25
The transcriptomic cortical alterations in profound hearing loss
Xuan Wang, Itzamná Sánchez-Moncada, Bo Ao, J. Tilak Ratnanather, Francis A. M. Manno

GP 26
Overexpression of the Ecdysone Receptor promotes an undifferentiated transitional state during germline stem cell differentiation
Alexandria Warren, Lauren Jung, Elizabeth Ables

GP 27
Cancelled

Ballrooms	Human Health	1:00-3:00 PM

GP 54
Event-related potential (ERP) measurement of noun and verb production in aphasia
Sarah Porter, East Carolina University
Matthew Walenski, East Carolina University

GP 55

Functional and Temporal Velopharyngeal Muscle Movements During Speech

Samantha J. Power[1], MS, Bradley P. Sutton[2], PhD, Jamie L. Perry[1], PhD
1 Department of Communication Sciences and Disorders, East Carolina University, Greenville, NC
2 Bioengineering Department, University of Illinois at Urbana Champaign, Urbana, IL

GP 56

Comparison of displacement measures on modified barium swallow studies between symptomatic and asymptomatic people with cricopharyngeal dysfunction

Alyssa Rowe, Wilson Wysor, Deirdre Larsen

GP 57

RETURN TO RUN PROTOCOLS AND LOAD PROGRESSIONS FOR BONE STRESS INJURY: A RAPID REVIEW

Emily Seguin, SPT
Sarah Johnson, PT, DPT
Stacey Meardon, PT, PhD

GP 58

Intraductal Carcinoma of the Prostate (IDC-P): Treatment, Demographic, and Geographic Trends in the United States

Taylor Stamey1, Kristen Armel1, Andrew W. Ju2, Shoujun Chen3, Musharraf Navaid4, Michael C. Larkins1¶ & Arjun Bhatt1¶
1Brody School of Medicine, East Carolina University (ECU), Greenville, NC, United States
2Department of Radiation Oncology, ECU, Greenville, NC, United States
3Department of Pathology & Laboratory Medicine, ECU, Greenville, NC, United States
4Division of Hematology/Oncology, Department of Internal Medicine, ECU Greenville, NC, United States
¶These two authors contributed equally to this work.
Kristen Elizabeth Armel

GP 59

Effect of High Intensity Interval Training on Physical and Cognitive Function in Middle-Aged Male C57BL/6 Mice

Justin Stephenson[1], Tuan Tran[2], Ted Graber[1,3,4,5]

Ballrooms	Natural Sciences	1:00-3:00 PM

GP 65

Like two peas in a pod: The co-occurrence of metal and antibiotic resistance genes across aquatic ecosystems

Cory Joyner[1], Erin Field[1]
1Department of Biology, East Carolina University

GP 66

Investigating links between pectin dynamics and meristem activity in maize

Charles Maus, Daniel Maynard, Hailong Yang, Beth Thompson

GP 67

Population demographics and parasite prevalence of the non-native green porcelain crab (*Petrolisthes armatus*) at the northernmost limit of its range

Schulte, M., Gittman, R.K., Geesin, M.E., Zamudio-Jimenez, E., Stancil, C.K., Blakeslee, A.M.H.

GP 68
Transcriptomic analysis of white-fingered mud crabs uninfected and infected with a castrating parasitic barnacle.
Carter Stancil, Michael Brewer, April Blakeslee, Zac Tobias, Carolyn Tepolt

GP 69
Artificial Reefs as Climate Refugia: Investigating How Man-Made Habitat Affects Changing Spawning Phenology and Distribution in Groupers and Snappers
Charles Veith and Rebecca Asch

GP 70
Cancelled

Ballrooms	Social Sciences	**1:00-3:00 PM**

GP 85
The Heart of the Problem: Assessing the Relationship between Workaholism and Health-Related Outcomes
Adam Tresidder
Shahnaz Aziz, Ph.D.

GP 86
Every Therapist Needs a Therapist: A Tentative Theory Exploring How Therapists-in-Training and Recent Graduates Decide to Attend Therapy
Mary Wheeler

GP 87
The effects of self-efficacy on the temporal and behavioral consistency on pre-performance routines in an ROTC shooting task.
John White-Singleton

GP 88
Prediction to the MAX(ent): Comparing Logistic Regression Predictive Models to Maximum Entropy Models in the North Carolina Coastal Plain
Libby Wruck

GP 89
Dead Men Tell No Tales, But Animal Bones Do
Jay Mayfield-Loomis

GP 90
Lost not Found: A comparative analysis of the Cape Creek site and its connection to the Lost Colony
Autumn Jean Saski

Ballrooms | Natural Sciences/Water Resources Center A   2:30-4:30

GP 91
Assessment of Dry Detention Basins to Evaluate Retrofit Potential for Water Quality
Joseph Abuarab
Michael O'Driscoll - Department of Coastal Studies
Guy Iverson - Department of Health and Human Performance
Rob Howard - Department of Geography

GP 92
Mapping Nearshore Bathymetry for Coastal Resilience in the Caribbean
Daystar Babanawo, David Lagomasion, Siddharth Narayan

GP 93
Spatial dynamics of mangrove mosquito communities: temporal shifts, connections to environmental conditions, and associations with human–mosquito interactions
Kinsey Blumenthal, David Lagomasino, Aaron Kipp, Stephanie Richards, Lawrence Reeves, Rachael Gitman

GP 94
Industrial Fishing and its Impacts on Food Security: A Systematic Review
Samantha Farquhar

GP 95
Factors influencing nitrogen treatment performance of in-stream and stormwater outfall regenerative stormwater conveyances in the NC Coastal Plain
Colin Finlay[1,2], Michael O'Driscoll[2,3], Ariane Peralta[1,2]
1 Department of Biology, East Carolina University
2 Water Resources Center, East Carolina University
3 Department of Coastal Studies, East Carolina University

GP 96
Evaluation and application of a soil water content metric in North Carolina watersheds
Jennifer Fulcher

GP 97
Foraminifera as Indicators of Sediment Transport by Hurricanes, Onslow Bay, NC.
Asher Jacobik, Stephen J. Culver, David J. Mallinson

Ballrooms | Natural Sciences/Water Resources Center B   2:30-4:30

GP 98
Calibration of two electromagnetic induction (EMI) sensors for their use in soil conductivity mapping of salinated agricultural fields.
Blake King
Alex Manda
Matthew Sirianni

GP 99
Assessing Changes to Sediment Transport, Microfauna, and Seabed Morphology Related to a Coastal Restoration Project: Sugarloaf Island, NC
Kristen N. Malosky, David Mallinson, Steve Culver

GP 100

The impact of hurricanes on the resilience of spot (*Leiostomus xanthurus)* off the North Carolina coast
Jessica N Miller, Rebecca G Asch

GP 101

Improving the Coastal Carbon Cycle with Space Based Observations of Reef Complexity
Shalimar G. Moreno, David Lagomasino

GP 102

Hydrogeophysical investigation of Shackleford Banks using electrical resistivity tomography examining freshwater availability and quality
Jackson Rizzolo
Matt Sirianni

GP 103

Pay Attention to Small Flooding: A Review on Socio-Economic Risks of High-tide Flooding
Yicheng Xu

GP 104

Assessing Nutrient Reduction of Town Commons Creek's Green Infrastructure
Brice Long (Department of Engineering and Technology), Neda Safari (Department of Geography, planning, and Environment), Skyler Morris (Department of Biology), Lucia Wall (Department of Environmental Studies and Biology), Dr. Moysey (Department of Geological Science), Dr. Manda Department of Geological Science), Dr. O'Drsicol (Department of Costal Studies), Dr. Sirianni (Department of Geological Science)

Ballrooms | Natural Sciences/Water Resources Center C   **2:30-4:30**

GP 105

WaterCorps - A student led environmental consulting organization: Updates and Opportunities
Braden McPhillips, Camryn Landreth, Nicholas Kruchten, Matthew Sirianni

GP 106

Seasonal and Spatial Variability of Recreational Water Quality at Nags Head, NC
Austin Newton Mentors: Manda, Alex, Moysey, Stephen, O'Driscoll, Michael

GP 107

Factors That Affect Polyphosphate-Accumulating Organism Performance in Enhanced Biological Phosphorus Removal
Autumn Robinson[1], Ketan Chamakura[1], Katherine Foster[1], Anna Koirala[1], Gary Li[1], Natasha Bell,[2] Erin Field[1]
1 Department of Biology, East Carolina University, Greenville, NC, USA
2 Department of Biological Systems Engineering, Virginia Tech, Blacksburg, VA, USA
Funding: UNC Research Opportunities Initiative

GP 108

Socio-ecological Restoration at the Boundary *Integrative Monitoring in South Florida Protected Areas*
John Edward Sabin III

GP 109

Hybrid constructed wetlands for treatment of marine aquaculture wastewater

Kimiya Yousefi, Department of Chemistry, East Carolina University.
Natasha Bell, Department of Biological Systems Engineering, Virginia Tech.
Randall Etheridge, Department of Engineering, East Carolina University.
Steve Hall, North Carolina State University, Biological and Agricultural Engineering.

GP 110

Analyzing Public Support for Sustainable Hog Production in North Carolina
Katie Wagner

GP 111

Utilizing the Calm Before the Storm: An Exploration of Disaster Mitigation in Princeville, North Carolina
Alexandra Stevenson

GP 112

Exploring the Implementation of Urban Social-Ecological Gradient Analysis
Roshan Saud[1] and Steven M. Richter[1]
[1]Department of Geography, Planning and Environment

| **Ballrooms** | Water Resources Center Community Partners | 2:30-4:30 |

WRC 113

CAR's History of fighting for justice and supporting Working People
Don Cavellini, Eddie Williams
Pitt Co. Coalition Against Racism (CAR)

WRC 114

Impacts on the Biodiversity, Abundance, and Community Composition of Fish Larvae and Zooplankton Due to Ship-Channel Dredging
Rebecca G. Asch, Naomi Jainarine, Abigail Alford, Brian Bartlett, Christine Chan, Elise Easterling, Esra Gokturk, Peyton Jackson, Taniya Johnson, Caitlin McGarigal, Quentin Nichols, Brianna Salazar, Jalen Walker, Zachary Reece Warfel, Ceilia Wood, Mae Wright
East Carolina University, Department of Biology

WRC 115

ROCK Museum
ROCK Museum/Kaye Lees Corner Foundation
Kaye Lee Brady

WRC 116

Greenville Rotary Community Work
Hunt McKinnon

WRC 117

A Process for Asset Mapping to Develop a Blue Economy Corridor
Dr. Emily Yeager, Dr. Beth Bee, Taylor Cash, Anjalee Hou, Michael Schilling, Kelsi Dew
Recreation Sciences

WRC 118

Communities thrive within strong networks. Come be a part of the NC EJ Network.
Dani Lin Hunter and Chris Hawn
NC Environmental Justice Network

WRC 119
Environmental Justice Work in Sampson County
Hayley Gorham, Sherri White-Williamson, Denise Robinson, Saisha Neilsen, Christian Felipe
Environmental Justice Community Action Network

WRC 120
Together for a common cause? Cooperative tendencies in transdisciplinary research groups aimed at solving water quality and quantity issues in Eastern North Carolina.
Kyra Selina Hagge, Delnaz Amroliwalla, Marcia R. Hale, Poonam Arora, Stephen Moysey
Department of Coastal Studies

WRC 121
Leading Inclusive Transformation in the Geoscience Community via an Intercultural Network of Learning Ecosystems - LIT GEO
Adriana Heimann Ríos, Edu Leorri, Alex Manda, Stephen Moysey
Department of Geological Sciences, East Carolina University

WRC 122
Herring Run Creek Tributaries Monitoring Project
Sarah Whitfield
2024 WHS APES Students
Washington High School, BCS

WRC 123
Impact of Ship-Channel Dredging on Zooplankton Abundance and Species Composition in Summer Months in Beaufort Inlet, North Carolina
Taniya Johnson, Lulea Adams, Abigail Faith, Naomi Jainarine, Rebecca Asch
Asch Lab

WRC 124
Innovation Early College High School (IECHS) research: Investigating the effects of hog farming on local rivers in Eastern North Carolina
Joseline Mata, Kamora Gorham, Joseph Eakes, Alanna Matthews, AbdalRahman Musallam, Jasmin Perez, Oana Risden, Bobby Bowser, Stephen Moysey

WRC 125
Coastlines and People Community Water Corps
Gigi Otranto, Jalind Lampa, Kent Brantley, Deshawn Matthews, Austin Newton, Emily Killebrew, Lauren Holliman, Dave Schwartz and Tara van Niekerk.

WRC 126
WaterCorps ~ A Student-Led Environmental Consulting Organization/Updates and Opportunities
Jeffrey McPhillips, Camryn Landreth, Nicholas Kruchten, Matthew J. Sirianni, Stephen Moysey

WRC 127
NC Community Information Portal
Water Resource Center

WRC 128

Elnaz Pezeshki

Investigation of Storm Surge Versus Saltwater Intrusion on Coastal Aquifer Salinization in Hyde County, North Carolina.

Elnaz Pezeshki Stephen Moysey, Alex Manda, Andrea Gibbs, Tyler Palochak, Jon Gullett

Graduate Student Online Poster Presentations (Asynchronous)

Elementary Education

Student Perceptions on whether the AIG Isolation Model Impacts their Social or Emotional Well-Being, Christina Broodno

Dual Language Immersion Impacts on Academics and Student Behavior, Stephanie Brooks

Dual Language Models—A/B vs Roller Coaster, Migdy Gonzalez

The Underserved Gifted Population, Gracey Guagliardi

Multi-Tiered Systems of Support, Kelly Hefner

Effect of Color Integration on Basic Math Fact Accrual, Retention, and Retrieval, Erin Heistand

School Strategies for Parent Involvement and School Climate, Mykayla Hines

Impact of Elementary School Class Size: Teachers' Perceptions, Katie Hooper

Understanding Reading Motivation in the 5th Grade Classroom, Jaden Jenkins

Comparing Reading Horizons and mClass Phonemic Awareness Scores, Sloane McConnell

Learning Through Play!, Sarah Morgan

The Impact of Effective Instructional Strategies for Gifted Students, Ikea Parson-Roberson

Scholar Perception of the Purposes for Reading, Jennifer Salisbury

A Cross-Sectional Study of Co-Teaching Strategies Utilized in Inclusion Classrooms in Rural Elementary Schools, Victoria Strickland

Instructional Strategies that Enhance High Writing Motivation in First Grade Students, Lindsay Walter

Teachers' Perceptions of the Effectiveness of Conscious Discipline in Elementary School, Jordan Watson

Science Education

North Carolina's Third and Fifth Grade Science Classrooms' Emphasis on Teaching the Ocean, Eleni Blackley

Can High Schoolers Really Argue?, Jessica Burch

Examining the Impact of Animal Ambassadors on Student Interest in Environmental Education Topics, Megan Campbell

The Power of Argument: Enhancing Student Understanding of the Nature of Science through Argument-Driven Instruction, Adrienne Evans

If a picture is worth a thousand words, will you remember them?
How do student-chosen images affect their retention and recall of Science Vocabulary in a digital note-taking setting?, Patricia Burgin Fernandez

The Effect of Project-Based Learning on Student Motivation and Attitudes Toward Science Education, Payton Harrell

Virtual Simulations in the Science Classroom: Investigating the Influence of Gizmo's Based Experiments on Student's Misconceptions, Elizabeth Proctor

Investigating the Efficacy of Gamification Integration within the ADDIE Instructional Design Framework for Enhancing High School Student Engagement and Learning Outcomes, Nicholas Rambaldi

Nature Place Based Experiences in Science Education: Impacts on participants, Allison Schaefer

The Impacts of Artificial Intelligence on Vocabulary Development and Student Engagement during Inquiry-Based Learning Experiences, Mattie Skinner

Taking Notes on Earth: A Comparison of Note Styles in Earth & Environmental Science, Noelle Stevens

Teaching Science in Nature: A Hands-on Approach to Enhance Comprehension of Ecosystems, Janice Tyciak

Higher Education

Caring for the Caretakers: Building Resilience in Alternative Licensed Teachers through the Implementation of a Social and Emotional Needs Professional Development, Michelle Royster

Biomedical Physics

Analysis of Fibrin Fiber Polymerization, Aravind Elangovan

Nursing and Social Work

Hypoglycemia Events in Patients Who Receive Treatment for Hyperkalemia, Eileen Briggs

A Journey Toward Eliminating Central Line-Associated Bloodstream Infections, Patricia Donnelly

Enhancing Fall Detection and Response in Long-Term Care Facilities: One Intelligent Bracelet at a Time, Luana Vendramel Santos Weeks

Enhancing MyChart Bedside Utilization: A Comprehensive Education Initiative for Patients and Staff, Brooke Townsend, RN BSN, RNFA, CNOR

Asian American immigrants' language accessibilities, interpreter training, and providers' expectations. How can the medical community make language "justice for all"?
Kaitlin E Gray

Art & Design

The Science and Visual Representation of Memories, Kristen Lanier Baucom

Undergraduate Podium Presentation Abstracts

UPM 1 9:00 AM - 10:45 AM | MCSC 249

Downregulation of desmosomal genes contributes to skin fragility in AEC syndrome

Isaiah A. Proctor, Maddison N. Salois, Saiphone Webb
Biochemistry

Mentor: Maranke I. Koster, Anatomy and Cell Biology

Ankyloblepharon ectodermal dysplasia cleft lip/palate syndrome (AEC) is a rare genetic disorder caused by dominant mutations in the TP63 gene. One of the major clinical manifestations of AEC is the presence of severe skin erosions, or wounds that fail to heal. These painful wounds predispose AEC patients to the development of systemic infections, and frequently lead to repeated hospitalizations. There are no cures or treatments for the skin erosions that develop in AEC patients. Further, the molecular mechanisms responsible for the skin fragility are poorly understood. To understand the mechanisms underlying skin fragility in AEC, our laboratory has developed human keratinocyte cell lines (NTERT) that express mutant TP63 proteins. These cell lines were generated through transduction of NTERT keratinocytes with lentiviral constructs encoding mutant TP63 proteins as well as a TdTomato reporter gene. The mutations in TP63 we selected are known to cause severe skin erosions in AEC patients. To identify mechanisms that lead to skin fragility, I analyzed the expression of genes that are essential for maintaining skin structure and function. Initially, I focused on genes that encode proteins of the desmosome, cell-cell adhesion structures that connect neighboring keratinocytes. To analyze expression of these genes, cells were exposed to calcium to facilitate the formation of desmosomes and to initiate keratinocyte differentiation. Through qRT-PCR analysis, I observed a downregulation of several desmosomal genes including DSC1, DSG1, DSC3, and DSG3. In addition, I also observed a downregulation of genes that are essential for normal epidermal differentiation, including KRT1, IVL, and LOR. Previous data from the laboratory showed that the proteins encoded by some of these genes are also downregulated in the skin of AEC patients, demonstrating that the cell-based model faithfully replicates AEC. Further, as these proteins are known to be essential for maintaining skin integrity, my data suggest that reduced expression of desmosomal and differentiation genes contributes to skin fragility in AEC. Combined with other data from our laboratory demonstrating a downregulation of hemidesmosomal genes in AEC keratinocytes, we believe that a concurrent downregulation of multiple essential skin integrity genes is responsible for skin fragility in AEC patients.

UPM 2 9:00 AM - 10:45 AM | MCSC 249

Exploring the Connection between Neurons and Germ Cell Maintenance

Saumya Vithalkar; Amanda Powell
Multidisciplinary Studies BS

Mentor: Elizabeth T. Ables

Female fertility is necessary to maintain the production of healthy offspring. Although many of the cell biological processes that maintain female fertility are intrinsic to the ovary, neuronal input from the central nervous system also plays important roles in promoting oocyte production. For example, steroid hormones are one of the many regulators in oocyte production, but it remains unclear whether steroid hormones act on neurons or directly on developing oocytes. Using the fruit fly, *Drosophila melanogaster*, we are able to visualize the stages of oogenesis and determine where ovarian cells and neurons are located in relation to each other, allowing for genetic manipulation to test how these cells respond to steroid hormones. Previous data from our lab suggested that a steroid hormone importer, EcI, is necessary for oogenesis. Although these data implicated steroid hormone signaling outside of the ovary as important for oocyte development, it was not clear whether this signaling occurred in neurons in the central nervous system or in other cells in the adult female. To address this knowledge gap, I first attempted to visualize where the neurons are located in relation to ovarian cells. Since the *pickpocket* (*ppk*) gene encodes an acid-sensing sodium channel in neurons which also express EcI, I used ppk-Gal4 to drive expression of a membrane-bound green fluorescent protein (GFP) reporter in EcI-positive neurons. Although neurons were imaged, it was difficult to determine their localization as the dissection often shredded the muscle layer encompassing the ovary. I am currently testing whether loss of EcI in ppk-positive neurons specifically blunts mating induced proliferation. These results will confirm whether ecdysone import in neurons is essential for oogenesis.

UPM 3 9:00 AM - 10:45 AM | MCSC 249

Naloxone Availability in Retail Pharmacies across the United States

Kayleigh Fields, ECU
Public Health

Lori Ann Eldridge, ECU; Kathleen Egan, WFU; Rachel Graves, WFU; James McMillian, ECU

Mentor: Lori Ann Eldridge, Health Education and Promotion

In 2021, the rate of opioid overdose deaths in the United States (US) was 32.4 per 100,000 persons; over 75% of them involved an opioid. Naloxone is an opioid antagonist that reverses the effects of an opioid overdose. Naloxone works by acting quickly to block the opioid effects to the brain and restores normal breathing in a matter of minutes. Expanding naloxone access serves as a crucial component in combating the overdose epidemic in the US. In March 2023, the Food and Drug Administration advanced access to naloxone with the approval of over-the-counter naloxone that could be sold at pharmacies. The purpose of this study is to identify the national estimates of naloxone availability at retail pharmacies, cost of naloxone, and which type of pharmacy (independent or chain) has better access to naloxone. A cross-sectional, mystery caller design was implemented to collect data. A list of all US retail pharmacies was obtained from Hayes Directories, Inc. We identified a stratified random sample of 1,200 pharmacies. Strata consisted of the top 7 corporate pharmacies with over 1,000 stores, chains with 8-999 stores, and independent pharmacies. Addresses were verified via google maps. A mystery caller approach was utilized to assess availability of naloxone and cost; where a phone call is made anonymously to pharmacies, asking them a series of questions. Pharmacies was given 3 attempts to reach a pharmacist employee. After the 3rd failed attempt, pharmacies were considered "unverified." If a pharmacy employee put the caller on hold

for over 4 minutes, the call was ended and that was considered an attempt. If the pharmacy took over 1 minute to answer the phone call, the call was ended and that was considered an attempt. Data analysis will consist of descriptive statistics of naloxone availability and price. Chi square analysis will be conducted to assess differences in naloxone availability based on pharmacy type. Preliminary results include 64 of the 71 (90.1%) of pharmacies had naloxone available that day. We hypothesize that because of the approval of over-the-counter naloxone, that more pharmacies will have naloxone accessible and that chain pharmacies are more likely to have over-the-counter naloxone. by the National Institute on Drug Abuse of the National Institutes of Health under Award Number R03DA055783. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

UPM 4 9:00 AM - 10:45 AM | MCSC 249

Implementation of medication disposal boxes in pharmacies across the United States

Briana Lewis
Public Health

Mentor: Lori Ann Eldridge, Health Education and Promotion

Briana Lewis, ECU; Lori Ann Eldridge, ECU; Kathleen Egan, WFU; Rachel Graves, WFU; James McMillian ECU

In 2021, the number of reported deaths in the United States (US) involving prescription opioids was 16,706. Each year 9.3 million people in the US misused someone else's medication or used their own medication unintended. Keeping unused or expired prescription medications in a shared living space is a public safety issue. A national survey of 50,000 adults reported over half who misused prescription opioids obtained them from their peers. Disposal of medication is one approach to reduce opioid misuse. Community pharmacies offer medication disposal boxes to assist in the mitigation of opioid misuse but not all pharmacies have implemented disposal boxes. This study aims to obtain a nationwide prevalence estimate of disposal boxes within pharmacies across the US, to identify location of the disposal box in the store and assess if independent or chain pharmacies are more likely to implement a disposal box. A mystery caller approach was used to determine if a pharmacy had implemented a disposal box. A list of all licensed retail pharmacies in the US from Hayes Directories, Inc was used to develop a stratified random sample of 1,200 pharmacies. Strata consisted of the top 7 corporate pharmacies with over 1,000 stores, chains with 8-999, and independent pharmacies. Pharmacy locations were confirmed by using Google maps. The Drug Enforcement Administration (DEA) website was used to determine if the pharmacy had a registered disposal box. A research assistant called a pharmacy within business hours and asked the pharmacy staff if they take back medications or have something they provide to dispose medications at home. If the staff answered that they had a medication disposal box, they were asked where it was located within the store. Data analysis will consist of descriptive statistics of disposal box implementation and location. Chi square analysis will be conducted to assess differences in disposal box availability based on pharmacy type. Preliminary findings indicate that 29.7% (25 of the 118 called) of the pharmacies have a disposal box. The study findings will advance the understanding of disposal box

UPM 5 9:00 AM - 10:45 AM | MCSC 249

Investigating the role of SRPK on germline stem cell number in the Drosophila germarium

William Outlaw and Amanda Powell
Biology

Mentor: Elizabeth Ables, Biology

Oogenesis is defined as the creation of female gametes (oocytes). In *Drosophila*, this process begins in the germarium, where the germline stem cells (GSCs) are housed. Each GSC divides asymmetrically, producing a cystoblast that mitotically divides another four times to produce a cyst of precursor cells where one will mature and differentiate into the oocyte. Previous studies demonstrated that the beta-importin, Transportin-Serine/Arginine rich (Tnpo-SR), is necessary for GSC self-renewal and oocyte differentiation. Tnpo-SR is thought to bind cargo proteins and facilitate their movement across nuclear pores. In some cells, cargo recognition by Tnpo-SR requires the cargo to be phosphorylated prior to binding. Serine/Arginine Protein Kinase (SRPK) phosphorylates serine-arginine-rich proteins (SR proteins) in the cytoplasm to enable their intracellular transport into cell nuclei. Although roles for SRPK in meiotic spindle formation have previously been described, it has not been studied for a potential role in the GSCs. I hypothesize that SRPK plays a role in determining GSC number in the germarium. In support of this hypothesis, I found that SRPK is endogenously expressed in GSCs and localizes to the cytoplasm. I am currently testing whether loss of SRPK will impact GSC number. These localization and loss-of-function experiments will help to determine the potential molecular mechanisms by which SRPK promotes GSC maintenance and establishment.

UPM 6 9:00 AM - 10:45 AM | MCSC 249

Digging into the taphonomy of human subadult remains interred in iron coffins from the Rhem Family Vault, New Bern, North Carolina

Kate Freakley
Biology

Mentor: Megan Perry, Anthropology

By investigating the burial taphonomy of human remains, we gain a better understanding of the important biological processes that take place following a person's death. Taphonomy is the study of how organic materials pass from the biosphere to the lithosphere through processes such as decomposition, burial, and fossilization. This investigation focuses specifically on iron coffin burials, which became popular during the Civil War (1861-1865), and their effect on the preservation of human remains in above ground burials. The first part of this study consisted of examining eleven

skeletons to create an inventory of the present bones and note the pathological and taphonomic observations for each individual. The second part of the investigation will use X-Ray Fluorescence (XRF) to conduct both a qualitative and a quantitative analysis of the elemental composition of the bone surface, soft tissue, and coffin walls. This will give further insight on whether there is a positive correlation between the state of the bodies and the iron coffins. Nearly all of the individuals exhibit red colored, or "rust," staining, likely as a result of iron oxidation. XRF analysis will provide further understanding of the cause, as this type of staining is uncommon and therefore considered unusual. Establishing results of postmortem processes will help to further understand effects of decomposition, which is essential knowledge in the fields of forensics and anthropology.

UPM 7 9:00 AM - 10:45 AM | MCSC 249

Discovering the Mysterious Effects of Intracardiac Dopamine Receptor Signaling

Nandini Vishwakarma
Biology

Mentor: Laxmansa C Katwa and Srinivas Sriramula, Physiology

At a first glance, Parkinson's disease, restless leg syndrome, neuroleptic malignant syndrome, schizophrenia, and acute mania seem to have nothing in common. However, all these function through the central nervous system, and more importantly, all have symptoms that are targeted using dopamine receptor agonists or antagonists, as dopamine and its receptors are important in motor control, cognition, and the reward system. Over the years, the use of these drugs has become more prevalent, but as with any other drug, the side effects are often overlooked. Dopamine receptor agonists and antagonists have also been characterized by long term cardiovascular and renal side effects, which seems counterintuitive. With in-depth studies of the effects of changes in dopamine receptor signaling, our lab has characterized some of the important components in the mechanisms that underly the long-term cardiovascular effects. In this faceted narrative of the intracardiac dopamine signaling, we investigated three main points: 1) dopamine receptors exist outside of the central nervous system, especially in the cardiovascular and renal system, 2) intracardiac dopamine signaling is affected by pharmacological agents, as well as by the adverse mechanisms in diseased or injured heart tissue, and 3) dopamine receptor signaling also contributes to the development of adverse remodeling and cardiac fibrosis. Development of cardiac fibrosis is characterized by accumulation of excessive collagen through increase in growth factors (transforming growth factor beta 1), hypertensive peptides (Angiotensin II), and proliferation of myofibroblasts (alpha smooth muscle actin), and a decrease in degradation factors (matrix metalloproteinases). Our lab has shown that these contributors are affected by, and have an effect on, dopamine receptor signaling in the heart, which sheds some light on why these drugs have long term cardiovascular side effects.

UPM 8 9:30 AM - 11: AM | MCSC 253

Material Property Investigation of Common 3D Printer Filaments

Heath Faircloth
Engineering

Mentor: Teresa Ryan, Engineering

Heath Faircloth, Noah Sonne, Colleen Janeiro, Teresa Ryan

With the widespread use of additive manufacturing in industrial, academic, and personal sectors, considerable effort has been put towards characterizing material properties of the most commonly used polymers: Acrylonitrile Butadiene Styrene (ABS), Polylactic Acid (PLA), and Polyethylene Terephthalate Glycol (PETG). In the present study, the ASTM D638 Type I dog bone test specimen was used to characterize the material properties. The properties of interest were the modulus of elasticity and the ultimate tensile strength. These properties are known to be directly influenced by the structure of the test specimen. In order to better understand this influence, the specimens were printed at three different orientations (lying flat, on one edge, standing upright), at three different angles (0°, 45°, 90°) for each material, totaling to 27 unique specimen type. As per ASTM standard, five acceptable tests are required to derive material properties. As a result, 135 tensile tests were performed on the above sets. Additionally, an optimized specimen build path, as found in the literature, was prepared and tested to compare with the previously reported results. Tensile tests were performed using an Instron 5969 Tensile Testing Machine, the raw data was exported, and a post-processing technique was created to turn the raw data into the applicable engineering units. The findings were compared with those published in the relevant literature.

UPM 9 9:30 AM - 11: AM | MCSC 253

Affordable Pop-Up Homes

Austin Patrey
Design

Mentor: Ranjeet Agarwala, Technology Systems

Austin Patrey, Fermin Ponce, Jason Ramirez, Erwin Orellana-Perez

Foldable pop-up homes are an inventive approach to housing design enabling portability, swift deployment, and spatial efficiency. Homeowners are increasingly adopting pop up homes because of their ability to be folded or collapsed. This leads to ease of transportation and storage thereby catering to a spectrum of needs, including emergency housing, disaster relief, and serving as mobile homes for travel enthusiasts. These homes strike a good balance between convenience and functionality. The functions of foldable pop-up homes are further enhanced by the utilization of

prefabricated construction methods, incorporation of sustainability features, and deployment of innovative designs.

The focus of this presentation is to discuss the technology behind pop-up homes with specific coverage of functionality and accessibility of pop-up homes. This presentation will also depict the benefits of pop-up homes when compared to buying regular homes. We will showcase this in our presentation via a 3D model generated using Building Information Modeling (BIM) software.

UPM 10 9:30 AM - 11: AM | MCSC 253

Using Computational Fluid Dynamics to Simulate Blood Flow Through Different Banding Geometries of Arteriovenous Fistulas

Kenechukwu Nwadiaro
Engineering

Mentor: Stephanie George, Engineering

Kenechukwu Nwadiaro [1], Fatemeh Bahmani PhD [1], Veeranna Maddipati MD [2], Stephanie George PhD [1]
[1] Department of Engineering
[2] Department of Internal Medicine, Brody School of Medicine

End Stage Renal disease (ESRD) is a chronic disease that affects the kidney's ability to function at the level required by the body. A kidney transplant or a dialysis machine is used to replace the function of the patient's kidney. For patients put through dialysis, an Arteriovenous Fistula (AVF), a method for vascular access, is used to redirect the blood flow to the machine. An AVF is a surgical connection of an artery to a vein. Complications sometimes may occur due to the AVF. A commonly linked complication is pulmonary hypertension (PH). PH is characterized by high blood pressure in the pulmonary artery. Excess cardiac output has been linked to PH in patients with ESRD. A technique to help control the cardiac output from the AVF is through fistula banding. Fistula banding involves manually restricting the flow of blood through the AVF, by tightening a region of the fistula. The objective of this research is to use Computational Fluid Dynamics (CFD) to understand how different diameters and lengths of fistula bands impact the wall shear stress, velocity, and other fluid flow parameters using a specific patient's AVF model. Magnetic Resonance Imaging (MRI) data of a patient with an AVF was collected. These images were imported into Mimics medical software, where the AVF images were segmented, and a 3D model of the fistula was created. This 3D model was edited in 3-matic to give it the shape of a banded fistula. Then, the model was imported into ANSYS Fluent for blood flow simulation. Meshing was done, and the patient specific boundary conditions obtained from the MR data were imposed at the inlet. The outlet was set to 84% Proximal Vein 16% Distal Artery outflow boundary conditions, and a non-slip condition for the rigid fluid wall. A second order transient flow pressure-based solver was used, and blood was defined as an incompressible Newtonian fluid with density of 1060 kg/m^3 and viscosity of 3.2 cP. These results will allow us to understand how different banding geometries will affect the hemodynamic parameters, to observe trends and to potentially predict any complications.

Revitalization of Legacy Cities Utilizing Sustainable Design Practices

Benjamin Damm
Design

Mentor: Ranjeet Agarwala, Technology Systems

Ben Damm, Melissa Chen, Brandon Hicks, Kayla Antinarelli

Legacy cities are characterized by 20-60% population decline, economic downturns, and aging infrastructure. According to Mallach's 2000 population-based definition, there were 48 Legacy Cities in 21 states, across 4 regions. This prompts a crucial need for exploration of revitalization strategies, with a focus on sustainable design practices. These design practices offer a holistic framework to address the issues facing legacy cities.

These originally thriving cities now bear the marks of vacant structures, economic stagnation, and social disparities. Sustainable design practices present a multifaceted solution to rejuvenate these areas. Adaptive reuse of existing infrastructure, green space integration, mixed-use development, renewable energy incorporation, community engagement, and smart infrastructure implementation form the pillars of this approach. Adaptive reuse not only preserves historical value but also minimizes environmental impact. Green infrastructure, including urban forests and sustainable landscaping, enhances aesthetics while promoting environmental sustainability. Mixed-use development fosters a sense of community and economic vitality, reducing commute times. Integrating renewable energy sources reduces carbon footprints, contributing to long-term sustainability.

In addition, community centered design ensures that revitalization aligns with resident needs, fostering inclusivity and social equity. Smart infrastructure, utilizing technologies such as IoT, enhances overall urban system efficiency. This synthesis of historical preservation, environmental consciousness, and community collaboration lays the foundation for resilient, vibrant, and inclusive legacy cities.

This presentation will focus on the implementation of green and sustainable technologies to revitalize legacy cities. Adaptive reuse of infrastructure, green space integration, renewable energy options, smart infrastructure, and a community centered design will be discussed as viable options for the restoration of these areas. The presentation will include real-world examples of legacy cities and proposed designs to repurpose them by utilizing these techniques and strategies.

UPM 12 9:30 AM - 11: AM | MCSC 253

Deployment of EV Charging Stations in Commercial Applications Using Photovoltic Canopies

Wyatt Searles
Design

Mentor: Ranjeet Agarwala, Technology Systems

Wyatt Searles, Maximiliano Rodriguez, Jeremy Tuazon, Andrew Wolbert

Photovoltaic technologies are being integrated rapidly into commercial and residential architecture worldwide. Solar canopies in parking lots offer many advantages, when installed at malls, universities, airports, commercial buildings, or theme parks. According to Popular Science, a solar canopy consisting of 285 solar panels can produce about 140 MWh of electricity a year. This is enough to charge over 3,000 vehicles monthly, if parked for about an hour. Charging electric vehicles in this way curbs about 94% carbon dioxide emissions when compared to traditional grid methods. Internet of Things (IOT) and smart technologies can be incorporated for automated timing and controls thereby increasing sustainability.

This presentation will focus on technologies driving the EV charging stations. We will also present examples of use cases, technology gaps, and ideas for future large-scale adaption.

UPM 13 9:30 AM - 11: AM | MCSC 253

Live Light Research Analysis

Elizabeth Lambert, Samantha Knox, Oasis Lopez, Alexander Harris
Design

Mentor: Ranjeet Agarwala, Technology Systems

There needs to be more connections between nature and the built environment. Harvesting natural energy from plants can change the development of architecture positively from multiple different facets. Using light in a structure that is generated from the landscape can diminish this divide and enhance the use of renewable green energy in sustainable design. Research has shown that plant light harvesting gives promising results for interactive design techniques and beautiful appealing landscapes that offer sustainable lighting opportunities. With future development of these concepts, architectural design components like green facades, interior and exterior walkways/halls, sculptural pieces, bathroom designs, landscape, stairwell design etc. can all be enhanced with the addition of living light.

This innovative approach primarily focuses on the interaction between light and molecules within plant cells. The process begins with harnessing the energy generated through photosynthesis, where plants convert sunlight into chemical energy. Special molecules called chromophores play a crucial

role in capturing and transferring light energy. By comprehending these molecular mechanisms, scientists can develop technologies that efficiently tap into the plant's natural ability to harvest light. The soil extraction process is another vital aspect of light plant harvesting. It involves optimizing the soil conditions to support plant growth and enhance their light-absorbing capabilities. Through advancements in soil science, researchers aim to optimize the synergy between plants and their surroundings, paving the way for sustainable and efficient light harvesting.

We will present a model of how Live Light can be utilized in an office building to adopt new green technology that will provide aesthetic and functional benefits to the structure. Applying this new technology to green roofs, exterior facades, interior plant walls, and other interior features will all be showcased in this research presentation. We will look at how Live Light technology provides sustainable benefits to people and how it improves the overall architectural design. We will also present a novel perspective on the Live Light concept and demonstrate its application in commercial settings utilizing a modeled design.

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UPM 14 9:00 AM - 11:45 AM | MCSC 200

Amplifying Our Voices: Exploring Black Women Student Leaders Experiences at East Carolina University

Jade McNeill
Public Health

Mentor: Roshaunda Breeden, Educational Leadership

Higher education serves as the pinnacle for challenging norms and investing in emerging innovators. The environment is conducive to Black women who are achieving higher academic success than other racial minorities (Leath & Chavous, 2018). Their success is enhanced through a sense of belonging tied to campus involvement (Porter & Dean, 2015). Centered at East Carolina University, the study explores the experiences of Black women student leaders, who represent the largest group of Women of Color. While literature highlights isolation, racial and gender stereotypes, and chilly campus climates at PWIs (Leath & Chavous, 2018), this study focuses on specific cases at ECU. The study aims to amplify the voices of Black women leaders and demonstrate how their success outcomes directly align with the objectives of ECU's Strategic Plan. By illuminating the experiences of Black women leaders at ECU, this study provides insight for academia interested in better engaging with Black women leaders. It offers an opportunity to candidly learn how Black women, at the forefront of their student life, are navigating through campuses. **Significance:** Following the Supreme Court ruling ending Affirmative Action; policies against diversity, equity, and inclusion programs; and university presidents' resignation (Mark & Telford, 2024), it is evident the political context surrounding education will pose challenges for minority student populations including Black women. It is imperative for academia, specifically ECU, to understand how Black women student leaders are navigating their environments to uphold their value of inclusion and strengthen the enrollment, retention, and graduation of Black women. **Methodology:** Employing narrative inquiry, our research team recruited ten undergraduate Black women who held leadership roles at ECU within the past two years. Through a series of interviews, lasting an average of 60 minutes each, participants delved into narratives about how their societal position—intersecting race and gender—shaped their experiences as student leaders within PWIs. This qualitative research project serves to amplify the collective "herstories" of Black women leaders, accentuating the diverse perspectives and realities articulated by these individuals in their own words. The findings are forthcoming.

UPM 15 9:00 AM - 11:45 AM | MCSC 200

Using Drone Imagery To Analyze Post Disaster Recovery

Brady McKay
Construction Management

Mentor: Daniel Perrucci, Construction Management

The documentation of impacts from natural hazard events is increasing globally. This data collected on hazardous events supports an investigation of new or improved methodologies to modernize response and recovery efforts. As recovery takes place, allocations of funding and rebuilding efforts

can lead to a disruption in the pre-hazard community and potential gentrification. A deeper understanding of recovery rates and processes between diverse communities (e.g., urban vs. rural, wealthy vs. impoverished) is required to evaluate methods to improve disaster funding and preserve pre-hazard communities. The main objective is to increase effectiveness and equity in disaster funding by identifying a novel recovery metric utilizing iteratively collected drone imagery to enable a quantifiable analysis of initial damage and recovery progress. This study implements a case study approach utilizing the March 2020 series of tornado touchdowns affecting rural and urban environments in middle Tennessee to propose evaluation metrics based on visual damage and recovery attributes visible in the drone imagery. By establishing an iterative metric to evaluate initial damage and recovery progress, communities can benefit from dynamic appropriation that enables uniform recoveries for communities and ensures equitable funding allocations.

UPM 16 9:00 AM - 11:45 AM | MCSC 200

Beyond the Game: Analyzing Fan Bases and Sponsorship Landscapes in North Carolina's Sports Teams

Mackenzie Hudson
Marketing

Mentor: Jenny Gregory, Honors College Interdisciplinary

This presentation explores a data-driven analysis of four major North Carolina professional sports teams – the Carolina Hurricanes, Carolina Panthers, Charlotte Hornets, and Charlotte Football Club. The research combines a focused marketplace analysis with an examination of the sponsorship landscape for strategic insights. The marketplace analysis studies the demographics of each team, comparing insights on gender, race, age groups, and income levels. Simultaneously, the sponsorship analysis examines each teams' partnerships, analyzing industry sectors, deal values, and sponsorship durations. Ending the presentation with insights derived from the analyses, attendees will gain actionable knowledge surrounding the North Carolina sports market while understanding the need for these analyses before entering a strategic partnership. The research not only contributes to academic understanding but also offers practical implications for sports marketing professionals in the dynamic realm of brand sponsorship in sports.

UPM 17 9:00 AM - 11:45 AM | MCSC 200

"It's not that simple. With the Joker, it never is." *Othello* and *The Dark Knight*

Arthur D. Schupbach
English

Mentor: David Wilson-Okamura, English

Two characters often compared for their deviousness and pure chaotic evil are Iago of William Shakespeare's *Othello* and the Joker in Christopher Nolan's film *The Dark Knight*. But such a comparison, though apt, is incomplete. This essay additionally argues that Nolan's *The Dark Knight* is a far more direct adaptation of Shakespeare's *Othello* than it seems to be at face value, with both

works exploring themes of human agency, societal structures, and the role of chance. The eponymous Dark Knight is in fact a shade of Othello, with Batman and Harvey Dent representing two sides of the same coin. Through this construction, the essay delves into the characters of Othello/Batman/Dent and Iago/Joker, highlighting their roles as avatars of human order and chaos. The essay also draws parallels between the opening scenes of The Dark Knight and Othello, suggesting that both follow similar narrative structures and thematic roles. Finally, the essay argues that Shakespeare and Nolan resolve their stories incompletely, leaving the audience with lingering anxieties. Ultimately, the essay argues that *The Dark Knight* is a postmodern adaptation of *Othello*, incorporating various elements of the play, which serve to intensify already present postmodern themes.

UPM 18 9:00 AM - 11:45 AM | MCSC 200

The Convertibility Theory and Privation of Evil, An Analysis of Arguments

Evan Thornton
Philosophy

Mentor: John Collins, Philosophy and Relig Studies

The problem of evil is a common argument against the existence of a benevolent God. Some solutions to this argument involve a privation theory of evil. This means that evil doesn't have a positive existence, or that it only exists as an absence of goodness in a similar way that darkness is an absence of light. This would imply that a supposed benevolent God didn't *create* the evil, but that God *allows* goodness to hide its face in some places.

This brings a few follow-up questions. One is whether God creates or simply allows evil has any real implications on His possible moral culpability. Another is why might evil be privation when its existence sometimes seems more real and pressing than goodness. Many defenders of privation theory have based their argument for this off convertibility theory. This means that being and goodness are the same, at least in essence. St. Thomas Aquinas, the famed medieval theologian, taught that being and goodness were really the same thing, and that they differ only in idea. Idea means that they differ in presentation. An example would be how Batman and Bruce Wayne are the same but differ in idea or presentation.

This presentation will discuss the problem of evil, privation theory, and convertibility theory. It will evaluate whether privation theory is relevant to the problem of evil and whether convertibility is necessary to the theory. It will spend most of its time examining whether convertibility theory has metaphysical evidence. I ultimately will argue in favor of convertibility theory, the problem of evil, and the necessity of privation theory for the problem of evil.

UPM 19 9:00 AM - 11:45 AM | MCSC 200

The Individual Village: Exploring Stylization Through 3D Modeling

Hayley Whoolery
Art

Mentor: Amy McIntyre, Art and Design

Many have heard the quote, "life imitates art." Through my work, I aim to expound on the lesser-known pattern in which art imitates life. In my presentation, I will show how I have captured unique individual lifestyles and encompassed them into one unified piece. Using animation, I will bring to attention the idea that everyone has a creative style, showing that we are all living, breathing beings. I am not limiting a resident to the pattern of the environment that they are placed in, instead they are free to express themselves inside their homes however they like, in the context of my project. This idea is presented through computer animation and three-dimensional modeling, in which I have created an aesthetic village that shows my line of thinking. The village is made up of small, copy-and-paste houses and exterior decorations that are uniform in their looks. I have pushed the viewpoint that each house is the same; that on the outside, there are no differences. For the second part of my presentation, I will reveal the interior of a few of these houses. Each interior is vastly different from the next and contains color palettes and themes that show their uniqueness. I aimed to push the idea of individuality as much as possible, exaggerating the differences between the houses to better show the differences from person to person. I will present the final creations, process work, and my discoveries as I navigated the research for this project.

UPM 20 9:00 AM - 11:45 AM | MCSC 200

Responding to Student Housing Insecurity at East Carolina University

Mere Wells
Psychology

Mentor: Roeder, Lynn Michele, Higher, Adult, and Couns Education

In 2021, The Hope Center at Temple University reported that 43% of U.S. college students had faced housing insecurity in the previous year, 29% had faced food insecurity, and 14% had been homeless at some point. While recent data suggests that these percentages have fallen somewhat since the height of the COVID-19 lockdowns, many American universities have insufficient protections in place for the significant proportion of housing-insecure students. Here at East Carolina University, provisions like the Purple Pantry have gone a long way to address student food insecurity, but housing insecurity remains one of the most urgent issues facing students, especially during university breaks. This project intends to usher the development of a comprehensive emergency housing system where there are solutions for students in need throughout the year.

To begin, inquiries were made to ECU's Housing Department regarding provisions for students experiencing housing insecurity. After determining the efficacy of existing resources, a stakeholder group was formed by the Dean of Students to discuss, design, and implement a plan to address

temporary emergency housing needs. The group will continue to meet monthly with the goal of creating and sustaining a more comprehensive housing solution.

Research and experience have determined that while emergency housing for a short period of time would likely be feasible at East Carolina, an external organization would be necessary to fully meet the needs of housing-insecure students. As such, the immediate focus of the group is to strengthen existing short-term provisions while searching for potential stakeholders for the development of a non-profit or service-based organization.

This project, while hindered by strict federal and state regulations regarding the disbursement of university resources, has resulted in (1) increased interdepartmental cooperation at East Carolina University, (2) formation of a group meant to address housing insecurity, and (3) clarification of existing resources with a developing plan for improvement.

UPM 21 1:00-3:30 PM | MCSC 249

Courting male ruff sandpipers (*Philomachus pugnax*): do males vary their tactics in the absence of one morph?

Eden Stainback and Amelia Moore
Biology

Mentor: Susan B. McRae, Biology

The ruff sandpiper (*Philomachus pugnax*) is a wading bird native to Eurasia that displays strong sexual dimorphism in size and breeding plumage. Unique among shorebirds, the ruff has a lek mating system where breeders gather on an arena and males display to attract a female mate. All ruff populations have three distinct genetic morphs that specify differences in male mating behavior and plumages. Independents display 'Resident' behavior, each defend a small court on the lek, whereas Satellites move among courts and co-display with the Resident. Independents and Satellites grow ornamental mating plumage, a head tuft and ruff around the neck, which is showcased during ritualized displays. Faeders, the third and rarest morph, are smaller in size and resemble females in appearance, lacking ornamental plumage. These are heritable, genetic morphs determined by variants of an autosomal chromosomal inversion. I observed behavior on the lek of captive bred ruff sandpipers at Sylvan Heights Bird Park (SHBP) in Scotland Neck, NC. This colony presently lacks Satellite males providing an opportunity to observe males for potentially compensatory behavior in the absence of this morph. Anecdotally, Faeder males have been observed to display in captivity under some circumstances, and an Independent male was observed co-displaying at SHBP in a previous year. To explore this behavior, observations were made both in person and using videos before and during the mating season. Behaviors categorized as aggressive, display, and proximity to other males were recorded. These observations were then quantified using standardized methodologies to characterize the behavior of individual males and identify instances of co-display behavior by Independents and the Faeder. Observations of this colony from the 2020-2021 breeding seasons captured this behavior while those from the 2023 season did not. Although pleiotropic effects of the chromosomal inversion results in distinct male morphs, males may retain some flexibility in mating tactics responsive to the social environment. This study will aim to examine the possible role social environment plays in the behaviors of a species with a permanent genetic morph.

Such investigations are important for understanding the relationship between permanent genetic morphology and conditional behavior. Findings may be applied to other species with similar morphology, which is important for the purposes of captive breeding and future conservation.

UPM 22 1:00-3:30 PM | MCSC 249

Critical Analysis of the Impact Inherent and Applied Tension Have on Fibrinolysis

Mason Verhaeghe and Joshua Packard
Biochemistry

Mentor: Nathan Hudson, Physics

Fibrin is an insoluble fiber-forming protein polymerized from the blood plasma protein fibrinogen in the presence of the enzyme thrombin. Fibrin fibers serve as the structural component of blood clots formed at the site of vascular injury and are crucial to the wound healing process. The breakdown of these fibers is called fibrinolysis and is primarily facilitated by degrative enzymes such as the serine protease plasmin. Tissue plasminogen activator (tPA) is responsible for cleavage of plasmin from the plasminogen bound fibrin, initiating the fiber digestion process. The role of tension in regulating lysis is important due to the highly fluctuating tension applied to fibrin networks by blood flow and cellular components during vascular repair. To better understand the impact of tension in fibrinolysis, we've invented a novel mechanism for testing fibrinolysis under tension. Tension was applied to individual fibrin fibers on a microscale level using a substrate made from fugitive glue stamped with micropatterned ridges. A fibrin clot was polymerized on the ridges and peeled off leaving individual fluorescent fibers spanning the ridges horizontally. Tissue plasminogen activator was added to the tensioned sample to initiate fibrinolysis. The fiber digestion was observed under fluorescent microscopy and recorded. Experiments were run in three different groups, targeting fiber digestion at 50, 100, and 150 percent strain respectively. Lysis times, length, strain, and angle measurements were recorded for 50 fibers of each group parallel to the direction of applied tension. Other studies using fluorescent beads to image the fibers have suggested that application of tension has a negative impact on fibrinolysis, but it has since been found that this method could have skewed the results. Using revised methods, I hypothesize that lysis will slow under applied tension as a result of reduced access to binding sites for lytic enzymes.

UPM 23 1:00-3:30 PM | MCSC 249

Sexual Dimorphism, Throat Coloration, and the Evolution of Gene Expression in Threespine Stickleback Brain Tissue

Cameron Grey, Christopher N. Balakrishnan, W. Burns Newsome
Biology

Mentor: Jeffrey McKinnon, Biology

Understanding the causes and mechanisms underlying variation in sexual dimorphism is a critical issue in evolution, medicine, and ecology. In the threespine stickleback (*Gasterosteus aculeatus*), a preeminent model organism for evolutionary study, sexual dimorphism in color and morphology is

known to vary dramatically among populations. Here I examine how sexual dimorphism of gene expression in the brains of stickleback fish varies with color pattern and life history across populations. In previous studies, marine (anadromous) populations showed greater morphological dimorphism and more consistent color dimorphism. Data comes from two populations, one marine and one stream-resident, that both exhibit sexual dimorphism in red throat coloration; two stream-resident populations that express intense red coloration in both sexes; and one stream-resident population that lacks red coloration in either sex. This data set was collected previously in my laboratory and made available for more comprehensive analysis. Data was initially trimmed using fastp for quality control. The trimmed data was then remapped to the newest threespine stickleback genome (UGA_version5) using STAR (Spliced Transcripts Assigned to a Reference), a popular RNA sequence aligner. I used featureCounts to count the number of reads associated with each gene from the reference genome. Initial remapping of the reads to a stickleback genome and a principal component analysis (PCA) of the data shows strong divergence in sex for all five populations on the first principal component and some differentiation by population on the second principal component. Analyses of PCA results by color pattern and life history are continuing. In additional ongoing analyses I am using the DESeq2 package to generate a list of the top differentially expressed genes for use in a gene ontology analysis.

UPM 24 1:00-3:30 PM | MCSC 249

Examining Population Genetics and Disease Incidence in Local Grass Shrimp Species

Charles Brooks
Biology

Mentor: April Blakeslee, Biology

Charles Brooks, Chloe Gabriel, Dr. Jim Morley, Dr. April Blakeslee

In marine coastal ecosystems, grass shrimp (*Palaemon spp.*) are both detritivores and food sources for a variety of fish and crustaceans. These trophically and ecologically significant species not only serve as food sources and bioindicators but also may be a potential reservoir species for an emerging pathogen of commercially valuable penaeid shrimp species in North Carolina (NC) coastal and estuarine systems. Shrimp Black Gill (sBG) is a pathology caused by the ciliate parasite *Hyalophysa lynni*. This disease has been found to negatively impact commercial shrimp populations in GA and SC, but it represents a recent climate-induced disease spreading into temperate waters, including NC shrimp populations. By analyzing grass shrimp species collected from NC estuarine populations, my investigation aims to (1) use microscopy and PCR-based tools to determine the proportion of shrimp infected (prevalence) by the damaging ciliate parasite, *Hyalophysa lynni*, and (2) determine the species composition of grass shrimp and gene flow among populations. Altogether, my research will provide a better understanding of the species composition, migration, and disease incidence of these ecologically important species in our local estuaries. By better understanding how grass shrimp move and interact via gene flow, we can establish their potential impact on commercially valuable penaeid shrimp (e.g., brown and white shrimp), which co-occur with grass shrimp and can also contract the disease. Moreover, by understanding disease prevalence and species movements in these systems, we can better understand the impact of emerging diseases and investigate transmission, infection, and the long-term impacts of disease spread into the future.

UPM 25 1:00-3:30 PM | MCSC 249

Evaluating plant-microbe associations in response to environmental stressors to enhance wetland restoration

Kai Davis
Biology

Mentor: Ariane Peralta, Biology

Kai Davis, Mary-Margaret S. McKinney, Rachel K. Gittman, Ariane L. Peralta

Microorganisms can enhance nutrient acquisition or suppress diseases from pathogens, while plants can provide carbon resources and oxygen to root-associated microbes. However, human activities have altered nutrient cycles and disrupted such mutualisms. Therefore, we need to understand how to promote positive plant-microbe associations to aid in restoring coastal wetland ecosystems where human stressors and climate change (e.g., hurricanes, sea-level rise) challenge restoration outcomes. This study seeks to examine how salinity stressors influence plant-microbe relationships, where we hypothesize that the presence of microbes will buffer stressor effects. We used a whole sediment inocula approach to test this hypothesis. We exposed marsh cordgrass (*Sporobolus alterniflorus*) seedlings to a replicated factorial experiment with three levels of microbiome addition (microbial inocula, autoclaved microbial inocula, no microbe control) and two levels of salinity (0 psu, 20 psu), replicated 10 times. We added microbial inocula from the marsh site with autoclaved soilless media and exposed half the seedlings to salt water (20 psu) and half to freshwater (0 psu). Results revealed that marsh microbial inocula additions during early plant development may ameliorate salinity stressors and could be critical for future restoration efforts. This work provides evidence that microbial stewardship is important for buffering against environmental stressors and could promote plant establishment for wetland restoration.

UPM 26 2:30-3:30 PM | MCSC 249

Effects of Auxin and Cytokinin on Cotton Shoot Proliferation *In Vitro*

Stefan Boromisa
Biology

Mentor: Baohong Zhang, Biology

Stefan Boromisa, Zhang Baohong, Vijay Sheri, Karina Alvarez, Nathan Perry

Cotton, or *Gossypium hirustum L.*, is one of the most important crops in the global economy and is thought to have an estimated trade value of almost 500 billion USD. Global production of cotton has remained relatively stagnant in recent years due to the difficulty faced with genetically modifying cotton *in vitro*. Shoot proliferation is one of the most promising ways to increase genetic transformation during this critical time in development. During the shoot proliferation stage, stem cells are rapidly dividing and differentiating and producing new cells. This makes stem cells a prime target for genetic transformation as they can introduce the foreign DNA into the genome and pass it

on to the next generation, creating a transgenic plant. The most common media used to facilitate shoot proliferation is Shoot Multiplication Media (SMM). Auxins and cytokinin's are plant hormones that control cell growth, elongation, proliferation, and other developmental processes. SMM is often made with auxins and cytokinins such as 6-benzleaminopurine (BAP) and kinetin (KN) which promote the development of shoots at certain concentrations. Different concentrations of auxins and cytokinins will be tested to determine the concentration that produces the most shoots.

UPM 27 2:30-3:30 PM | MCSC 249

Causes and consequences of timing of ornamental plumage molt and courtship in captive ruff sandpipers (*Philomachus pugnax*)

Amelia Moore and Eden Stainback
Biology

Mentor: Susan B. McRae, Biology

Ruff sandpipers (*Philomachus pugnax*) are medium-sized Eurasian shorebirds extraordinary for their sexual dimorphism and lek breeding system. Ruffs possess a unique genetic polymorphism for male courtship behavior with three stable male morphs: Independents, Satellites, and Faeders. Independent males are identified by their darker ruff plumage, are dominant, and will defend their court on a lek. Satellite males have predominantly white ruff plumage and are tolerated on the courts of Independents and co-display alongside them on the lek. Faeders, the third male morph, are female mimics that do not display but are tolerated on courts and attempt to sneak matings. During the breeding season, Independent and Satellite males can be seen displaying, and Independents show aggression toward each other at court boundaries. Using direct observation and video, we documented the individual molt sequence and courtship behavior of male ruffs at Sylvan Heights Waterfowl Park in Scotland Neck, North Carolina, where a captive colony of ruffs is distributed in two aviaries. This colony currently lacks Satellite males. Males in this colony vary in age, morph type, and birthplace (hatched on site or transferred from Vancouver, Canada). In addition, some individuals experienced extended daylength caused by artificial lighting near the aviary. We documented the progression of molt and initiation of courtship to understand what factors influenced the timing of each. To document ruff molt progression in male ruff sandpipers, we measured the length of ruff plumage from a time series of photographs. Observations were made four times per week between April and June to identify the onset and duration (in days) of courtship behavior for each of the nine males. Our results will help us gain a deeper understanding of the intrinsic and extrinsic factors that trigger molt and courtship behaviors and lead to improved captive breeding programs for this species.

UPM 28 2:30-3:30 PM | MCSC 249

Examining Human Fibrinogen's Molecular Structure Using Electron Microscopy

Victoria A. Gonzalez Mundarain
Biochemistry

Mentor: Nathan E Hudson, Physics

Fibrinogen is a hexameric glycoprotein found circulating in the plasma of human blood that is essential for the initiation and regulation of hemostasis. It is a soluble protein that by action of the enzyme thrombin gets converted to the insoluble form fibrin (the major structural component of a clot) by cleavage of fibrinopeptides A and B. Despite a century of research in fibrinogen, many aspects of its structure are still not well understood, thus leaving many unanswered questions such as how alterations in fibrinogen structure subsequently alter fibrin structure and by extension clot formation.

Recent studies suggest fibrinogen undergoes large-scale structural changes, but how they influence its physiological function and interaction with other molecules is unknown. The only high-resolution structures of fibrinogen, derived from x-ray crystallography, suggest a long, stiff molecule. Using electron microscopy however, structures of the protein can be elucidated while maintaining its conformational flexibility, thus more faithfully capturing the molecule's dynamism. Using a high-affinity knob 'A' mimic mixed with fibrinogen to limit its motility, samples were prepared and imaged at the NIEHS Molecular Microscopy Consortium. Using single particle analysis software, 2D images are processed and used to back project a 3D density model. This has resulted in high resolution (< 3 Å) density maps of the fibrinogen D-region. These density maps will be used to build updated atomic-level structure of human fibrinogen.

UPM 29 2:30-3:30 PM | MCSC 249

Effects of Oyster Reef Sanctuaries on Fish Abundance in Pamlico Sound

Charlotte Grimes
Biology

Mentor: James Morley, Biology

The value of restoring oysters to enhance natural water filtration is well-established, but the habitat value of restored reef habitat has been less studied. Further, while artificial reef structures in the ocean, like shipwrecks, have been shown to provide valuable feeding and breeding habitat for fish, the function of artificial reefs in estuaries are poorly studied. In estuaries, the availability of adequate shelter and feeding habitat is particularly important due to the abundance of juvenile life stages. The state of North Carolina has established 14 oyster sanctuaries within Pamlico Sound as part of its shellfish restoration efforts. These oyster sanctuaries are considered artificial reef and are established with a variety of substrates including natural oyster cultch, reef balls, and rip-rap marl. Acoustic imaging of oyster sanctuaries in Pamlico Sound was undertaken from May to November of 2023 with the goal of comparing fish abundance on these reefs to adjacent areas without reef substrate. The acoustic samples were analyzed to measure fish abundance and length at 26 sample points per sanctuary. Fish abundance observed on the reef was generally higher than in the area without reef substrate, which would be consistent with the belief that these reefs provide useful habit. There was a higher prevalence of schooling fish on the reef as well, which indicates that oyster sanctuaries could be important feeding ground for prey fish. Understanding the value and use of oyster sanctuaries to fish in estuarine ecosystems like Pamlico Sound would provide justification for the funding and implementation of further restoration efforts.

UPM 30 1:00-3:30 PM | MCSC 200

Stantonsburg Station: Transforming an Eastern North Carolina Historical Site

Caramia Landis
Community and Regional Planning

Mentor: Misun Hur, Geography, Planning and Envir

Caramia Landis, Kaylie Williams, Mary Archibald, Tayler Bartlett, Ben Bergman, Riley Jakob, Nicholas Johnson, Sam Miles, Noah Mills, Makayla Selby, Tamia Slye, Chase Warner, Tanner Haylette, and Cameron Brown, Misun Hur

Placemaking is vital to a town's economic and socio-cultural success. Towns that lack a community core and sense of place tend to lack resiliency and struggle to maintain a healthy and vibrant population. Stantonsnburg, North Carolina, is a small Eastern North Carolina town that was struggling with these aforementioned issues and reached out to the ECU Community and Regional Planning program for help. The town of Stantonsburg had a historically meaningful site in their downtown area that they wanted the students of ECU to turn into a space to boost economic vitality and spark community engagement. The project was undertaken by two undergraduate planning classes under Dr. Misun Hur, "Introduction to Planning Techniques" and "Computer Applications in Planning". Together, the classes came up with a comprehensive report and site plan for the residents and government of Stantonsburg. To do this, we first embarked on a site visit to see the historical site that we were working with, the Applewhite Seal Building. We talked with the local government about what they envisioned for the space. We then analyzed U.S. Census data to understand the demographics of the town and created a demographics report. As community engagement plays a large role in creating an appropriate sense of place and creating something the community will enjoy, it was necessary to host a community discussion forum in Stantonsburg. We heard from residents about their hopes for the site and received feedback on what they would like to see. We also ran a community survey for five weeks to further engage the community in the decision-making process. The students of the computer design class utilized Adobe Creative software such as Photoshop, Illustrator, and InDesign to create beautiful visuals of our ideas for the site. One of our main points of interest was using temporal designs such as shipping containers to remain cost-effective and for easy installation. Since the site is located near a railroad, to give the site a theme and further a sense of community pride, we called the site Stantonsburg Station. All designs follow the color scheme of the site to create a sense of continuity and commemorate the Seal Building. To promote community gathering and economic activity, our proposal contains two retail shops, a coffee shop, a bar, a food truck park, a community garden, and a flexible open space. Our proposal was well-received by the officials of Stantonsburg, and we hope to see progress soon.

UPM 31 1:00-3:30 PM | MCSC 200

College Students and Sharing Fake News on Social Media

Noah Walker
Communication

Mentor: Cindy Elmore, Communication

The study titled "College Students and Sharing Fake News on Social Media" investigates the proliferation of fake news on social media, specifically among college students. With a recent surge in the existence of fake news, along with the demographic's heavy use of social media, the study aims to explore the characteristics of fake news on social media that motivate college students to share it, college students' perceived impact of sharing fake news on social media, and who (if anyone) college students believe is responsible for preventing the spread of fake news on social media. The study will be conducted via a qualtrics survey distributed around East Carolina University campus. With the study's recent IRB approval, data is currently being collected as the survey is being distributed around campus.

UPM 32 1:00-3:30 PM | MCSC 200

What Makes a Happy Couple? The Impact of Body Image, Attachment Style, and Mating Motives on Relationship Satisfaction

Macie Yao
Psychology

Mentor: Michael Baker, Psychology

For young adults, romantic relationships are essential sources of emotional and social support. As the happiness experienced in such relationships is tied to individual wellbeing, it's important to examine the elements that contribute to overall relationship satisfaction. Previous research has indicated the importance of body image, attachment style, and mating motives on individual happiness; the present study explores the impact of these factors on relationship satisfaction both within and between couples. Three hypotheses are tested: 1) Individuals with higher body image ratings will report greater relationship satisfaction; 2) Couples with at least one securely attached partner will experience higher overall satisfaction; and 3) Higher relationship satisfaction will correlate with stronger mate retention motives and weaker mate seeking motives. 60 college-aged couples in long-term relationships are administered questionnaires assessing each of the above factors. Intra class correlations are employed to analyze both the within- and between-couples hypotheses. The results of this study contribute to the field by evaluating the complex relationships that govern individual and couple satisfaction, leading to a deeper understanding of relationship dynamics.

UPM 33 1:00-3:30 PM | MCSC 200

Overcoming Disparities in Disciplinary Practices in Rural Schools

Evan Thornton, Jessica Lichansky, Jordan Burchett, and Josiah Cole
Psychology

Mentor: Jeannie Golden, Psychology

Even at a young age, implicit bias of teachers affects their disciplinary practices with students of color (SOC). Although Black children enrollment in preschool is just 19%, Black preschool children represent 47% of one or more suspensions. Relative to White preschool children, Black preschool children are suspended 3.6 more times (U.S. Department of Education, Office of Civil Rights, 2016). School personnel use harsh disciplinary techniques such as office discipline referrals, suspensions, and expulsions disproportionately with SOC (Rodriguez & Welsh, 2022). SOC are often subjected to unique traumas that include racial inequity, racial bias, and racial prejudice. Black children are affected by how they are treated in schools, causing them to resist these discriminatory influences and to become alienated from school (Jernigan & Daniel, 2011). Unfortunately, these techniques exclude and alienate SOC from the school environment, making it more likely that these students will drop out of school, become involved with gangs and criminal activity, and ultimately end up incarcerated, referred to as the "school-to-prison pipeline" (Porche et al., 2011; Center for Labor Market Studies, 2009). In an effort to alter this trajectory, our research team has developed a survey to determine the attitudes of school personnel toward traditional disciplinary practices and willingness to use alternative strategies, conducted a thorough review of the literature regarding alternate strategies, and developed a training program for school personnel to learn to use these alternate strategies. Presenters will discuss the effects of inequities in disciplinary practices on SOC and alternative strategies that can be used by school personnel to correct those inequities.

UPM 34 1:00-3:30 PM | MCSC 200

Balancing Growth and Heritage: Affordable Workforce Housing's Role in Sustaining Small Town Charm and Economic Development in Beaufort County

Mary Archibald and Merrill Flood
Community and Regional Planning

Mentor: Misun Hur, Geography, Planning and Envir

This research project explores the issue of affordable housing development in Beaufort County, aiming to reconcile economic growth with the preservation of its small-town ambiance. Over the past decade, Beaufort County, NC has witnessed a concerning decline in its population, shrinking by 6.5% from 2010 to 2020. Furthermore, within the last decade, the demographic comprising individuals under the retirement age of 65 has dwindled by 8%, while those aged 65 and above have surged by 36%. While this highlights the area's strong appeal to retirees, it raises questions about the vitality of its workforce.

The research seeks to address four main findings: firstly, by demonstrating the necessity of affordable workforce housing and its impact on population loss and workforce shortages in Beaufort County; secondly, by exploring how affordable housing initiatives can spur economic development and job growth, drawing lessons from similar small-town contexts; thirdly, by assessing whether the implementation of affordable housing strategies can safeguard the county's small-town charm and culture; and finally, by addressing the needs for affordable housing, this study aims to demonstrate how the availability of affordable housing promotes inclusivity and diversity needed to attract the new generation and thus create sustainability and viability in small towns.

This study uses a mixed-methods approach, including quantitative analysis of US Census data and qualitative interviews with local stakeholders and community leaders, to investigate the relationship between affordable housing programs, economic growth, and the preservation of Beaufort County's cultural identity. The study's findings are intended to inform elected officials, politicians and local organizations on strategies for promoting economic growth, stimulating job creation, and preserving rural areas' distinct identities. This project aims to generate conversation and feasible action toward sustainable rural development in Beaufort County and beyond.

Keywords: Economic growth, affordable housing, population, preservation, workforce, small-town, sustainable rural development.

UPM 35 1:00-3:30 PM | MCSC 200

The Impacts of Tourism on Jamaican Farming

Grace M Messaoui
Geography

Mentor: Jeff Popke, Geography, Planning and Envir

Caribbean farmers face a wide range of challenges, such as small farm size, costly inputs, changing weather patterns, and price instability, all of which can negatively impact the cultivation, marketing, and distribution of their crops. In this context, it is important to better understand the strategies used by Caribbean farmers to achieve success. Previous research from St. Elizabeth Parish, Jamaica, has focused on a range of factors that can influence farming success, including water management strategies and new farming technologies such as the adoption of greenhouses . One strategy that has not been examined is the potential role of the tourist sector to provide a stable market for farmers. This study builds upon previous studies from St. Elizabeth to assess the impact of tourism on prices for common crops, and to examine what role these play in the planting strategies of small farmers through three questions: 1) How do farmers in St. Elizabeth determine planting strategies and what role does the tourist sector play in their decisions? 2) What role, if any, does tourism play in the prices that farmers receive for their crops? 3) What policies or programs have been promoted and/or implemented to link local agriculture to the tourist sector? Farmer strategies will be examined using an existing dataset of 120 transcripts of field interviews with farmers carried out from 2011 to 2015. Transcripts will be analyzed and coded for key themes related to strategy, crop price, and tourism. Prices for commonly-grown crops will be tracked over time using JAMIS, a publicly-available database of farmgate prices. Lastly policies linking agriculture to tourism in the Caribbean will be assessed through an analysis of policy documents from the Jamaican Ministry of

Agriculture and Rural Agricultural Development Authority (RADA) and reports and technical reports from regional and international agencies. Results from this research could yield insights into successful farming strategies that may be able to benefit rural Caribbean farmers and would be of interest to RADA, which provides extension services to Jamaican farmers.

UPM 36 1:00-3:30 PM | MCSC 200

The Effectiveness of Trauma Informed Strategies Training on Teachers Knowledge, Attitudes, and Interactions with Students in Rural Schools

Taylor Smith, Logan Routh, George Cherry, Nancy Soto-Garcia, Jasmine Dinh, Sydney Buchanan, Courtney Alston, Daniel Stickel
Pyschology

Mentor: Jeannie Golden, Psychology

The National Child Traumatic Stress Network says that approximately 25% of American children will experience at least one traumatic event by the age of 16. When children are affected by trauma it can cause problem behaviors and other troubles in school that can ultimately lead to office visits, suspension, and even expulsion. There is a lack of training for teachers for working with children with trauma, specifically when it comes to giving teachers specific strategies to use. Not only is there a lack of training for teachers but there are no observation systems to measure teachers' use of trauma-informed care. The purpose of this research study was to determine the extent to which a trauma-informed behavioral observation system can reliably measure trauma-informed behavioral strategies in teacher-student role plays. Secondly, we wanted to determine if there is a change in teachers' use of trauma- informed strategies during role play situations as well as knowledge of and attitudes towards using trauma-informed strategies following a training in rural schools in trauma-informed care. A virtual training was conducted with public-school teachers in low-income rural schools. During this training teachers were taught a checklist of 32 trauma-informed strategies and how to utilize them with students. Participants were given pre and post written measures of their knowledge of and attitudes towards trauma-informed strategies. Teachers also participated in recorded teacher-student role-play scenarios before and after training. Student observers were trained in the behavioral observation system and took data on the participants' use of trauma-informed strategies during the role-play interactions. Results indicated that teachers gained knowledge and positive attitudes toward trauma-informed strategies and improved their use of trauma-informed strategies in role-play interactions.

UPM 37 1:00-3:30 PM | MCSC 200

Rape Myth Adherence Among University Students

Cassidy Fitz-Randolph
Political Science

Mentor: Walfield, Scott, Criminal Justice & Criminology

Sexual assault remains a prevalent issue on college campuses. Understanding the attitudes and beliefs of students towards rape and rape myth adherence is essential to combatting sexual violence. Rape myths, which are false beliefs or stereotypes about sexual assault, contribute to the stigmatization of survivors and impede initiatives aimed at preventing and addressing sexual violence. Neglecting these aspects undermines efforts to establish a secure and supportive campus atmosphere, particularly for sexual assault survivors. This study examines the associations with rape myth adherence among university students; results are discussed.

UPM 38 1:00-3:30 PM | MCSC 200

Emotional Laboring Through Birth: Insights From Doula Volunteers

Rachana Charla
Biology

Mentor: Kristen Myers, Sociology

In the US, only 6% of patients can afford to have a doula during their labor and delivery experience (Declercq, 2014). Doulas provide birthing patients with continuous physical, emotional, and informational support through nonmedical interventions to achieve the patient's birth expectations and better birth outcomes. Regardless of hospital staff or support people in the room, the doula's work is grounded in emotional labor and support for the birthing patient (Gilliland, 2011). To better address the need for empowering birth support, for both patients and doulas, I studied end-of-shift surveys completed by a cohort of hospital-based volunteer doulas who served eastern North Carolina during the program's first year of active service. This paper explores the doula's perception of the relationship between birthing patients and the doulas, themselves, in their assessment of providing effective care and service. I believe that doulas feel that they do better work based on an establishment of strong emotional connections with the birth patient and their support. We found that most volunteers were able to help patients make more informed decisions and manage their pain more effectively. Because doulas are servicing a region with a healthcare and maternal care desert, there has been a greater need for doulas to provide birthing patients with direct support. To better address the gaps in maternal health equity, further studies are needed to find equitable long-term solutions, but hospital-based doula services could be a potential answer.

Undergraduate Poster Presentation Abstracts

UPR1 9:30-11:30

Force Production of Diverse Populations

Macy Sanderson and Hannah VanStaalduinen
Exercise Physiology

Mentor: John Mizelle, Biomedical Sciences

Physical activity is all around us. As you look around and see people walking, running, riding a bike, skateboarding, and everything in between they are all partaking in a type of physical activity. The positive impacts of physical activity range widely. Most of our daily activities often involve the execution of physical activity, which typically consist of fixed sequences of movements. Although we may not realize it, successful performance of physical activity skills is highly dependent upon total body strength. That being said, planning and executing an organized and well-coordinated series of movements is fundamental for engaging in different activities or tasks that are significant to occupations and roles that we take on. The overall aim of this research is to further understand the relationship between hand grip strength and physical activity level as it relates to diverse populations.

The model for investigating the connections of physical activity and grip strength is determined by monitoring the capability to control different force regulators. This process will be done by using hand dynamometers and MATLAB analysis of the participants' capability to be able to stay within the predetermined range.

We have not yet started collecting any data with participants yet. However, it is hypothesized that the more physically active a participant is, the more capable they are of controlling and producing force of different magnitudes.

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UPR2 9:30-11:30

C. elegans PUF-9 protective role against stress

Alex Tiet
Multidisciplinary Studies

Mentor: Myon Lee, Internal Medicine

The decision on stem cell fate and generation of multicellular tissues is vital for homeostasis in multicellular organisms. The PUF RNA-binding protein family in *C. elegans* is involved in stem cell fate decisions through translational repression of target mRNAs. More specifically, the human PUMILIO (PUM1/PUM2) homolog, PUF-9, plays a role in the differentiation of somatic epidermal stem cells in *C. elegans*. The *puf-9 (null)* mutant has been shown to have enhanced mortality and

expressed other heterochronic phenotypes. In fact, there are established oxidative stress response pathways involving other proteins, however, the role of PUF protein in these pathways is still unknown. Stress response survival assays are important methods to elucidate physiological responses and understand the consequences of the homeostasis of certain genetic models. Here we demonstrate the protective role of PUF-9 against induced heat and oxidative stress, where *puf-9 (null)* mutants were shown to have significantly higher lethality than the control counterparts. However, more investigation is needed to examine specific mechanisms and pathways to generalize any results that would be useful in therapeutic applications.

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UPR3 9:30-11:30

Intrarater and Interrater Reliability in the Analysis of Immunohistochemical Data

Hayden Carter
Exercise Physiology

Mentor: Ted G. Graber, Physical Therapy

Hayden Carter[1,*], Ashby Dickerson[1,*], Justin McCrary[2], Anna Webster[2], Emily Bowser[1], Emily Rust[1], Brandon Baucomb[1], Justin Stephenson[1], Lucas Tripp[2], Madison Underwood[1], Ted G. Graber[1,2,3,4]
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In muscle research two common types of analysis are myofiber cross-sectional area (CSA, determines the size of individual muscle cells, or myofibers) and fiber typing (determines what type of myofiber: slow twitch type 1, or fast twitch types 2a, 2x, or 2b). To produce the needed data, we used immunohistochemistry. Immunohistochemistry (immunofluorescence) is a procedure that allows us to take a cross-sectional slice of frozen muscle on a cryostat, then stain and image those sections to understand relative abundance or locality of certain proteins of interest. In our lab we use primary antibodies to attach to proteins of interest, and then secondary antibodies that attach to the primary antibody. The secondary antibody has a fluorophore attached to it. A fluorophore is a chemical tag that will absorb a specific wavelength of light when it is stimulated by a laser and re-emit it at a longer wavelength. Our recent study was designed to identify changes in muscle fiber cross sectional area and fiber-type as a result of the aging process and due to exercise training in male C57BL/6 mice soleus (SOL) muscle, part of the plantar flexor group and a mixed-fiber type postural/locomotion muscle. Using multiple primary and secondary antibodies (4 different fluorescent tags) we detected and visualized 4 different proteins (myosin heavy chain 1, 2a and 2b; and laminin, a sarcolemma protein that outlines the myofiber). Fiber and cross sectional area was determined using ImageJ software. The primary purpose of our current study is to evaluate intrarater and interrater reliability to determine the accuracy and precision of CSA and fiber typing data acquisition. Each researcher (n=9) analyzed the same muscle cross section 3 times for intrarater reliability in CSA and fiber-typing, and then we compared the results of an analysis done by all nine researchers for interrater reliability. Intrarater reliability tests how precise each researcher is within

their own analysis, while interrater reliability tests how accurate results are between researchers. Statistical analysis is pending as of the abstract due date, but will be complete for the presentation.

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UPR4 9:30-11:30

Novel nano-antibiotic inhibits recurrent _Pseudomonas aeruginosa_ infections in chronic muco-obstructive lung diseases

Lauren C. Garcia
Environmental Health

Mentor: Lok R. Pokhrel, Public Health

Lauren C. Garcia[1]; Lok R. Pokhrel[1], MSc, MS, PhD; Shaw M. Akula[2], PhD
[1]Department of Public Health, [2]Department of Microbiology and Immunology, The Brody School of Medicine, East Carolina University, Greenville, NC, USA._

Introduction: Patients diagnosed with muco-obstructive lung diseases, such as chronic obstructive pulmonary disease (COPD) and cystic fibrosis (CF), present hyperaccumulation of thick mucus within the airways, which impairs ciliary movement and creates a favorable environment for recurrent and chronic bacterial infections. _Pseudomonas aeruginosa_ (Pa), an opportunistic soil bacterium, often predominates in advanced stages of muco-obstructive lung diseases. Despite frequent and high dose antibiotic (i.e., aerosolized tobramycin) treatment, Pa persists within the pathological mucus, evading antibiotic insults and causing recurrent infections. Antibiotic treatment failure remains a global public health challenge due to bacterial resistance to current antibiotics, causing 3.23 million deaths in 2019.

Objective: The main objective of this study is to determine the potential efficacy of a novel nano-antibiotic, amino-functionalized silver nanoparticles (NH2-AgNPs), against _P. aeruginosa_ under low and high mucin environments, mimicking airway milieu of patients with early and chronic stages of muco-obstructive lung diseases.

Methods: _P. aeruginosa_ PAO1 strain will be used for multiple toxicity bioassays, including agar disk diffusion assay, LB broth growth assay, cell leakage, and cell debris assays; the results of which will be confirmed by microscopic and biochemical analyses. Treatments will involve NH2-AgNPs and tobramycin, in the presence of variable mucin concentrations (0.5%, 1%, 2%), mimicking early and chronic stages of infected airways. Each treatment will be tested in at least triplicates and compared with untreated control and tobramycin, as positive control.

Results: Our previous work has shown high efficacy of NH2-AgNPs against ampicillin- and kanamycin-resistant _E. coli_ strains. Our pilot data indicate that NH2-AgNPs are inhibitory to _P. aeruginosa_ PAO1 at ≥1 μg/mL in the absence of mucin. Experiments are underway to determine the efficacy of NH2-AgNPs in the presence of low and high mucin concentrations. While our pilot data are encouraging, we expect to include our new findings in the poster.

Conclusions: Upon proven effective in high mucin concentration, NH2-AgNPs may serve as a novel nano-antibiotic against tobramycin-resistant Pa infections in patients with chronic muco-obstructive lung diseases, including COPD and CF.

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UPR5 9:30-11:30

Investigating the role of ElpB and ElpQ paralogs in complement evasion by Lyme disease spirochetes

Lara M. Matulina
Microbiology and Immunology

Mentor: Brandon Garcia, Microbiology and Immunology

Lara M. Matulina, Anna M. Schulz, Sheila Thomas, and Brandon L. Garcia
From the Department of Microbiology and Immunology, Brody School of Medicine, East Carolina University, Greenville, North Carolina, USA

The causative agent of Lyme disease, Borrelia burgdorferi, causes nearly half a million infections yearly in the United States. To avoid killing mediated by the arm of the innate immune system known as the complement cascade, the spirochete expresses numerous surface attached lipoproteins that bind to specific complement proteins and block their function. _We have previously shown that two lipoproteins of the OspEF-related protein family,_termed ElpB and ElpQ, act as highly specific inhibitors of the first component of complement, C1. ElpB and ElpQ specifically bind to the C1 protease subcomponents, C1r and C1s, and protect the spirochete from antibody-mediated complement killing. Interestingly, B. burgdorferi strain B31 encodes three additional paralogs of ElpB and ElpQ, called ElpM, ElpX and ElpD. Here, we investigated whether these paralogs also function as complement inhibitory proteins. Focusing on the putative complement-binding C-terminal regions, we produced purified recombinant truncated forms of soluble ElpM, ElpX, and ElpD._Surface plasmon resonance binding assays showed that all three Elp paralogs bound to C1s with high affinity. To investigate whether this impaired C1s function, thereby reducing classical pathway (CP) activity, we conducted serum-based ELISA complement assays. All Elps showed significant inhibition of CP activity, most potent of all ElpM with a half-maximal inhibitory concentration (IC50) of 19.4 nM. To understand the structural basis of Elp-C1s inhibition, Apo-ElpM, apo-ElpD and complexes of ElpM-C1s and ElpX-C1s were subjected to crystallization trials. Preliminary crystals were identified for Apo-ElpM and Apo-ElpD, which are currently being optimized for diffraction quality. Collectively, our findings reveal three additional potent C1s inhibitors produced by the Lyme disease spirochete B. burgdorferi. Ultimately, this work provides new insights into microbial complement evasion and may help to identify novel Elp-based therapeutic strategies against complement-mediated diseases.

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Transcriptional control of lipid metabolism in response to traumatic brain injury and aging

Paulina Weglarczyk
Public Health

Mentor: Jessica M Ellis, Physiology

Traumatic brain injury (TBI) affects approximately 1.7 million people each year. TBI in older adults results in longer recovery periods and poorer outcomes. Despite the prevalence and impact of TBI, our understanding of the underlying pathophysiological mechanisms in repair and recovery remains incomplete. Recent advances in lipidomics, the large-scale study of pathways and networks of cellular lipids, have provided new insights into the role of lipid metabolism in TBI. However, the impact of aging on lipid metabolic control in response to TBI remains incompletely understood. In this experiment, we investigated the changes in lipid-related gene regulation post-TBI to study the recovery response of lipid metabolizing genes in both young and aged mice.

Young mice of 3 months of age were compared to aged mice of 18 months. A controlled cortical impact (CCI) procedure of 3mm diameter was induced in male mice from the C57BI/6 strain. Ipsilateral cortex tissue was harvested at 1-, 3-, 7-, and 28-days after CCI, n=6. Sham mice underwent the same procedural steps but did not receive the CCI procedure. RNA was extracted from tissue surrounding the injury site, cDNA synthesized, and RT-PCR by comparative CT was performed for the expression of neuroinflammatory and lipid-metabolizing genes.

As expected, neuroinflammatory markers were significantly upregulated after injury. While lipid metabolizing genes were suppressed on day one after injury, several of these genes increased beyond this time point. Specifically, genes related to fatty acid uptake, metabolism, and PUFA synthesis increased while genes that enhance fatty acid release were downregulated. The modulation in gene expression for both inflammatory and lipid metabolism genes followed similar patterns between young and aged mice; however, gene modulation was more pronounced and significant in young mice compared to aged mice.

These results suggest that following injury, regulation of genes that control lipid metabolism plays a role in recovery. Importantly, the reduced mRNA modulation in the aged animals suggests that aging reduces the ability of the brain to aggressively respond and adaptively repair following injury. These data suggest that aged individuals may show greater efficacy from lipid-targeting post-injury therapies.

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Quantifying different α-Synuclein oligomeric protein forms.

Mithil J. Patel, Whitney G. Bond
Biochemistry and Molecular Biology

Mentor: Tonya, N. Zeczycki, Biochemistry and Molecular Biology

Parkinson's disease (PD) affects one million people in the US, with ~ 90,000 new cases diagnosed each year. Currently, PD is clinically diagnosed based on the presence of motor impairment (*e.g.* tremors, muscle stiffness) and cognitive decline. But by the time these symptoms are present, significant irreversible damage has already occurred in the neurons. Blood tests and brain imaging scans are used to support a PD diagnosis, however there are no approved diagnostic or early-detection tests for PD. This is mainly due to the variation of symptom severity and disease progression in patients and our lack of understanding how proteins, like α-Synuclein (α-Syn) drive disease pathology. α-Syn is a key protein proposed to be responsible for neuronal cell death. Monomers of α-Syn will aggregate to form toxic, oligomeric a-Syn species as the disease progresses. Therefore, measuring levels of α-Syn oligomers in blood or cerebrospinal fluid would both provide a way to detect and diagnose PD in its early stages as well as monitor disease progression. However, there are no approved methods to reliably quantify α-Syn oligomers. Therefore, the overall goal of our research is to develop methods to accurately detect, identify, and quantify α-Syn oligomeric protein forms. Developing such methods is challenging for two reasons: first, because α-Syn forms disordered oligomers that are highly variable in structure and second, because not all oligomers adopt toxic structures. Using recombinantly expressed protein and modified, published methods, we generated α-Syn oligomers and monitored their formation by ion-exchange chromatography, native and SDS-PAGE, and thioflavin T assays. To begin developing assays that quantified the amount of unique oligomeric species, we relied on limited proteolysis and targeted mass spectrometry to identify unique "biosignature" peptides for each oligomer. Multiple proteases were surveyed to determine which gave the most unique peptides for oligomer mixtures. Additionally, PyMOL and cryo-EM and x-ray crystallographic structures of a-Syn monomeric and fibril structures were used to predict the accessibility of protease sites in the α-Syn oligomers. Quantitative analysis of the cleaved peptides from the limited protolysis was performed using targeted mass spectrometry. Taken together, this work lays the foundation for developing specific and quantitative methods for the assessment of oligomeric α-Syn species in a variety of fluids and tissues.

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UPR8 9:30-11:30

Colloidal stability of magnetic nanoformulations and their therapeutic properties to treat cancer via magneto-mechanical actuation

Oisediamehi Abhulimen
Biology

Mentor: Juan Beltran-Huarac, Physics

Jarrett Douglas Nagy, Samuel Minier, Yara Fareez Maayah

Renowned as the most lethal disease of world history, cancer continues to take the lives of millions of people across the globe. In the U.S. alone, it is estimated that about 1,000 patients die every day from cancer. Scientists have primarily used treatments such as chemotherapy and ionizing radiation to treat cancer. Although these treatments hold the disease at bay, they have side effects that are

detrimental to patient quality of life. Therefore, there is a strong need for a new, less detrimental cancer treatment. We propose a novel treatment in which nitrodopamine polyethylene glycol coated superparamagnetic iron oxide nanocubes (ND-PEG SPIONs) are absorbed by cells and actuated by alternating magnetic fields (AMF), which can translate magnetic forces into mechanical agitation via magneto mechanical actuation (MMA). In this treatment, ND-PEG SPIONs will first be tested for stability in water and cell culture media using DLS. Once stable, they will be incubated with human adenocarcinoma (MCF-7) cells followed by cell uptake studies. The particle-containing cells will be treated with AMF at initial conditions of 100 mT pulse, 65 Hz frequency, for 30min (5 min on/off intervals). Cell viability studies will be performed after magnetic treatment via CCK-8 and PrestoBlue reagent assays to determine the optimal concentration of ND-PEG SPIONs and incubation time to maximize cell killing rates. Magnetic fields parameters will be adjusted to optimize this response. MMA is anticipated to cause shear stress on the cytoskeleton of MCF-7 cells and induce apoptotic cell death. This approach represents a step further to advance the field of cancer therapeutics utilizing modern-day technology and serves as a less harmful alternative to current cancer treatments.

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UPR9 9:30-11:30

Mobile Sensorimotor Integration Assessment Following Repetitive Sub-Concussive Loading

Kendall Nelson, Brittany Trotter
Exercise Physiology

Mentor: Nicholas P. Murray, Kinesiology

Producing no clinically observable symptoms of concussion, sub-concussive loading increases the risk of neurological injury and degeneration. Concussion, a form of mild traumatic brain injury (mTBI), is a diffuse injury to the brain, producing a broad range of impairments. Such impairments include impaired sensorimotor integration, or the capability of the central nervous system to integrate different sources of stimuli and transform them into motor actions. Currently, mTBI diagnoses are clinically-based and predicated on an individual's presenting signs and symptoms 1. Thus, a lack of clinically observable symptoms following head impact often results in no diagnosis of injury. However, this lack of observable symptoms does not equate to lack of injury. Measurable neurocognitive and neurophysiological impairments have been identified in individuals who displayed no clinically observable signs or symptoms of mTBI following head impact.

To validate our MTU, we will recruit 20 healthy adults, ages 18-50 with no known history of concussion, no recent lower extremity injury, and no history of any other neurological impairments. Participation in the study will be voluntary and informed consent will be obtained from each individual prior to beginning testing. The maximum age of 50 years has been set to control for age-related changes in sensorimotor integration.

Using a within-measures design, participants' postural control will be assessed at three time points on two separate days. A non-fatigue measurement will be obtained at one visit and pre-/post-fatigue

protocol measurements will be taken at a separate visit. Postural control testing will utilize an HTC VIVE virtual reality (VR) headset. Postural sway data will be induced via a moving room in the VR. Ground reaction force will be simultaneously collected using an in-ground Bertec force plate (static) and Novel Pedar in-sole pressure system (mobile). Cortical activation will be measured throughout the duration of the postural and oculomotor control assessments using a 32 channel dry g.Nautilus RESEARCH EEG cap. On the fatigue visit, following a pre-fatigue postural control measurement, participants will walk to voluntary exhaustion on a treadmill using the Buffalo Concussion Treadmill Test (BCTT). After the BCTT is completed, a post-fatigue measurement will be obtained. The results of this study are currently pending.

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UPR10 9:30-11:30

Assessing the Role of the Endocannabinoid System in Arsenic Induced Developmental Neurotoxicity

Monica Cross
Biology

Mentor: Xian Wu, Pharmacology and Toxicology

Arsenic occurs naturally in the air, water, and soil. The rise of the oceans and the nature of agriculture mean that arsenic levels in our water are dangerously high for humans. People can be exposed through cigarette smoke, contaminated water, or industrial processes. Arsenic has been found to
cause neurodevelopmental disorders including cognitive impairments, ADHD, and autism. The endocannabinoid system (ECS) is crucial for neurodevelopment. Understanding how arsenic and the ECS interact could be used for therapies targeting the ECS system. This study is to examine the effects of arsenic on the ECS during critical early neuronal developmental stages including neuronal expansion, neuron differentiation, network formation and synaptic activity. The hypothesis is arsenic exposure when newborn neurons are establishing synapses alters the ECS significantly and will specifically affect the cannabinoid receptor type 1 and other regulator genes. In this study, human iPSCs are differentiated in 3D with the cerebral organoid kit. The differentiation is closely examined during the process. Sodium-arsenite solution (0.01, 0.1, 1, 10 and 100 μM) is added to medium during the 3D cerebral organoid formation. The
lethal dose 10% (LC10) is determined (0.1 μM) for 40 days of organoid differentiation exposure and for mRNA expression analysis. We analyzed RNA sequencing data from previous work in the lab and found that arsenic repressed genes related to the neuronal synaptic endocannabinoid pathway (CNR1, GRIA4, CACNG2, MGLL, KCNJ9) in the cerebral organoid exposed to arsenic for 40 days. The preliminary results suggest that arsenic exposure disrupts the ECS during early brain development. In addition, the project aims to analyze gene expressions and neuronal function, with a particular focus on the ECS during neuronal differentiation and on markers related to synapse formation.

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Signals Inducing Gene Expression During Stem Cell Niche Assembly in *Drosophila melanogaster*

Kirklan Naumuk
Biology

Mentor: Lauren Anllo, Biology

A stem cell is an undifferentiated cell, capable of producing different specialized cells found in the body. This feature makes stem cells vital to tissue regeneration and repair. Stem cells require signals from a niche, a cellular microenvironment that regulates and houses stem cells until they differentiate. Stem cell niches are vital to many different systems, and to function properly they are often compartmentalized in a specific region of their tissue. This begs the question: how does the niche assemble in the correct location during development? To ask this question, we use the *Drosophila* testis niche as a model due to its clearly defined niche and genetic amenability. This niche requires compartmentalization at the anterior of the gonad during development. _Here, we focus on the transcription factor *islet*, which our lab previously identified as a key regulator of testis niche assembly. Islet protein is detectable in niche cells. Further, when *islet* is disrupted, the niche is oblong and dispersed, as the cells do not migrate fully. (Anllo and DiNardo, 2022). We want to identify and understand key intermediaries and signals required for turning on *islet*. In the alary muscles, the transcription factor Org1 induces *islet* (Boukhatmi et al., 2014)*,* and we have confirmed the same relationship in the gonad. We also found that *islet* is expressed in response to Slit and FGF signals from neighboring tissue (Anllo and DiNardo, 2022). We wanted to know if *org1* acts as an intermediary between Slit and FGF signaling and *islet* induction for niche assembly. To test this, we knocked down Slit and FGF signaling in a line of flies and compared Org1 protein accumulation in mutant and sibling control niches. We found that when Slit and FGF signals are knocked down, Org1 is significantly reduced. These data, coupled with our other work, suggest that Slit and FGF signaling is influencing *islet* via induction of *org1*. To delineate additional signals influencing *islet* during niche morphogenesis, we are currently investigating the Wnt signaling pathway, which is known to induce *islet* in the heart (Mann et al., 2009). By identifying additional niche assembly signals, we can gain a more comprehensive understanding of how *islet* is activated during niche morphogenesis. Overall, these cumulative results will give us a broader understanding of how the niche is properly formed and compartmentalized during development via cell signaling.

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Evaluating The Stability of In-Vitro Calbindin-D28k

Cole Perretta, Jude Kinkead, Richele Thompson
Multidisciplinary Studies

Mentor: John Cavanagh, Biochemistry and Molecular Bio

Calbindin-D28k is an important calcium buffering protein and signaling protein that is highly concentrated in the mammalian central nervous system for supporting neural function, the kidney, and the stomach to support the transportation of calcium. Calbindin-D28k has two integral structural features, one of these features being EF- hands. Calbindin-D28k has 6 EF hands to assist in the calcium- binding process that can bind up to 4 molar equivalents of calcium per protein. The other structural feature is a disulfide bond formed when oxidation of a thiol group on calbindin-D28k occurs in vivo after calbindin-D28k is synthesized. Calbindin-D28k also plays a role in regulating the activity of other proteins like IMPase and caspase-3. While calbindin-D28K directly activates IMPase through a redox-regulated mechanism, its binding to caspase-3 inhibits protease activity and suppresses apoptosis. These proteins' sensitivity to changes in calcium levels or redox states is essential to see the stability of proteins in an in vitro setting with reducing agents and calcium presence. Using circular dichroism (CD), DTNB assays, and Native-PAGE, the time-based integrity of Calbind-D28k's structural features may be evaluated to determine their stability following recombinant expression.

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UPR13 9:30-11:30

Perfusing Profusely, a Novel Approach to Sperm Motility Analysis

Logan Harrison
Biology

Mentor: Cameron Schmidt, Biology

In-vitro fertilization procedures are costly, time consuming, and often require multiple rounds of treatment to produce a successful pregnancy. In order for us to better select a sperm for fertilization we have to analyze millions of cells at the start of their reproductive journey to determine the cell most likely to fertilize, a feat of superhuman proportions. Computational simulations are the way of the future for asking and answering complicated questions in a limited amount of time. Translating virtual scenarios into real life is necessary for quality control and verification of the simulation output. Sperm research necessitates real world data because sperm selection is not a well understood topic in biology and simple assumptions are not sufficient to answer pressing questions. By obtaining realistic real world data on the front end, the data we receive from simulations on the back end will be more valid. Our study focuses on the development and implementation of perfusion chambers designed to mimic the conditions that sperm encounter during their journey through the female reproductive tract. Overcoming the effects that occur at microscopic scales, we sought to enhance the precision and controllability of the experimental setup. It is necessary to develop chambers as the ethics and feasibility of a human study are difficult to overcome. Through comparing the flow rates and concentrations of various dyes and microscopy image analysis, we show the validity and fidelity of the perfusion chambers. Our research provides a foundation for advanced and high-precision semen analysis for clinical, agricultural, and basic research applications.

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UPR14 9:30-11:30

Computational Analysis of Fibrin Formation with Light Sheet Microscopy

Dylan M. Miller, Aravind Elangovan, David M. Hart
Physics

Mentor: Nathan E. Hudson, Physics

Throughout the formation of a blood clot, fibrinogen is converted to fibrin through thrombin cleaving N-terminal peptides. Fibrin monomers polymerize both laterally and longitudinally into thick fibers that comprise the structural scaffold of a clot. The resulting fibers form a dense network and join together in crosslinks (junctions). This polymerization process is of incredible importance to research concerning blood clots as aberrant clot structures correlate with numerous hemostatic pathologies. Modern methods of microscopy, in this case, light sheet microscopy, allow the imaging of this entire process. However, the tracking of individual fibers as they grow and collecting data concerning their branching is difficult due to the fiber density in a microscopy image volume. The networks of fibers are 3 dimensional, overlap, are extremely small and consist of thousands of individual fibers. The goal of this study is to identify and segment all fibers in a 3D light sheet microscope video, track them across time and compute relevant data on each individual fiber. Manual annotation of objects is slow and unable to effectively take data on all fibers of all blood clots in our dataset. By designing computer algorithms for tracking objects in 3D data, information may be collected on thousands of fibers in the time frame of minutes. This allows for processing of statistics and features that would be unavailable otherwise. Preliminary results towards measuring fiber growth rates and junction formation over time will be presented.

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UPR15 9:30-11:30

Preliminary comparison of temporal measures between symptomatic and asymptomatic people with cricopharyngeal dysfunction

Wilson Wysor, Alyssa Rowe
Speech & Hearing Sci

Mentor: Deirdre Larsen, Communication Sciences and Disorders

Background: Choking on food contributes to the 8% of unintentional deaths in adults over 65 in the United States. Relatedly, up to 46% of apparently healthy individuals seek medical treatment for feeling food sticking in their throat. Associated symptoms may include anxiety of choking or avoiding certain foods. The upper esophageal sphincter (UES), or opening to the esophagus, is an essential component of swallowing as it allows what we swallow to pass easily from the pharynx into the esophagus. Cricopharyngeal dysfunction (CPD) encompasses structural anomalies of the UES identified in modified barium swallowing studies_(MBSS). CPD is known to significantly reduce the extent of UES opening, which can lead to food sticking in the pharynx and a sensation of choking.

However, not everyone who has a bar has symptoms or shows pharyngeal residue on MBSS. Further, it is not known what temporal measures are affected by CPD.

Purpose: The intent of this study is to determine if temporal measures related to UES opening differ between symptomatic and asymptomatic subjects with CPD on modified barium swallow studies (MBSS).

Methods: This is a preliminary retrospective analysis of 10 MBSS obtained from Our Lady of the Lake Regional Hospital in Baton Rouge, Louisiana as well as University of California, Davis. Participants include 5 symptomatic subjects with CPD age-matched with 5 asymptomatic subjects with CPD over 65 years of age. Temporal measures include onset and duration of pharyngeal transit time, hyoid elevation, and UES opening. All measures will be obtained by a trained, blinded rater using Swallowtail (Belldev Medical, Inc) during a 20 cc Level 1, thin bolus and a 3-5 ml Level 4, pureed bolus. Repeated measures will be taken by a second trained, blinded rater. Inter-rater reliability will be assessed using intraclass correlation coefficients. Paired t-tests will be used to compare group differences.

Results: Results from this study will identify specific timing measures that contribute to symptoms and will be used to provide further insight into the range of typical swallowing physiology.

Conclusions: Ongoing investigation of specific temporal measures may further illuminate features of atypical swallowing to improve assessment on MBSS. This work can further be used to improve treatment planning for symptomatic individuals.

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UPR16 9:30-11:30

Evaluating Harm Reduction Services and Opioid Use Disorder Outcomes in Eastern North Carolina Communities: A Research Proposal

Virginia Hope Rahilly
University Studies

Mentor: Chandra Speight, Adv Nursing Practice & Educ

Eastern North Carolina has been deeply impacted by the opioid epidemic: overdose death rates and other opioid-related harm exceed state and national averages in many communities of eastern North Carolina. Research indicates that harm reduction services such as peer support services, safe syringe exchange programs, naloxone distribution, fentanyl and xylazine test strip distribution, safer use strategies and services, and HIV/hepatitis testing reduce overdose death rates and opioid-related harm rates. The United State Substance Abuse and Mental Health Services Administration (SAMHSA) Harm Reduction Framework outlines best practices for harm reduction services. However, there appears to be significant variation from county to county in the type and extent of harm reduction services offered. This project will explore harm reduction services offered by North Carolina Department of Health and Human Services sanctioned harm reduction programs in select eastern North Carolina counties using publicly available data. Harm reduction services will be

evaluated per county using the SAMHSA framework. Then, the association between services offered and opioid-related outcomes will be explored. This project will help us understand the link between harm reduction services and opioid related outcomes in counties in this region that have been deeply impacted by the opioid epidemic.

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UPR17 9:30-11:30

Ronald Mcdonald House Strengthening Families During Hospitalization

Jany Soth
Maternal and Child Health

Mentor: Alice Richman, Health Education and Promotion

Background: ECU Health extends its services to 1.4 million individuals annually across the 29 counties of Eastern North Carolina. Despite operating eight community hospitals, only one has a pediatric unit. Maynard Children's Hospital (connected to ECU Health Medical Center) offers specialized care for children of all ages. Patients within Eastern North Carolina often find themselves traveling considerable distances from their homes to access the necessary care for themselves or their families, due to the insufficient resources available within their communities. When families travel extended distances to seek medical care, they tend to leave their regular routine and attempt to navigate often challenging unforeseen circumstances. This Ronald Mcdonald House has the purpose of providing accommodation to families and providing financial relief to those with a hospitalized child. The program helps reduce the stress and financial burdens of parents and siblings who are going through similar situations. Ronald Mcdonald House provides housing for families to stay close with their children while offering other services such as sibling support services, recreational activities, and consistent meals. Their goal is to provide family-centered care and help families physically, economically, and emotionally during their health care journey.

Methods: A study was conducted to compare parents who slept at their hospitalized child's bedside to those who stayed at their local Ronald Mcdonald House. After a couple of stays, researchers conducted a survey to gather their feedback.

Results: Parents who slept at their hospitalized child's bedside experienced more disruption, reported poorer sleep quality, and shared feeling less rested in comparison to family members that were staying at the Ronald McDonald House. Parents who were sleeping in the hospital complained about neck pains and waking up to discomfort. On the other hand, families who stayed at Ronald McDonald House were offered their own beds (along with other necessities), which provided a feeling of more energy to take care of their child the next day.

Conclusion: Based on the study conducted, RMH has been shown to be cost-effective to parents and designed for families in need of rest. Those who stay at the Ronald McDonald House can fully engage with their child's care and have a better hospital experience.

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Influence of Exercise Types during Pregnancy on Maternal Cardiometabolic Profiles

Grace Biancofiore
Exercise Physiology

Mentor: Linda May, Kinesiology

Pregnant women should follow exercise recommendations by the American College of Obstetricians and Gynecologists. Studies demonstrate that exercise during pregnancy is safe for the pregnant woman and the fetus and can have positive effects on maternal health. For example, maternal exercise during pregnancy is known to lower SBP, regulate weight gain, and lower total cholesterol levels. Exercise is also beneficial for decreasing cardiometabolic risk and exercise types influence this differentially. However, it is unknown how different exercise types influence maternal cardiometabolic risk during pregnancy. While current research explores exercise effects on various cardiometabolic factors, there is a gap in knowledge when comparing specific exercise types and when comparing effects between healthy and overweight/obese populations. We hypothesize that combination exercise (aerobic+resistance) will decrease GWG, blood lipids, and body fat percentage, while increasing HDL cholesterol, thus decreasing cardiometabolic risk (CMR) score. To answer this question, healthy, women between 13-16 weeks gestation with a singleton pregnancy were recruited and randomized to aerobic, resistance, combination, and attention-control. Blood lipids (i.e., HDL, LDL) and measures (systolic blood pressure) were taken at 16 and 36 weeks gestation. With a significance level of $p<0.05$, ANOVA tests were conducted to determine if there were differences between groups. After controlling for attendance ($>80\%$), maternal data was analyzed and stratified based on pre-pregnancy BMI. Major findings included that exercise is beneficial for lowering SBP, LDL, triglycerides, and overall CMR for all exercise groups compared to control. Based on pre-pregnancy BMI, CMR decreased for women with a healthy pre-pregnancy, but CMR increased for women who were overweight/obese pre-pregnancy, except for those in the resistance group. Overall, all exercise types are beneficial during pregnancy; resistance exercise might be more beneficial for women who are overweight or obese starting pregnancy. Further research is needed to evaluate the change in CMR across pregnancies.

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Self-Efficacy and Performance Over Various Trials in a Soccer Shooting Drill

Sophia Elizabeth Fisher
Mary Green
Sports Studies

Mentor: Christine M. Habeeb, Kinesiology

Bandura (1977) introduced the concept that self-efficacy, or confidence, can influence performance. While this has been investigated across many different sports, not many have studied how efficacy

changes over various trials with performance. The purpose of this study was to see how efficacy and performance change over multiple trials of a soccer shooting drill. Nineteen players from a university women's soccer team participated in the study. Participants completed 5 trials of the Loughborough Soccer Shooting Test (LSST); 1 practice trial and 4 test trials. Before each of the 4 test trials, each participant self-rated their confidence on a scale of 0 (not at all confident) to 10 (completely confident) and then they were asked to report what they would be focusing on during the upcoming trial. After they completed each trial, they were asked to rate their subjective performance on a scale of 0 (not at all successful) to 10 (completely successful). The objective performance task took on average 10.5 seconds to complete (8.4 to 14.1 seconds). Results indicated athletes were moderately confident in Trial 1 (M= 5.95) and this continued to increase throughout, ending with the highest confidence in Trial 4 (M=6.53). Comparing this to subjective performance, the first trial started with moderate ratings of personal performance (M=5), increased by the third trial (M=5.63) and then decreased during the last trial (M=5.5). For both efficacy and subjective performance, every player had a unique trajectory, and a majority did not have a liner increase. When players were asked what they would focus on most in the next trial, majority said shooting accuracy (n=18) and shot placement (n=12), followed by speed (n=10), power (n=7) and other (n=10; e.g., turning, leaning over ball). Athletes that focused on turning reported the most confidence (M=8.5). This data and results exemplify how self-efficacy and performance change throughout trials of a task. The focus of turning and a high level of confidence may lead athletes to better performance and offer an innovative coaching strategy for this task.

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UPR20 9:30-11:30

Comprehension of verb tense in aphasia: Evidence from event-related potentials.

Colin McCauley
Multidisciplinary Studies: Neuroscience

Mentor: Matthew Walenski, Communication Sciences and Disorders

Introduction
Past research has shown that people with aphasia have difficulties processing time reference and verb tense (Bastiaanse et al., 2011). This project uses event related potentials (ERPs) to examine the comprehension of verb tense in people with aphasia as well as the effect that a slowed rate of speech input has on this comprehension. Prior ERP research in healthy people has shown reliable P600 effects to tense violations of regular verbs (Allen et. al. 2003). These P600 effects are usually reduced in amplitude in people with aphasia (Barbieri et al., 2021; McCauley et. al., 2023). Prior studies of slowed speech input show that it may (but does not always) improve comprehension in people with aphasia and can restore processing to near-normal levels. Slowed speech has also been found to impair processing in healthy comprehension (Love, 2008).

Methods and Materials
We examine tense comprehension with an auditory acceptability judgment task.

Participants will listen to 120 simple sentences spoken by a male English speaker, 60 of which are grammatical (Yesterday I **kicked** the ball) and 60 of which are ungrammatical (Yesterday I **kick** the ball). Sentences will be presented first at a normal rate of speech (5.36 syllables per second), and then at a much slower rate of speech (2.68 syllables per second). After each sentence, participants make a button press to judge the sentence as "good" or "bad".

Data Collection and Analysis
We aim to collect data from individuals with aphasia, a healthy matched control group, and a group of younger healthy college students. EEG data will be collected throughout the whole task and processed using EEGLAB, ERPLAB and MATLAB. To ensure clean ERP data is analyzed, artifacts will be removed using ICA. The continuous EEG data will be epoched into 1200ms ERPs and time-locked to the onset of the main verb in each sentence with a short (100ms) baseline preceding each verb.

Hypothesis
Using an a priori chosen time window (800-1100ms) to examine the P600 effect, differences in P600 amplitude are expected between groups and conditions. For healthy controls, we expect a P600 effect at the verb to tense violations in a normal rate of speech. In people with (agrammatic) aphasia, we expect to see reduced P600 amplitude relative to healthy participants. With slowed rate of speech input, we expect the opposite pattern, with normal-like P600 amplitude in participants with aphasia, but reduced amplitude P600 in healthy listeners.

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UPR21 9:30-11:30

Reliability and Patient Compliance for Nasopharyngoscopy in the Assessment of Velopharyngeal Insufficiency: A Literature Review

Emma Stewart
Speech and Hearing Sciences

Jessica Williams, MS, Phoenix Children's Center of Cleft and Craniofacial Care

Mentor: Jamie Perry, PhD, East Carolina University

Background: The velopharyngeal (VP) mechanism seals the oral cavity from the nasal cavity during speech. Velopharyngeal insufficiency (VPI) occurs when there is incomplete closure of the VP port due to structural differences, causing air to enter the nasal cavity and making speech hypernasal. VPI is treated surgically. Surgeons obtain images of the velopharynx to make a surgical plan. Nasopharyngoscopy is the most common imaging method to view the VP mechanism; however, many outcome studies that use nasopharyngoscopy do not include reliability of the ratings or patient compliance rates. The purpose of this literature review was to determine the percentage of studies that included data about reliability or patient compliance when nasopharyngoscopy was used to view the VP mechanism.

Methods: The East Carolina University library database and Cleft Palate-Craniofacial Journal were used to find studies. Search terms used included "nasopharyngoscopy", "velopharyngeal insufficiency", and "VPI management". Studies that did not report inter- or intrarater reliability were classified as having no reliability reported while studies with inter- or intrarater reliability for any measure on nasopharyngoscopy were classified as having reported reliability. The studies were classified as having no patient compliance data reported, mentioning patient compliance as a limitation but reporting no specific data, or the patient compliance rate was reported. The data were summarized using frequency and proportions.

Results: Thirty-three studies met criteria for inclusion in this review. Of the 33 studies, 8 (24.2%) included interrater reliability data for at least one measure. Only 2 of those 8 studies reported interrater reliability data for the same measurement. Several of the studies did not specify the measurement for which the reliability measure was intended. None of the studies included intrarater reliability. Patient compliance was mentioned as a limitation of nasopharyngoscopy in 4 (12.1%) studies. The patient compliance rate was provided in 5 (15.1%) studies. Both interrater reliability and patient compliance data were reported in 2 (6.1%) studies.

Conclusions: Only a small percentage of clinical outcome studies that use nasopharyngoscopy report reliability and a patient compliance rate. This is concerning given that nasopharyngoscopy measures drive surgical planning, which may be interpreted differently by different raters and can be confounded by patient compliance.

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UPR22 9:30-11:30

A Neurological Study on the Effect of the Cingulate Cortex in Determining Food Choice in Individuals with Eating Disorders and Active Individuals

Caitlyn Mayo
Exercise Physiology

Mentor: John Mizelle, Kinesiology

Over twenty-eight million Americans currently struggle with eating disorders (NEDA), which are characterized by aberrant eating behaviors, distorted body image, and pervasive preoccupations with food. The cingulate cortex, located in the cerebral cortex, serves many functions, including emotional regulation, cognitive processing, and decision-making. Specifically, the anterior cingulate cortex is involved in linking reward and punishment information and establishing emotional responses to specified behaviors and actions (Rolls, 2019).

The purpose of this study is to use information obtained by electroencephalogram (EEG) to make inferences about the cingulate cortex's role in food perception in three comparator groups: individuals with self-identified eating disorders, individuals who are chronic exercisers, and a healthy control group. Chronic exercisers are classified as individuals who participate in vigorous aerobic exercise for at least 30 minutes, 4 times a week. Once data collection begins, researchers will evaluate neural responses as participants are shown 50 images of different foods and classify and classify

them based on their perception of the foods being good or bad. The hypothesis in this study is that there will be similar neural responses/similar perceptions of food in the active group and the individuals with eating disorders. The goal of this study is to analyze the role of the cingulate cortex in food perception and observe the neural responses for different foods in specific groups.

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UPR23 9:30-11:30

A Closer Look at Mothers in Rural North Carolina

Simona Adhikari
Public Health

Mentor: Alice Richman, Health Education and Promotion

In rural areas, there is a big health disparity that exists for individuals. Specifically, for maternal and child health, there are even fewer resources available to new mothers during their pregnancy and early motherhood. The importance of comprehensive and effective maternal and child healthcare in these areas should be a priority. The purpose of this study is to conduct a qualitative study of mothers in rural areas of North Carolina to gather information about their experiences during their pregnancies and how healthcare could improve. The study will explore anecdotes from these mothers and learn about the struggles of accessing healthcare in these remote areas. By telling the stories of these mothers, I hope to spread awareness of how poor healthcare delivery and access are in some parts of this country. The interviews will be filmed and edited into a creative video project to showcase the data collected from this study. Each woman will have a chance to tell her story through a one-on-one interview. My role will be lead researcher which includes finding participants, conducting interviews, reviewing data, and creating the video. Based on prelimiary data and information collection, I have found results that both support positive healthcare practices and highlight negative healthcare practices. Currently, I have completed 14 interviews and have gathered stories from multiple races and ethnicities who have given birth in Eastern NC. Long term, this project can gain the attention of future healthcare providers to showcase this target population and encourage small changes in how healthcare can be delivered and accessed in rural areas.

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UPR24 9:30-11:30

Using Film to Understand Nursing Students' Perception for the Care of the LGBTQ+ Patient

Ryan Lockhart
Nursing

Mentor: Shannon Powell, Nursing Practice & Educ

Developing teaching strategies to best prepare nursing students for practice is a priority for nurse educators. The literature supports that inclusion of best practices for care of LGBTQ+ persons is important for nursing curriculums to include. This research investigates the impact of integrating film into the nursing education curriculum, to enhance nursing students' perceptions of LGBTQ+ patient care. This study, involving 29 prelicensure BSN students, utilized qualitative focus groups to explore perceptions post-viewing of the documentary "You Belong Here". The documentary explores stories of nearly 27 different LGBTQ+ persons and allies who grew up in the rural south near where these students are in nursing school. First and second-cycle coding and thematic analysis were used to analyze focus group data with identified themes of "Nurse as Advocate", "Enhanced Holistic View", and "Internalizing Values". The findings of this study highlight the usefulness of film integration in nursing education as one way to increase student preparation to care for the LGBTQ+ population and may particularly impact the affective domain of learning. The study contributes valuable insights into a teaching pedagogy to build competencies for prelicensure nursing students to learn to best provide care for the LGBTQ+ population.

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UPR25 9:30-11:30

Exploring Intercultural Nutrition Guidance Through International Virtual Exchange

Lauren Briggs
Nursing

Mentor: Kim L Larson, Nursing Science

Purpose: This study explored intercultural nutrition guidance to expand the cultural competence of nursing students and nurses caring for refugees from Ukraine. **Significance:** The impact of the current war on the nutrition of Ukrainian refugees has evoked a humanitarian crisis. Nurses are in the unique position to provide holistic care to all persons yet may not be adequately prepared to care for the nutritional needs of refugees from Ukraine. Refugees may face long-term challenges from nutritional concerns, including micronutrient deficiencies, undernutrition, and lack of culturally acceptable food options. **Methodology:** This qualitative descriptive study is one part of a mixed methods study, entitled "Intercultural Nursing Care for the Health and Well-being of Ukrainian Refugees" led by ECU Principal Investigator, Dr. Kim Larson. In Spring 2023, an International Virtual Exchange course was conducted with ECU and Polish nursing students from Jagiellonian University in Kraków, Poland (N=18). Data were generated from five reflection papers from each of the 18 students, totaling 180 single-spaced typed pages. Polish reflection papers were translated by a native Polish speaker into English and confirmed using Deepl translation app. Data were de-identified and given ID numbers. Three research team members read the transcripts multiple times for key words and elements of intercultural nursing care. Data management included a codebook, with code words and definitions: nutrition, diet, overweight, obese, dietary, and food. Analytic matrices facilitated content and thematic analysis. **Results:** The three themes of intercultural nutrition identified were insufficient resources, inattention to dietary intake, and shared culture. Insufficient resources were represented by food insecurity, finances, and malnutrition. Inattention to dietary intake was represented by lack of nutrition knowledge and connection to overall health by both patients and nurses. Shared culture highlighted how food fulfills a sense of community and

familiarity to the Polish diet. **Discussion**: Multilevel support is needed for long-term food security for refugees, including diet variability and sustainable efforts through community gardens. Public health centers can partner with NGOs to develop nutrition education programs in schools and community centers. Nursing programs should assess whether content addresses nutritional needs of refugees. Community gardens can support shared culture.

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UPR26 9:30-11:30

Comparison of Heat Stress Risk Within Crops Rows to Perimeter in Sweet Corn and Tobacco Fields

Ryan Edwards
Noel Lanier
Nursing

Mentor: Elizabeth Mizelle, Nursing

Introduction- Agricultural work is one of the highest risk US occupations for heat-related illness (HRIs). Farm and crop workers, who commonly perform strenuous labor under direct sunlight, were 35 times more likely to die from HRIs than workers in other industries. Some tall-growing crops can block the cooling effects of wind or contribute to environmental humidity, yet few studies have included measurements of farmworker microclimates (environments directly surrounding workers). The purpose of this study was to assess the differences in heat stress within crops rows compared to the field perimeter.

Methods: In the summer of 2023, two QUESTemp°34 heat stress monitors were set up daily from 8AM to 5PM in crops fields in Bertie and Columbus counties, in the warmest region of North Carolina. Two crops were selected, sweet corn and tobacco, and measurements were collected over 27 days in June and 27 days in July and August, respectively. The monitors measured wet bulb globe temperature (WBGT); which includes temperature, humidity, wind speed, sun angle and cloud cover, and is the preferred occupational heat stress measure. The hourly WBGT averages were compared to the American Conference of Governmental Industrial Hygienists' Threshold Limit Values (TLVs®). The TLVs provide a recommendation on permissible WBGTs to work in based on breaks and workload. Data analysis (SPSS, v28.0) included independent sample t-tests.

Results: There were significantly higher WBGT measurements inside of the row compared to the field perimeter for peak (11AM-2PM) and afternoon (2PM-5PM) times in tobacco. The morning (8AM-11AM) and peak humidity in both tobacco and corn was also significantly higher within the crop rows. With corn, the field perimeter was above recommended TLVs 38 hours (16.9% of total hours) and the center of the field was over the TLVs 53 hours (23.6% of total hours). With tobacco, the field perimeter was above recommended TLVs 141 hours (73.4% of total hours), and the center of the field was over the TLVs 167 hours (87.0% of total hours).

Conclusion: In the summer of 2023, farmworkers in the study area were potentially at an increased risk for HRIs due to warm and humid microclimates within corn and tobacco crop rows. As

environmental heat stress is increasing due to climate change, the greater risk of working inside tall crop rows should be considered in worker education and heat stress plans, such as more frequent breaks at midday and in the afternoon.

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UPR27 9:30-11:30

My Experience as a Social Work Student in Carteret County Schools and the Risk for Substance Abuse Within the School System.

Kearstyn Ellsworth
Social Work

Mentors: Alice Richman and Kelli Russell, Health Education and Promotion

Background: Between 2017-2021, the rate of opioid overdose deaths in Carteret County, North Carolina was 38.9 per 100,000 NC residents. With the rate of opioid overdose deaths in Carteret County being higher than the state average (27.6 per 100,000), students at Carteret County schools are more susceptible to substance use. During my internship with the Carteret County Public School System, I have reached out to local agencies and worked with school counselors to understand the nature of substance use within the county school system and community. Utilizing ACEs (Adverse Childhood Experiences), studies have shown that those who experience ACEs are more at risk for substance use and addiction. Individuals with ACE scores of five or greater are seven times more likely to report illicit substance use than those without ACEs.

Methods: In my internship at the Carteret County Public School System, I engage in attendance issues, student concerns interventions, and school events. I reach out to local agencies to understand what resources they have available for the schools I serve. If these agencies are not already working with my schools, I work to bridge the gap so those services can be provided. I have worked with the Health Department to understand the rate of overdose deaths in Carteret County and what programs they have to combat this.

Results: Through my internship, I developed relationships with the Carteret County community, I addressed barriers to services for students, and I communicated with nine agencies by email, phone, and by meeting in person. In these meetings with agencies, I have learned about the PORT program and have advocated for its involvement in the K-12 system in Carteret County Public Schools.

Conclusion: Through this work, I helped to form relationships with agencies and the Carteret County School System and made a difference by connecting students and schools to old and new resources needed to address crisis intervention and substance use. More prevention programs need to be implemented in schools, such as PORT, in order to address the substance use crisis in Carteret County.

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UPR28 9:30-11:30

Expanding Naloxone Access in Rural Communities in North Carolina

Meghan Guter
Public Health

Mentor: Lori Eldridge, Health Education and Promotion

Drug related overdoses are affecting communities all over the country. In the past two decades, over 28,000 people have died from a drug overdose in North Carolina (NC). Research has shown that there has been an increase in overdose deaths throughout NC, particularly in rural areas. To help reduce overdose rates, health care interventions should be implemented. Accessibility of naloxone has become a factor in combating overdose rates. Naloxone is a medication designed to rapidly reverse an overdose. Public health vending machines (PHVMs) are a strategy to provide harm reduction supplies that have recently been implemented in some communities within the US. Thus far, PHVMs have been installed in communities, detention centers, and police departments. The purpose of this study is to develop implementation strategies to employ PHVMs as a healthcare delivery option for harm reduction in five rural communities (Carteret, Jackson, Surry, Stanly, and Swain counties). This study utilized a community-based participatory approach in which we partnered with the North Carolina Harm Reduction Coalition and Community Impact North Carolina to engage with substance use prevention providers and community members in five rural counties in NC to improve naloxone access. We will collect qualitative interview data from people with lived experience to examine placement of PHVMs and items to be stocked in PHVMs. To do this we are hiring one local community member with lived experience from each county to recruit, conduct interviews, and collect data from other members of the community with lived experience of substance use. Interviewers will be trained to conduct interviews and collect data. Development of protocol for training interviewers includes an interview training presentation with an adapted collaborative institutional training initiative (CITI) portion. The findings will inform implementation of PHVMs to improve harm reduction access and assist in decreasing overdose deaths. This project is supported by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) as part of an award totaling $300,000 with no percentage financed with non-governmental sources. The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement, by HRSA, HHS, or the U.S. Government.

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UPR29 9:30-11:30

The Effects of Commercial Grade E-Cigarette Chemical Ratios and Nicotine Strength on the Gravimetric Filter Correction Factors and Real-Time Measurements

Daniel Walker, Amelia Tart
Public Health

Mentor: Sinan Sousan, Public Health

Electronic cigarettes (ECIGs) generate high concentrations of liquid aerosol by heating nicotine-rich chemicals, reducing the quality of air inhaled through secondhand exposure. PM2.5, also known as fine particles, refers to particles that are 2.5 μm or less in diameter. Given the microscopic size of these aerosol molecules, deep inhalation of PM2.5 can result in lung and bloodstream deposits (EPA, 2022). The Environmental Protection Agency (EPA) has in place a daily limit of no more than 35 micrograms of PM2.5 per cubic meter of air (35 μg/m3). When e-cigarette liquids are heated, particulate matter, such as PM2.5, is released from the device and increases concentration of aerosol in the atmosphere. Increased PM2.5 exposure is a public health issue because high concentrations of liquid aerosols can increase the risk of heart disease and asthma, and exacerbate pre-existing health problems (New York State DOH, 2020). ECIG liquids are available on the commercial market, enabling users to customize ratios of chemical ingredients - propylene glycol (PG) and vegetable glycol (VG) - and nicotine strength. While previous studies have quantified PM2.5 concentrations in ECIG aerosol generated from different PG/VG ratios, commercial-grade ECIG liquids have not been assessed. Furthermore, nicotine strength and effects of PG/VG ratios on aerosol filter correction factors have not been assessed in regard to the impurities of commercial-grade liquids. The filter correction factors for aerosol instruments (SMPS, APS, pDR, MiniWRAS) will be determined for five different chemical ratios: 0PG/100VG, 30PG/70VG, 50PG/50VG, 70PG/30VG, 80PG/20VG, and four different nicotine strengths: 0mg, 9mg, 24mg, and 48mg. Liquid aerosols from e-cigarettes will be generated inside a controlled exposure chamber using the diaphragm pump, SMOK Novo device, and refillable pods for the different PG/VG ratios and nicotine strengths. Data collected from this research study can improve measurement accuracy for additional chemical ratios. This project is immensely important in the field of public health because commercial e-cigarette liquids have yet to receive attention regarding PM2.5 concentrations produced by numerous PG/VG ratios and nicotine strengths. As a result of this study, the existing body of knowledge regarding e-cigarette aerosols will be broadened to include commercial-grade liquids, providing relevant information for policy and personal health.

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UPR30 9:30-11:30

Educational Program Development for Parkinson's Disease and Parkinson's Disease with Dementia Caregivers

Bonnie Chen
Nursing

Mentor: Donna Roberson, Adv Nursing Practice & Education

Introduction: Parkinson's Disease (PD) is a neurodegenerative disorder causing a unique set of clinical manifestations. In the United States, approximately one million individuals live with PD suffering from mental, emotional, and physical complications. As PD progresses, hallucinations,

memory impairment, and difficulties with decision making may be seen. Gradual deterioration in function is referred to as Parkinson's Disease with Dementia [PDD/PLWPDD] and affects three-fourths of PLWPD. PDD manifestations differ from traditional PD resulting in additional care needs. Care competency in PDD and tailoring to the individual are required to achieve optimal outcomes.

Purpose: This project developed educational materials with strategies and resources for caregivers of PLWPDD. The aim was to provide education that improves care and expectations with PDD.

Methodology: Evidence from the literature provided most of the content and was supplemented with information from the Parkinson's Foundation and Alzheimer's Disease national agencies. Professionals and caregivers with experience with PLWPDD provided feedback, suggestions, and comments on the utility of the materials. Finally, an aesthetically pleasing, easy to read informational pamphlet was created, written at a 6th grade education level in English. The materials will be distributed in print and electronic formats to attendees at the research mentor's grant events for caregivers in eastern NC. Caregivers' feedback will also be solicited to further refine the material.

Results: The creation of the materials was completed but evaluation by caregivers of PLWPDD will be completed over the next months by the research mentor. Thus far, the professional reviewers have provided useful input to allow for readability and accuracy of the content.

Conclusion: As the prevalence of dementia in Parkinson's Disease diagnoses continue to increase, it is imperative that caregivers are equipped with knowledge and resources entailing effective and efficient means of care. Based on the literature, caregivers struggled with caring and reported a need for education including symptom management, expectations for changes in lifestyle, and ways to improve wellness and maintain strengths. This project meets a knowledge gap that may improve the future of patient care for the PLWPDD.

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UPR31 9:30-11:30

Evaluation of MagicSchool AI-Generated Elementary Teaching Materials: A Self-Study

Leah Carr
Elementary Education

Mentor: Kristen Gregory, Elem Educ Middle Grades Educ

Recent developments in Artificial Intelligence (AI) have resulted in many possible tools, such as MagicSchool AI, educators could use in their practice. Some educators are concerned with whether using AI to generate classroom materials is a violation of ethical and professional standards. Regardless of such ethical considerations, educators are tasked with determining if AI is a viable tool, what kinds of classroom materials can be generated, and if those materials are aligned with learning standards and students' learning needs. As educators continue to balance many aspects of their role, they may benefit from AI as a tool to generate classroom materials. Possible outcomes of using AI in their practice could be reduced teacher burnout, reduced time for

developing materials, and increased time for other aspects of their role as an educator. Thus, the purpose of this mixed methods self-study is to investigate my experiences using MagicSchool AI to generate elementary classroom materials for a four-week integrated instructional unit, the quality of the AI-generated materials, and my pedagogical decisions surrounding using those materials in my personal teaching practices. The study will address the following research questions: (1) What are my perceptions of using MagicSchool AI to generate elementary classroom materials for a four-week integrated instructional unit? (2) How do the MagicSchool AI-generated materials align with standards, learning objectives, and student learning needs? and (3) What are my pedagogical decisions surrounding using the MagicSchool AI-generated materials? The following data sources will be collected: MagicSchool AI-generated lessons and materials, user prompts, scored evaluation rubrics, personal journal entries, and recorded critical friend conversations. Quantitative data analysis will include descriptive statistics and qualitative data analysis will include open coding and axial coding to identify themes. I will triangulate the quantitative and qualitative data to confirm consistency across the findings. The findings will present my experiences using MagicSchool AI and my pedagogical decisions based on the quality of the materials. Implications will present considerations for pre-service and in-service teachers as they use AI to generate classroom materials which align with state mandated standards and determining if those materials are appropriate and aligned.

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UPR32 9:30-11:30

A Counting Lesson Ending in Defeat

Lexi Lozner
Special Education

Mentor: Monica Gonzalez, Math, Science, & Instr Tech Ed

Using a case study and a series of activities given over the course of a semester, preservice teachers answered discussion-based questions to uncover implicit biases. This study was done to help preservice teachers begin to talk about the impact of racial biases in special education. The case study is about a Black boy named Tay who engaged in a counting collections task in a kindergarten classroom. The responses were coded using the FAIR framework (Louie et al., 2021) in order to categorize the preservice teachers' noticings. Class discussions and practicum experiences occurred over the course of these activities to see how noticings would change based on these. Modifications for future studies are included to look further into how to guide preservice teachers to anti-deficit noticings.

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UPR33 9:30-11:30

Initial Evaluation of an After-school Reading Tutorial for 2nd and 3rd Grade Students: Lessons Learned and Next Steps

Caroline Williams
Elementary Education

Mentor: Kimberly Anderson, Lit Std Engl Educ Hist Educ

The purpose of this study was to evaluate the effectiveness of a short-term literacy tutoring program designed to meet the needs of second and third grade students considered to be at-risk for long-term literacy learning difficulties. The study was conducted at a K-5 elementary school where an after-school tutoring program was provided during the second half of the 2022-23 school year. Tutoring sessions were approximately one hour long on Tuesdays and Thursdays; a total of 21 sessions were offered between late January and the end of April. Eight second grade and 10 third grade students participated in the tutoring; seven second grade and five third grade students who did not participate in the tutoring but who were similarly at-risk served as comparisons. The primary goals of the study were 1) to determine if students who participated in the tutoring improved their rate of growth in reading from the middle to the end of the year as compared to their growth from the beginning to the middle of the year and 2) to determine if students who participated in the tutoring demonstrated greater improvement in their reading skills from the middle to the end of the year as compared to students who did not participate in the tutoring. Preservice teachers from a nearby university and paraprofessionals from the K-5 elementary school served as tutors. Findings indicated that second grade students benefited more from the tutoring than did third grade students. While no results were statistically significant, second grade students did, on average, demonstrate an improved rate of growth in the second half of the year and greater improvement in their reading skills than comparison students. A description of the tutoring is provided and an analysis of the data is discussed with implications for the design, intensity, and timing of literacy tutoring interventions and the need for ongoing training and supervision of volunteer tutors.

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UPR34 9:30-11:30 Perkins, Kasey perkinsk20@students.ecu.edu Health Services Management Majewski, Diane J majewskid@ecu.edu Honors College Hnrs College Interdisciplinary Education

Development of a Student-Led, Student-Focused Mentorship Program for the ECU Honors College

Kasey Perkins, Whitley McCoy, Kylie Murray
Honors College

Mentor: Diane Majewski, Honors College

One of the most important components of the undergraduate experience is the sense of belonging with a strong group of peers. While this is an important feeling for young adults, it is also difficult and daunting to find. This is especially true for first-year students who are also simultaneously transitioning to college. The following research looks at how an Honors College or honors program can help generate student mentor relationships between underclassmen and upperclassmen. These relationships not only have the potential to propel students academically and professionally but also, and more importantly, help students connect with one another and find their community. These

connections allow students to expand their networks, form relationships with people from different backgrounds, and get involved with the university and surrounding community.

A meta-analysis was performed to assess the qualities of established mentor programs in higher education. The programs were scored on a customized rubric that was designed based on common themes discovered in the literature review. The rubric considered various elements such as the program's structure, the expectations of the mentors, and the impact the program had on the students and university. After identifying the strongest elements of these programs as well as areas of improvement, a proposal was generated for a pilot mentorship program for the East Carolina University Honors College. The goal of this mentorship program for the Honors College will be to help foster relationships between students and assist first-year students with the transition to college. By knowing the characteristics of a successful mentor program, the Honors College can use this research to customize the program so that it best serves the students, the college, and East Carolina University.

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UPR35 9:30-11:30

Is the Goldman Fristoe Test of Articulation an unbiased assessment of speech sound production skills for Southern American English children ages four to five.

Whitley Dockery and Sarah Nasser
Speech and Hearing Sciences

Mentor: Yolanda Holt
Communic Science & Disorders

The Goldman Fristoe Test of Articulation (GFTA) is a standardized speech sound assessment for children which claims to be unbiased. It tests for sounds-in-sentences along with sounds-in-words in the initial, medial, and final word positions. We wanted to know if GFTA held bias towards Southern American English speakers in our community. We examined the following question: Is the Goldman Fristoe Test of Articulation an unbiased assessment of speech sound production skills for Southern American English children ages 4-5? We evaluated the performance of four female children, two African Americans and two White Americans, aged 4-5 years, on GFTA words and sentences. Southern American English varies from standard American English in the production of final consonants. African American English (AAE) also varies from standardized American English for final consonant production and for the production of vocalic R and L in words such as fire and feel. We compared the children's production of individual words and sentences to the expected production from the standardized sample. We predict the children's use of Southern American English and African American features will have a negative effect on their scores. We hypothesize the use of southern and African American English will result in biased scoring of the test.

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UPR36 9:30-11:30

How has the community school framework impacted family support for learning at P.W. Moore Elementary?

Jamie Day, Remington Sullivan, Brooklyn Buchanan
Family and Consumer Science

Mentor: Jerry Johnson, Educational Leadership

Community schools foster an environment where teachers, parents, and students work together to strengthen student learning via community engagement. This style of public school provides services and resources specific to fit the diverse needs of the community. For years, Community Schools have been rapidly appearing and successfully running in urban areas, but have never been established in rural areas. After receiving state-level funding East Carolina University's Rural Education Institute (REI) has partnered with the Pasquotank Public Schools (ECPPS) in rural Elizabeth City to implement the community school framework at P.W. Moore Elementary School. The four pillars of community schools include 1. Integrated Student Support 2. Expanded and Enriched Learning Time and Opportunities 3. Active Family and Community Engagement 4. Collaborative Learning and Practices. The purpose of this study is to determine how the community school framework impacted family support for learning. The REI team hosts monthly family dinners which provide a space for teachers, students, and parents to discuss student academic success and home-learning contributions, all while providing a free meal. Different organizations attend depending on the month thus strengthening the community relationship. In the 2021-2022 school year, P.W. Moore's overall academic score ranked an F. Since becoming a community school in the 2022-2023 school year, the grade has increased to a D. The REI team will continue collecting qualitative data through observation, structured interviews, and informal interviews until the end of the 2023-2024 school year to determine how the community school framework has impacted family support for learning.

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UPR37 9:30-11:30

Is there a bias against Southern American English (SAmE) speakers in an undergraduate college classroom.

Abigale Elyse Williams & Reagan Danielle Hall
Speech and Hearing Sciences

Mentors: Yolanda Holt and Emily K. Brewer
Communication Science & Disorders

Southern American English (SAmE) is a recognized regional dialect of American English prevalent in the Southern United States from Florida to Maryland and from the East Coast to the Appalachian Mountains. Despite its widespread use, SAmE faces persistent negative perceptions. Motivated by personal experiences and interactions with other SAmE speakers, our research aims to investigate whether individuals from the Southern US also harbor negative views of Southern American

English. To address this, we posed the question: Is there bias against Southern American English (SAmE) speech in the undergraduate college classroom? Following a research review, we collected qualitative data from our undergraduate peers via a Qualtrics survey. The survey explored their experiences and opinions regarding SAmE. Our qualitative data analysis sheds light on the experiences of both SAmE speakers and those encountering SAmE within the context of other English varieties. The main objective of this project was to gauge whether our peers, especially those who speak SAmE, perceive bias against SAmE and whether this bias has impacted their academic, personal, and professional college experiences. The insights gained from this research will guide us in determining the necessity for further studies and/or advocacy for SAmE speakers in the college classroom. Our findings will be shared with our peers, educational administrators, and the broader research community.

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UPR38 9:30-11:30

Enhancing Electrical Systems Technology Education: A Study on Virtual and Augmented Reality Integration in Community Colleges

Dhwani Hada, Kailee Grubbs, Stephanie Stewart, Aliah Spencer, Jameson Gerdts
Multidisciplinary Studies

Mentor: Yilei Huang, Construction Management

Virtual reality (VR) and augmented reality (AR) are being increasingly utilized for education. Prior research suggests that VR and AR use in the classroom may increase readiness for the workplace. This could be especially beneficial in eastern NC, where, according to the North Carolina Department of Commerce, over 70% of the counties east of I-95 are classified as Tier 1, the level designating greatest distress as measured by factors such as unemployment and income. Since NC Community college graduates earn an estimated extra $6,900 per year versus students without a college degree, supporting education in community colleges may improve the economic well-being of surrounding areas. In partnership with Pamlico Community College, this project aims to investigate the effectiveness of using VR/AR technologies in learning Electrical Systems Technology in community colleges, identify student perception of the use of VR/AR technologies in the Electrical Systems Technology curriculum in ENC, and compare the benefits between VR and AR technologies in assisting hands-on labs.

To gather data, a pre-and post-survey was administered to students in the Residential Wiring course at Pamlico Community College. The surveys assessed the students' perceptions and previous experience of the use of AR and VR in education and their comfort level with the current curriculum. During the study, students at Pamlico Community College experienced sample electrical simulations through VR and viewed a virtual model of their electrical systems lab environment using an AR headset. Early findings suggest that the provision of AR and VR experiences to students studying Electrical Systems Technology elicits a discernibly favorable perspective toward the subject matter, resulting in heightened motivation and enhanced overall educational engagement among participants.

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UPR39 9:30-11:30

Characterizing Inherited Patterns of Nicotine Use Behavior using a *c.* elegan Transgenerational Model

SriPallavi Yendamuri, Biology

Mentor: Xiaoping Pan, Biology

Background: The use of electronic cigarettes has risen significantly in the last couple years. especially among adolescents. The increased use of electronic cigarettes comes with a decrease in the use of traditional cigarettes as well as a reduced risk for those who are withdrawing from tobacco use. However, colorful marketing paired with fruity flavors have disproportionately targeted adolescent use of electronic cigarettes. This rapid increase has started to raise public health concerns about the use of nicotine among adolescents. Moreover, the transgenerational effects of nicotine use is minimally studied.

Purpose: Using a *c.elegan* model, our study aims to study the transgenerational behavioral effects of nicotine by comparing behaviors of the F0 generation with the F2 and F3 generations.

Methods: *C. elegans*, at the L3 stage, were dosed with a concentration of 61.7 uM a 99% L-nicotine working solution. Once the worms were allowed to reproduce, we collected the eggs of the F1 generation using a syncing procedure. The F1 worms were allowed to reproduce, and the same procedure was repeated to obtain the F2 and F3 generations. At each of the generations, the worms, which were only dosed at the F0 generation, were placed on nicotine and nicotine-free plates to capture behavioral analyses such as stimulation, tolerance, and withdrawal. After confirming the behaviors, knock out miRNA models will be used to understand which miRNAs are associated with nicotine addiction and behaviors.

Results: Preliminary results show the F0 generation exhibits stimulation behaviors when placed on nicotine plates (294.2 um/s) and normal behaviors when placed on nicotine free plates (69.8 um/s). Next steps include, collecting the same parameters using the F2 and F3 generations. Overall, this study has the ability to predict the multigenerational effects of using nicotine. . There is currently a gap in research that looks at specific miRNAs associated with nicotine addiction. A main goal of this study is to understand if the exerted vaping behaviors could be mitigated by knocking down certain miRNAs or targeting various nAChRs (nicotine acetylcholine receptors). As mentioned before, because of the homologs that exist between humans and *c. elegans*, if significant data is found this could serve as a starting point into further studies of therapies for nicotine use along with a better understand of the physiological effect nicotine has on the body.

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UPR40 9:30-11:30

An Update to Expression and Purification of Cryptochrome 4 from Bacterial Cultures

Alyssa Burris and Wyatt Guy
Chemistry

Mentor: Adam Offenbacher, Chemistry

The navigational abilities of birds have been observed throughout history, yet the discussion and research into magnetoreception in birds and other organisms only recently emerged in the past 40 years(1). While the exact mechanism is yet to be agreed upon by scientists,(2) one of the theories for magnetoreception involves the radical pair model in the protein cryptochrome (CRY). In the radical pair model, a protein bound chromophore, flavin adenine dinucleotide (FAD), is photo-reduced by blue light, which initiates an electron transfer from a nearby tryptophan to the FAD forming the separated, but correlated radical spin pair. It is believed that the formation of the radical pair is linked to a signal transduction in cryptochrome proteins by driving a protein conformational change (3).

The aim of this research is to investigate the relationship of the radical pair mechanism in the protein conformational change that is expected to be the signaling state for migratory birds to sense the direction of the Earth's magnetic field. Toward this goal, progress will be presented in the expression and purification of the CRY protein from bacterial cultures. Some preliminary time-resolved spectroscopic evidence for the intermediates in the generation of the radical pair mechanism will be presented. Future research will focus on investigations of the quantum yield of FAD photo-reduction for structure-function studies to further understand the molecular details of the radical pair mechanism.

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UPR41 9:30-11:30

Novel Synthesis of Biologically Significant Beta-Carbolines

Alexander Fisher
Biochemistry

Mentor: Brian Love, Chemistry

Novel synthetic models of biologically significant organic compounds are of importance throughout organic chemistry. β-carbolines and terpyridines are compounds of particular interest due to high levels of biological activity that have been reported in previous studies. It is thought that the combination of these two individual compounds into a hybrid compound can demonstrate widespread anti-tumor properties as well as other biologically significant properties. Previously, attempts at synthesizing this hybrid compound have been widely unsuccessful. I hypothesized that the target compound could be synthesized through several different pathways. Specifically, it was thought that a model involving two terpyridine intermediates could synthesize the target compound.

The first intermediate synthesis involves a reaction between a substituted benzaldehyde, acetylpyridine, and excess ammonium acetate. After isolation, the nitration of the substituted terpyridine compound would lead to the second intermediate. Subsequent ring closure of the nitrated terpyridine structure was thought to successfully isolate the target compound. After several attempts at various reaction conditions, I have successfully prepared the target substituted β-carboline, which will be discussed. While additional work is being completed to demonstrate success across a diverse range of substituents, this model exhibits an efficient synthesis of the biologically important target compound.

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UPR42 9:30-11:30

Hypofibrinolytic defect affects on natural fibrin fiber digestion.

Hannah Sowers
Engineering

Mentor: Nathan Hudson, Physics

Blood clots are created as part of a vital lifesaving response initiated by the body when it detects harm. Clots are created when thrombin polymerizes fibrinogen creating fibrin fibers. Fibrin fibers provide clots with both their strength and structural support. When a clot is no longer needed, the fibrin fibers are lysed, and the clot is digested. Proper clot digestion is just as important as clot formation. If these fibers do not properly digest, then parts of the clot remain in body and have the potential to embolize and cause serious medical conditions. UPA starts the digestion process by activating plasminogen which initiates fiber lysis. A hypofibrinolytic defect is a medical condition that affects fiber digestion by resisting some part of the lysis process. The specifics of how this causes a resistance to fiber digestion is unknown. This research focused on understanding the specific effects of a hypofibrinolytic defect on fibrin fibers. To analyze individual fibers, clots of patients with hypofibrinolytic pathologies are formed on microscopic ridges by combining plasma, purified thrombin, and 1.5% Alexa-488-labeled fibrinogen. Fiber polymerization is assisted though incubation at 37 degrees Celsius. The clot is then removed leaving only a thin layer of fibers. A Leica DMI 8 epifluorescent microscope is used to image fibers. UPA is added to the sample and fiber lysis is recorded thorugh a time-lapse imaging sequence. This time-lapse is imputed into an analysis pipeline that uses fiber intensity to determine mechanisms of digestion. Preliminary data will be presented; so far, the fibrin fibers have failed to digest from normal methods. Understanding how a hypofibrinolytic defect affects clot digestion could help provide essential information for creating medications to treat this condition.

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UPR43 9:30-11:30
Withdrawn

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UPR44 9:30-11:30

Understanding the role of translation factor eIF4G in germ cell and embryo protein synthesis.

Brooke Barker, Chloe Cannon, Hannah Umphlett, Eun Suk Kim
Biology

Mentor: Brett D Keiper, Biochemistry and Molecular Biology

Cellular identity and fate are critically determined by what proteins are synthesized. A prime example occurs during differentiation. Embryonic cells use translational control of mRNAs to guide spatial and temporal gene regulation. We previously showed that selective translation initiation overcomes repression and recruits subsets of mRNAs to ribosomes. This positive regulation is mediated by translational machinery, the eIF4 factors. The purpose of this study is to compare short (p130) and long (p170) forms of translation factor eIF4G in protein synthesis during embryonic development.

We set out to demonstrate that reproductive cells, embryos, and somatic tissues naturally vary in their expression of eIF4G (IFG-1). Using CRISPR engineering in *C. elegans*, we added mCherry and GFP fluorescent tags to IFG-1. The engineering also added small affinity peptide tags for detection by western blot. To our surprise, strains with certain N-terminal tags on IFG-1 were deficient in fertility and embryo viability; other tags were fully tolerated. The sensitivity of embryogenesis to altered forms of eIF4G may disrupt mRNA translation activities. We will analyze several tagged forms of IFG-1 using biochemistry techniques such as sucrose gradients and western blots. Extracts from *C. elegans* will be resolved using sucrose gradients to determine differences in translation initiation. We expect that various IFG-1 forms will show differences in association with ribosomes during our experiments. Greater association with ribosomes (polysomes) correlates with an increase in protein synthesis activity, indicating the active recruitment of mRNAs for protein synthesis. Overall, we expect to find a relationship between protein synthesis in embryonic development and the structure and function of IFG-1.

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UPR45 9:30-11:30

Using Biodiversity to Assess Restoration Success and Monitoring Effectiveness

Ulises Mendoza, Grace Loonam, Rachel Gittman
Biology

Mentor: April Blakeslee, Biology

Oyster reefs provide a variety of ecosystem services, including enhanced water quality, shoreline stabilization, and habitat provisioning. As a result, there has been widespread interest in reef restoration along NC coasts. However, optimal restoration methods are still being refined. My study aims to use three approaches to understand the biodiversity (free-living and parasitic) associated with two restoration techniques (shell bags and novel OysterCatcherTM) in the Rachel Carson Reserve (Beaufort, NC) implemented 5 years ago. I aim to determine: (1) whether reef-associated communities recruiting to traditional passive samplers (plastic crates filled with loose oyster shell) are good representations of the biodiversity found in situ in oyster reefs restored with shell bags; (2) how different wave energy environments impact species richness and abundance of organisms in shell bags; and (3) if there is a difference in the abundance of pea crab parasites found within oysters from the two reef restoration techniques The findings of this investigation will help demonstrate the effectiveness of different restoration techniques on biodiversity and reveal the reflectiveness of monitoring efforts (2018-ongoing) by the Blakeslee and Gittman labs that have been used in the Rachel Carson Reserve restoration. Also, there has yet to be a study on parasitic pea crabs associated with different restoration types at these sites, and thus this will be an additional valuable metric to assess the previous restoration approaches.

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UPR46 9:30-11:30

Evaluation of High-Performance Liquid Chromatography Column Health Using the Hydrophobic-Subtraction Model Following Controlled Degradation

Carlos Ocampo
Chemistry

Mentor: Jack Pender, Chemistry, ECU Eastern Region Pharma Center

Reversed-phase high-performance liquid chromatography (HPLC) is the most commonly-used analytical separation technique in the pharmaceutical, cannabis, and related industries. It is used to chemically separate the compounds of interest from the sample matrix components prior to quantity measurement. In contrast to the flexibility allowed in academic uses, separation performance in these regulated environments is expected to remain consistent and acceptable using the validated separation conditions without modification.

One challenge is that HPLC columns are known to lose separation ability with use and storage. Established HPLC methods rely on application-specific tests and trends over many weeks or months to determine when a column is unacceptable. Unfortunately, a scientist creating a new separation is often limited to unused columns to avoid the risk of establishing the separation conditions on a modified column that is not representative of future (expensive) new columns. Currently, there is no universal method for evaluating the health of a previously-used column.

One possible general approach for evaluating the health of a used column is based on the Hydrophobic-subtraction model (HSM). The HSM was developed to quantify the major solute-column interactions available on a wide-range of reversed-phase HPLC columns. These parameters are hydrophobicity (H), size/shape selectivity (S), hydrogen-bond donating (A), hydrogen-bond

accepting (B), and cation interaction (C). The values are published in an online database (hplccolumns.org) with the goal of allowing chromatographers to compare column selectivity; typically to identify similar or very different options.

Hypothesis: Measurement of the H, S, A, B, C parameters and comparison to the database could confirm a used column still provides new column separation and would be an acceptable candidate for developing a new separation procedure.

Methodology: Three identical new columns (Agilent Zorbax SB-C8, PN:883975-906, same batch) were purchased and confirmed to produce H, S, A, B, and C values that acceptably matched the column database. Two of the columns are undergoing controlled degradation at low pH (1.8, 2,8) and high temperature (60°C) conditions. The resulting column values are being measured monthly alongside the third column (control) stored at recommended temperature and chemical storage conditions.

Results: Initial, 1-month, and 2-month data will be presented and early trends discussed.

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UPR47 9:30-11:30

Characterization of background dependent effects of *zfl1;zfl2* double mutants in maize development

Emma Lou Pakulniewicz
Biology

Mentor: Beth Thompson, Biology

Functional floral organs are essential to the reproduction of flowering plants. Maize, an important agricultural crop, produces male and female flowers on separate inflorescences called tassels and ears. To understand the genetic regulation of maize floral development, we study mutants that perturb floral development. Mutations in floral development genes and their associated regulators can affect the development of reproductive organs and lead to inflorescences with altered identities, morphology, and fertility. Double mutation of maize regulatory genes *zfl1;zfl2* has been shown to knock out the function of two redundant genes, which produces severely altered floral phenotypes. These mutations were originally characterized over twenty years ago in inbred background W22, but the Thompson Lab has introgressed the *zfls* into the A619 family and has observed enhancement in some phenotypic effects, such as tassel branch number. Maize has an abundance of inbred lines that each have the capacity to present mutation effects in distinct ways, so analysis of gene functions across maize families is crucial in the understanding of tassel and ear development. This project aims to characterize the phenotype of *zfl* mutants in the A619 background using scanning electron microscopy, which will also provide modern imagery of maize afflicted with *zfl* mutations. Previous findings have indicated that *zfls* act redundantly and knockout of both genes is required to produce a mutated phenotype, but some preliminary data suggests that there may be a spectrum of phenotypic effects associated with varying levels of mutation. To further examine this dosage effect, I will be looking at individuals with different combinations

of zfl mutations as well as the homozygotes. I use DNA extraction, PCR, and gel electrophoresis techniques to identify mutated and wild-type zfl alleles in test plants. The tassels and ears of A619 maize found to exhibit $zfl1/zfl1;+/+, +/+;zfl2/zfl2,$ and $zfl1/zfl1;zfl2/zfl2$ genotypes are imaged using the scanning electron microscope, and these images are analyzed to characterize the corresponding phenotypes. These SEM photographs will be beneficial in establishing the functions of $zfl1$ and $zfl2$ and the analysis of zfl mutants will increase our understanding of maize floral development, potentially shedding light on the function of zfl homologs in other cereal crops.

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UPR48 9:30-11:30 Kidimbu, Glory kidimbug22@students.ecu.edu Biology Peralta, Ariane Legaspi peraltaa@ecu.edu College of Arts and Sciences Biology Natural Sciences

Nutrient enrichment effects on wetland soil bacterial traits

Glory Kidimbu
Biology

Mentor: Ariana Peralta, Biology

Soil microbiomes participate in nutrient transformations that result in bioavailable nutrients for the maintenance of global biodiversity. However, activities like land use change and industrialization modify environmental conditions in ways that influence bacterial interactions, ultimately altering microbial diversity and plant-microbe relationships. For example, nutrient enrichment from atmospheric deposition onto low nutrient but high biodiversity ecosystems are increasing. We hypothesize that this nutrient enrichment will modify species interactions between bacterial species and between bacteria and plants from cooperative to competitive ways. We test this hypothesis using soil bacterial isolated from a long-term wetland fertilization experiment (Greenville, North Carolina, USA). This ecological experiment (est. 2003) examines how nutrient additions (N-P-K fertilizer) and disturbance (by mowing) affect wetland plant and microbial community structure and function. We measured growth rates and compared antibiotic resistance trends for bacteria in the genera Bacillus and Streptomyces isolated from fertilized/mowed and unfertilized/mowed plots. Results have revealed that nutrient enrichment tends to increase soil bacterial growth rates and modify antibiotic resistance. The results from this work will help us understand how human activities that involve indirect nutrient enrichment influence wetland soil microbiomes and plant-microbe associations.

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UPR49 10:00-12:00

Sustainable Horizons: Exploring design initiatives to shape vibrant college town, Greenville, NC.

Oasis Lopez
Design

Mentor: M. M. Lekhon Alam, Technology Systems

This project explores the balance between architectural innovation and ecological consciousness. Sustainable design revolves around many professionals working towards solutions that are environmentally responsible, economically viable, and socially equitable. The goal of sustainable design is to meet all the needs of the present generations, without compromising the ability of future generations of meeting their own needs. We will learn the significance of sustainable design in urban environments and its profound impact on communities and the environment. Building and construction methods that incorporate green design create less waste, use less energy, and less water consumption. Through a combination of real-world examples and case studies, we delve into the advantages and challenges associated with implementing sustainable design principles in urban planning and design decisions. This journey toward a more sustainable future takes us from green cities like Freiburg, and Portland (ex. Sustainable Stormwater Management Plan, Smart Growth Strategy), towards a closer examination of Greenville's BUILD Projects (at least two sections of West 5th Street Streetscape, and Town Common Connector Street Section, Greenville, NC). Greenville is the home of East Carolina University, the third largest university in North Carolina state (~28,718 enrollment), and the sites in the Uptown district were selected carefully within the recreational hub, considering the most frequent movements of the massive, diverse student population. This qualitative research studies Jane Jacobs's masterpiece, "The Death and Life of Great American Cities," to create analysis rubrics, features, and the necessary criteria to conduct more in-depth assessments. Researchers also discuss some of the key features of city planning and sustainable design from the selected case studies, highlighting the importance of urban form, diversity in neighborhoods, importance of Mixed-Use developments, green infrastructure, and renewable energy. To illustrate the transformative potential of sustainable design and to find blending possibilities of culture and technology, we examine case studies such as The Edge in Amsterdam, and the New York High Line. Ultimately, the study concludes that simultaneous cultural, contextual, and technological interpretations can potentially suggest more sustainable urban settings for a community, offering many benefits for the environment, society, and the economy.

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UPR50 10:00-12:00

Autism Intervention Awareness in Eastern North Carolina

Sydney Faulk
Hannah Davis
Public Health

Mentor: Jocelyn Ruffin, Human Dev and Family Science

Autism is a disorder caused by differences in the brain that lead to difficulties in communication, social interactions, restricted or repetitive behaviors, and differences in learning methods (CDC, 2022). Eastern North Carolina (NC), along with the majority of the east coast of the United States, has a higher prevalence of Autism as compared to the rest of the nation. This provided an opportunity to further educate our region on Autism interventions. A resource was created through this study to guide families to local interventions and infomr them on differences in each type of internvetion. This resource guide will help lessen the extreme differences seen in prevalance rates throughout NC. Finding the right type of intervention for each child with Autism is key to

combating negative and/or harmful behaviors. To create this resource for families of children with Autism, it was necessary to know what interventions are currently available in eastern NC and what internvetions are highly supported and effective. To conduct the research both quantitative and qualitative data from previous studies was compiled and analyzed. The data found was from scholarly and reliable sources that provided in-depth explanations of the interventions' background and effectiveness. From the compiled results it was clear that rural counties of eastern NC are lacking in autism interventions compared to those in urban counties such as Greenville, NC and other central NC counties. Of the interventions studied it was evident that Applied Behavior Analysis (ABA) is most widely used, with many other types of interventions stemming from this therapy. Overall a mix of interventions was recommended to best support children with Autism. These intervention mixes include things such as occupational therapy, speech therapy, ABA, and others to target many goals in a child's life. The information found was compiled to explain each available resource in eastern NC, the types of interventions, and what the interventions consist of. The study also discusses interventions that have been effective outside of eastern NC that would be beneficial to bring into our rural communities. This research could allow more families to give their children the support that they may need in order to succeed.

Centers for Disease Control and Prevention (CDC). (2022, March 28). Signs and symptoms of autism spectrum disorders. Centers for Disease Control and Prevention. https://www.cdc.gov/ncbddd/autism/signs.html

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UPR51 10:00-12:00

Teaching Fraud Prevention to Seniors

That email may not be your grandson; check it first

Austin Clinefelter
Management Information Systems

Mentor: John Drake, Management Information Systems

Senior citizens are the most common age group to fall prey to electronic fraud. My research aims to help senior citizens detect and avoid electronic fraud by teaching a class to two groups. I am partnering with two local community partners to help with my research. Salem United Methodist Church and the Pitt County Council on Aging. Both places have a large population of senior citizens who are not well-versed in technology and are likely to fall victim to electronic fraud, which could potentially cause a financial loss. My research will determine how much senior citizens know about electronic fraud before and after my presentation. My presentation will describe electronic fraud and review the different types. Multiple examples will be given on each type to help recognize fraud and what to do if you fall victim. An exercise will be given to each individual to see if they can

spot what is fraud and what is not. The class will end with a focus group for more explicit feedback and discussion.

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UPR52 10:00-12:00

Depth-based Action Recognition for Home Health Care Applications

Sven Reyes
Computer Sciences

Mentor: David Hart, Computer Science

Dr. Sartipi

The purpose of this project is to improve home health care through analyzing depth-based visual data using computer vision and artificial intelligence techniques. Older adults who live at home are highly susceptible to hospitalizations due to age-related diseases. One way to reduce these hospitalizations is through active home monitoring. By including sensors and other technologies, it could be determined if a person is not behaving according to their regular schedule. This would allow for early detection of health issues that a nurse or other medical practitioner would be alerted to. Overall, such a monitoring system could allow for reduced hospitalizations and improved health care.

Specifically, I work with data from a Time-of-Flight camera. Time-of-Flight (ToF) cameras are devices that can calculate the distance from the camera sensor to each object or person in a room. The use of the ToF camera provides two benefits in this research. First, it would allow for detecting the location and actions of humans in the room. This information could be used to establish specific actions that happen throughout the day (sitting at the table, washing hands, doing the dishes, etc.). Second, it preserves privacy since no color information is captured in the camera, so text and pictures would be unreadable. This privacy-preserving depth data can then be fed into computer vision and artificial techniques for analysis.

We use a ToF camera attached to an Arducam that is powered by a raspberry pi. I programmed the raspberry pi to get the camera to only record depth and to only start once it senses that someone has approached the area. I used programming methods for determining the location of people in the scene (person on the left side of a room, near a desk, etc). The program takes one frame and gives an average depth value. Each frame should give a consistent value unless someone approaches. Thats when the program will recognize that someone has entered the area due to the change in the average value in the frame. I also established protocols for how this data can be summarized and sent to other algorithms for further analysis.

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UPR53 10:00-12:00

Eternal Light: Two Holocaust Survivors' Stories Of Perseverance

Jack Meltsner
Communication

Mentor: Glenn Hubbard, Communication

In Association with East Carolina Hillel

Between October 7th and December 7th 2023, The Anti-Defamation League recorded a total of 2,031 antisemitic incidents in the U.S. -- a 337% percent increase from the same period in 2022. Now, more than ever it is important to be aware of Jewish hate.

"Eternal Light" aims to tell the powerful and inspiring stories of two Holocaust survivors, Suly Chenkin and Irving Bienstock. Their testimonies will provide a firsthand account of the horrors they endured during one of humanity's darkest periods. They persevered to positively impact the world leaving a legacy behind as an American Military veteran and Holocaust educators. The documentary will weave together historical footage, music, archival materials, animations and interviews to create a compelling narrative capturing the essence of their resilience and determination to not only survive, but to thrive and leave a lasting impact on the world.

The Documentary will preserve the stories of Holocaust survivors and analyze the persistence of antisemitism. It will promote tolerance, empathy and act as an educational tool to combat antisemitism and discrimination today.

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UPR54 10:00-12:00

EdAccess: A Resource Compilation for English Learners (ELs) and People With Intellectual Disabilties (ID)

Sophie Adgate
Hispanic Studies

Mentor: Laura Levi Altstaedter, Foreign Lang and Literatures

Under the scope of my research class, SPAN 4950, 4951 and 4952 Interactive Digital Mapping and Transmedia Cultures in the L2 Classroom, with the supervision of Dr. Levi Altstaedter, I created a compilation of digital resources that promote meaningful learning for English learners (ELs) and people with Intellectual Disabilities (ID). The resources are presented in a user-friendly way, including a link to the resource, the purpose the resource serves, and recent research that indicates to what extent the resource is helpful for both people with Intellectual Disabilities and language learners. The resources are meant to be digestible by the general public, including students, parents/guardians, teachers, community members, therapists, and more. All information is presented in English and in Spanish. My method of research is secondary, meaning that all of the information collected was taken from previously conducted research and government webpages. I

reviewed all of the methods of the research that I used, and all research conducted was done in the past 10-15 years. While finding research to back up resources that can teach ELs and people with ID, I also analyzed patterns and trends in research, including what research emerged at what time, for which group (EL or ID), and how educational trends at the time influenced the research. Including multiple populations in the research encourages the audience to consider creative uses of resources, as the research plainly tells us that when the use of a practice for one group of students has been proven effective, it's likely to be effective for many others. As I looked for free resources, I noticed that I got significantly different results when I searched for EL resources than when I searched for ID resources, yet the resources I found marketed to one group were also supported by research to assist the other group. Research that includes students with disabilities and language learners as part of a larger group of learners also encourages researchers to examine how special education practices or high intensity practices may benefit everyone, which could transform the way that both special education services and disability looks in school and in the world.

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UPR55 10:00-12:00

Knife Building Creative Portfolio

Noah Watkins
Health Fitness Specialist

Mentor: Gerald Weckesser, Honors College

Overview: Why did I go the creative route?
I decided that I had spent my time doing a lot of science and mathematics classes. I took some time with Gerald Weckesser in his Honors Thinking Through Making class and got to first start to get my hands dirty and explore what it feels like to have creative freedom in the classroom. I decided I wanted to pursue this more in my Signature Honors Project.

Goals

1. Learn more about pocket knives and the building and assembling of Knives in general.
2. Have a finished product of a built or refurbished knife that I am pleased with, I want it to be pleasing to the eyes as well as functional.

Steps

Step 1: Brainstorming and planning what kind of knife I want to assemble and what materials I would need for said knife.
After drawing up knife prototypes as well as looking at materials prices to build an adequate knife I started brainstorming ideas of ways I could lower cost.

Step 2: Mitigating costs: I wanted to find a way to accomplish what I wanted creatively without having to lose a bunch of money out of my pocket. If I learned anything during my time in Thinking

Through Making it is that sometimes you have to be okay scrapping your primary idea and shifting a different way.

Step 3: Shifting from building from scratch to refurbishing from old. I was able to go home one weekend and find a knife that had been in my family for a very long time. It was old and cracking on the handle and was not very functional. I felt that it would mean more to me and my family if I could get this knife looking good and functional again.

Step 4: Planning out the refurbishing process of the knife:

- First step is removing the handle
- Second step is sanding the blade and cleaning the handle residue
- Brainstorming new handle, gaining resources for new handle
- Assembling new handle
- Cleaning and polishing blade
- Sharpening blade

Step 5: Carrying out refurbishing process such as: carving handle, assembling handle, adding finishes to handle, and sanding blade.

Results: Presenting the finished product, and the process it took to get there.

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UPR56 10:00-12:00

Innovation Project: Designing an App to Help with Household Inventory

Sydney Dixon
Art

Mentor: Dan Elliott, Art and Design

For my project, I wanted to solve a communication problem that would be helpful and add convenience to people's everyday lives. While brainstorming ideas, I was planning to buy groceries and make sure I was not adding food to the list that I already had in my cabinets, which gave me inspiration for my idea for solving this common communication and memory issue in households. In response, I want to design an app for smartphones and tablets to inform the user of the consumable goods in their household.

The primary functions of this application that I am considering are inventorying what you buy at the grocery store to keep track of household goods by scanning items' barcodes, deleting items after use, and sharing inventory access among the user's members of their household. Possible special features

of the app would be using information collected from the barcode scans to give information on your purchased products, so users can know the price, the weight, and the expiration date of their goods. The app's functions were inspired by the features on smart fridges that allow the owners to view what food they have in their fridge through their phone and apps that allow users to scan food products' barcodes in store to know what they are possibly consuming.

My plan for developing and designing this app is to start with deciding on a name and research my target audience and similar apps function-wise, and then I will start sketching logos based on name and research. Afterwards, I start with analog sketches of my app's primary pages that focus primarily on the functionality of the app that could used for user testing, so the usability of my design is solid before developing the app's brand identity. Once the app's functionality is good, I will sketch the app pages based on 3 to 5 brand concepts, and once I land on a brand concept, I will start creating my interface design system with the brand's colors, typefaces, buttons, pop-ups, which help with planning my brand style guide. By revising my concept, creating an interface design system, and creating a wired system that is easy to navigate, I will be able to create a successful brand style guide and a successful prototype app design.

With this project, I want to create an app that will prevent households from buying duplicates of products and prevent food waste because the users will be able to know what food they have and when they are going to expire.

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UPR57

Railcare Health: An undergraduate-led mobile health clinic.

Benjamin Juhl, Ethan Angell, Cortland Toomey
Biology

Mentor: Joseph Ginski, Pediatrics

Railcare Health is a non-profit mobile health clinic founded in Chapel Hill, NC. Since its inception, Railcare has sought to provide free health services to those who most desperately need them throughout North Carolina. In 2021, the organization was looking to expand east to address the dire need that was only continuing to be exacerbated during the COVID-19 pandemic. It was at this point that the Greenville branch was born. Alongside our various partners throughout Eastern North Carolina, the Greenville Branch of Railcare Health has connected with new patient populations and provided no-cost healthcare to eastern North Carolinians who need it most.

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UPR58 10:00-12:00

How Preferred, Neutral, and Disliked Music Affect Entrainment and Heart Rate in Adults

Corrina Miller
Music

Mentor: Virginia Driscoll, Music Education Therapy

Entrainment refers to the process of body responses aligning to an external stimulus. Music has been shown to bring people together, even resulting in the heart rate of choir members synchronizing while performing. Research in music therapy has assessed the effects of music on heart rate in a variety of specific patient populations such as cancer survivors (Chuang, et al, 2010), following nasal surgery (Tse, Chan, & Benzie, 2005), severely sick children (Uggla, et al, 2016), and premature infants (Chou & Choi, 2006) among others. Other research has shown that entrainment is more likely to occur when listening to unfamiliar music (Kumagai, et al, 2018). Most studies evaluate heart rate variability, but not necessarily the latency for the patients' heart rates to entrain to the tempo of music when presented with varying levels of preferability. Participants in this study were adults without identified heart conditions who were instructed to wear headphones. Participants were presented with preferred, nonpreferred, and neutral musical stimuli while their heart rate was monitored and recorded using a KardiamobileTM device. The time it took for the heart rate to entrain to the stimuli was evaluated. Data collection is currently ongoing. The initial prediction is that individuals' heart rate will entrain with a shorter latency than when presented with a neutral or preferred stimulus. Results may be used to further inform Music Therapist's who may use music as a means to address desired physiological responses. This information may provide greater justification for the use of music for individuals undergoing stressful experiences in which heart rate may play an impactful role of intervention efficacy.

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UPR59 10:00-12:00

AI Enhanced Brain Signal Location

Sariah Schulteis
Computer Science

Mentor: David Hart, Computer Science

The purpose of this project is to improve brain-signal location methods through artificial intelligence. For neuroscientists and medical professionals, it can be important to associate specific physical activities with specific parts of the brain that are signaling during such activities. A common way to determine such locations is with an electroencephalogram (EEG). An EEG is a test that measures electrical pulses in the brain. This is done by attaching electrodes to the head of a person during specific activities.

Current methods for associated EEG measurements with brain activity rely on data that is free of noise. However, real-life measurements are rarely perfect and these methods often fail. With recent breakthroughs in artificial intelligence, this research hopes to show that a neural network could be trained to determine the brain activity location, even with very noisy data. Such a technique will allow for improved diagnostics for medical professionals, ultimately leading to improved health outcomes for individuals.

Methodology: I will be working with my mentor on this project. My role in the project will be to analyze the architecture of the AI neural network and training setup. I will be working with synthetically generated brain models and EEG measurements. I will complete full analyses of how factors such as dataset split, neural network depth, regularization, and added noise affect the accuracy of the neural network. Additionally, I will be exploring alternate AI setups such as graph networks and surface-based methods.

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UPR60 10:00-12:00

Exploring Text Animation in Motion Graphics

Thomas Berkman
Marketing

Mentor: Dan Elliot, Art and Design

Motion graphics are an essential element in the fast-growing modern world of media. They are an effective way to catch people's eyes in a visually fascinating way. In this project,
I research the different variations of text animation within motion graphics, seeking to enhance my skills in this dynamic field. Introduced to motion graphics during a project for Dowdy-Ficklen Stadium, I embarked on a journey of self-learning and experimentation. Recognizing a need to improve text animation techniques, the project's focus lies in exploring diverse methods of animating text elements using Adobe After Effects. By studying principles of design animation and storytelling, I aim to develop a portfolio showcasing various text animations, emphasizing effective communication and engagement strategies. Through research, experimentation, and application, I was able to refine my skills in text manipulation and Adobe After
Effects proficiency, ultimately elevating the quality and impacting my motion graphics endeavors.

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UPR61 10:00-12:00

Analysis of the Factors Influencing the Adoption of Telehealth Services among Acute Care Hospitals in the U.S

Bradly Boaz
Health Services Management

Mentor: O. Elijah Asagbra, Health Services and Info Mgmt

Background
Recent unprecedented events, notably the COVID-19 pandemic, have profoundly influenced the landscape of the United States healthcare system. In response to challenges related to accessibility, affordability, and the rapid spread of the virus, technological advancements played a pivotal role. Telehealth services, encompassing virtual medicine, public health, health education, and support services, emerged as a crucial solution.

Objective
This study aims to explain the influence of a hospital's geographic location on its adoption of telehealth services post-COVID.

Method
Data incorporating hospital characteristics and adoption of telehealth services from the 2020 and 2021 American Hospital Association's Annual Survey of Hospitals was combined with county-level characteristics from the Area Health Resource File. A logistic regression analysis was conducted to analyze the panel data.

Results
Examining 6,552 acute care hospitals (38.83% rural and 61.17% urban), logistic regression revealed that rural hospitals were 1.37 times more likely to adopt telehealth services than their urban counterparts ($P<0.05$). Furthermore, hospital characteristics, including ownership status and bed size, were identified as significant factors influencing the likelihood of telehealth adoption. County-level factors such as unemployment rate ($\beta= 0.064$, $P<0.05$), percent persons with more than a high school diploma ($\beta= 0.041$, $P<0.05$), and percent white population ($\beta= 0.011$, $P<0.05$) also proved vital predictors.

Conclusions
During the COVID-19 pandemic, the urgency to adopt telehealth services was notable, particularly in hospitals serving rural communities. Rural hospitals exhibited a higher likelihood of telehealth adoption than their urban counterparts. Telehealth played a pivotal role in mitigating accessibility challenges in rural areas and curbing the spread of the disease. Healthcare leaders are urged to consider both internal and external contexts when allocating resources for telehealth services, adapting to the dynamic healthcare landscape to meet evolving patient needs.

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UPR62 10:00-12:00

Typographic Experimentation and Creative Expression

Sydney Cook
Art

Mentor: Dan Elliott, Art and Design

This creative endeavor embarks on a journey of playful experimentation, exploring the boundaries of type beyond its traditional role of information conveyance. Instead of seeking out entirely new designs, it embraces the philosophy of "there is no such thing as new design" by utilizing existing font families, both historical and modern, as building blocks. Inspiration flows from various sources, fueling an initial phase of exploration where different elements are combined and manipulated until a captivating concept emerges.

A typefaces success is closely related to its legibility. Once a concept takes root, the development process carefully considers established typographic rules to ensure the resulting font remains readable. A flexible system or set of criteria is adopted, guiding the creation of consistent and functional characters throughout the alphabet. This system adapts and evolves alongside the typeface itself, ensuring harmony and clarity.

Ultimately, this project seeks to challenge conventional notions of typeface design. It pushes towards improvement, venturing into the realms of merging and melding existing fonts to create entirely new visuals. Whether the outcome is a refined iteration, a unique hybrid, or a completely unexpected form, the process informs and drives the result. It's a celebration of exploration, discovery, and the limitless potential of type to transcend mere communication and become a powerful tool for creative expression.

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UPR63 10:00-12:00

Understanding the role of dental providers in Human Papillomavirus (HPV) prevention

Mackenzie Bowen
Public Health

Mentor: Alice Richman, Health Education and Promotion

Background: Human papillomavirus (HPV) is the most common sexually transmitted infection in the United States (US). HPV is associated with causing approximately 70% of oropharyngeal cancers (OPCs) in the US. HPV vaccination is known to be the most effective primary prevention strategy which can reduce the prevalence of HPV-OPCs. Implementing preventative interventions within dental offices might increase HPV vaccine uptake as studies have shown that provider recommendation for HPV vaccination is associated with completion. This research study seeks to understand patient population perspectives on dental providers role in HPV prevention.

Methods: We will employ quantitative methods via anonymous surveys administered through Qualtrics to understand patient's perspectives on the role of dental providers in HPV prevention. The dental survey includes validated questions of HPV knowledge, HPV vaccines knowledge, and thoughts on dental providers educating about HPV prevention and vaccinations. In addition, the survey includes questions on basic demographics. We are aiming to collect 200 patient surveys across 5 of the ECU School of Dental Medicine Community Service-Learning Centers (CSLCs). Data will be analyzed using SPSS statistical programming.

Results: Because data collection is underway, we have 40 patient surveys thus far. Preliminary data analysis shows low HPV knowledge of participants. When participants were asked if HPV can cause head and neck cancer, only 35% answered correctly (correct answer=true). The majority of patients (78%) believed that dentists are qualified to counsel them or their family about HPV vaccination and 58% said they would like to receive information about HPV and HPV vaccination from their dentist. Furthermore, the majority (78%) said they would feel comfortable with their dentist talking to them about the HPV vaccine but only 23% said they would feel comfortable with them talking to their children. Out of the 40 participants, 58% reported never receiving the HPV vaccine, while 15% were unsure. Over the 40 participants, 70% were women with an average age of 47 years old, 58% identified as white while 22.5% were black or African American

Conclusion: Our initial data show a need for an increase in HPV knowledge about dental patients. Despite some knowledge gaps, patients seem willing to want to engage with dentists about HPV prevention. The discomfort of dentists talking to children should be explored further.

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UPR64 10:00-12:00

Barriers and Facilitators to Rural Opioid Harm Reduction Programs

Erin Dracup, Nursing

Mentor: Chandra Speight, Adv Nursing Practice & Educ

Purpose: The purpose of this project is to explore factors that serve as barriers or facilitators to the provision of harm reduction programs in rural areas in North Carolina. **Significance:** North Carolina has been deeply impacted by the opioid epidemic, and opioid-related harm rates exceed national averages in many parts of our state, with rural areas experiencing the highest rates of harm. Harm reduction programs seek to mitigate opioid-related harm by providing services such as naloxone, fentanyl test strips, peer support, safe needles, and treatment referrals. Research indicates people living in rural areas experience higher rates of opioid-related harm, and this project seeks to contribute to understanding how to meet the needs of rural communities by providing harm reduction services. **Methodology**: This qualitative descriptive study used secondary data from an in-progress parent study titled, "Facilitators and Barriers to Harm Reduction Services. The parent study includes interviews with harm reduction workers throughout North Carolina. **Preliminary results:** Barriers to Harm Reduction Services in eastern North Carolina include stigma, geography, and policy while facilitators include partnerships, funding, and personal commitment. Findings from this research will help us understand barriers and facilitators to OUD-related harm reduction programs, emphasizing the unique barriers that rural programs may face and the facilitators they may have developed to address those barriers.

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UPR65 10:00-12:00

Student Perceptions of Major Health Needs Among Adult Refugees from Ukraine

Neha Makanangot
Nursing

Mentor: Kim Larson, Nursing Science

Purpose: This study aimed to examine student perceptions of the health needs of war-affected adult refugees from Ukraine. Significance: Ukrainian refugees affected by war face formidable obstacles when attempting to access essential healthcare services and effectively manage chronic health conditions. These challenges are exacerbated by the upheaval caused by displacement, forcing individuals, with language differences, to navigate unfamiliar healthcare systems in the host countries. Moreover, the resources available for healthcare in these settings are often constrained, further impeding refugees' ability to receive timely and comprehensive health care. Poland received over 1.5 million refugees from Ukraine. Understanding the healthcare needs of this vulnerable population is imperative to prevent potential health crises and ensure the provision of culturally competent care by nurses and healthcare workers in the future. Methodology: This qualitative descriptive study is part of a mixed-methods research project entitled "Intercultural Nursing Care for the Health and Well-being of Ukrainian Refugees." Nursing students from ECU (n=7) and JU (n=11) in Poland met for six synchronous class sessions in a Global Health International Virtual Exchange course. Students submitted reflection papers after each of five class sessions, these reflections generated data for this study. Data management included creation of 18 transcripts and a codebook. Analytic techniques included data matrices, content, and thematic analysis. Results: The study identified two main categories: Compromised vaccination conditions and Overextended healthcare system. Compromised vaccination conditions was characterized by vaccine delays, regulations, and hesitancy. An overextended healthcare system was characterized by an increase in disease burden, unfamiliarity with the Polish healthcare system, and a severe nursing shortage. Discussion: This study highlighted both macro-level and micro-level barriers to the health and well-being of refugees from Ukraine who resettled in Poland. At the macro-level, the war in Ukraine contributed to low vaccination rates, which compounded an overextended Polish healthcare system. At the micro-level, language differences between refugees and healthcare workers made healthcare system navigation challenging. Ensuring language access is critical to meet health promotion and chronic disease management needs of refugees.

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UPR66 10:00-12:00

Heterogeneity in cancer burden and control among black immigrants in the US: A systematic review of the literature

Tyler West and Elisabeth Reed
Public Health

Mentor: Leslie Cofie, Health Education and Promotion

Introduction: There is limited research pertaining to cancer burden, prevention, and control among Black immigrants in the US. Studies exist that shed light to this subject, but to our knowledge there is no collection created to more easily access these studies. The purpose of this study is to examine

and collect all relevant studies that looked at various forms of cancer screenings and HPV uptake among Black immigrants in the US.

Methods: This study is a systematic review of literature using databases including PubMed (MEDLINE), CINAHL, Embase, PsycINFO, ProQuest and Scopus using a predetermined search strategy. Inclusion criteria was Black immigrants that are living in the US and their screening behaviors from cancers such as breast, colon, and prostate among others as well as HPV uptake. We looked for quantitative, qualitative, and mixed-method studies that were published within this century. Initial search results yielded 7677 abstracts. After full text review, 182 studies were deemed eligible for data extraction. Variables that were identified included aims/objectives, type of cancer, control & risk assessment, study population, sample size, sampling strategy, study design, data collection source & year(s), variable definitions, analytic approach, and findings among others. All variables were stored in an excel spreadsheet. Data extraction was completed by two reviewers who met frequently to review for consistency.

Results: Preliminary findings indicate that 167 studies of the 182 extracted report cancer (breast, cervical, colorectal and prostate) screening and HPV vaccine uptake among Black immigrants. Most studies were conducted after the year 2000, primarily cross-sectional quantitative research, and grouped into early detection, prevention, morbidity/incidence, and intervention studies. The studies included both men and women aged 18+ years (total sample ranging between 14 and 20,000+). Black immigrants were mostly from the sub-Saharan Africa and the Caribbean; and reported lower screening rates than their US-born counterparts. Screening rates were generally lower than national guidelines. Determinants of adherence to preventive behaviors included cancer knowledge, health care access factors, cultural and religious beliefs, acculturation, and social support.

Conclusion: These findings highlight disparities in cancer preventive behaviors among Blacks and potential points of interventions for promoting uptake among cancer preventive behaviors.

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UPR67 10:00-12:00

Mini Pantry at Carol G. Belk

Iyaira Williams
Public Health

Mentor: Kelli Russell, Education and Promotion

The purpose of the "Mini Pantry at Carol G. Belk" is to install a mini food pantry that will provide grab-and-go food options for students that are taking courses in the Carol G. Belk building. The Carol Belk building is part of main campus but is just over a mile outside of the Main Campus Student Center, and within Carol Belk the only food option is a vending machine. By providing a mini food pantry at Carol Belk, students taking courses within the building will have access to healthy food options to fuel them as needed while supporting the Williams-Ross Purple Pantry's mission to "decrease food insecurity among the students at East Carolina University (2024)."

Prior to the COVID-19 pandemic, "30% of all college students had experienced food insecurity at some point in their college career (McCoy et al., 2022)." The assumption is that this number has

only increased and will continue to grow and negatively impact our students if no action is taken. Food insecurity has proven to be detrimental to student's academic success and performance and research has shown a link between students' food insecurity and their grade point average (McCoy et al., 2022).

In 2018, nutritionists surveyed 692 undergraduate and graduate students at a rural university in Appalachia that yielded the results of food insecure students having an averaged GPA of 3.33 out of 4.0 versus those food secure who averaged 3.51 out of 4.0 (Nam, 2023). While GPA is not the only indicator to measure a student's success rate, it is a value used for a lot of academic considerations. By adding a mini pantry, an aim of this project is to minimize any potential negative academic impact for ECU students.

I will be creating a Partnership Agreement that will be a formal document shared between the Department of Health Education and Promotion and the Williams-Ross Purple Pantry that will include:

- The purpose
- My personal statement
- The responsibilities of the public health organizations that will maintain the upkeep of the mini pantry; under faculty supervision
- The responsibilities of the Williams-Ross Purple Pantry's contributions to maintain the restock of the mini pantry; under staff supervision
- A sustainability plan for the mini pantry that will include instructions on how to conduct donation drives and collect and organize donations

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UPR68 10:00-12:00

What types of physical activity do postpartum women engage in?

Aubrey C. VanWynsberg
Exercise Physiology

Mentor: Bhibha M. Das, Kinesiology

Being physically active leads to a more healthy lifestyle. However, there is a stigma that to be physically active, you must participate in vigorous workouts. Due to this stigma, many groups of people are driven away from physical activity, and a very prominent one is pregnant women. **Purpose**: The aim of this study is to emphasize that physical activity is good for pregnant women pre and postpartum. This is because physical activity does not just improve physical health, but emotional and mental health as well. **Methods**: Existing data will be analyzed to find what kinds of physical activity are most frequent among women pre and post pregnancy. **Anticipated Results**: It is anticipated that pre-pregnancy women participate more in low intensity exercises than high ones. Low intensity exercises are less strenuous and may not require as much energy. Therefore, pre-pregnancy women can physically handle the exercises more. Additionally, it is expected that these

women focus more on strength building because society generally correlates physical activity to how strong someone is. These exercises are also expected to focus more on static and dynamic movements such as stretching and yoga. These movements are not just physically beneficial, but they are often associated with a better mental and emotional wellbeing as well. **Conclusion**: More programs that promote light physical activity should be created for pre/postpartum women. For example, walking "mommy and me" programs, group yoga, pilates, water aerobics, etc. These programs can enhance the wellbeing of women who are undergoing physical changes due to pregnancy. Furthermore, light activity programs can create a sense of community for these women to feel a part of. For example, there are different Facebook groups where these women can connect, and not just meet to exercise and talk, but to remain in touch through social media. In return, helping with pregnancy side effects such as postpartum depression, anxiety, and more.

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UPR69 10:00-12:00

Education and Confidence of Nursing Care for Patients with Autism

Rebekah Arensman, Janet Tillman
Nursing

Mentor: Mitzi Pestaner, Nursing Baccalaureate Educ

Introduction: Autism Spectrum Disorder affects roughly 1 in 100 people and can range in severity. Nurses are trained to care for a variety of patients; however, preliminary review of the literature indicates that nurses are underprepared to care for patients with autism. The purpose of this study is to implement a survey developed to determine nursing students' confidence in caring for patients with autism. The sample includes doctorate, masters, and baccalaureate students within a large college of nursing in the Southeastern US to determine if differing degrees of study impact the education and confidence seen in patient care. The results will be used to help encourage the creation of a new curriculum to include details in care for patients with autism spectrum disorder.
Method: The research includes a survey to be administered to current East Carolina University nursing students. In preparation for this study IRB certifications, literature reviews, and data survey courses were completed to competently build a survey and understand how to gather and interpret data. The survey was built from literature reviews on nursing education and competency in caring for patients with autism. The survey was reviewed by professors at the College of Nursing for accuracy and clarity. Surveys were distributed to the various departments within the College of Nursing through student email. The data was analyzed and translated into a paper where results will enlighten the next steps and solutions to any disparities.
Results: The survey will be conducted in January and February. From the data, answers were compared with answers from literature reviews and professional reports. Conclusions were drawn on nursing students' confidence in caring for patients with autism based on their schooling and personal experience.
Conclusion: With the survey results, changes can be made to curriculum and standardized modules can be developed to equip nursing students with information on how to best care for the population of patients with autism. Limitations exist as all student's experiences are different and the research is limited to the East Carolina University College of Nursing and may not apply to all nursing

education. Other limitations include differences in patient care depending on the patient and personal experiences of the individual outside of their nursing education. The survey is not verified but is based on literature reviews and peer-reviewed research.

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UPR70 10:00-12:00

Impact of Aerobic Exercise on Blood Pressure

Emma Faulmann
Public Health

Mentor: Gabriel Dubis, Honors College

Nearly half of American adults have hypertension, the most significant risk factor for cardiovascular disease. Hypertension is also the most modifiable risk factor, with exercise prescriptions complying to the American College of Sports Medicine recommendations resulting in blood pressure reductions. With 60% of hypertensive individuals also having high cholesterol, it is of interest whether an exercise prescription can successfully manage both conditions. In this study, participants follow a 12-week exercise prescription designed for high cholesterol. Obese, sedentary participants are recruited with the requirement of a >5% risk for cardiovascular events in the next 10 years or identified as having 2 of the 5 metabolic risk factors. One of these risk factors is hypertension. Participants complete a 12-week exercise prescription of 5 monitored exercise sessions a week, each session 45 minutes long at a 65-75% heart rate reserve. The baseline and post intervention blood pressure readings of participants were analyzed to determine whether this exercise prescription can also help manage hypertension. Major findings include that an exercise prescription following the guidelines for high cholesterol also elicited reductions in resting, peak exercise, and recovery blood pressure. The greatest reductions were seen in individuals with a >80% compliance in attendance and heart rate reserve range. Participants with baseline untreated hypertension stage I and II experienced greater reductions in blood pressure when compared to participants with normal blood pressure and those being treated with blood pressure medications. Further research is needed to determine whether the addition of resistance exercise, which is recommended by the ACSM for hypertension, would elicit further reductions in blood pressure.

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UPR71 10:00-12:00

Fostering Trust and Enhancing Vaccine Equity within Spanish Speaking Populations

Mariana Puente-Herrera
Public Health

Mentors: Alice Richman and Abby Schwartz, Health Education and Promotion

Background: Hispanic/Latinx populations have a higher risk of COVID-19–related morbidity and mortality compared to non-Hispanic/Latinx populations[1]. Because COVID-19 vaccines have the potential to save lives, it is imperative to address vaccine misinformation among Spanish speaking individuals. Sadly, most vaccine equity research in the US is focused on English-speaking populations. Historically and as of now, Hispanics are severely underrepresented in clinical research, but make up 18.5% of the total U.S. population[2]. The lack of representation of minorities, like Latinos, in clinical trials and research directly causes health disparities[3]. Through a comprehensive understanding of vaccine hesitancy by utilizing one-on-one investigations, our study aims to understand how Spanish-speaking community leaders deliver vaccine messaging and how the Spanish-speaking community in Eastern North Carolina (ENC) receives that messaging.

Methods: We will be utilizing a mixed-methods approach, combining quantitative surveys and qualitative focus groups delivered in Spanish. Participants will be provided with a short demographic survey prior to discussions which ask about socio-demographic characteristics. We will be utilizing qualitative data analysis and inductive thematic analysis. For the qualitative focus group, one will be conducted with 10 trusted community leaders who serve the Spanish-speaking community. Another focus group will be conducted with 10 Spanish-speaking community members in rural ENC._As incentive, focus group participants will receive a $50 gift card.

Results: Because focus groups will be held in March 2024, we hypothesize that we will find misconceptions pertaining to vaccines among community members. Individuals from the Spanish-speaking community tend to rely heavily on their community leaders to guide them. Trusted community leaders often include clergy and church leaders. The Spanish-speaking population tends to be more religious than non-Hispanics[4]. Religion influences decisions on vaccination and religious objection of vaccinations is on the rise globally[5]. Therefore, we believe that we will find perceptions of vaccination tied in with religious views and heavily influenced by religious leaders' perspectives.

Conclusion: Future research can help divert this. Latinxs/Hispanic's have a severe mistrust of doctors and scientists[6]. We can conclude this influences Hispanic/Latinx health disparities in the U.S.

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UPR72 10:00-12:00

Utilizing the Health Belief Model to Optimize Patient Education Within FSPRx

Imaan Siddiqi
Public Health

Mentor: Lauren Sastre, Nutrition Science

Purpose of Study
The purpose of this project is to evaluate the effectiveness of HBM guided education on the health behaviors of individuals diagnosed with diabetes in rural North Carolina. Specifically, there will be a focus on enhancing the current set of survey questions in order to make it all inclusive and comprehensive to further highlight aspects of the HBM. By doing this, the changes in perceived

susceptibility, severity, benefits, and barriers (along with self efficacy and cues to action) can be accurately recorded.

Methodology

With the start of FSPRx's nutrition program, there will be administration of the curated surveys. These survey results will be collected and recorded in order to note the initial status of participant's health behavior/mindset. Following the conclusion of the necessary sessions, the same surveys will be utilized in order to record changes in said health behavior. The optimal result will be a significant increase in perception of all aspects of the HBM.

Results

The FSPRx's nutrition/chronic disease portion will not be held until spring. As such, there is no definitive data to discuss or specific conclusions to draw at this time. The anticipated results will be gathered as a product of comparison between the surveys administered before and after this section of the program.

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UPR73 10:00-12:00

Volumetric Measurement of the Tensor Veli Palatini in Children: A Preliminary Normative Study

Julia Gillespie, McKenzie Perry, Imani R. Gilbert, Taylor D. Snodgrass
Speech and Hearing Sciences

Mentor: Jamie L. Perry, Communic Science & Disorders

Background: The tensor veli palatini (TVP) is the primary muscle responsible for dilation of the eustachian tube (ET). The ET, when dilated, allows for equalization of air pressure between the atmosphere and middle ear. Literature suggests a clear relationship between middle ear pathologies, specifically otitis media with effusion (OME) and dysfunction of the TVP. About 90% of children with a history of cleft palate have reported OME due to ET dysfunction. Considering the impact of craniofacial abnormalities on the TVP, one study investigated volumetric TVP measurements between adolescents with no history of craniofacial abnormalities in a group of children with 22q11 deletion syndrome (DS). The study found a significant volume difference between the two groups, where the control group's TVP volume was notably larger. The described study gives grounds to further explore the comparison of TVP volume between children with no craniofacial abnormalities and abnormal craniofacial anatomy populations, and further emphasizes the need to establish normative muscle size data at critical surgical age points. Research confirms there is a need to maintain the functional integrity of the TVP in children with a history of cleft palate. The purpose of this study is to understand the morphology of the TVP muscle in children without a cleft palate history so potential restoration of the TVP to near-normal anatomy/functioning in children with cleft palate is possible.

Methods: This study will utilize 3D MRI images from 15 child controls with no history of craniofacial anomalies that could affect the regions of interest for the study. The selected age range was chosen because of the critical age for determining surgical needs in children with a history of

cleft palate. TVP volume will be measured using Amira Visualization Software to obtain normative volumetric measurements.

Results: Data analysis is ongoing and expected to be complete by April 2024.

Conclusion: Determining normative volumetric measurements of the TVP muscle in non-cleft palate adolescents will allow for future comparison of cleft palate TVP volumes. This will increase understanding of anatomic differences that have a role in middle ear pathologies, audiological ability, language development, and surgical planning processes for the cleft population.

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UPR74 10:00-12:00

The Influence of Brain Stimulation on Social Language Processing: A Focus on the Right Temporo-Parietal Junction

Jewlia Burney[1], Peyton Disser[2], Ke'Asia Craig[3], Moritz Dannhauer[4], & Kathrin Rothermich[5]
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[5]Department of Communication Sciences and Disorders, East Carolina University, Greenville, NC

Mentor: Kathrin Rothermich, Communication Science and Disorders

We are currently investigating how the ability to process social aspects of language, e.g., verbal irony, changes with modulating brain activity in the right temporoparietal junction (rTPJ). The rTPJ has been shown to play a critical role for processes that underlie verbal irony perception, for example theory of mind (ToM) and cognitive empathy (Frith & Frith, 2001). Transcranial direct current stimulation (tDCS) has been used to explore the role of the rTPJ in social cognition, and results show that cathodal stimulation of the rTPJ leads to decreased accuracy in ToM and empathy tasks (Mai et al., 2016). However, the exact role of the rTPJ in social language processing is still under debate. Additionally, most previous studies have used still images or written materials, ignoring the dynamic nature of face-to-face interaction. In the current study, we use video materials of people engaging in using forms of verbal irony, and participants' task is to decide if somebody is being sarcastic, uses teasing, or is being blunt (% accuracy as outcome measure). We also measure their reaction time as an indicator of task efficiency. Before participants are performing the task, we inhibit brain activity in the rTPJ using cathodal tDCS (20 minutes of either 1.5 mA or sham). Additionally, we record eye tracking behavior to be able to better quantify how brain stimulation influences the processing of these complex social scenes. Participants also fill out questionnaires pertaining certain aspects of their personality, such as anxiety traits, empathy, psychopathy, and sarcasm use. Preliminary results from a pilot study revealed that after receiving tDCS, reaction time is slower in videos that display blunt interactions [N=2] when compared to the sham condition. We are currently testing more participants and plan to test N=30 to shed light on the relationship between brain regions related to perspective taking when processing social aspects of language. In

the future, we would also like to test clinical populations that exhibit social cognitive deficits, such as people with Autism Spectrum Disorders, Schizophrenia, or Parkinson's Disease.

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UPR75 10:00-12:00

Determination of PFAS Concentration using LC-MS/MS analysis.

Lauren Carter and Riley Frechette
Chemistry

Mentor: Eli Hvastkovs, Chemistry

Perfluoroalkyl substances (PFAS), also known as "forever chemicals," are used as reagents for many commercial products but have been detected in environmental water sources due to corporate malfeasance. Exposure to PFAS has been linked to many health issues including the development of cancer, decreased fertility, liver damage, and increase in autoimmune diseases among others. Because of these known health outcomes, the EPA has issued warnings over their use, and older variations have been phased out. However, newer iterations of perfluoroether acids (PFEA) have been developed with the idea that they are safer or do not persist in the environment. One of these newer PFEA is perfluoro-2-methoxyacetic acid (PFMOAA), a much smaller iteration of the first generation compounds. This compound has still been detected in water sources, such as the Cape Fear River in North Carolina. Health outcomes due to PFMOAA exposure are not as well established. To study this, pregnant C57BL/6 mice were exposed to PFMOAA at certain concentrations in their diet to determine the risk to unborn offspring. Following birth, the pups were sacrificed and organs and blood were harvested. Following extraction protocols, PFMOAA concentrations in mouse pup serum, urine, and liver were determined using liquid chromatography - tandem mass spectrometry (LC-MS/MS) analysis. Concentrations determined in the different tissues correlate back to observable health and survival outcomes. Ramifications of these data will be discussed.

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UPR76 10:00-12:00

The Effects of Power Settings and Liquid Flavors on the Gravimetric Filter Correction Factors and Real-Time Measurements

Emma Piner and Gabriela Perez
Public Health

Mentor: Sinan Sousan, Public Health

$PM_{2.5}$ or fine particulate matter are particles that are 2.5 μm in size or smaller that are produced by electronic cigarettes (ECIGs). This particle size is so small that it easily travels to deeper parts of our lungs. Overexposure to $PM_{2.5}$ beyond the Environmental Protection Agency safe limit of

$35mg/m^3$ can cause respiratory problems such as difficulty breathing or asthma and can be cancerous. Since the popularity of ECIGs among young adults and teenagers is exponentially increasing, this population is becoming more exposed to these particles. However, there is very limited research that has been done on ECIGs and their secondhand exposure effects. This study is being conducted to gain a better understanding of $PM_{2.5}$ exposure effects by conducting measurements using real-time aerosol instruments that can quantify the exposure and capture the vaping behavior. Since these instruments are calibrated by the manufacturer using alternative aerosols such as dust, a filter correction factor must be calculated to make the measurements more accurate for ECIG aerosol. The objective of this study is to determine the effects of three factors on these filter correction factors, including frequency of inhalation, flavorants, and ECIG device power. The ECIG device that will be used is the SMOK Novo X, which allows users to change the flavorant and power. Secondhand $PM_{2.5}$ exposure will be generated inside a controlled laboratory chamber using a diaphragm pump and a timer to simulate user secondhand vaping. A total of three aerosol instruments will be used to measure the exposure inside the chamber, and the filter correction factors will be calculated for these devices. The variability in $PM_{2.5}$ measurements and the filter correction values will be compared between these devices. There was 1 trial done for a total of 16 experiments. Public health can benefit from this study by providing people at risk of asthma or Chronic obstructive pulmonary disease with information on secondhand electronic cigarette exposure risks.

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UPR77 10:00-12:00

Evaluating access to oral healthcare in pregnant patients.

Lucy Anna Sheaffer
Public Health

Mentor: Vanessa Pardi, Dental Medicine

Pregnancy is a critical stage of life that requires additional care and monitoring but is often overlooked in healthcare. Monitoring for a safe and healthy pregnancy begins before conception and ends following birth to facilitate positive outcomes for both the mother and infant. Ob-gyn screening most directly monitors the pregnancy, however oral health and routine dental care is no less important during this time. Lack of access to health care can prevent many women, pregnant or not, from receiving dental care. Oral health plays a crucial role in overall health in the human body. Comprehensive oral care seeks to not only resolve existing issues such as dental cavities, infections, or inflammation (such as gingivitis or periodontitis), but also prevent those same issues from occurring. Dental cavities, infections, and inflammation are all linked to increase risk of systemic diseases (such as cardiovascular issues, diabetes, and stroke). The goal of this study is to identify: 1-

the number of pregnant women receiving dental treatment (ECU-SODM clinic) and 2- barriers and facilitators in receiving dental treatment.

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UPR78 10:00-12:00

The Effect of Preparatory Hip Muscle Activation on Lower Extremity Biomechanics during a Vertical Drop-Jump Task

Katie Kim Lauren Crawford
Exercise Physiology

Mentor: Anthony Kulas, Kinesiology

Background: Anterior Cruciate Ligament (ACL) injuries are widely known as the most common ligament injury of the knee, recently accounting for 100,000 to 200,000 of the total injury count for athletes each year. America spends on average $3,812,100,000 for ACL reconstructions yearly. Even with this surgery, there is a lack of evidence to prove that reconstruction prevents long-term joint damage such as osteoarthritis. To prevent these instances from occurring, biomechanical risk factors must be evaluated. A study focusing on the 2-dimensional analysis of dynamic knee valgus in athletes was performed (Numata et al., 2018). The results yielded by this study showed that 3 years after the first evaluation 9.6% of the athletes had sustained ACL injuries. The injured athletes had a greater knee valgus at initial contact with the ground than the non-injured athletes, showing knee valgus is a strong risk factor. It is hypothesized that hip muscle activation affects knee joint movements. Preparatory muscle activation happens before the actual movement i.e., before landing, making it plausible that appropriate preparatory hip muscle activation is a central component in reducing knee valgus.

Purpose: The purpose of this study is to determine if hip muscle activation affects knee valgus during a vertical drop jump task.

Methods: All subjects must be healthy meaning that they have not experienced any major lower extremity injuries. After completing the informed consent process, subjects will be prepped and set up for the use of electromyography (EMG). Electrodes will be attached to glute, quad, and hamstring, muscles. The subjects will then have reflective markers attached to major landmarks of the body to be used in motion capture analysis. Subjects are given 2 tasks to complete, squats and vertical drop jumps. Their movements are analyzed using both motion capture and EMG equipment.

Results: All data is still under review but, results will be reported at creative achievement week.

Significance: By understanding when hip activation happens during preparation for the jump, hip and knee torques can be better related to frontal knee motion, such as knee valgus, during the landing. If hip activation timing affects knee joint angles, interventions could be created to attempt a decrease in knee valgus and load, lowering the number of ACL tears as well as decreasing the population of young adults with osteoarthritis.

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UPR79 10:00-12:00

Parent Perspectives on Speech-Language Therapy Delivered via Telehealth During and After the Pandemic

Caitlin Fromm
Speech and Hearing Sciences

Mentors: Meaghan McKenna and Kathrin Rothermich, Communic Science & Disorders

Telehealth is the virtual delivery of services using video platforms that allow patients to be provided with various services remotely. Telemedicine has been consistently growing in the United States since the COVID-19 pandemic, yet there is limited information on the perspectives of families whose children received teletherapy. It is crucial to understand the successes and barriers of speech-language therapy via telemedicine, and why or why not parents choose to continue with this method of delivery. Current research has explored what this has looked like in other countries and other disciplines. Teletherapy for speech-language services in the US has yet to be explored through the eyes of parent surveys. Three study objectives were written before the start of the survey; understand the opinions and level of satisfaction parents experienced related to speech-language therapy via telehealth during the COVID-19 pandemic, determine what factors led to parents continuing or discontinuing telehealth as their mode of delivery, and analyze what successes and barriers there were to the use of speech-language therapy via telehealth during the COVID-19 pandemic. This survey will include parents of children who received speech-language therapy via telehealth during the COVID-19 pandemic. The survey was developed using procedures outlined by the commonly accepted stages of a questionnaire development process. This process aids in increasing validity and includes (a) identification of the purpose of the survey, (b) creation of a blueprint of items, (c) expert panel review by writing researchers, and (d) interviews with parents. Dissemination of the survey occurred via social media platforms and field-specific forums. Data was collected from July 2023 to November 2023. Ninety-five participants began the survey and 60 participants completed the survey in its entirety. Findings are currently being analyzed and described. Results from this survey have the potential to identify facilitators and barriers within telehealth and allow speech-language pathologists (SLPs) to reflect upon successes and make improvements to area(s) of concern within their practice. Parent input allows SLPs to adapt appropriately. We want to use the resulting themes to better the practice of speech-language therapy via telehealth.

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UPR80 10:00-12:00

Perceptions of Later Life Physical Activity in Former Black Male College Athletes

Darius Lawton
Sports Studies

Mentor: Bhibha M. Das, Kinesology

Introduction Black males have an average life expectancy of about 70 years old compared to the national average of all males' life expectancy, which is approximately 74 years of age. Black males face significant health disparities compared to their White counterparts including higher rates of cardiovascular and type 2 diabetes, which is impacted by physical activity. Despite an overwhelming number of Black men who engage in physical activity, particularly sports, during their youth, there are low levels of physical activity in Black men in adulthood. There are additional socioeconomic and environmental factors that may negatively impact Black men's physical activity levels, and ultimately their health. The purpose of this exploratory study is to examine the barriers Black men, who were former collegiate athletes, face in engaging in physical activity after finishing their athletic careers.

Methods: The study will be qualitative using semi-structured interviews. We will interview 15 Black men who identify as former Division 1, 2, or 3 athletes. Questions will be centered around their athletic career, barriers to physical activity after their athletic career, quality of life, socioeconomic status, and environment. Data analysis will occur using thematic content analysis.

Anticipated Results: It is hypothesized that Black males who were former collegiate athletes no longer engage in physical activity post-athletic career due to 1) physical ailments sustained during their athletic careers, 2) mental health concerns, & 3) burnout from the sport.

Discussion: By understanding why Black males, who were former collegiate athletes, do not engage in physical activity after their athletic careers, we can develop programs and policies to improve their physical and mental health through physical activity. We may also better understand the environmental and policy needs to improve physical activity access in these underresourced communities. This is of important because a significant amount of NCAA athletes identify as Black males. Potential interventions may include working with young Black male athletes to understand more about the role physical activity plays beyond sport, how physical activity impacts mental health, and how to avoid burn out as they engage in sport. For Black men who are former collegiate athletes, new ways to engage them in physical activity are needed. Some potential solutions may include physical activity programming tailored to this population.

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UPR81 10:00-12:00

Young Adults' Use of Technology for Finding and Maintaining "Talking", Dating and Committed Relationships.

Kristy Kibler, Annagrace Saufley, Chloe Cooper, Allison Robinett
Family Community Services

Mentor: Alan Taylor, Human Dev and Family Science

Over the years, the examination of young adults' romantic relationships has posed many challenges. With so many different dynamics playing a role within relationships, it can be difficult to narrow

down what young adults are desiring when forming and maintaining their romantic partner relationships. Most of the previous research has focused on the developmental stage of life within young adults and how they typically form committed relationships. For our study, we are exploring specifically the "talking phase" and the various forms of technology used by young adults when "talking" - that help them develop into committed relationships. We also plan to examine how the "talking phase" has influenced and impacted their overall relationship satisfaction and the length of their committed relationships. For our data collection, we created an online Qualtrics survey that will be available to ECU students eighteen and older who are currently talking or in dating relationships (IRB Pending). Some elements that are evaluated in this survey are their use and perceived benefits of various technologies used within their relationships, as well as the participants' personality and self-esteem assessments. In addition, we will have the participants rate their perceived relationship satisfaction and quality. T-tests and other statistical analyses will be implemented to examine the various components within the "talking phase" and the overall satisfaction and length of young adult romantic relationships. Finally, discussion of the findings and implications will be presented.

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UPR82 10:00-12:00

Are they thinking about me? The impact of age metastereotypes on threat and avoidance_

Kaitlyn Cannon, Isamar Ponce-Ponce, Thomas Evans, Matthew Nobles
Psychology

Mentor: Courtney Baker, Psychology

Introduction. Recently, organizations have been faced with an increase in age diversity. As a result, age-related issues have come to the forefront. Age meta-stereotypes, what workers think other workers think about them because of their age group, can affect the quality and quantity of intergenerational interactions amongst age-diverse workplaces. Age metastereotypes have been shown to vary in valence, content, and frequency of experience. Finkelstein et al (2015) developed a theoretical model of potential antecedents and consequences of experiencing workplace age metastereotypes. We explored the extent to which age, intergenerational contact, and public self-consciousness impacted the extent to which workers thought about negative age metastereotypes. We then evaluated whether experiencing age metastereotypes impacted workers' experiences of threat and avoidance.

Methodology. There were 108 participants. Participants completed an online survey that measured age metastereotypes (Thomas & Finkelstein, 2023; Adaption of Stigma Consciousness Scale, Pinel, 1999 as used in Ryan, King, & Finkelstein, 2015; Finkelstein, Voyles, Thomas, & Zacher, 2019), threat (von Hippel, Kalokerinos, & Henry, 2013), avoidance (Finkelstein, King, & Voyles, 2015), public self-consciousness (Scheier & Carver, 1985), and intergenerational contact (Bryant & King, 2016) in the workplace.

Results. The results indicated that intergenerational contact with older workers had a negative relationship with age metastereotypes. In our sample of younger workers, contact with older workers increased the likelihood that workers reported negative age metastereotypes. For public self-

consciousness, the more public self-conscious workers were, the more they thought about age metastereotypes. Age did not moderate these relationships. When workers thought about negative age metastereotypes, they reported more threat and avoidance. _

Conclusion. Our results show that intergenerational contact and public self-consciousness affect the likelihood negative age metastereotypes are thought about. This suggests that certain situational features (intergenerational context) and personal features (public self-consciousness) may make workers vulnerable to experiencing negative age metastereotypes. After experiencing negative age metastereotypes, workers are then likely to feel threatened by this awareness and avoid their coworkers, not allowing themselves the opportunity to prove the stereotypes wrong.

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UPR83 10:00-12:00

Autism Traits Influence Neural Correlates of Sarcasm Processing: Evidence from Event-Related Potentials

Rindi Povlich
Multidisciplinary Studies: Neuroscience

Mentor: Kathrin Rothermich, Communic Science & Disorders

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Individuals with autism often have difficulties with interpreting verbal and nonverbal social cues. Sarcasm is communicated via verbal and nonverbal social cue, such as changes in tone and prosody, and thus can represent a challenge for people who score high on Autism Quotient (AQ). The goal of this study was to determine the influence of autism traits on the neural processing of sarcasm. We invited 24 young adults to listen to dyadic interactions while reporting their social impression (appropriateness) of literal statements and sarcasm. Data on self-reported autism traits were also collected using the AQ. On average, participants judge sarcasm as less appropriate compared to literal statements. This confirms our hypothesis on the criticizing function of sarcasm. We also recorded electroencephalography (EEG) data and analyzed event-related potentials (ERP). We found a sustained frontal positivity in response to sarcastic utterances compared to literal compliments which was significant in the 250ms to 400ms time window. However, this effect was only present for participants with a lower AQ. It is possible that participants with lower AQ scores might have an advantage when interpreting sarcastic utterances, especially when there is a mismatch between the verbal statement and prosodic intonation. Our results provide new evidence for the influence of social skills on of sarcasm processing and extend frameworks such as the constraint-satisfaction model.

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UPR84 10:00-12:00

Nourishing Knowledge: Development and Assessment of the Impact of Low-Health Literacy Tailored Nutrition and Healthy Living Educational Handouts in Group Diabetes Management Class Settings

Aaditi Kulkarni
Public Health

Mentor: Lauren Sastre, Nutrition Science

In the United States, approximately 37.3 million Americans have type 2 diabetes, with a further 8.6 million individuals undiagnosed. Due to this, over $327 billion is spent annually on diabetes care and management. Furthermore, disparities in diabetes prevalence and outcomes persist, disproportionately impacting socioeconomically disadvantaged communities. Diabetes self-management education (DSME) has emerged as a valuable approach, with its success being studied to improve glycemic control and patient outcomes. However, there is a significant knowledge gap regarding the utilization and effectiveness of DSME among lower-resource, lower-income, and lower-literacy medically underserved patient groups. Research indicates that individuals with limited general literacy, health literacy, and nutrition literacy, which often coincide with lower education and socioeconomic status, face substantial barriers in effectively managing their diabetes diagnosis - more specifically in adhering to medical treatment plans and implementing necessary nutrition and lifestyle changes. Despite the evident need, there is a notable gap in the development and evaluation of diabetes education materials tailored specifically for individuals with lower literacy levels and limited resources. In light of these findings and the disparities that persist in diabetes management, the primary objective of this study is to develop, assess the acceptability of, and evaluate the impact of adapted patient education materials designed to cater to the needs of rural, medically underserved, and uninsured patients diagnosed with Type 2 diabetes. During the Fall semester, DSME handouts were adapted to be more culturally and socioeconomically attuned for patients with low health literacy. Subsequently, in the Spring semester, these adapted handouts are being distributed to patients participating in the Fresh Start group diabetes management classes. At the end of each class, the acceptability, impact, and usefulness of the handouts are assessed using a 6-item survey with quantitative Likert scale and qualitative open-ended questions. Preliminary results have shown that most participants agree that they learned something new from the handouts (84%, n = 31) and will make a change because of it (89%, n = 33). Participants showed the greatest response to learning about food portions and serving sizes when asked about a new topic learned about from the handouts.

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UPR85 10:00-12:00

Physical Activity Programming for Underserved Patients

Kensey Tarkington
Exercise Physiology

Mentor: Bhibha M. Das, Kinesiology

The region of Eastern North Carolina faces a higher prevalence of Type II Diabetes (T2DM) and socioeconomic disparity. The Fresh Start Program addresses these issues using an evidence-based multifaceted approach to behavior change. Physical activity is a crucial component of diabetes management, so this research aims to create physical activity plans for Fresh Start patients. Most of the Fresh Start patients are sedentary and have mobility issues, so chair-based exercises were developed to accommodate patients at all levels of functionality.

PURPOSE: To assess the health impact of chair-based exercises on underserved patients with Type II Diabetes (T2DM).

METHODS: Fresh Start patients were asked to complete surveys assessing their physical activity, health, and physical activity self-efficacy. Surveys were completed at the beginning of the 9-week Program in January 2024. Patients will be assessed at the end of the program in April 2024 to determine if their health was impacted by physical activity.

RESULTS: Anticipated results include improvements to patients' physical activity levels, health, and self-efficacy in physical activity.

CONCLUSIONS: If successful, this program is a low-cost, yet high on return investment in patients from low socio-economic backgrounds. This program can introduce sedentary patients to physical activity in a low-cost, low-risk way to improve physical activity, health, and physical activity self-efficacy.

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UPR86 10:00-12:00

Evaluating the Impact of Social Media Influencers on Exercise Addiction in College-Aged Women

Leah Darby
Communication

Mentor: Bhibha M. Das, Kinesiology

Introduction: The vast landscape of social media has allowed for in-depth and specific niche communities, such as fitness communities on Tik Tok and Instagram, sometimes referred to as "fitstagram" and "fit tok." In recent years, a phenomenon known as exercise addiction or dependency has become increasingly common, specifically in young women. The purpose of this study is to examine the relationship between college-aged women and their relationship to social media influencers.

Methods: Data was collected using an online Qualtrics survey to collect demographics and other study items. All study collection procedures were approved by East Carolina University's Institutional Review Board. Participants were recruited based on enrollment at a college or university, identifying as female aged 18-25. Participants were recruited through word of mouth as well as social media advertising and were incentivized with a $10 Amazon gift card to participate.

Results: Out of the data collected from 78 respondents (90% White), BMI was 26.37 ± 6.5 kg/m2, was 21 ± 2.23 years old. Nearly 34% identified as being a part of a collegiate Greek council. When asked about the types of activities performed most often, 42 out of 77 respondents reported focusing on cardio-based activities. When asked if they believed themselves to be easily influenced by users on social media, 34 resonded with definitely or probably yes, and 18 responded with maybe, totaling 52 out of 77 respondents. When asked an open-ended question about feelings associated with missing or skipping a workout, there were overwhelmingly negative words and phrases, for example "guilty," "disappointed," or "stressed and anxious" from 43 out of 77 responses.

Discussion: Findings show that college-aged women ages 18-25 are at a higher risk for exercise dependent behaviors due to the current nature of social media and pressure to follow trends. Public health implications of these findings are that social media is a major factor that contributes to these exercise dependent behaviors, and these behaviors put college aged women at a higher risk for poor mental health which can have negative effects that carry through adulthood and effect overall social, physical, and mental health. Future research should focus on the negative mental health effects and exercise behaviors caused by specific fitness influencers, and the difference between those influencers, as this research did not focus on specific social media content creators.

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UPR87 10:00-12:00

Effects of Relaxation on Adults

Ellie Juergens
Music

Mentor: Virginia Driscoll, Music Education Therapy

Current literature highlights the effectiveness of music therapy interventions with individuals that are diagnosed with PTSD and/or have experienced trauma-like events (Carr et al., 2012). However, current literature does not highlight the effectiveness of relaxation techniques with individuals specifically from this population. Individuals that report trauma-like experience can present with increase anxiety responses, heightened reactions, and depressive behavior (Bensimon, M. 2022). This study used the music therapy relaxation technique to understand the either positive or negative impact that relaxation had on these populations. This is important in the field of music therapy because understanding individual's responses to relaxation will help music therapist chose the appropriate interventions for specific populations. This study sought to deliver the relaxation intervention to participants in a single experience. Participants completed a screening prior to the study including consent form, age, gender, questions to determine if one has had trauma- like experiences, etc. Participants completed pretest and posttest- given before and after the relaxation

facilitation to determine their level of relaxation. Data collection is currently in progress. I hope to determine if relaxation techniques are effective for individuals with trauma like experiences. The findings can be implemented in the field so that music therapists can effectively use relaxation techniques with the appropriate populations.

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UPR88 10:00-12:00

Adjective Comprehension in aphasia: Evidence from eye-tracking

Grace Evans
Speech and Hearing Sciences

Mentor: Matthew Walenski, Communic Science & Disorders

Aphasia is an acquired language disorder that is caused by damage to the areas of the brain that control language. Aphasia can impact language in multiple facets including expression, comprehension, reading, and writing. It has been found that adjective comprehension has been severely understudied throughout the aphasic population, which enhances the need for further knowledge in this area. In English, there are two main types of adjectives: attributive and predicative. Attributive adjectives come before the noun (John chose the **blue** table), while predicative adjectives come after the noun (John chose the table. It was **blue**). We are testing individuals who have aphasia in comparison to a matched healthy control group to analyze the similarities and differences in their adjective comprehension abilities. We are using a visual-world eye-tracking paradigm to examine comprehension of attributive and predicative adjectives within a sentence. The participants will be shown a series of grids that include four pictures that each have a specified target, adjective match, noun match, and mismatch. (blue chair, blue table, yellow chair, yellow table). While viewing the grid, participants will simultaneously listen to a recording of a sentence that corresponds to the grid (John chose the blue table. Point to the one John chose). It has been found that sentences with multiple adjectives are harder to comprehend for individuals with aphasia. Therefore, we also examine comprehension abilities for multiple adjectives in either good (John chose the big green chair) or bad sentences (John chose the green big chair). For both the attributive/predicative and good/bad sequences, twenty sentences per category are included. In most cases, we hypothesize that the individuals with aphasia will be able to comprehend the adjectives, however, we expect to see abnormal eye movement patterns and a slower response rate relative to the control group, especially with individuals that have agrammatism, which causes increased difficulty with word order, sentence structure, basic grammar, and syntax.

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UPR89 10:00-12:00

Barriers and Motivators for Participating in Mindfulness-Based Interventions in Emerging Adults from Underrepresented Racial/Ethnic Groups

Jordan Signorelli
Psychology

Mentor: Christyn Dolbier, Psychology

Introduction: Emerging adulthood (EA, 18-29 years old) is a transitional time associated with the highest risk of onset for some mental health disorders and high prevalence of many others (Arnett et al., 2014; NeMoyer et al., 2022). People of color (POC) in EA are more likely to experience greater and more persistent mental health symptoms with low mental health service use as they experience more barriers (Iwamasa et al., 2023; NeMoyer et al., 2022). Accessible and culturally responsive interventions are needed to address the unmet need of POC in EA (Moore et al., 2018).__

Mindfulness-based interventions (MBIs) may be an attractive way to address this issue. MBIs teach mindfulness practices, promoting non-judgmental awareness of emotions, thoughts, and sensations (Bishop et al., 2004). Research supports the safety and mental health benefits of MBIs in EA (Dawson et a., 2019). Mindfulness and its link with benefiting mental health have become part of popular culture (Kwon et al., 2023), making MBIs less stigmatizing and an option some in EA may be more amenable to than traditional mental health services. However, POC are underrepresented in MBI research, little research has examined how identity and sociocultural context may influence MBI participation, and no MBIs have been culturally adapted for POC in EA (DeLuca et al., 2018).

Purpose: Aims include identifying barriers, motivators, interests, and preferences for MBI participation in POC in EA.

Method: Using a cross-sectional design, eligible participants (U.S. residence, English fluency, 18-29 years old) will be recruited through CloudResearch crowdsourcing, with sampling stratified by race/ethnicity. Participants will complete an online survey assessing demographics, mindfulness perception and experience, MBI barriers, motivators, interest, and preferences.

Results: Recruitment will begin in the spring 2024 semester after receipt of IRB approval. An update on study progress and any preliminary results will be included in the presentation.

Discussion: Given the disparities experienced by POC in EA and their underrepresentation in MBI research, providing MBIs that address their motivations (e.g., improve mental health), barriers (e.g., religious/spiritual belief incongruence), and preferences (e.g., delivery format) can maximize the likelihood of participation and thus benefits from MBIs. The results will inform the development and implementation of MBIs for POC in EA, being the first to do so.

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UPR90 1:00-3:00

Mammalian Sperm Heterogeneity During Capacitation in *mus musculus*.

Aidan Charles
Biochemistry

Mentor: Cameron Schmidt, Biology

Mammalian sperm capacitation is a cellular process that renders sperm cells viable for fertilization. Capacitation *in vivo* functions to mature sperm cells at the correct time and place for fusion with the egg, as well as select for optimal fitness among a large population. Sperm viability directly impacts early embryonic development and implantation. In vitro fertilization treatments seek to replicate both the cellular signaling mechanisms critical for capacitation and the rigorous selection process. Sperm selection for clinical and research applications is limited by our ability to identify competent individuals or subpopulations within a greater sample. Sperm cells must respond to bicarbonate and calcium ion concentrations in the environment at the correct time and place to successfully fertilize the egg. Testis-specific sodium bicarbonate cotransporters (NBC) and CatSper ion channels link environmental conditions to signal protein phosphorylation activity in the cytoplasm. Protein Kinase A (PKA) and tyrosine kinases effect characteristic capacitation phenomena such as hyperactive motility and release of the acrosomal vesicle. Here, we propose a method to combine population level, time-dependent assays with individual cell spectral flow cytometry to examine sperm heterogeneity in *mus musculus*. Qualitative and statistical modeling of sperm subpopulations can improve sperm selection and capacitation methods, with implications for clinical and agricultural use.

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UPR91 1:00-3:00

Source Localization of Event-related Components for Lexical Decision Tasks

Margaret Leland
Engineering

Mentor: Matthew Walenski, Communication Science & Disorders

In a visual lexical decision task, a person is presented with a string of letters, and must judge whether the string of letters is a real word (e.g., bird) or not (e.g., flurb). The task can also be administered auditorily, with people listening to words and nonwords. In order to make a correct judgment, a participant must search their mental lexicon, and either find a match (word) or conclude that the item wasn't a real word (no match was found). Differences in brain activity are seen for the processing of words vs. nonwords. For example, with event-related potential methods measuring electrical activity from the brain, larger N400 effects (negative deflections in voltage peaking around 400ms after stimulus onset) are consistently elicited for nonwords compared to words. Our goal in the current project is to investigate the brain regions that are involved in performing this task, and that produce these N400 effects. To do this, we first perform a meta-analysis on neuroimaging studies (PET or FMRI) of lexical decision tasks. We use activation likelihood estimate (ALE) technique to perform this meta-analysis. For this meta-analysis, we first searched for published neuroimaging studies in PubMed and Google Scholar to find any and all studies reporting results from a lexical decision task. The studies we found (n=293) are then screened to determine if they meet criteria for inclusion in the final meta-analysis. Studies that meet criteria are included in the meta-analysis, which is expected to reveal the set of brain regions contributing to the lexical decision task. Once the meta-analysis is completed for the FMRI and PET data, the goal is to perform source

localization analysis on an N400 effect found in electroencephalogram (EEG) data from lexical decision task in a cohort of healthy college-age students, and to see if these sources correspond to the same regions that were found in the meta-analysis of FMRI and PET data. The results are expected both to inform theories of lexical access and to inform methods of source localization.

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UPR92 1:00-3:00

In vivo interaction between SARS-CoV-2 and alpha synuclein performed fibrils

Ayesha Omair
Multidisciplinary Studies

Mentor: Jeffrey Eells, Anatomy and Cell Biology

Alpha-synuclein is a presynaptic neuronal protein primarily involved in binding synaptic vesicles to the membrane. It has been extensively linked to Parkinson's disease; a neurodegenerative disorder caused by the loss of dopamine neurons in the substantia nigra. In Parkinson's, α-synuclein accumulates in Lewy bodies and Lewy neurites, ultimately damaging dopamine neurons by blocking dopamine production and transmission. Recent studies have identified direct interactions between the N-protein of SARS-CoV-2 and α-synuclein, potentially explaining the observed correlation between SARS-CoV-2 infections and an increased risk of Parkinson's. To explore this link further, we injected α-synuclein into mice before infecting them with SARS-CoV-2. We then compared the viral infiltration in the brains of mice that succumbed to severe COVID-19 within 6-8 days with control mice. Our preliminary data suggest that α-synuclein may indeed protect the brain from viral infiltration. However, this protection does not translate to improved survival, as the α-synuclein-injected mice showed higher mortality rates despite reduced viral presence in their brains. This finding highlights the complex and contradictory roles of α-synuclein in neurological health and disease. Further investigation is crucial to understand why α-synuclein aggregates might offer initial protection against infection while ultimately contributing to neuronal damage and death in certain contexts.

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UPR93 1:00-3:00

Time of Day Effect on Knee Osteoarthritis Loading

Daniel Morgan
Exercise Physiology

Mentor: Ryan Wedge, Physical Therapy

Intro: Osteoarthritis (OA) is a disease that affects millions across the United States. Since it is not presently curable, pain management is key for people with OA. People with knee OA should still exercise regularly to delay the progression of OA and preserve overall joint health. It is unclear from

the literature if time of day affects knee joint contact forces in individuals with knee OA and how that would affect daily movement patterns. The topic of diurnal rhythms is very prevalent in sports and exercise medicine research; however, there have been no studies to find how joint contact forces vary in people with OA over the course of a day.

Purpose: This study's purpose is to determine the effect of time of day on knee joint contact forces in people with knee joint OA so we can help determine the optimal time for an exercise regimen based on joint loading.

Methods: Eight participants walked at their preferred speed and the set speed (1.3 m·s^{-1}) on an instrumented split belt treadmill. Participants with knee OA came in for a morning session (before 9 AM) and an evening session (after 5 PM) on a different day within three days of the first. Sixty-six markers were applied to bony landmarks and particular rigid segments to establish segment coordinate systems, define joint centers, and obtain motion data. Three-dimensional marker data was collected at 200-Hz and force data was sampled at 2000-Hz on an instrumented split belt treadmill. Data was post-processed and analyzed with previously described methods.

Results and Discussion: The difference between affected and unaffected limbs on total, medial, and lateral peak joint contact forces was significant ($p = 0.005 - 0.044$) with small effect sizes (0.015 - 0.028). The difference between time of day was significant for total ($p = 0.004$) and lateral ($p < 0.001$) peak contact forces and had small effect sizes (0.009 - 0.047). The interaction of limb by time of day was not significant for any peak forces ($p = 0.264 - 0.986$). The sample size was limited due to the budget period, but there are trends for the interaction of time of day and limb which should be further explored with more participants. If we can determine how time of day affects knee joint contact forces in people with and without OA, we could better prescribe when to exercise.

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UPR94 1:00-3:00

Immunotoxicity of understudied PFAS found in North Carolina

Matthew Wittenborn
Biology

Mentor: Tracey Woodlief, Pharmacology and Toxicology

Aya Ahmed, Krystal Taylor, Jaime DeWitt

Perfluoropentanonic Acid (PFPeA) and 1H, 1H, 2H, 2H-perfluorooctanesulfonic acid (6:2 FTS) are per- and polyfluoroalkyl substances (PFAS) that have been identified in North Carolina drinking water sources. To our knowledge, no rodent immunotoxicological data exist in the publicly available literature for PFPeA so potential health risks of exposure to these PFAS are unknown. Therefore, these studies sought to describe signs of immunotoxicity, following oral exposure. Adult male and

female C57BL/6 mice were exposed by gavage once per day for 30-days to PFPeA or 6:2 FTS at 0, 0.5, 5.0, or 50 mg/kg. Endpoints collected included in-life observations, organ weights, liver peroxisome proliferation, and the T-cell dependent antibody response (TDAR). Exposure to 50 mg/kg PFPeA did not affect organ weights or cellularity at any of the doses administered except for an increase (~23%; $p<0.05$) in the absolute thymus weights of exposed male mice compared to control. While exposure to 6:2 FTS did not affect terminal body weights or lymphoid organ weights at the doses administered, both absolute and relative liver weights in male mice ($P<0.001$). Compared to the control group, absolute liver weights increased by 25%, 44%, and 81% and relative liver weights increased by 18%, 38%, and 86% in the (6:2 FTS) 0.5, 5.0, and 50 mg/kg groups, respectively. Exposure to 6:2 FTS decreased (~13% on average) relative heart weights ($p=0.04$) of treated female mice compared to female mice from the control group. Compared to the control group, 6:2 FTS exposure decreased the TDAR by 5% (NS), 49% ($p=0.008$), and 32% in male mice and by 15%, 44% (NS), and 33% ($p=0.006$) in female mice, from control to 0.5 mg/kg, 5.0 mg/kg and 50 mg/kg, respectively, independent of changes in lymphoid organ weights. In male mice exposed to 6:2 FTS, thymus cellularity decreased significantly from control to 5.0 mg/kg (15%; $p=0.05$) and from control to 50 mg/kg (19%; $p=0.006$). Cells per mg thymus weight decreased statistically from control to 50 mg/kg (24%; $p=0.002$). In female mice exposed to PFPeA, thymus cellularity decreased statistically from control to 5.0 mg/kg (46%; $p=0.012$) and from control to 50 mg/kg (66%; $p=0.003$) and cells per mg thymus weight decreased statistically from control to 5.0 mg/kg (67%; $p=0.005$) and from control to 50 mg/kg (91%; $p=0.002$). These results indicate that exposure to 6:2 FTS has immunotoxic and heptatoxic potential, and exposure to PFPeA has immunotoxic potential.

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UPR95 1:00-3:00

Analyzing the Impact of Pain Medication Usage on Antibiotic Resistance Patterns

Aliza Bista
Biochemistry

Mentor: Eric Anderson, Biology

The overuse of antibiotics has led to many pathogens developing strategies to resist commonly prescribed antimicrobial therapies. However, the use of antibiotics alone may not be the only factor contributing to antibiotic resistance. Common symptoms of many bacterial diseases include pain and inflammation. To treat this pain, many patients turn to over-the-counter (OTC) analgesics such as non-steroidal anti-inflammatory drugs. This means that often antibiotics and NSAIDs are being taken in conjunction, and our goal was to investigate the possibility that NSAID usage may create selective pressures that increase the likelihood of developing antibiotic resistance. To test this theory, Selected ESKAPE pathogens were exposed to clinically relevant concentrations of NSAIDs and then tested for antibiotic resistance via growth in an antibiotic-supplemented media. Additionally, we are examining whether recurring exposure to NSAIDs, as is commonly seen in chronic pain treatment, will increase the likelihood of Increased resistance when prescribed dosage regimens are not properly followed. Currently, our data do not indicate a strong correlation between NSAID use and resistance development when nominal levels of antibiotics are maintained. We are now

investigating the effects of resistance development with sub-optimal antibiotic levels that are commonly seen when patients fail to follow their prescribed antibiotic regimen. These findings will assist physicians in making informed recommendations for the use of certain pain medications when prescribing antibiotics to patients.

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UPR96 1:00-3:00

The Role of Myoferlin and SREBP2 in HTLV-1-Infected T-Cells: Implications for Adult T-Cell Leukemia (ATL)

Anyanso Kalu and Sarker Kawser
Public Health

Mentor: Nicholas Polawkowski, Microbiology and Immunology
Isabelle M Lemasson

Human T-cell leukemia virus type 1 (HTLV-1) is a retrovirus that infects CD4+ T-cells, causing lifelong infection. Most patients are asymptomatic carriers throughout their life; however, 5% develop adult T-cell leukemia. Most patients with aggressive subtypes of ATL die within a year of diagnosis. Currently there are no effective treatments for ATL.

The HTLV-1 protein, HBZ, plays a crucial role in ATL. HBZ is found in the nucleus where it regulates transcription of cellular genes. HBZ promotes CD4+ T cell proliferation, suppresses apoptosis, and dysregulates DNA damage responses, accelerating oncogenic changes. It is the only HTLV-1 gene expressed in all cases of ATL.

We found that HBZ activates the expression of the cellular protein, myoferlin which is overexpressed in various cancers. In these cancers, myoferlin promotes proliferation, migration, and invasion. Therefore, abnormal expression of myoferlin in HTLV-1-infected T-cells may contribute to ATL.

To investigate the function of myoferlin in HTLV-1-infected T-cells, we established T-cell lines expressing short hairpin RNAs targeting the myoferlin transcript (shMYOF) or the GFP transcript (shGFP; negative control). We performed RNA-seq on these two cell lines to identify the effects of myoferlin on transcription. We used the program, ISMARA, to identify possible transcription factors regulated by myoferlin from which we identified sterol regulatory element-binding protein 2 (SREBP2).

SREBP2 is a master regulator of cholesterol biosynthesis. Cholesterol synthesis and uptake are increased in cancer cells, and cholesterol is important for cancer cell proliferation and survival. SREBP2 is retained in the cytoplasm until cholesterol synthesis is needed, at which time, it is modified to allow it to enter the nucleus and activate transcription. We hypothesize that myoferlin increases the stability of SREBP2 and/or increases SREBP2 nuclear localization, increasing the ability of SREBP2 to activate transcription of cholesterol biosynthesis genes. To test this hypothesis, we are using molecular biology assays to compare the stability and nuclear/cytoplasmic distribution

of SREBP2 in shMYOF versus shGFP cells. We are also using these cells to compare the mRNA levels of SREBP2-target genes and the SREBP2 gene itself. Last, we are performing these same experiments, using SLB-1 cells treated with a specific inhibitor of myoferlin or DMSO (control treatment).

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UPR97 1:00-3:00

A Rapid Review of Parental Bereavement Interventions and Implications for Clinical Practice

Rhea Ramkumar and Abby Floyd
Nursing

Mentor: Nancy Dias, Nursing Science

Background: The loss of a child is an unimaginable tragedy for any parent and leaves them in a state of incalculable grief, impacting them physically and emotionally. To cope with this loss, there are options available such as counseling and/or medications, but this comes at an expense for the bereaved parents. Parental bereavement support interventions are essential in providing these parents with the proper social, physical, and psychological support they need to navigate the overwhelming journey of healing. This rapid review highlights the support interventions available for parents that are navigating this complex journey of bereavement and the implications of pediatric palliative care.

Methods: A rapid review was completed by using the databases, PubMed, CINAHL, PsycINFO, and CENTRAL searching for peer-reviewed articles within the past five years.

Results: Using the Covidence software, 123 full text articles were reviewed and 14 were included for data extraction and synthesis. The articles discussed both online and in-person interventions including Chinese brush painting, web-based apps, mindfulness-based retreats, rehabilitation programs, psychotherapy, meaning centered grief, and cognitive behavioral therapy. Implications for practice, research, and policies to improve the access and usability of existing interventions were identified. There were no mentioned adaptations in care based on differing cultures which would indicate culturally competent care.

Limitations: Due to limited studies, all articles which identified bereavement care interventions were included without a quality appraisal of the article.

Implications for Clinical Practice: This review provides resources to integrate accessible hospital-based bereavement support interventions into palliative care, recommends policy changes, and research opportunities to improve bereavement care services for bereaved parents and their families.

Key Words: Bereavement, Grief, Bereaved Parents, Literature Review, Bereavement Interventions

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UPR98 1:00-3:00

Estimating the spermatogonial stem cell population in adult mice based on response to retinoic acid

Matthew Thomas
Biology

Mentors: Bryan A. Niedenberger, and Christopher B. Geyer, Anatomy and Cell Biology

Spermatogenesis is a stem cell-based system built upon a small population of spermatogonial stem cells (SSCs). When SSCs divide, the daughter cells either remain as stem cells to renew the stem cell pool or become undifferentiated progenitor spermatogonia that proliferate before committing to meiosis and ultimately becoming sperm. Insensitivity to retinoic acid (RA) is a key functional feature of SSCs. I will immunostain testes of mice treated ±RA for 6-12 hours for a variety of protein germ cell fate markers: TRA98, expressed in all germ cells; 'glial cell derived neurotrophic factor family receptor alpha 1' (GFRA1), expressed in SSCs and early undifferentiated progenitor spermatogonia; and 'stimulated by retinoic acid gene 8' (STRA8), expressed in response to RA. Cells expressing these proteins will be quantified, and I will use stereological calculations involving the volume of the testis to extend these values to the whole testis. In vitro, aliquots of whole testis single cell suspensions will be treated ±RA for 6-12 hours, and immunostained as above, followed by calculations to extrapolate from numbers in the aliquot. The determination of marker-positive and -negative germ cell populations will be completed in an unbiased manner based on thresholding using a machine learning-based Quantitative Pathology (QuPath) program that we have optimized for germ cell quantitation. This study should reveal the number of GFRA1+ spermatogonia that are bona fide SSCs; thus, it will demonstrate a novel means of identifying and quantifying SSCs.

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UPR99 1:00-3:00

How can two different microscopes image the same cell differently?

Rosario Lilley, Sierra Carr, Kendall Wilkerson
Biology

Mentor: Karen Litwa, Anatomy and Cell Biology

Microscopes have come a long way since the first one that was invented back in 1590, which consisted of just lenses in a tube. Looking back at how simple the first microscope was, the invention of today's microscopes is ground breaking work. The Airy scan microscope, introduced in 2014, used a point detector to capture images at every scan position. Compared to the S.T.O.R.M. microscope, introduced in 2006, a super-resolution scope that uses fluorophores that "blink" as they switch back and forth from a dark state. Although both microscopes had different imaging approaches, they both use fluorophores to detect cellular structures, even those as tiny as the pre- and post-synaptic compartments which are only 20 nm apart (~1000x smaller than a strand of hair!). In our research, we are examining how adhesion molecules facilitate the formation of these micron-

sized synaptic structures. Despite their small size, these synapses play a big role in brain function by passing along the information that supports our ability to think, learn, remember, etc. We are using knockdown approaches to determine how different adhesion molecules orchestrate the formation of these important structures. Out controls normally express the adhesion molecule. We then use immunofluorescence and microscopy imaging to determine the effects on synaptic formation. These microscopes can provide a variety of image types that can be compared to gain different perspectives on the same research problem. Two different adhesion molecules were investigated using these two different microscopes, one that allows us to see lots of synapses and another that allows us to see individual synapses with great detail. Even thoguh two different microscopes were used to evaluate the knockdown of adhesion molecules, we were still able to produce the central idwa that the knockdown of adhesion molecules alters synapse formation.

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UPR100 1:00-3:00

Magnetic Control of Protein Expression Via Magneto-Mechanical Actuation_

Dhanushi Dedakia and Amara Moeller
Physics

Mentor: Jean Beltran-Huarac, Physics

Brain cancer is associated with a high mortality rate, with approximately 18,000 deaths attributed to malignant brain tumors in the United States alone each year. Our research is centered on the integration of engineered nanoparticles and alternating magnetic fields through magneto-mechanical actuation. Within the bloodstream, the endothelium serves a crucial role in regulating the translocation of biological materials to cancerous tissues due to its semi-permeable characteristics. Unfortunately, intravenous drug administration often fails to overcome endothelial barriers near tumors, thus limiting drug access and treatment efficacy. Our lab designed nanoparticles exhibit no toxic response to endothelial cells, and distribute and assemble uniformly around the cytoskeleton. Our research has demonstrated the induction of temporary gaps without harming endothelial monolayers.

Our next step is to implement this method to translocate various therapeutic drugs into U87 glioblastoma cells using a 2D cell culture model. Our initial testing drug will be TRAIL (tumor necrosis factor-related apoptosis-inducing ligand), which is a therapeutic protein secreted by transduced C17.2 stem cells. The overarching goal of this project is to test the cytotoxicity of TRAIL on U87 cells at certain concentrations and exposure times. To achieve this, we begin with the optimization of TRAIL concentrations and exposure durations. Employing techniques, such as cytotoxicity assays (CCK-8), luciferase assay, ELISA assays, and Western blot analyses, we will meticulously quantify trends and observations based on collected data. In parallel, we will seed human umbilical vein endothelial cells on the membrane of transwell inserts followed by nanoparticle incubation and alternating magnetic field treatment. This will induce endothelial permeability, through which TRAIL will be translocated into U87 cells. This translocated TRAIL is anticipated to demonstrate potent cell-killing capabilities. This will be pedantically controlled by magnetic field parameters. The outcome of this research will provide invaluable insights into the

efficacy of our approach for targeted drug delivery in the realm of brain cancer treatment. Furthermore, these scientific advancements in targeted drug delivery of therapeutic drugs provide an opportunity to develop more avenues for better treatment when traditional methods fail.

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UPR101

Adhesion-Mediated Synapse Formation in Developing Neural Networks

Gaelle Desert
Multidisciplinary Studies: Neuroscience

Mentor: Karen Litwa
Anatomy and Cell Biology

Michelle Cobb, Department of Anatomy and Cell Biology; East Carolina Diabetes and Obesity Institute
Dr. Karen Litwa, Department of Anatomy and Cell Biology; East Carolina Diabetes and Obesity Institute
Autism spectrum disorder (ASD) is a clinical diagnosis primarily characterized by its detrimental deficits in social cognition and interaction, communication, and attention, and the presence of repetitive behaviors. Synapses between neurons facilitate information transfer allowing for these cognitive functions. Not surprisingly, synapses are altered in ASD. Our research focuses on the mechanisms contributing to these synaptic alterations. This has led us to hypothesize that the process of initial adherence between pre- and postsynaptic compartments during brain development is altered in autistic individuals. The complexities of human synapse development prompt scientists to study and design neurons made from human-induced pluripotent stem cells (hiPSC) that develop synaptic activity. Brain organoids are also used to model structures of human brain development and reveal molecular events that lead to altered synapse formation in neurodevelopmental disorders (Wilson and Litwa, 2018). Dendritic filopodia, long, thin structures that are present in developing dendrites may mediate synapse formation. The goal is to research the mechanisms by which dendritic filopodia promote synapse formation and are altered in neuronal disorders. Prenatal synaptic alterations have been shown to be a result of autism-associated genetic mutations that affect synapse formation. My investigation will examine dendritic filopodia by using immunofluorescence staining for proteins to identify neurons doublecortin (DCX), their associated spine precursors (drebrin), and the adhesion molecule N-cadherin (N-cad). The cell samples gathered will then be imaged using confocal and STORM microscopes and analyzed with ImageJ software to determine the number of spine precursors with an N-cad cluster. Future research will determine how the quantitative results between the controls and the autism-derived neurons and cortical organoids differ. Future assessments will also examine the presence of the adhesion molecule, N-cad, in spine precursors corresponding with increased synapse formation in human neuronal cultures.

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UPR102 1:00-3:00

Unraveling the Role of Mitochondrial Cofilin in Apoptosis Regulation

Bruno Pizani
Biochemistry

Mentor: Robert Hughes, Chemistry

Our research explores the recently discovered localization of cofilin protein to mitochondria during early apoptosis, prompting the synthesis and engineering of innovative cofilin constructs with unique mitochondrial localization sequences. We aim to provide nuanced insights into cofilin's role in cellular dynamics and apoptosis beyond conventional understanding. Building on previous work identifying cofilin-derived peptide sequences with mitochondrial localization, utilizing an S12W mutation, our research investigates the effects of this mutation in full-length cofilin. Additionally, we explore its role in apoptotic progression, contributing to a comprehensive understanding of mitochondrial cofilin's regulatory function in apoptosis.

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UPR103 1:00-3:00 Shah, Esha shahe22@students.ecu.edu Multidisciplinary Studies BS Tran, Tuan D trant@ecu.edu College of Arts and Sciences Psychology

Examination of Novel Small-Molecule Modulators in Mitigating Learning Deficits in a Mouse Model of Alzheimer's Disease

Esha Shah, Marcus Apodaca, George Cherry
Multidisciplinary Studies: Neuroscience

Tuan Tran, Psychology

Esha Shah[1,2], Marcus Apodaca [1,2], Douglas Bell Jr.[1,2], Jennette Antinore[1,2], George Cherry Jr.[1,2,3], Luke Jackson[1,2], Tuan D. Tran[1,2], PhD
[1]Multidisciplinary Studies Program in Neuroscience, East Carolina University, Greenville, NC
[2]Department of Psychology, East Carolina University, Greenville, NC
[3]African and African American Studies, East Carolina University, Greenville, NC

Background and Significance: Alzheimer's disease (AD) is characterized by progressive learning difficulty, memory loss, and deterioration of other important cognitive functions. The hippocampus degenerates in AD, leading to many aspects of cognitive dysfunction. This study was conducted to explore the impact of Rho GTPase modulators, ZCL278 and ZCL279, on neurocognitive function using a triple-transgenic mouse model (3xTg) of AD. ZCL278 inhibits Cdc-42 and the growth of tumor cells, while ZCL279 activates Cdc42, which in turn elicits dendritic growth. Dendritic growth during learning is key to neuroplasticity underlying proper memory storage. Cell morphology is governed by actin-regulatory-proteins (ARPs), which are regulated by Rho-GTPases like Cdc42. This study is very novel because ZCL's effects on modulating neurocognitive function positively or adversely in the 3xTg AD model are unexplored.

Methods: Six-month-old 3xTg or wild-type mice will receive ZCL278 (20 micrograms/g) or sesame-oil (200 microliters) every other day for 60 days. The same dose of ZCL279 will be administered to a different set of 6-month-old 3xTg or wild-type mice. The ZCL dose was determined based on pre-screening dose-dependent effects on standard body score measures in mice. After injections are completed, all mice will receive 5 days of Morris water maze testing (MWM), a form of hippocampal-dependent spatial learning. After MWM testing, 6 days of trace eyeblink classical conditioning (ECC) is imposed. ECC is a form of hippocampal-dependent associative learning based on the well-known Pavlovian classical conditioning paradigm. This study will have N = 32 mice (n = 8/group x 4 conditions).

Results: 3xTg mice treated with ZCL279 showed modest but significant improvements in acquiring both the learning and memory components in MWM, and the associative learning requirements in ECC, while ZCL278 did not improve nor impaired learning in these behavioral assays.

Discussion: ZCL 278 and 279 may produce synaptic changes in areas of the brain effected by Alzheimer's disease, particularly the hippocampus. Our results indicated that at minimum, spatial and associative learning impairments typically observed in 3xTg mice were spared by chronic treatment with ZCL279. Findings from this study may help elucidate the link between cellular changes and AD pathology, by identifying treatment targets that positively alter synaptic function underlying learning and memory storage.

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UPR104 1:00-3:00

Measurement of Nursing Faculty Informatics Competency

Nora McCunney
Nursing

Mentor: Mary Jo Nimmo, DNP, RN-BC, Adv Nursing Practice & Educ

Background/Purpose:

Effective teaching in nursing requires faculty to be proficient in technology and informatics, and the National League of Nursing (NLN) has emphasized this need. The NLN envisions a transformative role for nursing education, particularly in integrating nursing informatics into the curriculum. Understanding the current knowledge levels of nursing faculty and identifying barriers to teaching informatics are crucial in developing a strategic educational roadmap in this field. This study aims to assess the nursing informatics competency of faculty at a large College of Nursing, encompassing pre-licensure and graduate-level educators.

Results: Out of 84 faculty members, 66 participated in the survey, a participation rate of 79%. Predominantly, responses came from two programs: 38% from Pre-Licensure Registered Nurse and 21% from Doctor of Nursing Practice. Faculty experience varied, with 27% having 0 to 5 years. Online teaching (51%) was the primary mode, followed by traditional lecture-based (38%) and hybrid (11%) approaches. The SANIC questionnaire highlighted three categories: Basic Computer Knowledge (mean score 4.12, SD 0.59), Nursing Informatics' Role (mean score 4.44, SD 0.77) and Applied Computer Skills (mean score 3.23, SD 0.82). Notably, five scores fell below competency thresholds, signaling areas needing improvement, particularly in practical computing abilities.

Discussion: Evaluating faculty competencies is crucial for incorporating informatics into nursing education. Faculty feel confident in their informatics theory and basic tech skills but lack advanced application skills in tools like Excel and databases. This highlights the need for enhanced training in practical tech use.

Recommendations to bridge this skills gap include customized training, access to workshops, and ongoing learning in informatics tools. These measures are key to equipping faculty to teach informatics effectively, meeting the technological demands of healthcare, and preparing students for quality patient care through informed curriculum integration.

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UPR105 1:00-3:00

The Relationship between Level of Physical Activity (LPA)_vs. Speech Perception Abilities

Marysa Gavankar
Speech and Hearing Sciences

Mentor: Andrew J. Vermiglio, Communication Science & Disorders

Marysa Gavankar, Andrew J. Vermiglio, Virginia Driscoll, Drew Huffman, Kaitlin Abrams, Alayna Damm, Lane Hambrick, Bailey Bryan, Brooke Arnott, Rebecca Smith, and Reagan Orwig

Introduction: Kearns et al., (2019) observed subjects having an increased ability to recognize speech in noise after 30 minutes. Parbery-Clark et al., (2019) demonstrated a statistically significant relationship between speech recognition in noise results vs. working memory. Curhan et al., (2013), based on collected survey data, reported that women who were more physically active were less likely to develop hearing loss. Kawakami et al., (2021) showed a positive association between level of physical activity (LPA) and risk reduction in hearing loss development. Therefore, it was hypothesized that there would be statistically significant relationships between level of self-reported physical activity vs. pure-tone thresholds, speech-in-noise perception ability, and working memory. The purpose of this research was to investigate the relationship between degree of physical activity, pure-tone audiometry, speech-in-noise perception ability, and working memory.

Methods: Twenty-three native English speakers_with normal pure-tone thresholds participated in this study. Bilateral pure-tone average (PTA) was calculated for all participants. Speech recognition in noise ability was evaluated using the Hearing in Noise Test (HINT; Nilsson et al., 1994;

Vermiglio, 2008) and the AzBio test (Spahr et al., 2012). Working memory was evaluated using the Digit-Span test (Wechsler, 1991). A questionnaire was used to categorize the participants' LPA. The relationships between self-reported LPA vs. all test results were evaluated with the Spearman rho statistic.

Results: A weak negative relationship was found between LPA vs. binaural PTA (r = -0.21, p = 0.33). A weak negative relationship was found between LPA vs. HINT thresholds (r = -0.36, p = 0.10). A very weak positive relationship was found between LPA vs. AzBio scores (r = 0.15, p = 0.50). A very weak positive relationship was found between LPA vs. Digit Span scores (r = 0.18, p = 0.42).

Discussion: Contrary to the three hypotheses, no statistically significant relationships ($p > 0.05$) were found between degree of physical activity vs. the test results. The results of this investigation are inconsistent with previous investigations (Curhan et al., 2013; Kawakami et al., 2021; Kearns et al., 2019). Future research should further investigate these relationships using alternative measures of physical activity.

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UPR106 1:00-3:00

Motivational Climate Development During Shooting Performance

Rachael Urbanski, Sydney McIntyre, Elliot Jones, Stephanie Flores, Blake Birdsong, and John Mallett
Exercise Physiology

Mentor: Nicholas Murray, Kinesiology

Army ROTC emphasizes training their cadets' in leadership and military skills to become commissioned officers. One of these military tasks is marksmanship. An ego involving climate focuses on encouraging individuals to outperform others which tends to increase tension, pressure, and performance anxiety, as opposed to a task-involving climate where a coach focuses on skill improvement and personal achievement. The specific aim of this study is to compare the effect of an ego-involving and task-involving motivational climate against a baseline climate during an individual marksmanship task. The shooting was conducted using an Engagement Skills Trainer (EST) which is an indoor training system utilized by the US Army to simulate live weapon training. A control score is gathered, with baseline eye tracking, respiration, and EKG. For the manipulated condition, the participants complete the simulation where a leader is present. 60 MS1-MS3 (first through third year) ROTC cadets completed baseline testing. The marksmanship table consisted of 45 shots, 15 rounds in each supported position (prone, kneeling, standing). Using a Biopac system, the participants' heart rate and respiration was recorded over the duration of the study. To assess attentional focus, eye movements were recorded using eye-tracking glasses (Pupil Labs, Tobii Pro, SMI) during the EST simulation. For the manipulated condition, the only change is that MS-4 cadets' are present and coaching, either providing task or ego involving climate instructions. This study is currently ongoing, but it is anticipated that heart rate variability will decrease between the baseline and coached marksmanship tasks. A further decrease in heart rate variability, increased heart

rate, and shorter visual fixations were observed when MS-4 leaders presented an ego-involving climate versus a task-involving climate. As for eye tracking data, it is anticipated that the participants will have shorter visual fixations during the ego-involving climate compared to the task-involving. Post-data collection, the anticipated outcome should show that heart rate will rise and fixation time will decrease during the manipulated condition versus the baseline condition. The findings from this study will inform strategies for Army ROTC cadets' to promote positive experiences in high pressure situations.

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UPR107 1:00-3:00

Nurse Retention in the Acute Care Setting

Emma Thomas
Nursing

Mentor: Sandra Morris, Nursing Baccalaureate Educ

Nursing burnout and turnover intention are growing issues, largely impacted by the COVID-19 pandemic, yet ones that were prevalent before this worldwide health crisis and will certainly persist in the coming years. Strategies to intervene are key in order to maintain a strong workforce in the acute care setting. Signs of burnout such as emotional and physical fatigue, decreased alertness at work, and desire to leave the profession increased following a season of working during the pandemic. Among a large sample of RNs that experienced this increased workload, over half reported feeling at the end of their rope, fatigued, or burned out at least a few times a week if not everyday. With high levels of burnout, there is potential for an increase in turnover intention and subsequent further decline in nurses unless solutions are quickly enacted. This integrative review explores the current literature available on the causes and consequences of burnout as well as strategies to prevent and reduce the impacts of burnout and turnover intention on the nursing profession. Main causes of nursing burnout include high nurse to patient ratios and interpersonal strain such as lack of support from leaders and tumultuous staff relationships. Consequences of burnout and turnover intention include poor patient outcomes and declines in the mental and physical health of nurses. Strategies to reduce burnout include policies on staffing ratios and allowing nurses to have organizational power. Like burnout, strategies to reduce turnover intention happen at both the organizational and person levels. Organizations can focus on how to support nurses and capitalize on their strengths, creating autonomy and a space for joy and personal satisfaction at work. This review provides insight into why nursing burnout and turnover intention happen and why they matter to our healthcare system while exploring solutions to the ever-growing nursing shortage. Organization leaders, policy makers, and nurses can gain insight into why burnout exists and how to prevent nursing shortages by addressing factors leading to burnout and turnover intention.

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UPR108 1:00-3:00

Complexity of Walking With and Without Balance Perturbations

Hannah Blackburn
Engineering

Mentor: Ryan Wedge, Physical Therapy

The risk of falling increases with age and is associated with disorders such as amputation and stroke. In response to this challenge, this research project focuses on understanding the gait stability of people who receive balance perturbations. It seeks to quantify gait stability through a Lyapunov Exponent, which quantifies the complexity of a motion. The ultimate goal is to develop interventions which decrease the risk of falling in older populations and people with amputation to optimize their quality of life. Mathematical models have been created to consider the contributing factors in gait stability, including Lyapunov's exponent, which signifies the ability for an individual to recover a stable gait following an abrupt perturbation. The logarithmic response of the Lyapunov exponent demonstrates the ability for subjects to stabilize their gait along a smooth surface without perturbations. The preliminary results of this analysis, from a previously constructed MATLAB program, are representative of the maintained stability of the subject's gait on a flat surface without perturbation. This provides a basis for comparison to determine the impact of factors that create gait instability, which contributes to the potential for falls. MATLAB code will be refined and applied to a large dataset of symmetric and asymmetric walking with and without balance perturbations. The analysis of asymmetric walking is essential because many patient populations, such as people with amputation or who had a stroke, walk asymmetrically and this has a direct impact on their quality of life. The current research seeks to establish the rate of stability divergence (Lyapunov Exponent) for healthy participants, as they walk with and without perturbations.

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UPR109 1:00-3:00

The Impact of Sustained Phonation on the Velopharyngeal Mechanism: A Literature Review

Loghan Jones, Taylor D. Snodgrass, Imani R. Gilbert, Samantha Power
Speech and Hearing Sciences

Mentor: Jamie L. Perry

Background: Magnetic resonance imaging (MRI) has seen increased clinical use for assessing velopharyngeal (VP) functioning and describing the VP musculature during speech production. Most recently, a VP MRI protocol was published for clinical sites to follow when assessing VP functioning in populations with suspected velopharyngeal insufficiency (VPI). The published protocol requires the use of phonemes such as /i/ and /s/. However, it is well documented that those with a history of VPI may have articulatory concerns that hinder them from making targeted sounds. The protocol then encourages the production of other phonemes that are similar in nature. The production of varying phonemes during VP MRI assessment has given rise to the question of

which phonemes are best for evaluating VP closure. While literature does report on how the velopharyngeal mechanism responds to varying vowels and oral consonants (i.e., full closure vs partial closure), it is not fully understood which phonemes are best to use during VP MRI assessment at this time. The purpose of this study was to complete a literature review investigating the relationship between velopharyngeal functioning and production of varying oral phonemes.

Methods: Current best research will be evaluated by searching PubMed, Medline, and Scopus for articles that discuss the interconnectedness of sustained oral phoneme production and velopharyngeal functioning. Results will be limited to articles published in English, and the population of interest will include humans of all ages. All levels of evidence will be considered for this review.

Results: Data analysis is still ongoing, and results are expected by April 2024.

Conclusion: Determining the impact that production of various oral phonemes has on the function of the velopharyngeal mechanism will provide valuable information to the clinicians who assess VP functioning in a population with suspected VPI. This study may alter which phonemes are asked to be produced during a VP MRI assessment.

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UPR110 1:00-3:00

Spring Evaluation and Calibration of Low-Cost Aerosol Sensors

Michael Brannin, Sarah Elizabeth Fresquez, Colby Sawyer, and Ciprian Popoviciu

Mentor: Sinan Sousan, Health Education and Promotion, Public Health

Environmental analysis, targeting aerosol concentrations, is a necessity in today's world. Aerosols are one of the leading factors to health risk. Every second of everyday people are exposed to aerosols through physical contact and through cardiovascular respiration. Being able to identify dangerous aerosol concentrations quickly and effectively can drastically lower the health risks of a community. Currently, aerosol data is temporally and spatially scarce. Aerosols are measured using expensive equipment that are located on a county level resulting in locations in the United States being unmonitored. For example, Pitt County has one EPA regulated aerosol monitoring site. This site is located next to Pitt-Greenville Airport. Pitt County alone covers 651.58 square miles with a population around 179,042 (Pitt County NC). This means that if you are an individual that suffers from chronic asthma and wanted to check the air quality, you could be getting a measurement that is 2-6 miles away from your location. Our goal is to research the capabilities of cheaper low-cost aerosol sensors to see their capabilities when compared to a reference monitor. These low-cost sensors are extremely sensitive and can give different results from the reference monitor. As a result, we aim to evaluate this to see the most optimal performance for their use. The low-cost monitors we wish to prove reliable and accurate are AirBeam3, PMS, and Clarity when compared to the reference monitor ADR-1500. Currently, this is an ongoing research project, with data collection that represents 2023, and data analysis has only been performed for Spring 2024, by previous Honors students Joanna Mathew and Neha Joseph. Their results found that the low-cost sensors and ADR-

1500 performance fall within the EPA guidelines and are classified as good. The AirBeam had the highest R^2 value between 0.64-0.88. This research project continues their project, using the same equipment and processes. Data collection and use of the equipment has been completed. The final process includes data analysis, which includes calculating accuracy (R^2 and slope) and scatter plots. When this research project terminates, if successful, it will play a significant role in ensuring the reliability of low-cost aerosol monitors. Ultimately reducing health risks and concerns, by ensuring reliability of a new array of aerosol equipment at a cost-affordable price.

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UPR111 1:00-3:00

Hand Arm Bimanual Intensive Therapy Improves Spatiotemporal Characteristics of Bimanual Coordination in Children with Unilateral Cerebral Palsy

Holly Donnelly and Shailesh Gardas
Exercise Physiology

Swati M. Surkar, Physical Therapy

Unilateral cerebral palsy (UCP) causes sensorimotor impairments on one side of the body and affects bimanual coordination, which leads to difficulty in the performance of functional tasks and affects independence in daily life. Hand-arm bimanual intensive therapy (HABIT) is effective in improving bimanual function; however, the results of previous studies typically rely on standard assessments. There is limited evidence to understand preciseness of bimanually coordinated movements. The objective of this study is to assess the efficacy of HABIT on spatiotemporal characteristics of bimanual coordination. The study included 25 participants with UCP (age=11.2 3.6 yrs; 18M, 7F). HABIT was provided in a camp-based setting where participants engaged in structured, task-based bimanual activities in a play context 6hrs/day for 5 days. To assess spatiotemporal characteristics, 3-dimensional motion analysis (3DMA) was used to analyze variables of two cup-stacking tasks (symmetric performance and bimanual cooperation), pre- and post-HABIT. In the symmetric task, the child picked up a cup in each hand and concurrently placed them into targeted areas. In the bimanual cooperation task, the child stacked 6 cups in a pyramid formation. Variables measured included peak speed, task completion time, hand path distance, and normalized movement overlap time. A 2×2 ANOVA was used to compare spatiotemporal changes with time (pre-, post-HABIT) and UEs (affected and non-affected) as factors for all kinematic variables. Post-HABIT, in the bimanual coordination task, significant gains ($p<0.05$) were observed in task completion time (pre= 15.05 ± 1.9, post= 10.09 ± 1.08) and movement overlap (pre= 0.5 ± 0.02, post= 0.93 ± 0.01) indicating enhanced speed and bimanual participation. There was a significant interaction (time × limb [$F_{(1,54)}$]= 5.2, p= 0.02) for peak speed. Increased speed in the affected UE post-HABIT suggests enhanced fluency of movements. There was no significant interaction in hand path distance; however, there were significant main effects of time (pre= 3.2 ± 0.16, post= 2.7 ± 0.14, p= 0.001) and limb (affected= 2.5 ± 0.2, non-affected= 3.3 ± 0.2, p= 0.004). For the symmetric performance task, there were no significant changes in task completion time and

no time × limb interactions for hand speed and path distance. Based on these results, HABIT improves spatiotemporal characteristics of bimanual coordination.

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UPR112 1:00-3:00

Do Developmental Factors Impact Interpretability of Nasopharyngoscopy Data?

Lydia LaFevers, Taylor Snodgrass, Imani Gilbert, Samatha Power, Thomas Sitzman
Speech and Hearing Sciences

Mentor: Jamie Perry, Communic Science & Disorders

Introduction: Nasopharyngoscopy involves passing a narrow camera through the nostril into the nasopharynx. This procedure is often used to speech movements in patients with velopharyngeal insufficiency. Velopharyngeal insufficiency is a result of a gap between the patient's velum and pharyngeal walls during closure for speech, resulting in hypernasal speech. The goal of nasopharyngoscopy is to assess speech movements to inform surgical decision making; however, up to 40% of VPI speech surgeries fail to improve the quality of speech (Lithovius et al., 2014). Certain factors relating to scoping may negatively affect its useability for surgical planning (Pigott, 2002; Gilleard et al., 2013). Common factors considered when analyzing nasopharyngoscopy data include articulation errors, mucous on the scope camera, scope placement, scope movement, limited speech sample, and issues with audio quality. Other factors that could influence quality of nasopharyngoscopy data are age and syndromic status. **Aims:** (1) To describe the instrumental data analysis for a multisite study involving nasopharyngoscopy data, and (2) to determine if age and syndrome negatively impact scoping across clinical sites. **Methods:** Nine hospitals with craniofacial teams collected FNP data. These data were assessed by two craniofacial SLPs (not directly involved in patient care at any of the nine hospitals) to determine the number of FNP videos that provided key information for surgical planning. Inclusion criteria for this were the FNP videos needed to 1. allow for visualization of all key velopharyngeal structures and 2. elicit a speech sample with audio at the phrase level or above. A Fisher's exact test was conducted to determine factors correlated with usability of FNP videos. Factors included for consideration were 1. age and 2. syndromic status. **Result:** When reviewing nasopharyngoscopy data from sites, it was determined multiple factors were negatively impeding assessment for surgical planning. Other factors that we analyzed was age and syndromes. Key velopharyngeal structures could not be visualized in 41% of nasopharyngoscopy videos collected. Data analysis for the factors is ongoing and will be complete by April 2024. **Conclusion:** Nasopharyngoscopy data could be improved. Trainings may need to be tailored based on patient's developmental level. Other imaging modalities with higher success rates may need to be considered for special populations e.g., MRI.

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UPR113 1:00-3:00

Characteristics of Critically Ill Hemodialysis Patients with a Pressure Injury

Briley Stafford
Nursing

Susan Kennerly, Nursing Science

Briley Stafford[1], Jenny Alderden[2], Susan Kennerly[1]
[1] East Carolina University College of Nursing, [2]Boise State University School of Nursing

Background/Purpose: Intensive care unit (ICU) patients are at an increased risk of developing hospital acquired pressure injuries (HAPrI) due to various factors. Immobility, severity of illness, and various medical interventions place these patients at higher risk for developing a HAPrI. This study examined the characteristics of patients ≥60 years who received hemodialysis and developed a HAPrI during their ICU admission.

Methods: A retrospective study of hemodialysis patients (N=457) was conducted using data from the Medical Information Mart for Intensive Care database. Variables included in this study are age, length of hospital stay, minimum hemoglobin, minimum albumin, Braden total and subscale scores upon ICU admission. Bivariate statistical analysis was used to identify variables that characterized patients who developed a HAPrI.

Results: Eighty-six (19%) ICU patients developed a HAPrI. The stages were Stage 1 (n=17), Stage 2 (n=37), Stage 3 (n=2), Unstageable (n=8), and DTI (n=22). Length of hospital stay was longer for hemodialysis patients who developed a HAPrI (M=22 days, SD=14) as compared to those without (M=17 days, SD=14) (T(126) = -2.72, p=0.007). Similarly, patients who had a HAPrI also had mean minimum hemoglobin values (M=7.52 mg/dL, SD=1.46) (T(136) = 3.50, p < 0.001) or mean albumin values (M=2.44 mg/dl, SD=0.56) (T(133) = 1.79, p = 0.05) that were significantly lower than patients without a HAPI. Total Braden score was lower for patients with HAPrI (M=12.93, SD=2.56) compared to those without (M=14.05, SD=2.93) (W=19859, p < 0.001). Statistically significant differences were noted in Braden subscores: Activity (M=1.06, SD=0.28 vs. M=1.20, SD=0.54, W=17173, p=0.02), Mobility (M=2.10, SD=0.85 vs. M=2.41, SD=0.80, W=19185, p<0.001), and Sensory Perception (M=2.34, SD=1.08 vs. M=2.76, SD=1.0, W=19245, p<0.001).

Discussion: Occurrence of HAPrIs among hemodialysis patients was influenced by length of hospital stay, minimum albumin, minimum hemoglobin, total Braden score, and some Braden subscale scores: activity, mobility, sensory perception, and moisture. Understanding these factors can guide healthcare professionals in creating effective preventive measures for HAPrIs in the ICU.

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UPR114 1:00-3:00

A Volumetric Analysis of the Buccal Fat Pad in Children with a Repaired Cleft Palate

Marcus Apodaca
Multidisciplinary Studies

Mentor: Jamie Perry, Communic Science & Disorders

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Background: 1 in 700 children are born with a cleft lip and/or cleft palate (CL/CP), which makes it the most common congenital birth defect. With anatomical differences in the orofacial region, secondary issues exist in the following domains: feeding, speech, and psychosocial. Primary surgeries to correct CL/CP typically occur within the first year of life. However, up to 40% of children born with CP go on to present with velopharyngeal insufficiency (VPI), characterized by hypernasal speech, which requires additional surgical correction. Surgical modifications, such as the addition of tissue during palatoplasty (e.g., buccal fat pad) have been implemented in order to help lower the percentage of patient's presenting with VPI. The buccal fat pad (BFP) is a mass of adipose tissue found in the cheekbone. Because of its relative ease of retrieval and benign functions, it is commonly used in cleft palate repair operations as an adjunct to close the gap caused by the cleft. Its proposed functions are to add length and thickness to the velum, thereby creating a more advantageous velopharyngeal mechanism for speech. While this surgery has gained popularity in recent years, there's limited literature on how removing portions the buccal fat pad impacts facial symmetry and volumes of the cheek. This undocumented potential effect may have negative consequences on the patient's psychological and morphological growth. It is also not well documented what normative values of the buccal fat pad are in children without a history of CP, thereby reducing the ability to compare healthy controls and those with a history of a harvested buccal flap. Through this study, we aim to determine how removing the BFP during cleft palate repair surgeries impacts facial symmetry and cheek volumes when compared to matched peers.**Methods:** This study will utilize static 3D MRI images from 20 children (10 patients with a history of buccal fat pad surgery and 10 healthy controls) matched for age and sex. Fat pad volume on each side of the face will be measured using Amira Visualization Software to obtain a quantitative volumetric analysis of each subject's BFPs.**Results:** Data analysis is still ongoing, and results are expected by March 2024. **Conclusion:** Determining the impact of BFP removal on facial symmetry for those with a history of cleft palate can provide invaluable information regarding surgical outcomes and potentially alter surgical decision making for those in this population.

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UPR115 1:00-3:00

The influence of maternal exercise types on one-month infant body composition and blood lipids

Meredith Beaman
Biology

Mentor: Linda May, Kinesiology

In the US, obesity rates are rising exponentially, which can lead to chronic health conditions. Related to obesity are increased blood lipids (i.e., triglycerides (TG), LDL, HDL, total cholesterol (TC)) and body fat % (BF%), which are associated with comorbidities and metabolic disorders. It is known

that exercise is beneficial in lowering blood lipids as well as BF% in many populations, including pregnant women. Importantly, exercise types influence blood lipids and BF% differentially. However, it is not known how exercise types during pregnancy influence the blood lipids and BF% of the child in utero. The purpose of this study was to determine the influence of maternal exercise types on one-month infant BF% and blood lipids. We hypothesized that any exercise type would decrease infant BF% and blood lipids. To test this question, pregnant women were randomized to aerobic (AE), resistance (RE), combination (CE), or no exercise (CON). Participants completed 150 min/wk of exercise until delivery. At 1-month, infant blood (10mL) was collected, centrifuged, and separated into plasma and cell components. Samples were stored at -80° C until ready for analysis. Tricep, bicep, and subscapular skinfolds were taken to the nearest 0.1mm using calipers. Infant morphometric measures included: weight, head/abdominal circumferences, body, leg, mid-upper arm, and humeral lengths. ANOVAs were completed to compare group differences with all data and per protocol (>80% attendance); data was stratified by maternal pre-pregnancy BMI, and linear regression was completed to assess predictors of infant BF% and blood lipids. We found all exercise types safe for infants; specifically, maternal AE lowered infant TG and non-HDL cholesterol. After per protocol with BMI stratification, there were no differences between exercise types. Linear regression revealed CE decreases infant TC; gestational weight gain (GWG) was a predictor of one-month infant BF%. Overall, any maternal exercise is safe, while AE and CE might be more beneficial for infant blood lipid levels.

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UPR116 1:00-3:00

More Than Words Program and Its Associated Benefits: A Review of the Literature

Sarah Conner
Speech & Hearing Sciences

Mentor: Tricia Carter, MS, CCC-SLP, Communic Science & Disorders

Research centered around the More Than Words program and its associated benefits has indicated improved quality of life for autistic individuals and those with social communication disorders and their families. This is being demonstrated through evidence-based, specific parent implemented strategies to increase joint interactions and communication skills by using visual supports, joint action routines in play, and following the child's lead (child-directed play). Understanding the benefits of this approach will help parents, caregivers, speech language pathologists, and other professionals make an informed decision in choosing the most suitable intervention for the child under their care. Selecting the most suitable approach is necessary to meet the child's individual needs. More Than Words is a program developed by The Hanen Centre designed to support and train parents of young autistic children and children with social communication disorders. It is a family-focused, social pragmatic intervention program. According to the Hanen Centre, the More Than Words program focuses on the parents natural, day-to-day life with their child. During this program, the parents discover how to take everyday activities like mealtime, story time, and bath time and use them to help their child improve their communication and social skills. Utilizing parent-implemented intervention, the child's opportunities to develop social communication skills in everyday settings will be maximized. The overall goal of More Than Words is to empower parents to

become the primary facilitator of their child's social communication development. (Sussman et al., 2012) More Than Words is used internationally and can be presented in person or through telehealth. Telehealth has increasingly become an alternative mode of delivering healthcare services to patients. A study done by Dr. Robyn Garnett; PH. D showed that parents were satisfied with the deliverance of the More Than Words Program through tele practice. Evidence has shown parents can be successfully trained to implement intervention strategies with their children through tele practice.(Garnett et al., 2022; Garnett et al., 2019) In conclusion, synthesizing existing knowledge and reviewing the evidence in the literature of More Than Words, supports the benefits of the program which will create increased awareness and promote improved outcomes for those it serves.

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UPR117 1:00-3:00 PM

Stressors and their Effects on Students Living in Dorms on Campus at ECU

Crosby Whittington, Donald Luckett, Silvia-Aurora Perez-Deluna, Kit Tran, DeVaun Nelson, Meredith McColskey
Public Health

Mentor: Lei Xu, Health Education and Promotion

Abstract: A study has been conducted to examine the current prevalence of stressors and their effects on students living in dorms on campus. This study provides understanding for the extent of how on campus living impacts students' overall health. To conduct this research, a survey was shared to the students attending East Carolina University. The survey contained questions regarding on-campus factors that could have an effect on the mental health of students. Participants: These students (n= 101) registered at a large public university in 2023 are between the ages of 18-24 and have or are currently living in dorms on campus. Methods: Survey data was collected via flyer distribution using QR code or an anonymous link and analyzed using Qualtrics and SPSS. Results: In this study, findings have shown that the majority of students (94.6%) dealt with stress and mental health issues from environmental, physical, as well as social factors while living on campus. Among the environmental stressors, parking on campus and campus transportation were top stressors. Sleep quality (67.1%) and staying up late to study highly affected students among the physical stressors mentioned. Relationships with peers (51.9%) and balancing social and work life (53.6%) are some of the biggest social stressors college students face when living on campus. Conclusions: From the survey results and analysis, interventions and strategies can be developed and implemented for this university, which could be useful for other universities that may have similar problems. Increasing awareness and developing positive coping mechanisms for different types of stressors can help students deal with stressors and contribute to healthier lifestyles.
Key Words: College students, stress, dorm living, dormitories, environmental stressors, physical stressors, social stressors

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UPR118 1:00-3:00

Synthesis of Biembellin

Matthew Geib
Biochemistry

Mentor: Brian Love, Chemisty

Embelin, also known as 2,5-dihydroxy-3-undecyl-1,4-benzoquinone, is a naturally occurring chemical from Embelia ribes plants. Embelin has an array of biological activities including antioxidant, analgesic, anti-inflammatory, and even anti-tumor. Possible anti-cancer properties make these compounds and their derivatives very interesting to study. Biembellin is a dimer derivative of Embelin and this study will concentrate on its synthesis. In addition to this, the improved synthesis of Oosporein, a related compound, will be explored as its synthesis is related to that of Biembellin.

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UPR119 1:00-3:00

Determining The Best Housing Practices For Guinea Pigs, Rats, and Rabbits.

Macey Mozingo
Biology

Mentor: Brittany Thompson, Communication

The importance of proper pet care has been long recognized by both the veterinary industry and the public. However, numerous major pet corporations sell products that are dangerous to the health and well-being of pets around the world and a large portion of the pet-owning population is unaware of this. Exotic pets, such as rabbits, guinea pigs, and rats, have been around for decades and yet finding information about proper care for them from credible sources is rather difficult. This leaves pet owners in a situation where ignorance or false information about pet care can easily be spread. The long-term goal of the research is to inform pet owners, both current and future, about the harms that certain products advertised towards pets can cause so they can make knowledgeable decisions. The objective of the study is to provide a comprehensive review of literature and common practices concerning dwarf rabbits, American guinea pigs, fancy rats, and other breeds of these species. A comparison will be conducted to determine what types of enclosures many pet owners use to house their rabbits, guinea pigs, and rats, and what enclosures are recommended for these animals by both veterinarians and scientific literature. A survey for pet owners will be distributed to collect data on both the enclosures that house various rabbits, guinea pigs, and rats and the health histories of these animals. Interviews with multiple veterinarians who work with rabbits, guinea pigs, and rats will be conducted to obtain enclosure recommendations and determine if there is a correlation between pet housing and pet health. A thorough review of literature on husbandry for rabbits, guinea pigs, and rats has been conducted. The literature that has been reviewed shows that many of the enclosures sold to pet owners are not competent and could harm their pets. This study is ongoing so the results from the survey and interviews are still pending. Once

the enclosure recommendations from the veterinarians are obtained, a comparative analysis of the literature and the interviews will be conducted to measure the alignment of recommendations. Additionally, pet owner survey data will be analyzed to determine patterns of housing practices and health outcomes.

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UPR120 1:00-3:00

Investigating Cadmium, Lead, and Calcium Binding to Full-length Human Cardiac Troponin C Using Intrinsic Fluorescence

Ashton Fields, Rudy Sengelmann, Riley Warfel, and Mac Harrison
Chemistry

Mentor: Anne Spuches, Chemistry

Cadmium (Cd) and Lead (Pb) are two of the most prevalent toxic metals and exposure in the smallest amounts can be detrimental to one's cognitive development, kidney, and cardiovascular function. Previous research suggests that both divalent Cd and Pb can bind to and possibly displace divalent calcium (Ca) ions from essential binding proteins and disrupt Ca cell signaling pathways. However, there are gaps in literature in understanding how this process occurs at a molecular level. The goal of this project is to characterize Cd and Pb binding affinities using intrinsic fluorescence spectroscopy and to make comparisons to Ca binding. The information obtained from this study will shed light on how many metals bind to the protein and how tightly they bind in comparison to Ca. This project adds to the body of research on toxic metal interactions and enhances the knowledge of researchers aiming to create novel methods to remove lead from those who have been exposed.

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UPR121 1:00-3:00

Polygraph Tests

Saba Khanmohammadi
Mathematics

Polygraph tests have long been used in interrogations as a method to determine whether or not an individual is being truthful. In Raymond Nelson's "Five Minute Science Lesson: Bayes' Theorem and Bayesian Analysis", he studies the question, "Given a certain polygraph score, what is the probability that the person is telling the truth?" We use Bayes' Theorem, logistic regression, and bootstrapping to better understand Nelson's results. A meta study collected results where subjects were administered a polygraph and were later determined to be truthful or deceptive. We used this study and parametric bootstrapping to obtain distributions of the probability of truthfulness for a particular polygraph score. Bayes' Theorem allows us to study the probabilities of the scores individually and logistic regression imposes a linear model on the conditional probabilities. We

produce an estimate of the probability of truthfulness for various scores with associated credible intervals, which are in agreement with Nelson's recommendations for polygraph cutoffs in his 2011 paper, despite a different mathematical approach.

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UPR122 1:00-3:00

The Effect of Fiber Tension on Blood Clot Digestion (Fibrinolysis)

Joshua Packard, Mason Verhaeghae, Brittany E. Bannish, Valerie Tutwiler
Biology

Mentor: Nathan E. Hudson, Physics

When a blood vessel becomes damaged, a clot will form to prevent blood loss and promote healing. At the damaged area, the enzyme known as thrombin activates.
Upon thrombin's activation, it will cleave the soluble protein fibrinogen, turning it into fibrin fibers. Fibrin is an insoluble protein that serves as the major structural component of blood clots. Fibrin is digested once the glycoprotein plasminogen is activated by tissue plasminogen activator (TPA). The activated plasminogen is called plasmin and is able to cleave the fibrin fibers and digest the clot in a process called fibrinolysis. Blood clots are subjected to tension from numerous sources during wound healing, thus determining the role of tension in digestion will help us understand its physiological role in this process. To better understand the impact of tension on fiber digestion, we've devised a new method for observing tensioned fibers undergoing fibrinolysis. This new method involved stamping micropatterned ridges into a fugitive glue substrate which allowed us to observe the fibers on a microscale level. We then polymerized a fibrin clot on the ridges of the stamp by combining fibrinogen and thrombin. Once the clot was formed, we peeled the upper layers off the ridges, leaving individual fluorescent fibers spanning the ridges horizontally. The fibrin fibers were then tensioned, at which point plasmin was added to initiate fibrinolysis. Time series of fluorescently labeled fibers were recorded using an inverted epiflourescent microscope. Experiments were run at three different levels of fiber strain: 50%, 100%, and 150%, each of which correlates to different levels fiber tension. We will test the statistical difference in lysis times between fibers strained to these three amounts. We hypothesize that tension causes structural changes in plasmin binding sites and will therefore hinder lysis times.

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UPR123 1:00-3:00

Investigating the spread and infection prevalence of a marine parasitic bopyrid (*Aporobopyrus curtatus*) within its non-native host, the green porcelain crab (*Petrolisthes armatus*)

E. Zamudio-Jimenez, M. Schulte, C.K. Stancil, M.E. Geesin, R.K. Gittman
Biology

Mentor: April Blakeslee, Biology

Approximately 80% of the animal kingdom are within the phylum Arthropoda and it is estimated that nearly 40% of all animals are parasitic. With this, we can infer that a sizable number of parasites are closely intertwined with invertebrates including those found in marine environments. Crustacea is a subphylum of Arthropoda that includes the classes Malacostraca and Copepoda. Some organisms within these classes demonstrate unique parasite-host relationships that involve the parasitism of a crustacean by another crustacean. Our current understanding of marine parasite ecology is limited due to our restricted knowledge of their hosts. One example of this is parasitic isopods of the family Bopyridae in the suborder Cymothoida, which seven of its families are considered parasitic to marine life. Bopyrids however are primarily parasitic to decapods such as crabs, shrimp, and lobsters which typically serve as their final host. After the use of an intermediate host such as a copepod, these parasites attach themselves to the final hosts' gill chambers producing deformities, interrupting growth, and preventing reproduction by castration which ultimately could lead to populaation declines. In the case of the marine parasitic isopod, *Aporobopyrus curtatus*, its hosts include decapods within the infraorders Caridea and Anomura. One anomuran species, the green porcelain crab (*Petrolisthes armatus*), is a known host of *A. curtatus. Petrolisthes armatus* is a porcellanid crab native to the Caribbean. With rising coastal temperatures, this crab has expanded its range as far north as central North Carolina and with this range-expansion, has potentially facilitated the spread of *A. curtatus*, which could influence disease dynamics in these systems. This research is part of an ongoing project to investigate the community-level impacts of green porcelain crabs such as resource competition and the introduction of parasites. Passive-sampling devices were deployed at various sites on the coast of North Carolina to survey benthic faunal biodiversity, including the recent expansion of green porcelain crabs in the region. We aim to fill multiple knowledge gaps to gain a better understanding of this host-parasite relationship, determine range and abundance, and identify potential impacts of green porcelain crabs and their parasites on native species.

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UPR124 1:00-3:00

Examining the diet of a watchlist bird, the prothonotary warbler (*Protonotaria citrea*), using DNA barcoding techniques

Anna Strandberg and Skadi Kylander
Biology

Mentor: Michael Brewer, Biology

The prothonotary warbler (*Protonotaria citrea*) is the only cavity-nesting species of warbler in eastern North America and a conservation watchlist migratory species that nests annually in North Carolina's hardwood swamps and forested wetlands. As sea levels rise and coastal storms become more frequent and powerful, these freshwater habitats are increasingly threatened by saltwater inundation and anthropogenic habitat loss. The adult insects and aquatic larvae that make up the prothonotary warbler's insectivorous diet are especially sensitive to these changes, and prothonotary

warblers will need to respond to shifting insect communities if they are to continue to survive throughout their historic range. This research will evaluate and characterize the diets of prothonotary warbler nestlings from four different coastal plain forested wetland habitats across eastern North Carolina by applying DNA metabarcoding techniques to fecal samples collected during the 2023 nesting season. I will extract, amplify, and sequence key sections of DNA from these samples and compare the recovered sequences to publicly available databases of insect DNA genetic barcodes to identify what the young warblers were fed during their time in the nest. The results will show how nestling diets may vary between nests and among different habitats in eastern North Carolina and provide insight into how environmental changes are impacting sensitive arthropod communities and the species that rely on them. Understanding the warblers' diet will illuminate key connections within the state's forested wetland food webs, help to identify threats and changes to different habitats, and contribute to site-specific conservation practices.

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UPR125 1:00-3:00

Quantum Tunneling Effects in Rice Lipogeneses (OsLOX)

Madeline Herring, Carter Beaty, Evan Brinkley, Thomas Willis
Multidisciplinary Studies

Mentor: Dr. Adam Offenbacher, Chemistry

This study delves into the realm of quantum biochemistry, highlighting quantum tunneling in lipoxygenases (LOXs). LOXs are enzymes that play a crucial role in the oxidation of fats into useful, bioactive signaling molecules, aiding in an array of biological processes.

Kinetic Isotope Effects (KIEs) are a tool to determine reaction mechanisms and elevated values (>7) implicate non-classical, hydrogen tunneling behavior. This quantum mechanical process allows a particle to pass through a potential energy barrier that it could not transcend according to classic mechanics. By comparing KIEs of lighter and heavier isotopes of hydrogen, tunneling properties can be inferred.

In this study, we investigated the tunneling properties of LOXs from plant species, focusing on an enzyme from rice (*Os*LOX). The protein was expressed and purified from bacterial cultures and the protein structure was characterized by circular dichroism (CD) spectroscopy. The enzyme reaction with substrate linoleic acid (LA) was monitored by UV-visible spectroscopy, following the formation of product, 13*S*-HpODE at 234 nm. Triplicate Michaelis–Menten Plots were run for wild-type and an active site mutant (L565A) variant of OsLOX for both natural abundance and deuterated forms of LA We found that the corresponding KIE was large (what was the value?) for WT OsLOX, consistent with a hydrogen tunneling mechanism. The KIE for the L565A, which was catalytically impaired, was too slow to be determined.

This study contributes to the understanding of the mechanical behavior of hydrogen transfer in the LOX reaction. It provides insights into the role of quantum effects in biochemistry and increases the understanding of enzymes' functions in various biochemical roles. Knowledge gained from this

study will be instrumental in advancing the field of quantum biochemistry. This work was performed in a linked series of CURE labs: Biotechniques II (BIOL 3110) and Biochemistry lab (CHEM 3771).

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UPR126 1:00-3:00

Separation and Quantification of 15d-PMJ2 in Micelle Samples As an Anti-Cancer Therapeutic Using LC-MS/MS

Malak Hindi
Chemistry

Mentor: Colin Burns, Chemistry

According to the American Cancer Society, colon cancer is the third most diagnosed cancer in people of all ages, in the United State. Most cancer treatments involve chemotherapy, which kills the rapidly growing cancer cells, along with negatively damaging blood-forming cells and other healthy cells. Our research hypothesizes that 15d-PMJ2 can be an effective method of eliminating cancerous colon cells; it's mechanism of action leads the cancerous cell to apoptosis, without causing harm to normal healthy cells. Due to 15d-PMJ2's selective nature, the negative side effects of common cancer treatments can be significantly reduced or eliminated. The 15d-PMJ2 will be delivered through micelles due to their nature of having a hydrophobic exterior and simply injecting the drug intravenously would be problematic due to solubility issues. Having an optimized method of separating and quantifying the 15d-PMJ2 in a micelle solution using LC-MS/MS allows for further studies in drug loading and encapsulation efficiency to occur. As the method of delivering the 15d-PMJ2 drug is through micelles, therefore it is important to quantify the amount of 15d-PMJ2 that could drug loaded in the micelles.

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UPR127 1:00-3:00

Impact of Ship-Channel Dredging on Zooplankton Abundance and Species Composition in Summer Months in Beaufort Inlet, North Carolina

Taniya Johnson, Abigail Alford, Lulea Adams, Naomi Jainarine
Biology

Mentor: Rebecca Asch, Biology

In Beaufort Inlet, North Carolina ship-channel dredging has been historically conducted during only the winter to deepen the inlet to support maritime transport. The United States Army Corps of Engineers (USACE) has proposed expanding the dredging season to include summer to reduce costs and increase worker safety. The USACE and state and federal regulatory authorities temporarily allowed dredging year-round from 2020 to 2023, but the anticipated impact of this activity on water quality, fish, and wildlife was unknown. This is a concern because summer is a key

season when estuarine habitats inshore of this inlet serve as nurseries for juvenile fishes and invertebrates. The goal of this study is to assess the impact of dredging during the summer on zooplankton biodiversity and density. Zooplankton serves as an important forage base for higher trophic-level organisms. Sampling of zooplankton was conducted on the Piver's Island Bridge in conjunction with NOAA's Beaufort Inlet Ichthyoplankton Sampling Program (BIISP) before, during, and after the dredging during the summers of 2019, 2020, and 2021. A Zooscan was used to produce high-resolution images of subsamples of zooplankton. The images were then uploaded to Ecotaxa, a web application that uses Artificial Intelligence to identify and sort zooplankton samples into 24 taxonomic groups. These data were used to calculate species richness, the Shannon-Weiner Index, the Simpson Evenness Index, and zooplankton density during each dredging period. Preliminary results showed dredging did not have a significant impact on biodiversity metrics and zooplankton density. Our results will inform policy guidance on whether ship-channel dredging activities are safe to permit in the summer months.

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UPR128 1:00-3:00

Understanding voluntary self-exclusion across the U.S.: A comparative analysis of state-wide voluntary self-exclusion applications for individuals seeking to limit access to gambling

Cassidy Morrison
Criminal Justice

Mentor: Michelle Malkin, Criminal Justice & Criminology

Gambling disorder remains underacknowledged and misunderstood. Even less understood is voluntary self-exclusion (VSE), one of the gambling industry's strategies to limit access to gambling and to mitigate potential gambling-related harms as part of their responsible gaming practices. VSE is a process in which an individual voluntarily signs a contract that limits access and potentially makes it a criminal act to engage in forms of gambling specified in the contract. Possible consequences for violations of the contract vary depending on state law and the language of the contract, which can make VSE more difficult for individuals who gamble across state lines or may need to sign contracts in numerous jurisdictions. To better understand the complexity of VSE as an opportunity to address gambling disorder, it is imperative to gain an understanding of what the process entails, as well as how it varies by state. In this research, I analyze and compare the content and language of state-based applications used to apply for VSE. This allows for a better understanding of the processes in order to help establish best responsible-gaming practices as well as unification across the U.S. A better understanding of the current state of VSE allows responsible-gaming practitioners and policy makers to continue to enhance the opportunities presented by their VSE programs.

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UPR129 1:00-3:00

Listen, Breathe, Move – A Pilot Workshop for Informal/Family Caregivers

Ashby Dickerson, Maggie Ford
Health Fitness Specialist

Mentors:
Bhibha M. Das, PhD, MPH, FACS, Kinesiology
Adrienne Steiner-Brett, PhD, MT-BC, Music Therapy

INTRODUCTION: Informal caregivers (ICG) have been noted to experience decreased physical and psychological well-being due to the complex demands of their care duties. The purpose of the study is to investigate the acceptability and feasibility of a novel intervention, which involves combined evidence-based yoga and music therapy techniques for guided breathing and relaxation of ICG of adult care receivers. METHODS: Participants engaged in a one-time virtual integrated yoga and music therapy intervention conducted in Summer 2023. The intervention began with music-assisted guided breathing for 5 minutes, which was led by an undergraduate music therapy student. The intervention then transitioned into the yoga portion, which was led by a kinesiology student. The yoga portion consisted of guided flexibility exercises, with modifications as needed, for 20 minutes. To end the workshop, the music therapy student completed music-assisted relaxation with verbal meditation for 10 minutes and both students educated participants on how to use yoga and music therapy at home. Participants completed pre-post test session measures including demographics and the Feeling Scale. RESULTS: Participants (N = 14) were 59.2 ± 10.5 years, 71.4% White, and 100% Female. Prior to engaging in the integrated yoga and music therapy session, participants' Feeling Scale score was 2.6±1.2; after the session the score increased to 4.2±1.1 ($p < 0.00$). CONCLUSION: Findings from the novel intervention suggest that a single bout of an integrated yoga and music therapy session may increase ICGs' overall positive feelings. Despite the novelty of the intervention, there are areas for future research. The small sample size of this pilot study makes it difficult to draw broad conclusions about the effectiveness of the intervention, thus future interventions should attempt to increase sample size for generalizability. This study also focuses on a single-session workshop, which may not capture the long-term effects of the intervention. Therefore, future research should utilize a long-term intervention with multiple sessions for ICGs, which may improve ICG's overall well-being. If successful, this intervention has the potential to improve ICGs' quality of life and well-being and potentially their care recipients' quality of life as well.

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UPR130 1:00-3:00

Wearable Device Use and Mental Health

Kimbal Chapman
Exercise Physiology

Mentor: Bhibba M. Das, Kinesiology

Wearable devices such as Apple Watches, Garmin, and Fitbits have taken over the fitness industry

and have expanded to people outside of fitness. These devices are popular among many generations, but college students specifically are building habits based on the devices' constant notifications and fitness monitoring. Studies show that Apple Watches overestimate energy expenditure while the wearable device, Polar A370, underestimates energy expenditure. Users of wearable devices often heavily consider energy expenditure and change their daily habits to meet their goals. As the world becomes more connected through technology, the question arises as to how too much connection can be harmful. This is especially concerning in younger generations. **PURPOSE:** The purpose of this study is to analyze the correlation between time on a wearable device and mental health in female college students. **METHODS:** Female college students ages 18-25 will be assessed through self report questionnaires, focusing on students' demographics, wearable device use, and mental health outcomes. **ANTICIPATED RESULTS:** It is hypothesized female college students will report high dependency on their wearable devices, which will also be correlated with a negative impact on their mental health as well as their daily habits, including their exercise behaviors and sleep routine. **CONCLUSION:** Wearable devices were intended to support regular physical activity and lead users to a healthy lifestyle. If findings support the hypothesis, it stresses that wearable devices are not being used the way that they were intended. There must be a way for users to utilize wearable devices to positively impact their life. Strategies should be developed for users to use wearable devices for positive impact rather than negative impacts.

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UPR131 1:00-3:00

Trait mindfulness and its effect on the use of conflict resolution strategies in close relationships and subsequent relationship satisfaction

Nancy Soto-Garcia
Psychology

Mentor: Kendell Thornton, Psychology

Mindfulness is commonly understood as the state of complete awareness and consciousness in the present moment. It involves being fully attentive to the task at hand, with an open awareness (Brown & Ryan, 2003). Research suggests that mindfulness is associated with various positive aspects of life, such as adaptive emotional regulation (Baer et al., 2012), autonomy (Bloch et al., 2017), psychological well-being (Brown & Ryan, 2003), empathy, self-compassion, and reduced social anxiety (Dekeyser et al., 2008). While there's extensive research on the effects of mindfulness meditation on daily life and conflict resolution, there's a gap in understanding the relationship between trait mindfulness and conflict resolution strategies in close relationships. This study adopts a two-by-two design, considering participants' sex (female vs male) and trait mindfulness level (low vs high) based on their responses to the Mindful Attention and Awareness Scale (MAAS). Half of the participants will be female and the other half male. All participants will complete questionnaires assessing trait mindfulness, conflict resolution strategies, and relationship satisfaction. This design aims to investigate the influence of trait mindfulness on conflict resolution strategies and whether there are gender differences in this relationship.

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Is the Organization Keeping their Promise? The role of Aging and Stereotypes in Psychological Contracts

Melanie Branch, Gillian Christman, Kaitlyn Cannon, Isamar Ponce-Ponce, Matthew Nobles, Psychology

Mentor: Courtney Baker, Psychology

Introduction. The effect of age metastereotypes, or what workers think other workers are thinking about them because of their age group, on different aged workers has been largely underexplored when considering the growing heterogeneity of age diversity in organizations. Various workplace interactions (e.g., Intergenerational interactions, employer-employee) operate via the psychological contract theory. This theory suggests that there is an unspoken agreement that details the exchange of resources expected between employees and employers. When an employer or fellow coworker violates this psychological contract, workers experience psychological contract breach, or feelings of disappointment that their organization is not upholding their end of the bargain. We posit that age metastereotypes may act as a precursor to experiencing psychological contract breaches. A metastereotype is the perception of being stereotyped by another individual. While research suggests that age metastereotype content varies in accuracy, the perception of being stereotyped is still powerful enough to elicit certain behaviors. Some responses to age metastereotypes and their precursors have been theorized by aging at work researchers (e.g., Finkelstein et al., 2015). Previous studies on age metastereotype activation have shown that they are able to influence social behaviors at work. There is no work evaluating the extent to which age metastereotypes might impact employee expectations of the fulfilment of professional obligations by way of psychological contracts. Age metastereotypes may serve as a cue that the organization does not respect all members within the organization and therefore lead employees to feel that their organization is not protecting them from potential age discrimination. However, to make matters more complicated, these experiences may also fluctuate as a result of a person's age and subjective age (how old they feel). The current research aims to examine the relationship between age metastereotypes, age stereotypes, and psychological contract violations, and the moderating role of chronological and subjective age. **Methodology.** Participants are currently being recruited for an online survey using validated measures for age metastereotypes, age stereotypes, subjective age, and psychological contract violation and breach. Participants will also report their demographics.

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New team tug-of-war task communication and effort based on individual social identity

Samantha Nixon
Exercise Physiology

Mentor: Christine Habeeb, Kinesiology

Sarah Stephen, Heriot-Watt University

The purpose of this study was to investigate communication and effort based on one's social identity while performing a two-person tug-of-war task. Participants worked in 2-person teams, with one member of the team being a research actor (RA). Each participant was randomly assigned a social-identity condition: *in-group* or *out-group*. For the in-group condition the RA wore a t-shirt from ECU and they had the ability to create a team name. For the out-group condition the RA wore a t-shirt from NC State and they were assigned a generic team name. The participant completed a tug-of-war style task individually for Trial 1 and with the RA for Trials 2 and 3. Each trial consisted of pulling the rope, connected to a wall load cell, as hard as possible for 5 seconds to measure pull force. A questionnaire was given to the participant before and after each trial containing social identity, personal and partner's effort, and teammate feedback items rated on a number scale. In addition, video recordings were collected and used to analyze participants' communication and interactions throughout study. Based on survey and video observation data, results show the *in-group* and *out-group* conditions had distinct differences in communication and effort. In responding to the item "Being in this team is an important part of how I see myself", *in-group* participants displayed higher averages (M = 5.17) compared to *out-group* (M = 3.87). In reporting effort before and after practicing as a team, all participants perceived that they and their partner would try harder. However, the *in-group* reported a greater effort change score (ΔM_{me} = 11.11, $\Delta M_{partner}$ = 7.23) compared to the *out-group* (ΔM_{me} = 6.67, $\Delta M_{partner}$ = 5.76). Throughout the trials, the *out-group* showed a noticeable decrease (87.33 to 82.00) in their willingness to choose their assigned partner compared to no change in the *in-group*. Video findings revealed 80% of *in-group* participants watched their partner practice pulling on the rope compared to 56% of the *out-group* participants. Lastly, when asked to recall the team's name from the beginning of the study, 70% of *out-group* participants asked what their team's name was versus 0% of the *in-group*. These findings indicate there are differences in social identity, effort and communication based on their partner being within the *in-* or *out-group* conditions. Thus, teams within sport, military and occupational settings may foster social identity to improve effort and communication.

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UPR134 1:00-3:00

Exploring Opportunities for Growth in Mental Health Courts in North Carolina

Tierney Reardon
Political Science

Mentor: Mitzi Pestaner, Nursing Baccalaureate Educ

Background
A significant portion of the jail and prison population in the United States (U.S.) is facing mental health challenges. Almost 25% of incarcerated individuals are diagnosed with a serious mental illness, while up to 50% are subject to some mental health challenges. While incarcerated, mentally ill justice-involved individuals often lack mental health care, and once released, may have difficulty accessing health services. These health disparities place mentally ill justice-involved individuals at risk for poor symptom management and re-offending.

The North Carolina (NC) mental health courts are a diversionary measure that strives to reduce the risks of re-offending and poor symptom management. The over representation of justice-involved individuals with a mental illness suggests a lack of training being given to attorneys about signs and symptoms of mental illness and diversionary resources. Resources, such as mental health courts, are reliant on attorney referrals. It would, therefore, seem beneficial for attorneys to have a baseline knowledge of mental illness as manifested in their clients.

The eight mental health courts in North Carolina work to create supportive court room environments for those with mental health concerns. The courts function as both pre-adjudication and post-adjudication courts and offer additional resources and support for participants including support for housing, referrals to specialized mental health treatments, and substance use recovery services.

The purpose of this study is to explore the steps that can be taken to improve the reach of mental health courts in North Carolina.

Methods
A secondary qualitative data analysis of open-ended responses to survey questions and interview transcripts was conducted. Participants were members of the State Bar and mental health court teams in six NC counties. Structural coding and thematic analysis were used.

Conclusion
Preliminary findings indicate that knowledge of mental health signs and symptoms and awareness of the referral process for mental health courts is low. Increased knowledge about mental illness and diversionary resources among members of the Bar is needed. An application to the NC State Bar will be submitted advocating for approval of Mental Health First Aid Training as a Continuing Legal Education credit for NC attorneys in conjunction with education about mental health courts.

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UPR135 1:00-3:00

Pirate Swap

Macie Burcham, Natalie J Martin, Lawrence Newkirk, Anna Thomas, Amy Fadelici, Tia Shum
Speech and Hearing Sciences

Mentor: Beth Thompson, Biology

Pirate Swap is an organization that is dedicated to promoting sustainability through our Pop Up Thrift Shop. Pirate Swap seeks to engage and educate the ECU and Greenville community in sustainability. Whether it be through donations, participation, or shopping at our thrift shop. The problem that created the need for Pirate Swap is the lack of sustainability on East Carolina University's campus and the Greenville Area. Another problem we address is the culture of fast fashion on our college campus. Pirate Swap aims to maximize sustainability in the Greenville area and specifically on ECU's campus. We do this specifically by minimizing clothing waste as we collect student clothing donations and sell them in our Pop Up Thrift Shop. This also gives students access

to free and discounted clothing so they do not feel the need to buy from the fast fashion industry that contributes so highly to clothing waste and worldwide pollution. To grow as an organization early on we recruited the head of the Sustainability Department, Chad Carwein to be our mentor. He has become an incredible asset to our organization and connected us with many groups in the Sustainability Department. Some of these partnerships include: OSTEM, a group dedicated to supporting LBGTQ+ students and faculty members in the STEM field. We helped OSTEM relaunch by donating them racks, hangers, and clothing so they could continue to host events. We have collaborated with AIMO- Apparel and Interior Merchandising Organization, they have hosted over 18 fashion shows on ECU's campus. Pirate Swap has worked with the Center for Leadership and Civic Engagement, which connected us with the Pirate Give Initiative. Pirates Give/Give Pulse allows us to work with students and give them the opportunity to participate in Pirate Swap while getting volunteer hours as they help us sort clothing for our events. We have partnered and worked with the Hope of Glory Ministry as volunteers and donated our excess clothing to them. Pirate Swap is in the process of collaborating with the PPC-Professionally Purple Closet, an organization that gives ECU Students access to professional clothing. As an Organization we are always looking for more opportunities to partner with ECU Clubs and Organizations and new ways to engage our community on and off campus. Our goal has always been and will continue to be to educate and involve the community in sustainable fashion and encourage our campus to reduce their carbon footprint.

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UPR136 1:30-3:30

Modernization and Human Growth in Milan, Italy

Eleanor Curtis
Anthropology

Mentor: Christopher Wolfe, Anthropology

A child's growth rate is perhaps the best means to gauge a population's health and nutritional status. As a result, multi-disciplinary research has led to an abundance of research demonstrating the genetic and non-genetic factors that may influence human growth. The proposed study models skeletal-length-for-age and breadth-for-age and visualizes a skeletal growth profile that will be further contextualized based on known demographic information (i.e., cause-of-death, socioeconomic status, biological sex, etc.). Growth from Milan will be compared against that from a global subadult collection from the open-source Subadult Virtual Anthropology Database. The CAL Milano Cemetery Skeletal collection is an identified skeletal collection culminating in skeletal remains from throughout the 20th century with a varied demographic profile. The individuals from this collection encompass Italian history dating back to the end of the Kingdom of Italy, both World Wars, and the increasing urbanization and modernization into the present. Specific to the current work, we focus on the subadult sample (n= 82). We compare this information to published data from the subadult virtual anthropology database (n=4912). Data on lengths and breadths from all long bones (femur, humerus, radius, ulna, tibia, fibula) were collected from Milan, Italy. This sample includes 21st Century populations from the United States, France, Netherlands, Colombia, Taiwan, and South Africa. All analyses will be completed in the R programming environment. Our results

show that children in Milan are smaller for age across all diaphyseal measurements as compared to all contemporary children in the SVAD sample. These results suggest that the consequences of urbanization in Milan may have led to stunted growth in infancy and childhood.

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UPR137 1:00-3:00

Human Nature and Human Action: A Collaborative Approach to Decision Making

Ayri Evans
Psychology

Michael Baker, Psychology

The line of research takes advantage of a new interdisciplinary connection between social sciences as a whole but for the purpose of this research specifically psychology and praxeology. Praxeology studies theories of purposeful human action and decision making.

This research begins with an empirical study seeking to understand social interactions between humans. By using a praxeological lens heavily influenced by Ludwig von Mises and Austrian Economics, the purpose of this research is to understand how individuals allocate resources when acquired through different sources. We see how these disciplines are related due to the aspect of choice and action that praxeology focuses on and the social psychology of human interaction. The research hopes to educate the ECU community on praxeology and engage in a collaborative discussion on how human action and the studying of praxeology can further our understanding of not only psychology but all other disciplines in the collegiate field.

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UPR138 1:00-3:00

A Praxeopsychological Approach to Online Marketing and Content Creation

Elise A. Seawell and Daniel C. Franklin
Psychology

Mentor: Michael Baker, Psychology

In the age of social media and online presence, digital content creators are constantly looking for ways to boost social media following and engagement in online spaces. There are many methods and approaches to successfully growing one's brand online, however this study will be aiming to find if a means to achieving this goal can be found in science. The current work
applies a praxeopsychological approach to marketing strategies, which involves elements of both praxeology and psychology. This integrated approach requires a focus on the choices and actions of individuals and an examination of how these impact evolving relationship dynamics and relevant outcomes. This could be an effective strategy for content creators, social media influencers, and

social scientists as it offers a holistic approach to understanding human relationships. Taking a praxeological approach to marketing can help content creators understand the audience's desires and create content better attuned to audience preferences and the preferences of the band members. A survey will collect qualitative data regarding audience preferences for offerings from a local artist. Employing artificial intelligence, the data will be processed to determine patterns or categories of audience and band preferences. The results of this analysis will be used to craft a tailored online marketing strategy designed to increase engagement and enhance the relationship between the members of the band and their fans. Our research will employ a non-experimental interrupted time series approach that will summarize trends in overall account engagement before and after the implementation of a praxeopsychological marketing strategy.

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UPR139 *Moved to Wednesday*

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UPR140 1:00-3:00

Exposure of Undergraduate Nursing Students to Translational Science: A Quantitative Study

Bryce Asby
Nursing

Mentor: Thompson Forbes, Adv Nursing Practice & Education

Translational science can be understood as an approach to enhance communication and collaboration among interdisciplinary team members. When utilized in the health care setting, translational science can be used to maximize clinical outcomes by promoting evidence-based practices and patient-centered care. Early implementation of translational science in an 's career will help build confidence through interprofessional communication and provide a basis for collaborative efforts among team members.

This study aimed to understand the extent to which undergraduate nursing students are exposed to translational science and interdisciplinary communication. While evidence-based practices are emphasized in nursing curricula, less is known about the emphasis placed on multidisciplinary communication.

A quantitative approach was used which included three webinars that were embedded into nursing students' honors courses. Results were analyzed through the Undergraduate Research Student Self-Assessment (URSSA) which was taken by 5 undergraduate honors nursing students. Core components included introduction to team science, the role of a research team member, and using team science to engage stakeholders and partners.

Results were concluded by analyzing student's gains in thinking and working like a scientist, personal gains related to research work, and gains in research skills. It was concluded that the critical thinking

and research skills of students exposed to translational science at the undergraduate level is enhanced, while personal gains are also made, such as being able to communicate more efficiently and effectively with members of the health care team that are not in the nursing field. Further emphasis should be placed on implementing more multidisciplinary approaches in undergraduate nursing curricula due to the results provided from this study.

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UPR141 *Moved to Wednesday*

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UPR142 *Moved to Wednesday*

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UPR143 1:00-3:00

T-Shirts to Totes: How T-Shirts Impact the Environment

Jessica Johnston
Fash Merch and Cons Std

Mentor: Runying Chen, Int Design and Merchandising

Textile sustainability is a critical concern in the fashion industry, prompting a reassessment of T-shirt manufacturing and usage practices. This study aims to examine the environmental impact of T-shirt production and propose sustainable solutions. Employing a mixed-methods approach, it integrates quantitative and qualitative data collection and analysis. Secondary data, drawn from literature reviews, reports, and articles, underwent analysis using the Life-Cycle-Assessment (LCA) sustainability framework. Quantitative data, obtained from college student groups through convenience sampling, underwent Excel analysis to derive descriptive statistics regarding T-shirt environmental awareness among students. The study synthesizes qualitative and quantitative findings to advocate for more sustainable practices aligned with the circular textile economy model.

Within the LCA framework, the study identifies cotton and polyester as primary T-shirt materials. Cotton's heavy pesticide and water usage, coupled with polyester's non-biodegradability and dependence on petroleum, emphasize the importance of eco-friendly material choices. Energy-intensive spinning, knitting, dyeing, and finishing processes contribute to environmental harm, while chemical pollution during dyeing and finishing stages exacerbates ecological issues, necessitating cleaner production methods. Excessive T-shirt consumption and energy-intensive maintenance practices further burden the environment. Findings from student samples reveal a significant lack of awareness (69% to 87%) regarding T-shirt environmental impacts.

Circular business models, championed by Ellen MacArthur, offer a route to unlinking revenue from raw material production. Waste repurposing techniques like cloth recycling, quilting, and yarn making provide innovative avenues for sustainable T-shirt management. Embracing a holistic

approach encompassing material selection, production processes, responsible consumption habits, sustainability education, and waste management, the fashion industry can transition to a more environmentally conscious future. The study's insights and recommendations encourage all stakeholders to adopt sustainable practices in T-shirt production and consumption.

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UPR144 1:00-3:00

Innovation in Medical Education: Crafting a 3D Printed Female Pelvic Model

Joanna Mathew and Yanni Pavlikianidis
Biology

Mentor: William Godwin, Art and Design

Joanna Mathew[1], Yanni Pavlikianidis[1], Sam Lanier[1,2], Morgan Maner[3], Arvind Subramaniam[3], Wendy Wang[3], Bryce A. Pugh[3], Wayne Godwin Ph.D[2], Philip J. Boyer M.D.[4]
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Cadaveric specimens are considered the gold standard for anatomical education in medical school curriculum. However, medical students often face challenges understanding female reproductive anatomy due to its complexity, effects of muscular atrophy on cadaveric specimens, and systemic prejudice in research. These limitations, in conjunction with personal discomfort, often results in hesitation regarding learning to perform female pelvic exams. High quality 3 dimensional (3D) models may be used to address this educational gap by supplementing anatomical education. In a previous study, the Brody School of Medicine (BSOM) partnered with the ECU Innovation and Design Lab (IDL) to create an anatomically-accurate 3D printed uterus model. BSOM students completed a survey using a Likert scale to assess the perceived benefit of using 3D printed models to learn anatomy. 95% of survey respondents (n=40) found the model to be least "slightly useful" to their learning. Qualitative feedback from respondents emphasized the need for a pelvic model that showed the uterus amongst other structures—associated vasculature, tissues, and organs. This project seeks to expand upon the original uterus model used in our previous studies, by creating an enhanced female pelvic model. Once BSOM students and ECU Health faculty identified important anatomical features to be displayed in the model, female pelvic structures were rendered using Autodesk Maya®. Individual structures were color-coded for ease of identification and contributed to the model's ability to become an independent learning tool. BSOM students will evaluate the model via a series of Likert-style questions to assess perceived benefit of the pelvic model. The BSOM faculty will also receive a Technology Acceptance Model (TAM) survey to measure how likely they would be to integrate the model into their teaching practices.

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UPR145 1:00-3:00

Diurnal concentrations of eDNA of threatened juvenile river herring species in the lower Roanoke River

Cammy Bailey
Biology

Mentor: Erin Field

Other authors: Chase Spicer,[1] Patrick Harris[1], William Langely[1], Roger Rulifson[1], Erin Field[1]

East Carolina University[1]

Blueback (*Alosa aestivalis*) and alewife (*Alosa pseudoharengus*) herring are anadromous fishes that spawn in freshwater environments, but live in the ocean. These species are listed as threatened in NC waters due to urban development, overfishing, and water quality issues. Many organisms, including fishes, exhibit non nocturnal behaviors due to feeding strategies or anthropogenic light attraction. Environmental DNA (eDNA) is DNA found in the environment (For example: shedding trace amounts of DNA in waters) that can be used to study populations of conserved species without harming organisms in their natural habitat. Due to the differences in movements in the day and night, we wanted to determine what time of day influenced the detection of eDNA concentrations from these fish. The aim of this study was to determine if the abundance of juvenile river herring differs between day and night samples.__A total of 4 days were sampled day and night, and were collected from the Roanoke River at Plymouth, NC. It should be noted that each day and night sample were collected within the same 24 hour period. Water samples were filtered using a 0.45 uM cellulose nitrate filter and DNA of the biological material was collected after extractions. DNA specific primers were used to amplify the mitochondrial encoded *cox*1 gene from *Alosa* spp. and quantified using river herring-specific quantitative PCR (qPCR). ANOVAs, t-tests, and Bonferroni correlation testing was used to determine statistical differences in eDNA concentrations. From the data analyzed, it could be concluded that there was a statistically significant difference between day and night samples in which higher concentrations of juvenile river herring eDNA was measured in those samples collected at night. Though sampling at night may not always be feasible, it could be concluded that samples should be collected around the same time of day/night to ensure replication is accounted for in the study. When comparing three different samples collected during the night (differing by time in the night), no statistical significance was found. Knowing the diurnal patterns of juvenile river herring can help to further develop non-invasive eDNA approaches for assessing the spawning populations of juvenile river herring.

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UPR146 1:00-3:00

An Efficiency Analysis of Intercollegiate Athletics

Claire Hefner
Supply Chain Management

Mentor: Mauro Falasca, Supply Chain Mgmt

While researchers in the past have investigated specific issues related to athletic success, revenue, generation, and graduation rates, to my knowledge, no previous studies have attempted to evaluate these factors simultaneously. My research discusses the development of a data envelopment analysis (DEA) model aimed at measuring how efficient Division I university women's basketball athletic departments are in terms of the use of resources to achieve athletic success, generate revenue, promote academic success, and on-time graduation rates. I retrieved my data from the following sources, *National Collegiate Athletic Association (NCAA)*, *Equity and Athletics Data Analysis (EADA)*, and the *National Association of Collegiate Directors (NACDA)*. The National Collegiate Athletic Association provided me with the necessary data when correlating graduation rates as well as academic success to women's basketball. The NCAA developed the Division I Graduation Success Rate in response to university deans/chancellors who wanted graduation data that more accurately reflected the mobility among all college students today. The Equity and Athletic Data Analysis provided me with data to correlate the amount of funding each school receives along with the success of women's basketball teams. This database consists of athletics data that is submitted annually by the Equity in Athletics Disclosure Act (EADA). Finally, the National Association of Collegiate Directors, specifically The Directors Cup, provided me with essential information in order to examine the performance of each individual Division I University as a whole, along with its women's basketball program separately. All of the data sources mentioned above cohesively come together to assist me in evaluating the relative efficiency of the institutions. There are multiple questions that are used as benchmarks to determine the efficiency of each athletic program, such as which savings techniques could be achieved by each university to guide them towards becoming efficient, which institutions are the most efficient or inefficient out of Division I Universities, and what performance levels should be achieved by each university to become labeled as efficient in the DEA model? The model identifies a series of "best-practice" universities/programs which are used to calculate efficient target resource levels for inefficient institutions.

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UPR147 *Moved to Wednesday*

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UPR148 1:30-3:30

Analyzing Aesthetic and Material Properties in Product Design

Yasmin Mata-Delgado
Engineering

Mentor: Brian Sylcott, Engineering

In product design, striking a balance between aesthetics and material quality can be challenging. This research aims to quantitatively assess the importance of aesthetics of a product in consumer decision-making. Vases serve as an ideal subject for investigating consumer perceptions, given their decorative function and varied physical attributes. Vases are used solely for aesthetic purposes, however, its properties such as material and shape could also affect the decision habits of the

consumer because of its toughness to prevent it from breaking easily. Since vases can widely vary in shape, material, and color, those properties can be used to analyze the participants' preferences. There are also no biased advertisements or brands among vases that would sway participants to a particular type of vase. Using Matlab, this study will generate 3D models of vases, manipulating parameters such as curvature, base radius, and mouth radius. The shape and given material will be used to determine the toughness of the product and compared to other designs. Participants will be given three choices of generated vases to choose from given their design and properties. The research outcomes will shed light on how aesthetics and material properties affect consumer decision-making, offering practical guidance for refining product designs and understanding consumer behavior in today's markets.

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UPR149 1:30-3:30

Using the Critical Path Method CPM (CPM) for Evaluating Allocation Potential of Temporary Housing Unit Design

Josey Wilson, Jalene Mireles-Camey, German Camilo Buitrago, Maxwell Perry
Construction Management

Mentor: Daniel V. Perrucci, Construction Management

The critical path method is a project management technique that assists in maintaining construction project timelines and limiting delays. This study applies the sequential approach of the critical path method to the manufacturing and logistical phases of post-disaster temporary housing to reduce delays that can lead to prolonged sheltering and homelessness. A nodal analysis from the critical path reveals the attributes (manufacturing or logistical), such as door and window cutouts or cabinet installation, that can lead to delays in the actual allocation and occupation of units. The resulting critical path analysis model determines approximately 56 days are required to manufacture and allocate a modular unit design and discusses potential pathways of pro-active manufacturing and fast-tracking to maintain current expected sheltering periods of 21 days for displaced populations. These diagrams and discussions can benefit decision-making personnel to determine which tasks in the temporary housing manufacturing process require prioritization to reduce timelines and consequently reduce the potential of prolonged displacement following displacement events.

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UPR150 1:30-3:30

LoRaWAN Solution for Automated Water Drainage of Agricultural Fields

Cris Exum, Tyneasha Hazard, Tyler Williams, Jesus Zapata, Khaneil Pettiford, Colby Sawyer
Information and Computer Tech

Mentor: Ciprian Popoviciu, Technology Systems

Eastern North Carolina farmlands are often below the standing water level, requiring constant drainage to avoid flooding. Irrigation canals collect water from multiple farms, and they must be emptied regularly to avoid crop losses and damage to houses and equipment. Maintaining a low water level in these canals is a critical component of the daily tasks farmers must manage. In most cases, this process requires a visit to the location of the pumps and turning them on for a given amount of time, a manual, time-consuming activity. In this paper we discuss the development of an automated solution using ultrasound sensors to measure surface water levels networked over LoRaWAN with actuators that can remotely turn the pump on and off. Machine Learning based automation algorithms provide workflow optimization and necessary redundancy is built in. The solution can be customized to the specific performance characteristics of the pump being utilized. Farmers are provided with water level visualization tools accessible on mobile devices as well as automatic, intelligent notifications to help address failures and unusual circumstances. Future expansion options for this solution, such as integration of weather forecast and live weather data, are discussed.

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UPR151 1:30-3:30

Utilizing 3-D Building Information Modeling (BIM) Approaches to Propose Novel Post-Disruption Housing Designs using the Modularity of Recycled Shipping Containers

Josey Wilson, Stavros Boardman, German C. Buitrago, Maxwell Perry, Jalene Mireles-Camey, Sahara Browne
Construction Management

Mentor: Daniel V. Perrucci, Construction Management

Disruptive events can cause mass population displacement that leads to decision-making dilemmas regarding homelessness, short-term vs. long-term infrastructure investment, and resource utilization. This research utilizes Building Information Modeling (BIM) approaches to provide solutions for post-disaster issues via implementation of GP shipping containers as a means of temporary housing units (THUs). The use of GP shipping containers for THUs aims to solve the identified dilemmas by prioritizing modularity, increasing transportation methods, and designing for sustainable resource utilization. In this research, the types of human displacement are discussed, and past methods of THUs are scrutinized with comparison to GP shipping container designs, including the characteristics of mobile and manufactured homes, prefabricated kits and tenting, and prefabricated modular units. This research provides three novel temporary housing unit designs within three varying size container units (i.e., container length alters between from 10 ft, 20 ft, and 40 ft). The utilization of BIM approaches to create novel temporary housing approaches enables a further material life cycle analysis and project of potential material re-utilization.

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UPR152 1:30-3:30

Saba Khanmohammad Alqasem Hindi and Danielle Werts
Engineering

Mentor: Jinbo Chen, Engineering

Over two billion people globally reside in nations facing severe shortages of accessible freshwater, as reported by the United Nations. Traditional water desalination methods, particularly reverse osmosis, have been pivotal in addressing this scarcity. However, for every 2 liters of purified water produced through reverse osmosis, an equal amount of brine and potable water is generated, with the brine often being discharged into the ocean, causing ecological damage. In response, a novel approach known as supercritical water desalination zero liquid discharge (SCWD-ZLD) is proposed. This method aims to purify the brine waste, converting it into drinkable water and solid salt byproducts, thereby enhancing the efficiency of seawater desalination facilities globally. Testing included variations in salt concentrations, pressures, and temperatures, with recorded data on water quality and energy consumption. Future plans involve testing a larger-scale system with additional steps to improve thermal efficiency. Preliminary results from the smaller-scale system demonstrate promising outcomes, with a salt removal rate consistently above 99% and a freshwater recovery rate exceeding 80%. This project aims to validate and enhance these results on a larger scale, incorporating additional thermal processes to further improve efficiency. The next step of the process is to use a modified version of the system capable of continuous operation while discharging brine to test the reliability of the process at a larger scale at different concentrations. Additionally, allowing for more variables to be adjusted to test for different flowrates, discharge cycles, and heating stages.

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UPR153 1:30-3:30

Constructing a Prototype for a Flow Reactor Prototype for Continuous Flow Catalysis

Awesome Akinbanjo, Keaton Cadwell, Rober Hughes
Engineering

Mentor: Brian Sylcott, Engineering

Enzyme immobilization enables enzymes to be used repeatedly. This process is a way to increase the efficiency of chemical and biochemical processes. Incorporation of immobilized enzymes into a flow reactor is one way to enhance their activity and recyclability properties. The continuous flow reactor allows for the repetitive flow of reagents and biocatalysts to facilitate continuous interaction between the two groups, thereby ensuring that the observed quality of the product is the same as expected. The Flow Reactor or Continuous Flow Reactor is more than just a simple device. Instead, it can be considered an environment consisting of a peristaltic pump, an input or feeding vessel, a glass chromatography column, and a collection vessel. The pump circulates the biocatalysts and reagents from the input or feeding system. The pump then delivers the reagents from the feeding vessel into

the glass column for fractional distillation. The products are then discharged into the collection vessel to be tested or used for further chemical purposes. This project aims to validate the concept of applying flow reactors to continuous flow catalysis to improve biocatalysis's efficiency further through continuous interaction of the reagents and catalysts used in the biochemical process. There are literature examples of DIY flow reactors, but no one-size-fits-all approach currently exists. Hence, we constructed a flow reactor prototype using parts sourced online. These parts included a peristaltic pump, glass chromatography column, HPLC-grade tubing, and various fittings. We used the VWR Variable Flow Mini-Pump, a bi-directional pump with controlled speeds, for this prototype. Then, we connected HPLC-grade tubing to the pump, the feeding vessel, the glass chromatography column, and the collection vessel to send the liquid reagent through the pump to these vessels, which were glass beakers. Tubes were also sealed with various fittings to prevent the leaking of products and reagents. The device's assembly was straightforward and had the desired liquid handling capabilities. The prototype successfully achieved the goal of retrieving the liquid through the pump into the glass column and depositing it into the output vessel. While this is a proof-of-principle model, it lays the groundwork for future research and building flow reactors with enhanced capabilities.

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UPR154 1:30-3:30

Simulation of Student Traffic

Sophie Arruza
Engineering

Mentor: Jinkun Lee, Engineering

The traffic system around ECU campus gets heavily congested, especially during the morning when classes begin. Student traffic has a direct impact on routes going towards the stadium parking lot and parking deck. To analyze the parking problem imposed by this influx of traffic, a simulation will be created to identify how the bus transportation systems should be set up to accommodate students. The simulation will run on the platform SUMO, Simulation of Urban Mobility, and will be coded through Python. This simulation will include a variety of planned routes heading toward the student stadium parking lot and the parking deck along with other vehicles following random routes to simulate normal traffic. The results will include graphs of the number of vehicles stopped in traffic over time, the number of vehicles that reach their destination over time, and the average relative speed over time. The next steps involve inputting real data into the simulation that would be collected at various intersections around campus.

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UPR155 1:30-3:30

Neural Identification of Design Fixation using Functional Near-Infared Spectroscopy

Leah Rumble and Awesome Akinbanjo
Engineering

Mentor: Brian Sylcott, Engineering

The concept of design fixation is the process where a person, in generation of ideas, becomes unnaturally attached to a set of ideas, rather than allowing for full creative ideation. This bias can lead to untapped creative outputs. The use of Functional Near-Infared Spectroscopy (fNIRS), a non-invasive technology measuring changes in blood flow in the brain, aids in the isolation of areas of the cerebrum responsible for design fixation. Previous trials have revealed activation in the right inferior temporal gyrus, left middle occipital gyrus, and right superior parietal lobule regions, and hold potential to be the causation of design fixation. This is supported by the left lingual and superior frontal gyri, which are responsible for creativity, being less active in the trials. Further improvements to the design of the study, including the recording of idea generation using tablets, as well as strictly timed ideation sections, will allow for more complex data to be generated for the isolation of design fixation in the brain. This study hopes to provide more extensive verification of previously established theories regarding the regions of the brain responsible for design fixation. This study will help future creative endeavors to become more efficient with the awareness of design fixation and its cranial source.

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UPR156 1:30-3:30

Vertical Axis Wind Turbine Active Blade Pitch Control and efficiency

Matthew Graham
Engineering

Mentor: Colleen Janeiro, Engineering

North Carolina is ranked first in overall offshore wind potential along the Atlantic seaboard (50% more than the next highest state, Massachusetts). North Carolina has an untapped offshore wind technical potential of 630 TWh. To put that in perspective, the entire United States consumes about 4000 TWh per year.

Horizontal axis wind turbines (HAWT) have been widely accepted for onshore applications, but vertical axis wind turbines (VAWT) have two main advantages over their horizontal counterparts, which make them ideal for floating offshore wind generation. The gearbox and generator can be positioned below the water's surface, lowering the center of gravity. VAWT makes the floating platform inherently more stable. Because VAWT generate energy regardless of wind direction, they can also operate in rapidly changing wind conditions. My research is focusing on utilizing an active blade pitch control system to enhance the efficiency of VAWT. Active blade pitch control could make VAWT cost-competitive with HAWT.

Vertical axis wind turbine research can be divided into two categories: structural dynamics and aerodynamics. This work is an aerodynamic analysis of a VAWT. More specifically, the performance

of fixed and variable-pitched blade configurations. Ansys Fluent will be used to simulate the effects of active blade pitch control. A scale model designed in SolidWorks®, fabricated using 3D printers and traditional fabrication methods, and tested in the College of Engineering and Technology wind tunnel will be used to validate simulation results. The comparison from Ansys simulation and wind tunnel results will be compared and presented. A control system for the variable pitch blade turbine will be developed using Arduino, linear actuators, and a series of sensors. This will ensure the adaptability of the system as testing progresses. Only simple changes in the Arduino code will be required to test the system under different configurations. If vertical axis wind turbines with active blade pitch control are found to be as efficient as their horizontal counterparts, they could help in the fight against human-induced climate change.

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UPR157 1:30-3:30

Mix Optimization and Final Compressive Strength Prediction of Geopolymer Concrete

Robert Ellis
Construction Management

Mentor: Amin Akhnoukh, Construction Management

Concrete is the most used building material in the world. However, this does not come without issue. The production of Portland cement is one of the largest sources of CO2 emissions. In an effort to reduce these emissions, geopolymer cement is being developed. Geopolymer cement is made up of existing industrial waste products (ex. fly ash or ground granulated blast furnace slag) which are called precursors, and an alkaline activator (ex. sodium hydroxide and/or sodium silicate). This allows for the reduction of CO2 emissions due to the use of existing industrial waste. The purpose of this research is to determine the optimum proportions of precursors for geopolymer cement, along with the optimum alkaline activator. The proportions of each precursor and the alkaline solution will be varied, with compressive strength tests performed on samples from each mix at regular intervals. Once an optimum mix has been found, it will be investigated whether the final strength of geopolymer concrete can be predicted in a similar fashion to maturity meter in Portland cement concrete. The temperature of samples from the optimum mix, as well as other effective mixes will be measured along the curing process, with compressive strength tests performed at regular intervals. The aim of this is to develop a predictive model for the final strength of a geopolymer mix based on its temperature during curing.

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UPR158 1:30-3:30

Identifying Optimal Workflow in Pulmonary Hypertension Patients

Lauren Simpson
Engineering

Mentor: Stephanie George, Engineering

Lauren Simpson [1], Fatemeh Bahmani PhD [1], Veeranna Maddipati MD [2], and Stephanie George PhD [1]

[1] Department of Engineering; [2] Department of Internal Medicine, Brody School of Medicine

Pulmonary hypertension (PH) is a disease that affects the lives of many people all around the world. It is defined as elevated pulmonary artery (PA) pressure that is greater than 20 mmHg. Computational fluid dynamics (CFD) is used as an accessible and non-invasive tool to model the fluid flow within the pulmonary artery. Yet, there are still some gaps with these models such as how to use fluid flow parameters (e.g. wall shear stress) to diagnose and assess pulmonary hypertension. The objective of this research is to compare the pulmonary artery hemodynamics in a control subject and a patient with PH. Using previously collected magnetic resonance images (MRI) from two patients, 3D models of the PA will be generated. These geometries will be used to create CFD simulations based on inlet velocity data and laminar flow assumptions. We will implement the Windkessel boundary conditions at the outlets of the pulmonary artery which is more physiologically relevant. These computations and simulations will be done using several software to segment, mesh, and run the CFD. Some of the software that will be used include ANSYS, FLUENT, and MIMICS. The hemodynamic parameters e.g. velocity and wall shear stress will be compared with previously obtained results using zero pressure gradient outlet conditions. After modeling and comparing we will be able to know how the results are dependent on the outlet boundary conditions. This will allow us to identify an optimal workflow when we apply it to additional patients.

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UPR159 1:30-3:30

Soul Food: An Examination on the Physical Activity of Black Women

Jalen Walker
Biology

Mentor: Bhibha M. Das, Kinesiology

Overweight and obesity diseases lead to various critical health issues, including heart disease, high blood pressure, and type 2 diabetes. These diseases severely and disproportionately affect the Black female population as obesity rates are increasing at an alarming rate. Studies show that 80.6% of Black women ages 20+ are overweight or obese and Black women have the highest rates of physical inactivity in comparison to other gender/ethnic groups., it is a public health priority to develop and promote a program to develop and promote weight loss strategies for this underserved population. The purpose of this study was to examine the impact of a tailored physical activity program on Black women's physical activity rates.

Methods: A PA intervention tailored to Black women was implemented in Spring 2022. The intervention consisted of weekly health education lessons along with nutrition and physical activity classes plus a social media component. Baseline demographics and physical activity were collected via Qualtrics and a Garmin watch and post intervention, physical activity was collected via a Garmin watch.

Results: Black women (N = 28; 43.3 ± 8.7 years) increased their physical activity significantly (p < .05) from baseline to post-intervention.

Conclusion: This pilot intervention may have significant public health impact as it demonstrated an increase in physical activity, which is a health promoting behavior that may reduce overweight, obesity, and related chronic disease in an underserved population. Strengths of our program include a research team comprised of Black students its ability to be delivered virtually, and a high retention rate. A possible limitation was the COVID-19 pandemic, which sometimes impacted participant attendance. This program has the potential to decrease chronic disease risk, including type 2 diabetes and cardiovascular disease, two diseases that disproportionately Black women. By reducing chronic disease risk and consequences, we may improve the quality of life in Black women.

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UPR160 1:30-3:30

Personality and Aggression

Ethan Graham
Psychology

Mentor: Michael Parker, Psychology

Despite numerous studies making use of the Competitive Time Reaction Task (CRTT) to evaluate behavioral aggression under different contexts, minimal attention has been given to understanding its correlation with specific personality dimensions. This research aims to investigate the tendency of individuals to engage in direct virtual acts of aggression in response to provocation in the form of a stimulus, ultimately seeking a comprehensive understanding of the complex relationship between aggression and personality traits. Having extensive knowledge of the relationship between personality and aggression has important practical implications. This includes gaining insight into individuals with aggressive tendencies, such as perpetrators of domestic violence, and having a greater capacity to understand people with mental health issues in a clinical setting. Participants had the opportunity to experience and administer 'noise blasts' during the CRTT, serving both as the method of provocation and the aggressive act toward opponents. Additionally, participants completed an assessment comprising of the Light Triad (assessment of prosocial traits), the Dark Tetrad (assessment of antisocial traits), and Buss-Perry Aggression scales, exploring any correlations between aggression and personality traits. This research formulated several predictions related to establishing correlations between aggression and prosocial/antisocial behavior. Such predictions include a significant positive correlation between dark triad scores, specifically narcissism, and both the Buss-Perry aggression scale and CRTT task. Furthermore,

a significant negative correlation between light triad scores and both Buss-Perry Aggression score and the CRTT is a predicted correlation. Finally, it is predicted that participants will have comparatively higher scores on the Buss-Perry Aggression Scale compared to scores on the CRTT.

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UPR161 1:30-3:30

Dentists and HPV Prevention: Understanding how dental providers can help reduce HPV-related head and neck cancers.

Faith Bagwell
Public Health

Mentor: Dr. Alice Richman, Health Education and Promotion

Background: Human papillomavirus (HPV) is the most common sexually transmitted infection (STI) in the United States. While the virus can lead to genital warts and anogenital cancers, HPV also causes approximately 70% of oropharyngeal cancers (OPCs) in the US. The HPV vaccine is the most effective primary prevention strategy to prevent HPV related OPC. This project involves the research into understanding how dental health providers may play a role in facilitating HPV vaccination uptake for under-vaccinated populations. Specifically, this study sought to understand patient perspectives about engaging in HPV prevention with their dental provider.

Methods: A 20-item quantitative survey was developed using Qualtrics software to understand patients' perspective in terms of dental health providers' role in HPV prevention and their trust in dental providers as a valid source of HPV prevention information. We are currently using this survey to collect data from 40 patients at 5 of the ECU School of Dental Medicines Community Service Learning Centers (CSLCs) (n=200 total) across NC. Patients are approached in the waiting room of the dental CSLCs, informed consent is obtained, and the survey is provided via an iPad. A $25 Food Lion gift card is provided after survey completion as incentive.

Results: Although data collection is underway, we currently have 40 patient surveys complete from one of the CSLCs. The majority of survey respondents were female (70%). Regarding race/ethnicity, 58% identified as White, 23% as Black or African American, 8% as multiracial, and 3% as Asian, or mixed race. When asked about their knowledge of HPV causing head and neck cancer, 55% of patients reported they were not sure. Over half (58%) of the sample reported having children and of those, 23% said their child had not received an HPV vaccine. Almost half (48%) of patients said they would feel very comfortable discussing the HPV vaccine with their dentist, and 30% said they would feel somewhat comfortable having these discussions. Under half (45%) agreed to setting up a referral at a nearby clinic to receive an HPV vaccine.

Conclusions: Based off of the known results, there is substantial evidence that indicates there is a need for patient education about the HPV vaccine as well as an interest by patients to seek guidance for themselves or a family member to receive a vaccine.

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Trauma Center Trauma-Sensitive Yoga Programs on Campus: Student Needs, Interest, and Preferences

Aaliyah Buford
Psychology

Mentor: Christyn Dolbier, Psychology

Introduction: Trauma can negatively impact college students' biopsychosocial well-being. College counseling centers are struggling to meet the demand for mental health services (Gorman et al., 2022). Yoga is considered an emerging trauma treatment that follows the International Society of Traumatic Stress Studies Prevention and Treatment Guidelines (Bisson et al., 2020). Trauma Center Trauma-Sensitive Yoga (TCTSY) is an empirically based trauma intervention (Emerson et al., 2009). Due to yoga's increasing popularity and health benefits for college students (Villate, 2015), TCTSY may be an acceptable form of trauma care for this population. Dunn et al. (2022) discovered that yoga practice reduced the association between childhood maltreatment and posttraumatic stress symptoms in college students and recommended that yoga be offered for mental health care at universities.

This study aims to find the prevalence of trauma and post-traumatic stress symptoms among college students and their preferences for TCTSY programs. The information will drive the development of TCTSY programs to address the preferences and needs of ECU students to increase access to trauma support services. This research is important given the growing popularity of yoga in the United States (Nahin et al., 2024) and the difficulty universities confront in satisfying demand for mental health services. To our knowledge, no previous TCTSY research has included college students.

Method: This study aims to recruit 400 ECU students (18+ years) through the PSYC 1000 Sona System, campus flyers, and emails to student organizations, campus mental health resources, and faculty/staff listservs. Employing quota sampling to ensure a representative sample, this research will use a cross-sectional survey administered via Qualtrics. This survey will gather data on demographics, trauma exposure (LEC-5; Weathers et al., 2013), trauma symptoms (PC-PTSD-5; Prins et al., 2016), and yoga experience and preferences for TCTSY programs (adapted from Kabiri et al., 2018; Spadola et al., 2017). Data analysis will entail chi-square tests and analyses of variance to explore variations in responses across race, ethnicity, sexual orientation, gender, age, and academic year.

Results and discussion: Recruitment is scheduled to begin Spring 2024 semester, pending approval from the IRB. The presentation will provide a concise update on the study's progress, highlighting any preliminary results obtained to date.

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UPR163 1:30-3:30

Predictors of Cognitive Functioning in Infants Visiting the NICU Follow-Up Clinic

Katelynn J. Teli and Julie D. Doran
Psychology

Mentor: Aimee W. Smith, Psychology

Introduction
Graduated neonatal intensive care unit (NICU) infants often need multidisciplinary follow-up care to ensure early detection of and intervention for developmental delays, and NICU follow-up clinics often meet this need. Intraventricular hemorrhage (IVH) is diagnosed when there is bleeding in between the ventricles of the brain, and infants with IVH may be at risk for cognitive deficits. The present study aimed to determine demographic and clinical predictors of infant cognition using the cognitive subtest scores of the *Bayley Scale of Infant and Toddler Development, Third Edition* (Bayley-III), as well as to describe the differences in cognitive abilities of infants with and without IVH over time.

Methods
Participants (N = 1448) were selected from an existing clinical database from a NCIU Follow-Up Clinic. Data were collected from infants seen in the clinic between 2010-2022 including infant birthweight, gestational age (GA), 5-minute Apgar scores, presence and grade of IVH diagnosis, and Bayley-III cognitive standard scores at 12 and 18 months. To examine the relationship between infant clinical variables and cognitive ability at 12 and 18 months, two regression analyses will be performed where Bayley-III cognitive standard scores will be the outcome variables. All other variables described above will be included as predictors in both regression analyses. To determine the differences in cognitive scores of infants with and without IVH, a one-way analysis of variance (ANOVA) will be performed with 18-month cognitive scores, where IVH severity (absence-Grade IV) will be the independent variable. Additionally, dependent t-tests will be performed using 12-month and 18-month scores for each IVH group.

Results
Because institutional review board approval was recently received, data analysis is ongoing.

Conclusions
We expect our findings regarding clinical factors will be consistent with the previous literature, where the clinical variables will be predictive of cognitive functioning (Cha, et al., 2020; Kenyhercz & Nagy, 2022). Research on the cognitive outcomes of infants with IVH is mixed (Radic et al., 2015) and our findings will clarify the understanding of the relationship between IVH and cognitive functioning. Additionally, our study will identify predictive factors of cognition to help medical professionals more effectively treat NICU graduates.

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UPR164 1:30-3:30

Examining Levels of Loneliness and Social Anxiety in College Students and Their Relationship Across Different Phases of The Pandemic

Jordan Signorelli
Psychology

Mentor: Christyn Dolbier, Psychology

Introduction: Emerging adulthood (ages 18-25) is a stage of development full of profound changes crucial for the development of identity and independence (Arnett, 2000). Emerging adults (EA) who attend college face changes making them vulnerable to mental health challenges, and doing so during a pandemic put them at even greater risk. Loneliness (distress resulting from social relationships not meeting social needs) and social anxiety (marked and persistent fear of social performance situations) are two particularly relevant challenges in this context. Research shows levels of loneliness and social anxiety increased from pre-pandemic to pandemic onset (period of greatest health risk and social behavior restrictions), but none has examined their levels as the pandemic continued and health risk and social behavior restrictions decreased. Research also reveals a positive relationship between loneliness and social anxiety pre-pandemic, but none has examined their relationship during the pandemic.

Purpose: Aims include examining: 1) whether levels of loneliness and social anxiety differ across three years after the pandemic onset; and 2) if there are differences in the relationship between loneliness and social anxiety across these three years. I hypothesize that loneliness and social anxiety will be highest during the first year after onset (highest health threat and social behavior restrictions) and will be lowest during the third year after onset (lowest health threat and social behavior restrictions).

Method: In this repeated cross-sectional study, participants were undergraduate students at a public southeastern university recruited through Introductory to Psychology courses and a random sample during three academic years following pandemic onset (2020-2023). Participants completed a two-part online survey including the UCLA Loneliness Scale and the Social Phobia Screener (social anxiety symptoms).

Data have been collected and data analysis is about to begin. Hypotheses will be tested using two analyses of covariance with post-hoc comparisons to examine differences in levels of loneliness and social anxiety between the three academic year samples. The relationship between loneliness and social anxiety within each sample will be explored using Pearson correlations, and r to z Fisher transformations will test for differences between samples in those correlations.

Results and discussion: These will be included in the presentation.

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UPR165 1:30-3:30

Relationships of Self-Construal with Reporting Symptoms of Anxiety and Depression

Kolby Kinnaman
Psychology

Mentor: Christyn Dolbier, Psychology

Introduction: Depression and anxiety are some of the most common mental health conditions among the college-aged population. Studies examining cultural influences on mental health conditions have focused on the dimension of individualism vs. collectivism. Individualism is considered a value in individualistic cultures such as Australia and the U.S. Individualists value independence from their in-groups, prioritize personal goals, and their attitudes shape their behavior. Collectivism is a value in collectivistic cultures such as South Korea and China. Collectivists value interdependence within their in-groups, prioritize harmony within groups, and the norms of their in-group shape their behavior. Researchers have recognized that understanding cultural differences within cultures is as important as understanding them across cultures. A two-dimensional representation of independent and interdependent self-construal refers to how individuals perceive their relationship between the self and others. It is conceptualized as reflecting the separateness and uniqueness of the individual stressed in the West and the connectedness and relations often found in non-Western cultures.

Only two studies have been conducted on U.S. college students, and they focused on Asian American and European American students, dating back 22 years. The study aims to examine how the self-construal of U.S. college students correlates with their reporting of anxiety and depression symptoms. I hypothesize that after including race/ethnicity as a predictor, independent self-construal will be a significant negative predictor, and interdependent self-construal will be a significant positive predictor of anxiety and depression symptoms.

Methods: The proposed study will use a preexisting dataset from a larger longitudinal study. Participants were students aged 18-29 from a public Southeastern university. An online survey was administered at three-time points during Spring 2023. For the proposed study, only Time 1 quantitative data will be analyzed. Two linear regressions will be conducted to test four hypotheses that examine the relationship between self-construal (independent and interdependent) and depressive/anxiety symptoms. Race/ethnicity will be entered as a predictor in step 1, and the SCS subscale will be entered in step 2. The PHQ-8 and GAD-7 scores will be used as the criterion variables.

Results and discussion: These will be included in the presentation.

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UPR166 1:30-3:30

GENDER DIFFERENCES IN TEACHER RATINGS OF ANXIETY IN ELEMENTARY SCHOOL

Owen Farrar
Psychology

Mentor: Christy Walcott, Psychology

Anxiety is the most common mental illness globally (World Health Organization, 2023). Although there is a collective understanding of anxiety, it can be hard to detect. There have been inconsistent findings regarding the correlation between self-reported anxiety in children and reports of their parents and teachers. Although teachers may demonstrate competence regarding their interpretation of anxious students, there are several instances where teachers are unaware of the internal feelings of children (e.g., Neil & Smith, 2017). Approximately 9.4% of U.S. children ages 3-17 experience anxiety (Centers for Disease Control and Prevention, 2023), and schools are a prime setting to identify and serve children's mental health needs. This study examines the congruence of teacher ratings of their students' anxiety with children's own self-ratings. We also examine if teachers detect anxiety differently in boys and girls, such as rating boys as having oppositional or defiant behaviors when they rate themselves as anxious. Using an existing database from an ongoing school mental health project, we examine student data using the *Patient Reported Outcomes Measurement Information System* (PROMIS). This scale allows children to rate the severity of their own anxiety levels. Teachers completed the *Behavior Intervention Monitoring Assessment System* (BIMAS) for each of their students, which measures both externalizing and internalizing behavior problems. The study hypothesis is that boys and girls will have similar self-ratings of anxiety, but teacher ratings of anxiety will match better with girls' ratings than with boys' ratings. Additionally, boys with higher self-ratings of anxiety will be more likely to be rated as oppositional by their teachers. These findings have implications regarding if and how to provide further support to teachers to identify significant anxiety problems, especially in cases where anxiety is masked by behavioral problems.

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UPR167 1:30-3:30

Investigating the Impact of Childhood Social Support and Environmental Unpredictability on Adult Attachment Styles: An Online Survey Analysis

Nevaeh Harris
Psychology

Mentor: Michael Baker, Psychology

This study explores the relationship between perceived childhood social support (pCSS) and unpredictability in childhood environments (i.e., household/school instability) with adult attachment styles among 135 volunteer participants from Introductory Psychology classes at East Carolina University (ECU). Utilizing a confidential online survey, we measured various aspects of participants' childhood experiences, attachment styles, and demographic information, employing established psychological scales. We hypothesize that higher levels of pCSS are positively associated with secure attachment styles in early adulthood. Regression analyses generated by working with ChatGPT 4.0 will be conducted to examine these relationships. The findings, and their implications for psychological interventions targeting attachment-related issues, will be discussed.

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UPR168 1:30-3:30

Defining Passionate Leadership: An Assessment of Effectiveness

Lindsey Fleishman
Communication

Mentor: Rebekah Rogers, Political Science

Leadership is a widely studied discipline, with various styles and theories recognized and their efficacy argued. Currently, transformational leadership is often viewed as a positive impact leaving theory. Researchers such as Robert Vallerand have also ventured to explore passion and break down what makes passion a positive or negative factor in a person's life. However, little scholarly research discusses the cross-section of passion and leadership and how this could be an effective leadership style. This research aims to define passionate leadership, create a theory based on current research on these two subjects, and expand on the rare passionate leadership studies that exist. It also seeks to determine if passionate leaders effectively impact followers and, potentially, the workplace. This research required closely evaluating previous scholarly leadership and passion research through grounded theory. Grounded theory is used to tie together secondary research by creating common themes or codes to determine overall significance. The codes used in this research were basic leadership information, effective leadership, passion definitions, and fields and careers. Through the review of data, conclusions were found when codes overlapped and information became repetitive. For example, preliminary research showed that harmonious passion, as opposed to obsessive, is the target passion leaders should desire to embody to experience success. Overall, creating a definition can expand the leadership studies field and thus improve the workplace. Many people have passion for what they do, have the opportunity to lead, and can leave positive impacts because of it. If employers can understand the benefits of passionate leadership and in which career fields these leaders are most important, they can build training that improves culture and employee wellbeing.

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UPR169 1:30-3:30

Preliminary Assessment of Flood Potential and Treatment of Sediment by Dry Detention Basins in Greenville, NC

Camryn Landreth, Paige Brown
Environmental Health

Mentor: Guy Iverson, Health Education and Promotion

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Over the past several decades, stormwater control measures (SCMs) have played an integral role in urban planning to decrease the damage caused by stormwater. Due to urban development increasing the total impervious area where humans have settled, natural hydrology has been disrupted. This has resulted in increased nuisance flooding and water quality degradation from stormwater. Dry detention basins (DDBs) are a commonly used SCM designed to mitigate peak flow volumes by capturing and storing runoff that is slowly released into the existing stormwater infrastructure. The goal of this study was to characterize functionality and evaluate flood control and treatment of total suspended solids (TSS) by 4 DDBs located in Greenville, NC. According to NC DEQ, 2 of the 4 DDBs are in potentially underserved communities. Onset HOBO pressure transducers were installed in early October 2023 to measure water levels during storms. These data will be used to evaluate storm hydrology and flood control by the 4 studied DDBs. Additionally, samples will be collected from the inlet and outlet of DDBs for at least 1 storm to evaluate TSS concentration reduction. Discharge entering and exiting will also be measured during the storm to estimate mass inputs and exports of TSS. At the time of abstract submission, results are pending data analysis, and this poster will summarize preliminary results for at least 1 storm. Future work will include 2 additional storms to evaluate flood control and TSS treatment (estimated completion: December 2024).

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UPR170 1:30-3:30

Optimizing the Expression and Purification of the C-terminal Domain of Human Cardiac Troponin C for Fluorescence Studies with Calcium and Cadmium Binding

Rudy Sengelmann, Ashton Fields, Riley Warfel, Mac Harrison
Chemistry

Mentor: Anne Spuches, Chemistry

Heavy metal toxicity has been a health concern for many years; however, the mechanisms that these metals use to impart their toxicity remain unclear. Cadmium (Cd), a toxic metal, has been discovered to mimic calcium (Ca), an essential metal, due to the similarity in ionic radii and charge. The Spuches lab focuses on understanding the impact of cadmium binding to human cardiac troponin C, a cardiac muscle protein that binds calcium to promote heart muscle contraction. This protein

contains an EF-hand motif which can be characterized by the helix-loop-helix structure. It is composed of the N terminal domain (NTD) which contains two EF-hand motifs where only one binds a divalent calcium ion (Ca^{2+}) and the C terminal domain (CTD) which contains two EF-hands each binding a Ca^{2+} ion. The overarching goal of this project is to express and purify the CTD so that the interactions of Ca^{2+} and Cd^{2+} to this domain can be studied. To do this, the protein was optimized in pLysS cells with a N-terminus His-tag for easy purification. Through earlier research, the full-length protein was purified using a Phenyl Sepharose column and cleaved into the NTD and CTD at the TEV cleavage site between the two domains. This was then purified using a nickel column, binding to the His-tagged NTD and un-cleaved full-length protein, further purifying and isolating the CTD. Currently, intrinsic fluorescence spectroscopy is being used to study the interactions and mimicry of cadmium to calcium binding human cardiac troponin C. Through further research, there may be a more fundamental understanding of how this mimicry may influence cardiovascular disease and cognitive development concerns.

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UPR171 1:30-3:30

Can you make me stronger?: Antibiotic resistance of *Pseudoalteromonas spp.* & *Bacillus spp.* to prevent corrosion on micro-ecosystems

Savannah Amick, Kaitlin Newcomb, Cory Joyner
Biology

Mentor: Erin Field, Biology

As exploratory efforts advance, more submerged archaeological structures are being discovered which, over time, have become microhabitats for a variety of aquatic life, including bacteria. Bacterial biofilms formed on metal surfaces may contribute to microbiologically induced corrosion (MIC), resulting in structural degradation with negative impacts on structures with both ecological and archaeological importance. Current efforts to lessen MIC have suggested the introduction of bacterial species that produce antibiotics, and their subsequent biofilm could be protective against corroding community members. However, it is not well understood what antibiotics could be effective against bacterial isolates taken from one of these biofilms. To gain insight into this, the bacteria *Pseudoalteromonas spp.* and *Bacillus spp.* Previously isolated from an AI 2024 coupon were analyzed via Kirby-Bauer disk diffusion assay against 9 common antibiotics and their zones of inhibition were measured. We hypothesized that the *Pseudoalteromonas spp.* will be resistant to bacitracin and ampicillin and the *Bacillus spp.* will be resistant to bacitracin. The zone of inhibition measurements reflected that *Pseudoalteromonas spp.* was resistant to bacitracin and ampicillin yet also resistant to strong antibiotics such as tetracycline and carbenicillin, meanwhile, *Bacillus spp.* was resistant to bacitracin. This research will further our understanding of the innate antibiotic resistance of microbial communities capable of attaching to aluminum alloys, as well as provide advice to new efforts reducing biocorrosion.

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UPR172 1:30-3:30

Embedding Acid Scavengers into Melamine/ Formaldehyde Polymers

Yasmin Morales Rodriguez
Chemistry

Mentor: Brian Love, Chemistry

Vacuum pumps stand as indispensable tools within laboratory settings, playing a pivotal role in scientific processes and experiments. These devices are designed to create and maintain vacuum conditions, essential for tasks ranging from filtration and distillation to degassing and solvent evaporation. In laboratories, where precision and control are paramount, vacuum pumps ensure the removal of unwanted gases and substances, facilitating a controlled environment conducive to accurate measurements and analyses. One significant challenge in these environments is the potential for acid corrosion, which can compromise equipment and hinder experimental outcomes. The corrosive nature of acids often arises due to their ability to react with metals, leading to deterioration over time. Understanding and mitigating the effects of acid corrosion is crucial for preserving the longevity and efficacy of vacuum pump systems, thereby enhancing their utility in laboratory settings. To prevent the acid flowing through vacuum pumps, a filter that indicates the presence of acid would be beneficial. One approach we are investigating, is embedding an acid scavenger into a melamine/ formaldehyde polymer. This experiment explores integrating a variety of chromogenic compounds into a melamine/ formaldehyde polymer, aiming to find the best chromogenic compound that is responsive to acid. Simultaneously, the synthesis of derivatives of existing acid/base indicators adds versatility to these compounds, which amplifies the experiment's scope. Compounds such as methyl red, neutral red, crystal violet, Congo red, and alizaren yellow have been used as dye indicators. Although the experimental research is still ongoing, certain dye indicators have produced favorable outcomes.

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UPR173 1:30-3:30

Seedbank analysis of invasive and native plant species found in the soils of a local greenway

Kayleah Nieves and Amelia Claire Moore
Biochemistry

Mentor: Carol Goodwillie, Biology

When plants reproduce their seeds may become stored in a seed bank where they remain inactive until a disturbance occurs. The seed bank of an area can be made up of native and introduced plants, some of which may become invasive. Invasive plants with high growth rates can cause harm to other plants in the ecosystem by outcompeting them and monopolizing resources. In this study, we examined the seed bank of a local greenway to determine the relative abundance of native and invasive plants in shallow and deep soils and compare their growth rates. In September 2023, 16 soil cores were taken from a greenway in Greenville, NC, and split in half to compare the shallow and

deep seed banks. Soil samples were then transferred into their own individual pots and placed on top of potting soil. In total 32 pots were made, with 16 from shallow and 16 from deep soils. These pots were kept in a growth room where they were exposed to natural and artificial light. Seedlings that emerged were identified as different types by appearance, counted, and removed. Representative plants of each type were transferred to separate pots and identified to species when plants bloomed. To determine the growth rate of the species, biomass was measured by drying and weighing them after they had grown for 11 weeks. Over the course of the experiment, 489 seedlings emerged from the pots with 88% found in shallow soils. In total, 42 different plant types emerged, and 26 were identified to species, representing 17 families. Of the 26 species, 16 are known to be introduced from another region. Invasive species were more common in shallow soils (20% of total number of seedlings) than in deep soils (5%). What we found is consistent with our understanding that successful invaders have high seed production rates, allowing them to have a constant presence in shallow seedbanks.

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UPR174 1:30-3:30

Kinetic Investigations of Solvent Effects on Human Epithelial 15-Lipoxygenase-2 (15-LOX-2)

Soham Patel
Biology

Mentor: Adam R. Offenbacher, Chemistry

Lipoxygenases (LOXs) are non-heme, iron-containing enzymes that catalyze the oxidation of polyunsaturated fatty acids, resulting in the formation of potent, bioactive cell signaling mediators. Human epithelial 15-lipoxygenase-2 (15-LOX-2), one of six human LOXs, plays an important role in homeostasis and is implicated in the formation of atherosclerotic plaques, a contributor to cardiovascular disease. 15-LOX-2 is structurally solved and has well characterized kinetic isotope effects reported for its natural substrate, arachidonic acid (AA), which revealed the initial hydrogen transfer as rate-limiting for the reaction. Accumulating evidence has suggested that conformational fluctuations of a protein may mediate hydrogen transfer processes. Conformational motions can be influenced by solvent effects. Viscogens, such as trehalose and glucose, along with pH and temperature changes can be used to test solvent effects on the conformational fluctuations of a protein. This presentation will highlight the kinetic data for the reaction of 15-LOX-2 with AA as a function of pH, temperature, and viscosity. Most notably, the data suggests that the reaction is inhibited in a concentration dependent manner by the viscogens trehalose and glucose. The kinetic investigations conducted provide insight into the roles of solvent layers in LOX-catalyzed reactions.

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UPR175 1:30-3:30

Fibrinogen: The Mastermind Behind Thrombosis in Pregnant Women.

Maria A. Gonzalez Mundarain
Biology

Mentor: Nathan Hudson, Physics

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Fibrinogen is a glycoprotein that circulates in the blood. Its main purpose is to add strength and structure to a blood clot when a blood vessel is injured or compromised. Thrombosis is the decrease in blood flow due to the formation of a clot within a vessel, and poses an increased risk during pregnancy. This elevated risk likely stems from increased fibrinogen concentrations and changes in fibrinogen's posttranslational modifications during gestation. In particular, nascent evidence has suggested that increased sialic acid content of fibrinogen's glycans during pregnancy correlates with thrombosis risk.

To understand the relationship between fibrinogen concentration and thrombosis risk during pregnancy, we tested the plasma of pregnant women during the first and last trimester.An accurate quantification of fibrinogen in plasma will be accomplished by performing an Enzyme-Linked Immunosorbent Assay (ELISA). To test sialic acid content, an affinity column was used to purify the protein in the sample. An existing protocol was modified to include dilution of the sample and the use of a protein-compatible filter.After affinity purification, the protein is concentrated and ran in a Fast Protein Liquid Chromatography (FPLC) which separates molecules based on size.

After purification, sialic acid quantification kits, will quantify how the sialyation of asparagine sites changes during pregnancy. We hypothesize that changes in sialation results in an increased risk of thrombosis in the latter stages of pregnancy due to previous studies that suggest that sialic acid content affects the morphology of blood clots. We also plan to quantify clot structure and polymerization as pregnancy progresses.

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UPR176 1:30-3:30

Illuminating Collagen: Exploring Triple Helix Formation with Fluorescence Kinetics

Rachel Smith, Jordan Stanley
Chemistry

Mentor: William Allen, Chemistry

Collagen is a vital and abundant protein in the human body. Synthetic collagen shows promise in wound healing and uses in gastrointestinal surgical repair. As such, it is critical that it is well understood. Additionally, there is a need for applicable quantitative methods that are sensitive, efficient, and effective. This research aims to address those needs by synthesizing collagen chains

with the addition of a luminescent non-native amino acid, a modified naphthalimide. Naphthalimide linkers will be synthesized to include a hydrocarbon head and tail group of varying lengths. The individual peptide chains can be described by the general form (Xaa-Yaa-Gly)n in which Xaa and Yaa are Proline and Hydroxyproline. This repetition gives way to the name of (POG)n repeats.

The research aims to use fluorescence spectroscopy in place of circular dichroism, which can be slow and insensitive, to do temperature dependent kinetic studies on the triple helical structure of these peptides. This work will have implications on applicable methods for the quantification of triple helices as well as provide information on collagen shape and structure with the addition of non-native amino acids.

So far, synthesis has been completed on naphthalimide linkers with three, four, five and six hydrocarbon symmetric head and tail groups as well as some non-symmetric isomers. Collagen peptides have been synthesized to include the six hydrocarbon symmetric naphthalimide. Peptides consist of seven POG repeats with varying placement of the fluorophore; at the N-terminus, after two POG repeats, and after four POG repeats. Changes in kinetics can then be examined based on the position of the fluorophore. Preliminary UV-Vis studies show the folding is slow enough to be manually monitored.

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UPR177 1:30-3:30 ences

Saba KhanmohammadInvestigating **the restoration success of living shorelines using parasites.**

Louise Zango
Biology

Mentor: Rachel Gittman, Biology and Coastal Studies Institute

Megan Geesin, Coastal Studies

April Blakeslee, Biology

For decades, coastal areas worldwide have faced many threats from erosion, storms, and sea level rise events. Studies have shown the importance of living shorelines, which help reduce erosion, serve as protection during storm events, and purify surrounding water. However, more studies are needed to determine how faunal communities change after living shoreline installation. We have used parasites found in crabs to better understand and compare the benefits of living shoreline materials. By using the known life cycles of parasites, we can make inferences about what other fauna are in the system. For example, if a parasite found needs a blue heron to complete its life cycle, we can assume that there are blue herons in the ecosystem. Our study sites consist of 4 private waterfront properties with living shorelines that were constructed in 2022. We sampled our sites for parasites immediately post-restoration in August and September to determine how the parasitic and free-living communities are changing post-restoration. I expect that due to the structural differences between the control sites and living shoreline sites, the parasite communities of the living shoreline sites, and control sites will be significantly different. To test the hypotheses, different measurements

will be used to look at the habitat effect on targeted species. Some of the species that will be measured and dissected include blue crabs, stone crabs, and mud crabs, which will help determine the diversity and food web complexity at each site. Crabs collected at our sites have been dissected for parasites and identified to the lowest taxonomic level possible.

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UPR178 1:30-3:30

Soil seedbank study of a recovering meadow community of pollinator-friendly species

Carson Butts
Biology

Mentor: Carol Goodwillie, Biology

Soil seedbanks, a natural storage of dormant underground seeds, serve as a repository for future flora progeny and can play a crucial role in the restoration of meadows that support pollinator communities. Pollinators, such as bees, are critical for the fertilization of more than 80% of all plant species, including >60% of global crop species. The goals of this study were to determine if the seedbank of a former meadow community of pollinator-friendly species was retained in the soil after several decades of continuous mowing to maintain a grassy lawn. We compared the seedbank between the edge and center of our three sampling sites to determine the influence of seed dispersal from nearby undisturbed native meadows. Our testing sites were at the West Research Campus (WRC), an East Carolina University property in northwest Greenville, NC. We collected soil samples on the edge of the grassy habitat and the center, about 10-20m from the edge. We transported the collected soils to a greenhouse on ECU's campus where we processed and potted the samples and used the seedling emergence method to quantify and characterize the seedbank community. This method consists of keeping the soils under optimal conditions to promote the germination of as many species as possible to determine what seeds are present. A total of 675 seedlings of 34 species emerged. Of the 34 species, 21 were forbs while the remaining species were grasses and grass-like species that are wind-pollinated. Approximately 56% of the total seedlings were weedy species, which are relatively small plants with small flowers that would not contribute many resources to pollinators. While we found no variation when comparing the center and the edge of our sites, we did find that the sites varied from each other. We concluded that, after several decades of mowing, the seedbank alone does not retain the potential for the restoration of a pollinator-friendly meadow. We suggest that the seeding of native plants is necessary for the pollinator meadow community to be restored at the WRC.

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UPR179 1:30-3:30

The Effect of Knee Extension at Impact from Landing on Femoral Cartilage Thickness in Recreationally Active Adults

Will Goodwin, Starrett Vesper, Matthew Blount, Lily Szwejbka
Public Health

Mentor: Anthony Kulas, Kinesiology

Background: Post Traumatic Osteoarthritis [PTOA] is a type of osteoarthritis which occurs in individuals who have previously had a tear in the Anterior Cruciate Ligament [ACL] and who have had reconstructive surgery to correct the tear. Following the reconstructive surgery PTOA develops as early as 10 years later. Poor landing technique plays a role in added strain placed on the ACL and further, tears in the ACL. Poor landing technique also has the potential for Femoral Cartilage Thickness [FCT] deformation. Higher knee extension at initial impact would mean the force of impact would be directed directly through the femoral cartilage. This greater force passing through the cartilage would presumably increase the compression of the cartilage.

Purpose: The purpose of this study is to investigate the effects of knee extension during impact on changes in femoral cartilage thickness

Methods: 20 recreationally active females and 20 recreationally active males between the ages of 18 and 25, with no prior knee injuries, will be analyzed in this study. The research subject will complete informed consent documents, fill out the KOOS knee survey and then indicate their level of physical activity. This is to ensure the subject has no knee injuries or other conditions which would exclude them from the study. After this the subject will have ultrasound images of both knees taken to establish baseline cartilage thickness. Subjects will then perform two sets of ten drop jumps from a height of 30 cm. In between each set of jumps, ultrasound images will again be taken of both knees. The jumps will be video recorded in the frontal and sagittal plane. These videos will be analyzed in Kinovea. Three total jumps most representative of the subject's performance will be analyzed . The Landing Error Scoring System tool will be used to determine the extent to which subjects landed with the knee relatively extended or flexed.

Results: This is an actively ongoing research study and results will be presented during RCAW.

Conclusion: This study will compare cartilage compression in males and females between the ages of 18 and 25, to higher levels of knee extension at impact. From this comparison, a possible relationship between FCT compression and knee extension will be established. If this relationship is supported then the results would suggest the need for further research into knee extensions' effect on femoral cartilage injuries.

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UPR180 1:30-3:30

Protein Biomarkers for Mitochondrial Dynamics in the Forebrain of Aging Rats

Lizzie Phipps
Multidisciplinary Studies

Mentor: Erzsebet M. Szatmari, Physical Therapy

Background and Objectives:
Mitochondrial dysfunction is an early hallmark of neurodegenerative disorders. The goal of this study was to analyze the expression of mitochondrial markers using healthy brain tissue that are typically altered in Alzheimer's disease (AD). The mitochondrial markers presented in this study are Mitochondrial Calcium Uptake 1 (MICU1), an indicator of mitochondrial calcium uptake, and Sirtuin3 (SIRT3), a marker of mitochondrial biogenesis and a "shield" against mitochondrial dysfunction associated with aging and neurodegeneration. Our project focused on whether the protein alterations were specific to AD or if they also occur in the normally aging brain.

Methods:
Two age groups (3- and 10-12 months old) of Fischer female rats (F344) were used in this study. The Pierce Mitochondrial Isolation kit was used to perform mitochondrial protein extraction from frozen forebrain tissue. After performing protein assays, whole cell lysates and mitochondrial fractions were used in western blotting to evaluate the expression of MICU1 and SIRT3 in the samples. Protein bands were quantified using FIJI/Image J. For statistical analysis and figure preparation, we used GraphPad Prism 10; BioRender and Adobe Photoshop and Illustrator.

Results and Discussion:
MICU1 opens the Mitochondrial Calcium Uniporter (MCU) leading to mitochondrial Ca2+ overload, ROS production, and cellular stress. Inhibiting the MCU has been proposed as a therapeutic target against AD. We found a significant age-dependent upregulation of MICU1 in whole cell lysates with no significant difference between age groups for the mitochondrial fractions. The processed short form of SIRT3 is mostly localized to the mitochondria where it controls metabolic functions, while the full-length form of SIRT3 is localized to the nucleus to modulate stress-related and nuclear-encoded mitochondrial genes. Mitochondrial SIRT3 was shown to be reduced in the AD brain. In the middle-aged brain, SIRT3 expression increased in the whole lysates, while mitochondrial SIRT3 levels decreased with aging.

Conclusions:
We conclude that the total level of MICU1 and SIRT3 increases with aging in the brain as a potential compensatory mechanism. Uncoupled changes in the mitochondrial fractions of MICU1 and SIRT3 might be due to reduced protein translocation efficiency between the cytoplasm and mitochondria as a result of aging.

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UPR181 1:30-3:30

The importance of the novel desiccation tolerance factor *dtpC* in *Acinetobacter baumannii*

Gary Li, Greg Wells
Biology

Mentors: John M. Farrow III, and Everett C. Pesci, Microbiology and Immunology

Acinetobacter baumannii is a multi-drug resistant opportunistic pathogen that can survive on dry surfaces for extended periods. This poses a problem in healthcare facilities where contaminated medical equipment can be a severe problem for extremely ill patients. The high rates of drug resistance and its ability to spread in healthcare settings have led A. baumannii to be recognized as an "urgent threat" by the U.S. Centers for Disease Control and Prevention and a top priority for developing new treatments by the World Health Organization. In Acinetobacter species, a stressed-induced locus encodes multiple desiccation tolerance factors that are needed for survival on dry surfaces. This study aims to understand the role of one of these genes, dtpC, which appears to encode a novel desiccation tolerance factor. To understand dtpC, we performed RT-PCR on RNA isolated from A. baumannii cells. It was seen that dtpC is co-transcribed with the catalase-encoding gene, katE. To observe if both dtpC and katE are necessary for protecting A. baumannii cells from desiccation, we performed a drying assay on the desiccation-resistant strain ATCC 17961, along with a mutant lacking the stress-induced locus (ΔSL). We found that the ΔSL strain significantly decreased in survival rate after 7 days of drying. When complemented with dtpC, growth partly improved. However, when complemented with both dtpC and katE, growth improved to near wild-type levels. To find out if DtpC has any similarities to known desiccation tolerance factors based on structural similarities, we compared the predicted protein structure of DtpC from AlphaFold to known protein structures. We saw that DtpC possesses a domain similar to heme-oxygenase-like diiron oxidases (HDOs), such as SznF, which utilizes oxygen as a co-factor to drive enzymatic reactions. These results show that DtpC is unique and has an essential role in desiccation survival in A. baumannii. Further studies to understand this novel desiccation survival factor will provide more information on how A. baumannii persists in hospitals, with the goal of developing new strategies to improve facility sanitation and patient safety.

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UPR182 1:30-3:30

Neuroimmunotoxicological effects of short-term exposure to PFAS found in North Carolina surface waters

Yveonna West
Multidisciplinary Studies

Mentor: Jamie DeWitt, Psychology

Per- and polyfluoroalkyl substances (PFAS) are a large class of synthetic chemicals used in many industrial and consumer products. Due to widespread use, they are now found as pollutants in natural environments and in bodies of living organisms. In parts of North Carolina, surface waters have been contaminated by PFAS not been as well-studied as other PFAS. Over the past two

decades, toxicity studies have highlighted that exposure to other PFAS is associated with many different types of toxicity, including immunotoxicity and neurotoxicity. While immunotoxicological findings in exposed human populations and animal models are strong, data linking neurotoxicity are lacking. Due to connections between the immune and nervous systems, we hypothesized that microglia, resident immune cells of the central nervous system, and markers of inflammation would be modified by PFAS exposure at levels likely to impact other arms of the immune system. Adult male and female C57BL/6 mice were orally exposed to one of three doses of perfluorohexanoic acid, sodium perfluoro-3,5,7,9,11-pentaoxa-dodecanoic acid, or a control for 30 days. Six days before dosing ended mice were i.v. injected with an antigen to stimulate antibody responses for immunotoxicological investigations. One day after dosing ended, mice were humanely euthanized and brains were excised, weighed, and processed for embedding in paraffin. Brains were sliced at 10 μM on a rotary microtome starting with the pre-frontal/frontal cortices and eight sections/brain were mounted onto slides. Sections were stained immunohistochemically; half were stained with anti-ionized calcium binding adaptor molecule (anti-Iba1) to identify microglia and half were stained to identify 1L-1β, a pro-inflammatory cytokine. Images of two regions of interest (ROIs)/slide will be captured at 20X magnification. Relative staining intensity for all ROIs will be determined with the Fuji plug-in for Image J and on sections stained with anti-Iba1, all microglia will be counted in ROIs. Once data have been collected, differences in numbers of microglia and staining intensity for microglia and 1L-1β among dose groups will be statistically analyzed. Differences in these endpoints between the two PFAS also will be evaluated to determine if they vary in potency. These findings will help to shed light on whether neuroimmunotoxicological concerns exist for these PFAS found in surface waters of North Carolina.

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UPR183 1:30-3:30

The Detection of Heavy Metals in Teeth Using XRF Measurements

Mary Wells
Biology

Mentor: Dr. Stephen Moysey, Geological Sciences

Abstract: The microbiome of the oral cavity has a tight correlation with the health and function of the overall body, including the environment in which one lives. This study investigates whether heavy metals can be detected in teeth using a portable X-Ray Fluorescence (XRF) instrument as a preliminary step toward using teeth as indicators of heavy metal pollution in local drinking water systems. Barry Commoner proposed the first law of ecology which states: "everything is connected to everything else (B. Commoner, "The Closing Circle, 1971). This ecological law will be used to better understand the interconnections of the heavy metals to be studied.

The beginning stages of this research were to verify the portable XRF as a viable tool for heavy metal detection in teeth. In the research, 15 permanent teeth and 1 deciduous tooth were analyzed with a portable XRF. The teeth were categorized by maxillary and mandibular dentition. Both dentitions were sub-categorized by molar, premolar and anterior morphology. All teeth, excluding the primary tooth, used for this investigation have already been diagnosed to have irreversible decay by a North Carolina licensed dentist prior to the extractions.

For each tooth, measurements were performed on the facial, lingual, and buccal surface. We hypothesized that molars may have higher levels of heavy metals than anterior teeth due to the higher density of blood vessels posteriorly, anatomically speaking. The higher density of blood vessels may allow heavy metals to become more easily incorporated in teeth by transporting through the blood stream from the bone marrow within the human skull. The analysis revealed higher heavy metal levels in posterior teeth compared to anterior teeth

The following heavy metals were detected in the teeth: Arsenic, Mercury, Cadmium, Lead, Chromium, Aluminum, Iron, Cobalt, and Zinc. The XRF can detect the concentrations and thickness of the alloys and metals within most samples. Results have found that heavy metals in maxillary and mandibular anterior teeth were below rate of detection threshold. However, the two highest concentrations found were Mercury, with a statistical analysis of .104

$\pm$

.268 and Zinc, with a statistical analysis of .141

$\pm$

.366.

Motivations: Notations of commonality in the concentrations of heavy metals detected may determine how influential teeth are as bioindicators for pollutants in local drinking water supplies.

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UPR184 1:30-3:30

Structural abnormalities that result in functional impairments due to metabolic disease.

Jasmine Castro and Andrea Pereyra
Biology

Mentor: Jessica Ellis, Physiology

Pathological lipid accumulation compromises tissue structure and function and occurs during organ failure. Liver and skeletal muscle are especially prone to lipid build-up, commonly caused by metabolic, degenerative, and genetic diseases. While tissue structure and function decline in organ failure, the mechanisms leading to failure are incompletely understood. Herein, we posit to use a novel genetic model of fatty acid oxidation (FAO) deficiency to study muscle and liver failure. Carnitine-Acylcarntine Translocase (CACT) is key for FAO, facilitating the flux of long chain fatty acylcarnitines into the mitochondria for beta-oxidation and energy production. We found that loss

of CACT results in muscle contractile dysfunction and liver failure in response to ketogenic diet. Here, we sought to determine the pathological impact of FAO loss-induced organ failure. We used transgenic mice lacking CACT in skeletal muscle (CactSkMu KO) or mice lacking CACT in the liver (CactLiv KO) that were fed either control or ketogenic diet to induce liver failure. Tissues were processed for pathological analysis using stains for triglyceride (Oil Red O), mitochondrial content (Modified Gomori), and nuclei and cytoplasm integrity (H&E). Functional muscles from control mice and the extensor digitorum longus muscle of CACTSkMuKO were compared to the CACTSkMuKO soleus muscle which fails to contract. Compared to control muscles, CACTSkMuKO soleus muscle demonstrated significantly more misaligned muscle fibers, excessive mitochondria, macrophage infiltration, and high lipid accumulation. Healthy liver pathology of control mice and control-diet fed CACTLivKO mice were compared to ketogenic diet fed CACTLivKO who undergo liver disease and failure. Compared to control liver, diseased CACTLivKO liver pathology demonstrated larger and excessive lipid droplets and defected hepatic lobules. In addition to diet-induced liver failure, we observed pregnancy induced liver failure in CACTLivKO. In agreement with the pathology observed in the diet-induced liver failure model, we observed larger sinusoids and excessive lipid accumulation in pregnancy-induced liver failure. Molecular and signaling mechanisms involved in organ failure will be investigated in conjunction with the pathological impact on the liver and skeletal muscle described herein. Together this work will inform prevention methods for patients with metabolic, degenerative, and genetic diseases that are at risk for organ failure.

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UPR185 1:30-3:30

Developing a systematic review of the neurotoxic effects of per- and polyfluoroalkyl substances

Ashanti Moore
Multidisciplinary Studies

Mentor: Jamie DeWitt, Psychology

Per- and polyfluoroalkyl substances (PFAS) are a large class of synthetic chemicals used in many industrial and consumer products. Due to their widespread use, they are now found as pollutants in most natural environments and in the bodies of living organisms. Over the past two decades, toxicity studies have highlighted that exposure to PFAS is associated with many different types of toxicity, including neurotoxicity. However, to date, a systematic review of neurotoxicity has not been conducted even though neurotoxicological findings have been identified for some PFAS. Using systematic review criteria developed by the U.S. Environmental Protection Agency (EPA) Integrated Risk Information System (IRIS), a search for published neurotoxicity studies was conducted for six individual PFAS (PFOA, PFOS, GenX, PFBS, PFHxS, and PFNA). These PFAS were chosen as they are being considered for regulation under the Safe Drinking Water Act by the U.S. EPA. A list of search terms was developed and PubMed and Google Scholar were manually searched for published epidemiological, experimental animal, in vitro, and/or in vivo studies. Studies were briefly evaluated to confirm that they included neurotoxicological endpoints (i.e., behavioral, neurochemical, and/or histopathological) and exposure to one or a mixture of the six PFAS under

consideration. Using U.S. EPA IRIS systematic review criteria, studies will be assessed for myriad parameters, including risk of bias, study quality, subject selection criteria, etc. Once studies have been evaluated, an evidence map will be created to determine the strength of the evidence for a link between exposure to the six PFAS and neurotoxicological outcomes.

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UPR186 1:30-3:30

How does anxiety influence shooting performance?

Ellie Cleary
Exercise Physiology

Mentor: Erin Moore, Kinesiology

Soldiers need to be able to shoot effectively to complete their missions. As missions can produce symptoms of anxiety that are somatic (physical manifestations, e.g., muscle tension, butterflies) and cognitive (mental manifestation; e.g., thoughts, worry), it is necessary to better understand how anxiety influences soldiers' shooting performance. Anxiety is defined as an increase in tension and uneasiness in preparation for a perceived or real threat. Anxiety symptoms can be interpreted as facilitating (positive interpretation) or debilitating (negative interpretation). Previously, researchers conducting a study on Olympic air-rifle shooters found shooters with low state anxiety were able to perform better than shooters with high state anxiety. This result supports that it is important to study the effect of anxiety on shooting performance generally, but the limitation of that study was the researchers did not explore the connection between facilitating and debilitating anxiety with shooting performance. In the current study, data was collected as part of a bigger overarching study with ROTC cadets. Cadets participated in a shooting simulation taking 45 shots at targets at three different distances. After completing their simulated shooting task, the cadets completed a post-survey which included the Competitive Sport Anxiety Interactive-2 for assessing their somatic and cognitive anxiety symptoms frequency and if they interpreted those symptoms as debilitating (-3 to -1) or facilitative (+1 to +3). First, the reliability was calculated for each scale score; all anxiety scores met the 0.70 alpha criterion. Second, the averages were taken for each scale score and performance and as follows: performance (M = 23), cognitive anxiety (M = 5.23), cognitive intensity (M = -1.74), somatic anxiety (M = 8.0), and somatic intensity (M = -1.59). Third, the correlations between the cadets' overall performance score and their anxiety responses were examined. Only somatic intensity was significantly related to shooting performance (r = -.25, p < .05). The relationship between performance and somatic anxiety (r = -.22), cognitive anxiety (r = -.01), and cognitive intensity (r = .17) were not significant. The results indicate that the intensity of somatic anxiety can hinder performance. This means that educating soldiers on how to interpret their somatic response as positive and less intense can help them perform better and be more effective on their missions.

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UPR187 1:30-3:30

Identifying compounds that block HTLV-1 infection and pathogenesis

Gabriel Gibson, Kimson Hoang, Nicholas Polakowski
Microbiology and Immunology

Mentor: Isabelle Lemasson, Microbiology and Immunology

The human T-cell leukaemia virus type 1 (HTLV-1) is the first discovered pathogenic human retrovirus. Five to ten million people are estimated to be infected with this oncogenic virus globally. Approximately five percent of those infected will develop a rare form of cancer, known as adult T-cell leukaemia (ATL), that can affect the blood or lymph nodes; and another five percent will develop a neuroinflammatory disease that presents similarly to multiple sclerosis. HTLV-1 infection relies on interactions between host CD4+ T-cells. We discovered that the viral protein HBZ interacts with the KIX domain of the cellular coactivators p300/CBP, which cause changes in gene expression that facilitate the spread of infection. p300/CBP regulates gene expression by acetylating histone proteins on chromatin, which upregulate transcriptional activation. We discovered that HBZ activates the cellular gene MYOF through recruitment of p300/CBP. The MYOF gene encodes myoferlin, a protein that regulates vesicle tracking and reduces the HTLV-1 envelope (Env) protein's transportation to lysozymes. This reduces degradation of Env and enhances viral infection, as Env persists to facilitate infection. Myoferlin also increases adhesion of infected host CD4+ T-cells, facilitating spread of HTLV-1. The HBZ:p300/CBP complex activates the transcription of other genes potentially related to the pathogenesis of HTLV-1: DKK1, a potential regulator of ATL associated hypercalcemia, as well as FOXP3, and CCR4, genes associated with the ATL phenotype. We hypothesize that specific inhibition of the HBZ:p300/CBP complex will reduce HTLV-1 infection and pathogenesis of ATL. We used HeLa UAS LUC cells to identify inhibitors of the HBZ:p300/CBP complex from a library of 300 compounds. This cell line contains the GAL4 upstream activator sequence (UAS), which drives transcription of the luciferase reporter gene. HBZ is bound to the Gal4 DNA binding domain that can bind to the UAS sequences. When HBZ is recruited to DNA it interacts with the KIX domain of p300/CBP which results in luminescence. We have found 30 compounds that inhibit luciferase activity, indicating reduced recruitment of p300/CBP, at 10 _M concentration or less. These screened compounds are now being tested on HTLV-1 infected cell lines, using quantitative real-time PCR to measure changes in expression of genes related to HTLV-1 infection after treatment. Finally, we will test the most promising compounds in HTLV-1 infection assays.

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UPR188 1:30-3:30

The Efficacy of Blue Light in Decreasing Physiological Fear Responses

Kamilah Muhammad
Multidisciplinary Studies

Mentor: Nicholas P. Murray, Kinesiology

Mental health issues involving the psychological concept of fear conditioning are rapidly increasing in prevalence among today's society. Fear conditioning commonly affects individuals in the form of PTSD, generalized anxiety disorder, and specific phobias. Specific phobias elicit irrational fear in individuals when there is no apparent threat present. Specific phobias can decrease an individual's quality of life by preventing them from engaging in activities and occupying certain environments. Blue light has been found to increase serotonin levels, which are relatively low in individuals exhibiting anxiety. The purpose of this study is to determine if blue light therapy decreases physiological fear responses in individuals experiencing specific phobias. Using EEG, ECG, and eye movement, an individual's physiological fear response will be measured upon exposure to a fear-inducing stimulus. Blue light therapy will then be administered for 30 minutes, and physiological readings will be collected a second time. Final analysis will be executed by calculating asymmetry relation ratio of the frontal brain area and utilizing t-test methods.

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UPR189 1:30-3:30

Determining the Effect of Sex on Femoral Cartilage Thickness (FCT) Changes Following Drop Jumping Activities in Healthy Individuals

Starrett Vesper, Will Goodwin, Matthew Blount, Lily Szwejbka
Exercise Physiology

Mentor: Anthony Kulas, Kinesiology

Background: Previous research indicates that female's cartilage responds to both applied loads and injury differently than male's cartilage. Although no study has looked directly at the effect of sex on FCT changes, data from previous studies related to knee cartilage deformation seems to point to the fact that male's cartilage is more adaptable and thus better able to respond to stress than female's cartilage. Determining if this is true and why this might be the case will play an important role in understanding the development of osteoarthritis as well as the treatment of patients post-surgically.

Purpose: The purpose of this study is to determine the effect of sex on FCT changes following drop jumping activities in healthy individuals.

Methods: Participants will have 4 control ultrasound images taken of each knee to establish a baseline thickness of their femoral cartilage. Participants will then complete two series of 10 drop landings from a 30 cm platform. After each set of drop landings, 3 more images will be taken of each knee. After all images are collected, they will be exported to an external computer software program, Horos. This software will be utilized to measure the thickness of the femoral cartilage across three different regions: medial, intercondylar, and lateral. This analysis will be done for images taken at each point during the experiment so that the adaptations of the cartilage can be visualized throughout activity and a baseline can be established for how males' cartilage adapts to drop landings. Mixed Model ANOVAs with repeated measures on condition (3) and a between factor of sex will be performed.

Results: This is an ongoing research project and results will be reported during research and creative achievement week.

Significance: If there are measurable differences in FCT changes between the sexes, we may use this data to begin understanding why we see certain conditions such as osteoarthritis and ACL tears more commonly in females than in males. Additionally, if healthy males and females who are recreationally active experience different loading patterns in their cartilage, as measured by changes in FCT, while doing the same activity it would ultimately be important to discover what is causing this variation.

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UPR190 1:30-3:30

Development of novel molecular optogenetic tools to study Hirano body formation in neurons

Maelee Becton
Multidisciplinary Studies

Mentor: Erzsebet M. Szatmari, Physical Therapy

Maelee Becton1, Keerthana Surabhi1, Lizzie Phipps1, Noah Mann2, Robert Hughes2, Erzsebet M. Szatmari1
1- Department of Physical Therapy, College of Allied Health Scieces, East Carolina University
2- Department of Chemistry, East Carolina University

The pathology of neurodegeneration is extremely complex between neurodegenerative diseases, especially considering the variety of impacts and symptomatology. Cytoskeletal dysregulation, particularly involving actin-ATP interactions, is a common feature in neurodegenerative diseases such as Alzheimer's, Parkinson's, and Huntington's. This study focuses on understanding the structural factors in correlation with the impact of point mutations within the actin-ATP binding site. This is due to the potential impacts of abnormal actin structures as hallmarks of neurodegeneration. Point mutations were introduced into the actin-ATP interface, and their effects were investigated in mouse cortical neuron cultures. The study revealed distinct cytoskeletal phenotypes, including cofilin-actin rod formation and aberrant clustering. The results highlight the critical role of the actin-nucleotide binding pocket in regulating actin function and its response to stress conditions. Furthermore, the research identified specific mutants, such as G158L along with S14V which was reported previously resulted in a cofilin-actin rod phenotype with structural destabilization leading to rod-like formations reminiscent of pathological actin-cofilin rods found in neurodegenerative diseases. Two mutants (K18A and D154A) exhibited large cluster phenotypes, similar to Hirano bodieswith dramatic impacts on actin subcellular distribution. In conclusion, this study highlights the importance of actin-ATP interactions and their effects on cytoskeletal abnormalities. The findings have greater implications on the identification and treatment of cytoskeletal aberrations as they could be applied to the pathology of neurodegenerative diseases.

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UPR191 1:30-3:30

MADCAM-1 and TNF-α Expression Reduced in GPR4 Knockout Mice Given Immune Checkpoint Inhibitor Immunotherapy

Luke Boldt, Mona A. Marie
Public Health

Mentor: Li V. Yang, Internal Medicine

Immunotherapy medications have become very common in the field of oncology as an effective treatment against many forms of cancer. Patients who begin immunotherapy sometimes develop immune adverse-related events (irAEs), such as colitis or inflammation of the colon, forcing them to pause treatment temporarily or indefinitely. The occurrence of inflammation has been linked to pH-sensing G-protein coupled receptors (GPCRs), specifically GPR4, which acts as a pro-inflammatory receptor expressed mainly in vascular endothelial cells and blood vessel-rich tissues. Inflammatory cytokine TNF-a is commonly upregulated in inflamed tissues containing the GPR4 receptor. Endothelial cell adhesion molecule MADCAM-1 is also upregulated during inflammatory responses and is only expressed in mucosal or sub-mucosal regions of the colon, making the molecule a desirable target for preventing colitis. MADCAM-1 interacts with leukocyte integrins on the cell's surface to direct leukocyte infiltration, further exacerbating inflammation.

It was hypothesized that the lack of GPR4 could downregulate inflammatory cytokine TNF-a and endothelial cell adhesion molecule MADCAM-1 expression in inflamed tissues, leading to a decrease in the severity of immunotherapy-mediated colitis. Our results show that mice who contain the GPR4 receptor and were given an immune-checkpoint immunotherapy medication had increased TNF-a and MADCAM-1 expression compared to GPR4 knock-out and immunotherapy control groups. In the absence of GPR4, the severity of colitis was significantly reduced, as well as the levels of TNF--a and MADCAM-1 expression. Conclusions from this research could be used in developing antagonists specifically targeting the GPR4 receptor as a possible approach to lessen the severity of colitis.

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UPR192 1:30-3:30

Mineralizing a Dentin-like Structure for Clinical & Educational Applications with Calcium Phosphate and gelMA.

Bailey Gentle, Sarah Gillespie, Gabrial Abuna, Alex Vadati
Dental Medicine

Mentor: Saulo Geraldeli, Dental Medicine

Introduction: GelMA has superior cell adhesion and higher porosity compared to stiffer counterparts. This facilitates improved distribution of calcium and phosphate ions within the hydrogel, promoting enhanced mineralization throughout the 3D network. However, gelMA alone

does not mineralize in the absence of cells. To address this limitation, we propose augmenting gelMA composition with collagen Type I and evaluating its hardness and modulus of elasticity when combined with a calcium phosphate solution.

Objective: We hypothesize that mixing gelMA, collagen, and calcium phosphate solution at specific concentrations will yield a dentin-like tissue. Our aim is to assess the hardness and modulus of a construct composed of gelMA/collagen to calcium phosphate solution at a 3:1 ratio.

Subjects/Materials & Methods/Case or Case Series Report: A gelMA and collagen solution, containing 1.5mg/mL collagen, was prepared. This was mixed with a phosphate hydrogel solution at a 3:1 ratio. Gelation was induced by incubating the solution at 60°C for 2 hours. A 3.34M calcium nitrate tetrahydrate solution was then added in equal volume and left for 72 hours for mineralization. The resulting product was a gelMA/collagen infused HAp–PAA composite.
Two samples were embedded in epoxy resin and polished using an EcoMet 30 in decreasing coarseness. Material hardness was measured using KLA's iNano Nanoindenter with testing parameters set at a 50mN load and 250nm depth. Each sample underwent four indentations at different locations, resulting in eight data points.

Results/Discussion: After running eight tests on the samples, the hardness was an average 0.204 gPa plus a standard deviation of 0.089. The average modulus was 18.98gPa with a standard deviation of 12.03. The reported values on the literature for dentin hardness and modulus are 1.0gPa and 19gPa, respectively. Out of eight tests conducted, three reported hardness and modulus values of 0, which were excluded from the data. These zero values might indicate nonuniform mineralization homogeneity in the material. Additional experiments are underway to investigate mineralization uniformity.

Conclusions: GelMA mixed with type I collagen and a calcium phosphate HAp–PAA solution forms a structure with hardness akin to natural dentin.

Undergraduate Online Poster Presentation Abstracts
(Synchronous via MS Teams)

UOP01 1:00-1:15 **Jillian Conroy,** Exercise Physiology
Social Sciences   Assessing First-Year Physician's Assistant Students About Physical
Activity
Mentor: Bhibha Das, Kinesiology

Although physical activity is a critical behavior that is part of a healthy life; in the United States, only 20% of US adults meet physical activity and public health guidelines. The benefits of physical activity are numerous and can positively impact a person's overall health. One potential strategy to improve overall physical activity levels in the United States is to implement physical activity in a a healthcare setting PURPOSE: The purpose of this study is to examine the knowledge, attitudes, and skills of 1st year Physician Assistant students about personal physical activity as well as using prescriptive physical activity. METHODS: A Qualtrics will be administered to first-year Physician Assistant students to determine knowledge, attitudes, and skills related to physical activity along with their desire to prescribe physical activity. The survey will be administered at the start of the semester and end of the semester to see if knowledge, attitude, and skills change. POTENTIAL RESULTS: It is hypothesized that the Physician Assistant students will report high levels of knowledge but low levels of application. DISCUSSION: Healthcare providers are a critical component to prescribing physical activity, which can positively health outcomes. If Physician Assistant students are unaware of how to prescribe physical activity, they may not engage in that practice. Therefore, Physician Assistant programs may want to incorporate Physical Activity Prescription lectures.

UOP02 1:25-1:40 **Allison Davis,** Recreational Therapy
Social Sciences   The Influence of Multisensory Spaces on the Physiological Stress of
Individuals with Autism/Sensory Processing Disorder

Mentor: Loy, David P Recreation Sciences

It has been reported that up to 95% of individuals with autism experience some type of sensory processing issues (Baker et al. 2008). In fact, sensory problems have been identified as a symptom for diagnosing autism or sensory processing disorder in the DSM-5 (American Psychiatric Association, 2013). Given that approximately 1 in 40 children in the United States are diagnosed with autism according to parent reports, this is a prevalent population (Kogan et al. 2018). Sporting events include loud noises, large crowds, bright colors, strong smells, and a variety of other environmental stimuli. Individuals with autism may display behaviors of sensory-avoidance, leading them to avoid sporting events or other highly stimulating environments (Gourley et al. 2012). We believe that multisensory spaces could be utilized in highly stimulating environments to help make these events more accessible for individuals with autism and other sensory processing disorders. Martin et al. (2022) suggests that multisensory spaces can be mutually beneficial for college athletic venues and the population that uses them. The purpose of this study is to determine the effectiveness of multisensory spaces (i.e., PeeDee's Sensory Space) in promoting a physiological relaxed state in individuals with neurodiversity issues and their caregivers in high arousal environments. This study will measure physiological stress arousal via a finger pulse oximeter (see attached protocol) in a high stimulation environment (i.e., ECU athletic events) and a low stimulation environment (i.e., PeeDee's Sensory Space). Noise measurements will also be captured

via noise dosimeter (see attached) to confirm a positive relationship between sensory stimulation and physiological arousal. Statistical differences will be compared to determine if the use of a multisensory space can reduce the physiological stress arousal of individuals with neurodiversity issues. Dr. David Loy, Dr. Jennifer Hodgson, Dr. Jo Anne Balanay, Dr. Jihoun An, Dr. Matthew Fish

UOP03 1:50-2:05   **Bryce Herring,** Management
Business   Beyond the Ledger: Exploring Student Perspectives of Accounting
                  and Investigating the Growing Shortage of Accounting Professionals

          Mentor: Cal Christian, Accounting

This research aims to investigate the factors influencing students' decisions to pursue or not pursue a career in accounting. Collaborating with Dr. Cal Christian, this study focuses on students in ACCT 2401, an introductory accounting class for all business majors. Employing a comprehensive approach, we will survey approximately 400 students to discover the motivation behind a students' choice of major and career. The survey instrument was meticulously designed, gathering data on students' motivations for their current major and their perspectives on the accounting profession. By analyzing this data, we anticipate gaining insights into the underlying factors contributing to the decline in accounting majors, subsequently shedding light on the diminished pool of accounting professionals and Certified Public Accountants (CPAs). This investigation holds the potential to inform educational institutions and the accounting profession about strategies to address these trends.

UOP04 2:15-2:30   **Carson Allred**, Marketing
Interdisciplinary   Micro-Influencer Marketing in the Fashion Industry:
Innovation   The Effectiveness of Tik Tok Campaigns Among College Females

          Mentor: Dr. Christine Kowalczyk, Mktg and Supply Chain Mgmt

Digital influencer marketing alone is a whole new field of study that still has much research to be done on it. With the rise of micro-influencers comes an even deeper level of personalized advertising. These modes of marketing are increasingly popular among younger generations on the application Tik Tok. The fashion industry specifically has taken the reins on this strategy with many micro-influencers advertising clothing to a female audience in their video content. This study will investigate the contributing factors to the effectiveness of this type of marketing when it comes to consumer purchasing decisions. The results will be analyzed to determine any themes or connections between the types of content, authenticity levels, visual background locations, and end purchase results. Research for this study is to be collected through 100-150 anonymous surveys completed by female college students to gain a consumer perspective on their micro- influencer of choice. The results of the surveys will determine the relationship (if any) between factors such as authenticity, types of content created, location of video content, or frequency of posts and the end result consumer purchase decisions.

UOP05 2:40-2:55   **Rachael Kluge,** Nursing

Human Health   Teaching Strategies for Developing Emotional
                      Intelligence in Nursing Students: An Integrative Review

Mentor: Mitzi, Pestaner, Nursing Baccalaureate Educ

Teaching Strategies for Developing Emotional Intelligence in Nursing Students: An Integrative Review

Background: Patient safety is dependent on the critical thinking and decision-making skills of nurses. A component of clinical decision-making is awareness of one's emotions. Emotional intelligence(EI) consists of non-cognitive abilities that work with an individual's IQ, enhancing performance. These abilities include interpersonal skills, communication, self awareness, and empathy. A nurse with well-developed EI can manage their own emotions while also empathizing with others, enhancing the quality of care. Since the incidence of negative patient outcomes is more prevalent among new nursing graduates, it is important that nursing curricula integrate strategies to develop EI. The purpose of this study is to explore teaching strategies used in nursing education to develop EI or components of EI for students enrolled in nursing programs in the United States.

Method: Guided by the methodology described by Whittemore and Knafl (2005), an integrative review was completed. The three databases searched included CINAHL, Proquest Central, and PubMED. Inclusion criteria were studies focused on the development of EI or components of EI; published within the last 10 years; conducted in the U.S.; focused on nursing education; in English; and qualitative, quantitative, or descriptive in design. Exclusion criteria were studies conducted outside of the U.S.; not written in English; and dissertations.

Results: This review found six ($n=6$) studies fit the inclusion criteria. The studies assessed findings from faculty ($n=1$), BSN students ($n=4$), and APRN students ($n=1$). Teaching strategies included an educational escape room ($n=1$), psychosocial role playing skits ($n=1$), didactic training in self care ($n=1$), sensitivity training clown workshop ($n=1$), and other various teaching methods that embedded EI or soft skills ($n=2$). Outcomes assessed included EI or its components such as self-awareness, communication, critical thinking and empathy.

Conclusions: The review revealed a lack of empirical studies regarding effective teaching methods for EI in nursing school. The studies lacked rigorous design methods and clarity on specific teaching strategies. A prominent lack of U.S. studies compared to other countries was noted. There is a need for a systematic approach for nursing schools in the U.S. to support development of EI in curricula to enhance critical thinking and clinical decision-making for new nurses to optimize patient safety.

UOP06 3:05-3:20   Nathan Mizell, Public Health
Human Health   Digital Technology and Resource Provision to Advance
                      Digital Equity in Eastern North Carolina

Mentor: Alice Richman, Health Education and Promotion

Digital technology and resource provision to advance digital equity in Eastern North Carolina

Introduction
Digital inclusion is critical to addressing inequity and thus, our project works to improve access to digital technology, resources, and digital literacy and skills training among rural/underserved communities in Eastern North Carolina (ENC). This research sets the stage for a technology library lending program and community health worker (CHW) delivered skills-building training.

Methods
We conducted 25 key informant qualitative interviews with trusted leaders, heads of libraries, community members, and CHWs in ENC. Each interview lasted about 1 hour, was audio recorded, and transcribed for analysis. Prior to the interview, a brief demographic survey was provided to participants. Survey items included gender, age, employment status, race, and internet access and quality, with slight variations based on whether the participant was a community leader, librarian, or community member.

Results
We interviewed 10 heads of libraries, 5 community leaders/CHWs, and 10 community members. Preliminary analysis shows that representatives across all groups are receptive to ideas of lending programs and skills-building courses for community members. Community members have been frustrated with the quality of the internet in and around their communities, with limited options available. All libraries have public Wi-Fi that can be accessed, but not everyone is taking advantage of it. Potential barriers include that not everyone uses the library and how to best keep track of the devices within the lending program.

Conclusion
A library lending program and CHW-delivered skills-building training are needed in ENC, and support can be seen from all groups interviewed. Benefits include both improved access to and knowledge about digital technology, with some important concerns being highlighted like keeping up with devices and getting people into the library to utilize services. These important concerns and benefits raised will inform the next phase of the project.

Alice Richman - Professor, College of Health and Human Performance, Health Education and Promotion
Leslie Cofie - Associate Professor, College of Health and Human Performance, Health Education and Promotion
Abby Schwartz - Associate Professor, College of Health and Human Performance, School of Social Work
Leslie Osorio Pascual - Social/Clinical Research Specialist, College of Health and Human Performance, Health Education and Promotion

UOP07 3:30-3:45   **Lindsay Hamilton,** Nursing
Assessing Undergraduate Student Nurses Perception of Quality Improvement
Mentor: Thompson Hollingsworth Forbes, Adv Nursing Practice & Educ

Purpose: This study aims to understand the perception of quality improvement (QI) among third semester undergraduate nursing students enrolled in a leadership course. While QI skills have grown among nurses, it is only practiced by a slim majority of professionals. This study will attempt to

understand the gaps in QI comprehension among current nursing students to improve QI education.

Methodology: A quantitative descriptive correlation study was used to understand the perspective of nursing students. This study examined a subset of previously collected survey data from students enrolled in the course between fall 2019 and spring 2023 semesters.

Preliminary Results: Pre-course surveys showed little perceived understanding of quality improvement principles by undergraduate students. 5.6% of students surveyed indicated they were very or extremely knowledgeable about quality improvement. After the course content delivery, the survey was repeated. Understanding of quality improvement principles increased to 89.9% (Wilcox Signed Rank Test, $p<0.001$).

Discussion: Students reported increased understanding of quality improvement theory and practices upon completion of the leadership course. Results suggest methods employed during the course are effective for educating undergraduate nursing students on the principles of QI. Nursing programs can use data from this study to guide the implementation of quality improvement education into curriculum.

UOP08 3:55-4:10   **Riley Houser,** Nursing
Human Health   The Effects Pediatric Simulation Has on the Confidence and
                 Physiological Processes of Accelerated BSN Students
                 Mentor: Mitzi Pestaner, Nursing Baccalaureate Educ

Introduction: Simulation gives nursing students the opportunity to experience clinical scenarios in a controlled setting where mistakes do not harm a real-life patient. Confidence is crucial for nurses as it helps them provide competent care, fostering a sense of trust. Therefore, it is important to measure how effectively simulations build confidence in nursing students. Simulations may be designed to expose students to stressful clinical scenarios and prepare them for difficult situations in their nursing careers. However, stress levels during simulation should not reach levels that disrupt learning and prevent confidence building. This study aims to evaluate the confidence and physiological changes simulation has on East Carolina University Accelerated Bachelor of Science in Nursing students (ECU ABSN).

Method: Quantitative and qualitative data was gathered during a 2-hour pediatric simulation. The sample contained 21 ECU ABSN students. The study assessed the student's physiological indications of stress such as heart rate and oxygen saturation using a pulse oximeter probe provided by the ECU College of Nursing. Time points for assessment were pre-lecture, pre- and post-simulation, and at the conclusion of the activity. Changes in confidence related to the simulation were evaluated using a pretest and posttest question survey.

Results: Findings indicated that before the simulation, 12 (*n=12*) students had an increase in heart rate, 7 (*n=7*) students had a decrease in heart rate, and 2 (*n=2*) had no change. Of the 12 (*n=12*) students with an increased heart rate, 9 (*n=9*) had an increase in confidence and 3 (*n=3*) had a decrease in confidence. Of the 7 (*n=7*) students that had a decrease in heart rate, 6 (*n=6*) had an increase in confidence and 1 (*n=1*) had a decrease in confidence. Of the 2 (*n=2*) students with an unchanged heart rate, 1 (*n=1*) experienced an increase in confidence and 1 (*n=1*) experienced a

decrease in confidence. Sixteen (*n=16*) students had an increase in confidence and 5 (*n=5*) students had a decrease in confidence after completing the simulation. Oxygen saturation did not show clear correlation to stress.

Conclusion: Confidence is important within the field of nursing, but further research is needed to determine whether students' confidence is enhanced by simulation. Understanding how simulation influenced these ABSN students will allow further development and revision to ensure future students get the full benefits from pediatric simulation.

Graduate Student and Postdoctoral Scholars Podium Presentation Abstracts

GPP 1 MCSC 125 11:15-11:30

Assisting Large Equipment Transportation with AR Applications for Existing Facilities

Lijun Liu
Construction Management

Mentor: Yilei Huang, Construction Management

This research investigates the innovative applications of Augmented Reality (AR) technology in equipment transportation within existing facilities. With their pre-existing layouts and structures, existing facilities present unique challenges in efficiently and safely transporting large equipment. With its capability to superimpose digital information onto the physical environment, AR technology offers novel solutions to address these challenges. This study explores how AR technology can assist large equipment transportation by providing real-time visualization, navigation guidance, and safety alerts, and examines the potential for AR to improve communication and coordination among the transportation team and facility management, ultimately leading to streamlined and error-reduced processes. The findings of this study underscore the transformative potential of AR technology in optimizing large equipment transportation for existing facilities, improving efficiency, safety, and overall operational effectiveness.

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GPP 2 MCSC 125 11:30-11:45

High Spatial Resolution Long-Term Temperature Profiling to Inform Near-Shore Atmospheric Sound Propagation

Matthew Stengrim, Andrea Vecchiotti, Jeff Foeller, Diego Turo, Joseph Vignola
Mechanical Engineering

Mentor: Teresa Ryan, Engineering

Atmospheric sound propagation depends on factors such as surface characteristics and meteorological parameters. Effective numerical modeling of atmospheric sound propagation requires reliable and realistic input parameters. One of the most influential factors is the air temperature profile. This work examines the application of experimentally determined air temperature profiles in acoustic modeling of littoral environments. Long term measurements of near-surface air temperature profiles over water and marsh grass are presented. Data have been recorded using temperature loggers affixed to two permanent 7 m masts. The loggers were positioned with a 1 m vertical spacing. A common approach to characterize the near-surface boundary layer uses Monin–Obukhov Similarity Theory (MOST). This work compares high spatial resolution air temperature measurements with measurement-informed profiles based on MOST. The development of a more experimentally grounded set of assumptions will ultimately contribute to the improvement of atmospheric acoustic transmission loss models in near shore environments.

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GPP 3 MCSC 125 11:45-12:00

Satellite-Based Rainfall Datasets and Autocalibration Techniques' Effects on SWAT+ Flow Prediction

Mahesh R Tapas
Integrated Coastal Sciences

Mentor: James Etheridge, Engineering

Mahesh R Tapas 1*†, Randall Etheridge 2†, Thanh-Nhan-Duc Tran 3, Manh-Hung Le 4,5, Brian Hinckley 2, Van Tam Nguyen6, Venkataraman Lakshmi3

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†This author contributes equally to this study.

Accurate flow prediction is a primary goal of hydrological modeling studies, which can be affected by the use of varying rainfall datasets, autocalibration methods, and performance indices. The combined effect of three rainfall datasets — Fifth generation of European ReAnalysis (ERA-5), Gridded meteorological data (gridMET), Global Precipitation Measurement Integrated Multi-satellitE Retrievals (GPM IMERG) — and three autocalibration techniques — Dynamically Dimensioned Search (DDS), Generalized Likelihood Uncertainty Estimation (GLUE), Latin Hypercube Sampling (LHS) — on SWAT+ river flow prediction was measured using three evaluation metrics — Nash Sutcliffe Efficiency (NSE), Kling Gupta Efficiency (KGE) and coefficient of determination (R2) — for two watersheds in North Carolina (Cape Fear, Tar Pamlico) using the Soil Water Assessment Tool Plus (SWAT+) model. Five parameters in the SWAT+ model, cn2, revap_co, flo_min, revap_min, and awc, were found to be significantly sensitive under all combinations for both watersheds. Simulated flow varied more with the change in rainfall than the calibration technique used. We discovered that GPM IMERG gave the best results of the rainfall datasets, followed by ERA-5 and gridMET. We observed that the NSE score is more sensitive to different combinations of rainfall datasets and calibration techniques than the KGE scores. SWAT+ underperformed in the prediction of base flow for the groundwater-driven watershed. Overall, we recommend using the GPM IMERG rainfall dataset with the GLUE optimization technique and KGE performance index for optimal flow simulations. The results from

this study will help hydrological modelers choose an optimal combination of rainfall dataset, autocalibration technique, and performance index depending on watershed characteristics.

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GPP 4 MCSC 125 12:00-12:15

Evolving PITON: AI-Driven Simplification of IoT Data Access

Colby Sawyer
Software Engineering

Mentors: David Hart
Computer Science

Ciprian Popoviciu
Techonology Systems

Digital sensors continue to offer transformative potential for communities by gathering useful data regarding local conditions. Analyzing this data can provide granular insights for key personnel and enables informed decision-making. The Platform for IoT Open Networks (PITON) enables communities to develop, deploy and manage Internet of Things (IoT) based solutions to address environmental, health, infrastructure, and economic challenges. To streamline the access to PITON's vast sensing data, we introduce Crag (Conversational, Retrieval Augmented, Generation) a new framework that can deliver specific data and analyses without requiring specialized expertise. Central to Crag's innovation is its ability to process natural language prompts, replacing the need for intricate query languages and thereby granting PITON users direct and simplified access to complex IoT data sets. Crag champions user-friendliness, aiming to empower users with direct IoT data interaction, contributing substantially to scientific research and informed decision-making. Utilizing an AI-enhanced chatbot interface, reminiscent of OpenAI's popular ChatGPT, and equipped with a finely tuned large language model (LLM), Crag incorporates a sophisticated context retrieval system featuring Retrieval Augmented Generation (RAG) and Time-Series analysis. These technologies ensure the chatbot's responses are informed by the latest data and trends, complemented by moderation techniques for reliability. Crag is set to operate within a virtualized environment, boasting a streamlined API and web chat interface for effortless interaction. This advanced setup ensures a flexible and user-friendly experience, marking a significant step forward in accessible technology

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GPP 5 MCSC 125 12:15-12:30

Automated Garment Measurements in the Wild via Landmark and Depth Estimation

Cris Zbavitel
Computer Science

Mentor: David Hart, Computer Science

Our research introduces an innovative approach to automate garment measurements using state-of-the-art computer vision techniques for dynamic environments. By integrating landmark and depth estimation models with point cloud data, we propose a method to accurately calculate garment sizes from photos taken in uncontrolled settings. This methodology encompasses the adaptation of deep learning models to derive precise garment dimensions, as well as addressing the fashion industry's challenge of inaccurate sizing. Our system leverages the DeepFashion2 dataset, as well as unsupervised learning techniques for depth estimation, to facilitate a robust garment sizing and recommendation model. This study aims to significantly reduce return rates caused by sizing inaccuracies, therefore offering a practical solution for both consumers and retailers. Preliminary results indicate promising directions for real-world applications, highlighting the potential of machine learning in transforming fashion retail through improved fit prediction and customer satisfaction.

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GPP 6 MCSC 253 9:30-9:45

EXAMINING THE EFFECT ON BEGINNING TEACHER SELF-EFFICACY THROUGH CULTURALLY RESPONSIVE TEACHING PROFESSIONAL DEVELOPMENT

Kirby A. Maness
Educational Leadership

Mentor: Hodgkins, Lawrence, Educational Leadership

High teacher turnover rates and less students entering into the teacher preparation programs has increased the need to better prepare and retain beginning teachers. The purpose of this mixed methods inquiry is to focus on the effect of Culturally Responsive Teaching professional development on beginning teacher self-efficacy relative to African American student engagement in this rural Eastern North Carolina elementary school. Researched-based strategies to increase Culturally Responsive Teaching include setting high standards and expectations, critical self-reflection, and continued professional development. This inquiry encompassed an explanatory sequential mixed methods design organized through Action Research Cycles involving the Plan-Do-Study-Act model. This inquiry included multiple quantitative data instruments (Ohio State Self-Efficacy Survey, Walk-through Observation Instrument, and lesson plans) to collect and analyze data about engaging African American students on beginning teacher self-efficacy. This inquiry explained the quantitative data with qualitative data collected through beginning teacher interviews and a journal kept by the scholarly practitioner. The results indicated that the professional development series, observations, and post-conferences positively impacted the beginning teacher self-efficacy of the participants in this inquiry through the lens of their African American students.

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GPP 7 MCSC 253 9:45-10:00

Virtual Simulations in the Science Classroom: Investigating the influence of Gizmo's based experiments on student's misconceptions

Elizabeth Proctor
Science Education

Mentor: Tammy Lee, Math, Science, & Instr Tech Ed

Understanding of the significance of sunlight, nutrients, and reproduction in plants is crucial for advancing one's knowledge in the field of science. Nevertheless, the majority of students encounter challenges comprehending plant function, particularly in its connection to pollination. This study utilized a combination of quantitative and qualitative methods, as well as action research, to examine the influence of a virtual manipulative tool called Gizmos on students' academic achievement in the subject of plant structure and function. The study also examined students' perspectives on the intervention that was based on Gizmos. A multistage sampling method was employed to choose 21 eight and nine-year-old students from a school in Greenville, North Carolina. These students were subjected to a Gizmos-based lesson intervention on plant function and pollination. Data was collected through pre-test, post-test, and interviews.

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GPP 8 MCSC 253 10:00-10:15

Understanding Student Support Needed and Provided by Ph.D. Programs in Rhetoric, Composition, and Technical Communication

Mina Bikmohammadi
Rhetoric, Writ, and Prof Comm

Mentors: Erin A. Clark and Michelle F. Eble, English

Co-author and Principal Investigator: Dr. Erin A. Clark, Associate Professor & PhD Program Coordinator, Department of English, East Carolina University

Presenting author and student: Mina Bikmohammadi, Ph.D. Student, Department of English, Rhetoric, Writing, and Professional Communication, East Carolina University

This research explores the role of program coordinators, directors and administrators in supporting both prospective and current PhD students within the Rhetoric, Composition, and Technical Communication field. This study integrates a mixed-methods approach, which includes Mina Bikmohammadi's personal narrative about her journey of applying and choosing a PhD program as well as a comprehensive survey distributed to program administrators. The IRB-approved survey, distributed by Dr. Erin Clark, the study's Principal Investigator, aims to uncover the practices

Rhetoric, Composition, and Technical Communication programs employ to facilitate students' academic and professional paths. For students aiming to pursue graduate education, the study provides essential insights into the application process, program selection, and the cultivation of professional networks. For coordinators and directors, it underscores the significance of their role in shaping student experiences and outcomes, encouraging a reflective examination of current practices and potential areas for improvement. Ultimately, this research contributes to the broader discourse on optimizing support and development opportunities for PhD students in the Rhetoric, Composition, and Technical Communication field. Moreover, the insights gained from this study can be beneficial across various fields, as the process of applying for graduate school shares similar challenges and opportunities, thereby broadening the scope of its impact.

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GPP 9 MCSC BBT 9:00-9:15

Visceral Narrative

Haley Mcelroy
Ceramics

Mentor: Tisnado, James, Art and Design

In my past work, I combined human anatomy and the grotesque. My work represented my struggles with tumultuous thoughts encapsulated in contorted visceral figures. I stylized my figures, allowing me to distance myself from the content to evaluate and enjoy my work while infusing the piece with humor. Since starting grad school, I started to reflect on my tumultuous thoughts and life experiences, separating myself from the negative aspects, such as the overwhelming emotions I have tried to suppress. In my current body of work, I juxtapose the human figure with anthropomorphic forms representing stressful moments or emotions. As I am exploring uncharted territory and developing personal growth, I welcome the viewer in and share my narrative instead of utilizing the grotesque.

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GPP 10 MCSC BBT 9:15-9:30

Unveiling Ornamentation in Public Spaces: A Jeweler's Perspective

Chase Shotton
Metal Design

Mentor: Lazure, Timothy, Art and Design

Exploring the intricate tapestry of ornamentation within public spaces unveils a narrative of cultural expression, architectural legacy, and societal identity. As an MFA candidate specializing in metal design, my work is deeply rooted in the examination of ornamentation's historical significance in shaping public environments and its contemporary relevance.

From the grandeur of ancient monuments to the intricate details adorning modern urban landscapes, this presentation delves into the multifaceted history of ornamentation in public spaces. Through an exploration of architectural marvels, urban landmarks, and communal gathering places, we trace the evolution of ornamentation as a reflection of societal values, beliefs, and aspirations.

Drawing inspiration from this rich tapestry of ornamentation, my work as a metal designer seeks to reinterpret and reimagine traditional motifs within the context of contemporary public spaces. By blending craftsmanship, innovation, and artistic vision, I strive to create immersive experiences that resonate with the essence of their surroundings.

Through a synthesis of historical research, material experimentation, and conceptual design, I explore the transformative potential of ornamentation in revitalizing public spaces and fostering a sense of community and belonging. By engaging with the past while embracing the future, my work seeks to evoke a dialogue about the enduring significance of ornamentation in shaping our shared environment.

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GPP 11 MCSC BBT 9:30-9:45

77%

Tamla Boone
Art

Mentor: Tisnado, James, Art and Design

During an interview about familial diversity, the interviewer, my daughter, inquired about our family culture. She wanted to know about rituals, traditions, and ceremonies passed down from our ancestors. This question, one that I often ask myself, made me cry. My racial identity was thrown overboard on a trip across the Atlantic ocean; my familial rituals and ceremonies of traditions were stolen, stripped, and lost at sea. I answered her," I don't know our people's traditions."   Refusing to quote the stereotypical answers such as fried chicken, basketball, and hip hop, and yearning for a more profound, ancestral connection, especially with the arts, I started research.

Through an ancestry DNA test, I realized that 77 percent of my heritage is from West Africa. Countries like Ghana, Nigeria, Mali, and Cameroon contribute to my genetic makeup. The rituals, ceremonies, traditions, and art are broad in these countries, so I decided to focus on their art, specifically jewelry. What does the jewelry from each of these nations portray and symbolize? What kind of materials did my ancestors use to make this jewelry? So many questions for so much heritage. I asked AI to help me compose a collaborative set of jewelry representations from 77% of my heritage.

AI will produce jewelry that is truly representational to my heritage. These renditions can be reproduced with 3d printers, laser cutters and CNC routers. Technology can make this part of my identity beautiful and tangible.

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GPP 12 MCSC BBT 9:45-10:00

Dueling Identities: An Exploration Within and Beyond Twinship

Haleigh Brewer
Photography

Mentor: Angela Wells, Art and Design

Being an identical twin, I struggle to find my individuality outside of my twinship. People often neglect to view me as a separate person. I feel conflicted about possessing aspects that pertain to me that are not within my twinship. I value the connection I share with my sister. At the same time, I want to be my own person. I explore these tensions by making photographs with the use of still-life to symbolize aspects of our relationship. My research explores how twins are depicted and treated in society and how the challenges of being a twin are overlooked. This body of work aims to confront these issues and bring awareness to the complexities of twin identity and twin relationships; and to expand the conversation of this underrepresented topic. My thesis speaks to the broader challenges of defining oneself.

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GPP 13 MCSC BBT 10:00-10:15

Exploring Tourette Syndrome with Analog Photography

Katelyn Brewer
Photography

Mentor: Angela Wells, Art and Design

My research represents the emotional aspects of living with Tourette syndrome. My tics include facial grimacing, blinking, tensing of the throat, hands, upper body and more. My tics occur all day, every day and disrupt activities such as reading, driving, eating, and talking. It is sometimes difficult for others to comprehend how detrimental it is to my mental and physical health. The lack of understanding by others has affected the way I see and feel about myself.

I use analog photography, specifically a Diana camera, made of plastic with limited controls, to capture these feelings. I squint and blink my eyes repeatedly; it feels as if I spend most of my life with my eyes closed. Capturing these moments with a plastic camera is not perfect the same way my body and mind does not behave perfectly. My research communicates to audiences that while the physical experiences of those of us with Tourette's are unique, the emotions of shame, loneliness and misunderstanding are universal.

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GPP 14 MCSC BBT 10:30-10:45

Investigation of Materials and Processes

Katelyn Davis
Ceramics

Mentor: Tisnado, James R, Art and Design

My ceramic work explores materiality and the expression of chemical interactions within glazes. I enjoy the "why?" in all areas of my life, particularly in my art practice. Therefore, I experiment with recipes and processes to express colors, textures, and depth within surfaces. At first, I just wanted to execute a crystalline glaze successfully. I had been warned it would likely take years for me to produce a crystal, but after intense research, I produced many crystals on my first firing. My process became highly calculated- make a new glaze, fire with my specific schedule, analyze results, and then tweak the recipe until it is exactly how I want it. My goal was to control as many aspects of the glaze as possible. My obsessive nature has driven me to understand what each chemical in the glaze does and how I can make them behave in certain ways by changing what they are exposed to and how they are fired.

In the past year, I have experienced a shift in my personal life and work. Last fall, I found myself without access to a traditional ceramic studio. I decided to start sourcing all natural materials and firing in a pit in my backyard. I had almost entirely let go of my obsessive need for control. Through this process, I have gained a new appreciation for the imperfect, and even ugly, parts of my work.

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GPP 15 MCSC BBT 10:45-11:00

Trends in Handedness: Conceptual Fine Art exploration in Textile Art through comparative data study

Paul Edwards
Art

Mentor: Haller, Robin Lynne, Art and Design

In the mid-20th Century, the mandate for students to use their right hands began to be rescinded across the United States. As policy changes were implemented, the reported number of left-handed students began to climb until leveling out in the latter half of the 20th Century. Statistical data obtained from <u>Hand Preference and Age in the United States</u> (Gilbert and Wysocki, 1992) and bolstered by the findings in <u>Right Hand, Left Hand: The Origins of Asymmetry in Brains, Bodies, and Atoms and Cultures</u> (McManus 2004) shows the population percentage classified as Left Handed increasing from 2.5% at the beginning of the 20th Century to 12% at its end where it remains relatively stable to this day. The causation between updates in education policy and percentages of lefthanded students supports the idea that when there was no longer a fear of punishment for being left handed, students could live more authentically and happily. Further

research investigated gender identity data for students following recent trends of acceptance towards trans youths in public schools. A thinktank inside the UCLA Law School, The Williams Institute, reported that while the number of transgender individuals has not seen an overall increase, the proportion of transgender people has shifted to have a heavier weight in younger brackets. Based on data from research conducted in 2017, the proportion of 13 to 17 year olds identifying as trans increased from 10% of the total trans population to 18% and that trans people between 13 and 24 year olds currently represent about 700,000 Americans (Herman et al, 2022). Just as in the previous century with the instances of left-handedness, society is seeing more and more transgender youth because of a lack of fear of punishment. Continued research into the comparative data will fuel the creative process for the handwoven textile art, Left Hands.

References

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Gilbert AN, Wysocki CJ. Hand preference and age in the United States. Neuropsychologia. 1992 Jul;30(7):601-8. doi: 10.1016/0028-3932(92)90065-t. PMID: 1528408.

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GPP 16 MCSC BBT 11:00-11:15

Critical Design Thinking in Practice

Parker Estes
Graphic Design

Mentor: Normoyle, Catherine Lucille, Art and Design

The current landscape of design education and practice often prioritizes commercial efficacy over social and ethical considerations. Often, designers are trained to create commercially viable and aesthetically pleasing products without critically examining the broader implications of their work. Many designers find themselves grappling with the disconnect between their values and the demands of the capitalist system within which they operate.

The inability or reluctance of designers to engage critically with the impact of their decisions perpetuates systemic injustices, environmental harm, and social inequities. Critical design offers a paradigm shift in design thinking, urging designers to transcend conventional boundaries and adopt a critical mindset. It emphasizes the importance of interrogating design decisions, acknowledging biases, and understanding the unintended consequences of design choices.

Critical design diverges from traditional notions of functionality and aesthetics, focusing instead on provoking thought, challenging assumptions, and stimulating conversations about broader societal

issues. It draws from disciplines such as anthropology, sociology, and psychology to inform design practice and foster interdisciplinary collaboration.

This presentation will introduce what defines critical design and how case studies such as Natsuki Hayashi's "Passage" and Laura Kurgan's "Million Dollar Blocks" exemplify the transformative potential of critical design. These projects prompt audiences to adopt an anthropological gaze, consider the context of use, and engage in rhetorical debates about societal issues, sparking introspection, dialogue, and societal transformation.

The ongoing discourse surrounding critical design reflects a collective desire within the design community to address criticism, enhance meaningful impact, and transcend the limitations of conventional design practice. By advocating for a critical mindset among designers, critical design enriches design education and practice, fostering a deeper understanding of the social, cultural, and ethical dimensions of design.

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GPP 17 MCSC BBT 11:15-11:30

Placebos and Panaceas

Nick Fowler
Ceramics

Mentor: James Tisnado, Art and Design

One of the best methods for advertisement is celebrity endorsement, whether it is life insurance, workout routines, or even salad dressings, regardless of their level of expertise with the product. Why is Paul Newman the face of caesar salad? Why is Gwenyth Paltrow the face of a personal health brand?

Many celebrities or others in positions of power will take advantage of their notoriety to sell their products or ideas, and Gwenyth Paltrow is an extremely successful example of this. With her "health" brand, she makes millions and millions of dollars a year selling products that claim to help everything from sexual effectiveness to hormonal regulation. This would be fine, but unfortunately she, like others, is endorsing products that could actively harm consumers, to the point she is currently in a lawsuit for a product that her company is continuing to sell.

Other celebrities have done this as well. If a random stranger on the street told you to inject sunlight and bleach into your veins to cure covid you would write them off, but when that person is the president of the United States, suddenly there's a whole cult of followers who believe him.

My research is in pseudoscientific medicine, the ways in which we advertise these products to consumers, and the negative effects they have on those who use them. I use cartoon-inspired aesthetics and humor in my work to satirize these ridiculous products and show that they should not be taken seriously.

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GPP 18 MCSC BBT 11:30-11:45

Debunking Phallacies

Michael Gaines
Art

Mentor, Wells, Angela, Art and Design

As we navigate through personal and traumatic experiences in life, we develop a personal myth – a false belief or idea centered around some aspect of ourselves – as a means of survival and social acceptance. In *Debunking Phallacies*, I use photography to explore my own personal myth that to be taken seriously, and seen as legitimate and successful, I need to adhere to socially determined, heteronormative concepts of masculinity and gender binaries. As members of the LGBTQ community continue to discover and redefine our personal identities, we are consistently met with opposition to our choices of expression, our appearances, and even our right to exist, which only helps to reinforce and perpetuate this myth. These attacks are a means of intimidation to force members of the queer community back into the closet, eradicating both our imprint on and presence within society. By exploring the intersection of gendered expectations and personal identity, I use my images to engage in a dialogue to understand why we instinctively suppress our true identities and deploy increased levels of masking and code-switching. By alternating or adjusting our language, grammatical structure, behavior, and appearance to fit into a dominant culture, I explore whether code-switching and masking are acts of self-preservation or self-sabotage. In researching the work of contemporary and historical photographers who work with identity and LGBTQ-related topics, this series examines these concepts through the lens of digital photography.

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GPP 19 MCSC BBT 3:15-3:30

Examining the Limitations of Weaving with a TC2 Jacquard Loom

Rachael Lowman
Textile Design

Mentor: Robin Lynne Haller, Art and Design

Technological advancements have brought weaving from my experience with basic barn-loom weaving to the complex design manipulations that occur within Jacquard woven fabrics today. The TC2 hand-jacquard loom offers the ability to manipulate the fabric in new and unusual ways and allows the artist to push the boundaries of the technology and material. The use of any structure in any location across the fabric can place unique stressors on this loom. No matter the design, the loom is built to compensate for extensive variation in structure because each vertical thread is controlled separately, as opposed to traditional floor looms that are restricted by their number of harnesses. By designing in *Photoshop* and weaving on the TC2, I am exploring the loom's ability to

maintain proper function while I manipulate the cloth to produce the desired challenge and/or effect. Within these explorations, I am expressing my connections to the Appalachian Mountains, where I was born and raised, and to my faith.

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GPP 20 MCSC BBT 3:30-3:45

Artistic Resilience

Tansy Obryant
Ceramics

Mentor: James Tisnado, Art and Design

Sometimes we have a failure, and we adjust and try again. But sometimes things change fundamentally. We want to continue being artists, but the change threatens our entire artistic practice. A lost limb, bankruptcy, or the change we will all go through, if we are lucky - aging.

Today, somewhere in the art school, a collective of artists delve into a profound odyssey of self-discovery, navigating the delicate balance between creativity and change. Amidst the vibrant chaos, they confront personal setbacks and societal expectations, each grappling with their own insecurities and fears. Yet, through resilience and communal support, they unearth newfound sources of inspiration, transforming adversity into fuel for their artistic endeavors. In this nurturing environment, age, physical limitations, and financial struggles were not barriers but catalysts for innovation. Together, they forge a path forward, redefining what it means to be an artist and embracing the ever-evolving journey of creativity.

Artists build supportive communities and new practices not just to future proof their creativity but to fuel it.

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GPP 21 MCSC BBT 3:45-4:00

The Inner Portrait

Loraine Scalamoni
Painting and Drawing

Mentor: Eagle, John, Art and Design

"Every portrait that is painted with feeling is a portrait of the artist, not of the sitter." Oscar Wilde

As much as I am interested in capturing a likeness and painting what I see, I am also allowing my intuition to interpret the sitter. In doing this, I am projecting my beliefs and ideas on to my subject. At times, I am a voyeur capturing my perception of an unaware subject. Other times, I establish an

environment that suits my impression of the sitter's personality using objects relevant to their life. My curiosity of people informs my interpretation of their personality influencing my color palette, pose, and patterning. Therefore, each portrait I create is as much a self-portrait rendered through the lens of my own experiences and insights as it is an image of the individual being depicted.

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GPP 22 MCSC BBT 4:00-4:15

Exploring Tourette Syndrome with Analog Photography

Katelyn Brewer
Photography

Mentor: Wells, Angela, Art and Design

My research represents the emotional aspects of living with Tourette syndrome. My tics include facial grimacing, blinking, tensing of the throat, hands, upper body and more. My tics occur all day, every day and disrupt activities such as reading, driving, eating, and talking. It is sometimes difficult for others to comprehend how detrimental it is to my mental and physical health. The lack of understanding by others has affected the way I see and feel about myself.

I use analog photography, specifically a Diana camera, made of plastic with limited controls, to capture these feelings. I squint and blink my eyes repeatedly; it feels as if I spend most of my life with my eyes closed. Capturing these moments with a plastic camera is not perfect the same way my body and mind does not behave perfectly. My research communicates to audiences that while the physical experiences of those of us with Tourette's are unique, the emotions of shame, loneliness and misunderstanding are universal.

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GPP 23 MCSC BBT 4:15-4:30

Futurity: a Glimpse into Surface and Design

Christopher Zidek
Art

Mentor: Scott Eagle
Art and Design

"Beauty in things exists in the mind which contemplates them" –David Hume

I aim to produce works of art that evoke a sense of elegance for the observer. The abundance of beauty and love in my surroundings inspires an earnest endeavor to embody these sentiments. My artwork explores and celebrates the richness of colors, reflectivity, curvilinear geometry, and high craftsmanship. The forms of my work are inspired by the opulent craftsmanship of Art Nouveau,

Mid-Century modern, and contemporary furniture design as well as the fine movement of Light, Space, and Surface.

Within my low-relief works, the qualities of dimension, depth, and reflectivity arise from an intuitive dialogue between digital design and human craftsmanship. I employ contemporary techniques of painting and sculpting, which include intensive coating arrangements and a variety of materials, such as plastic, wood, high-density foam, and composites.

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GPP 24 MCSC 253 10:45-11:00

Combating bacterial biofilms: Investigating unconventional regulatory proteins SypA and SypE in Vibrio fischeri

Elody Bensch
Biochemistry and Molecular Bio

Mentor: Milton, Morgan, Biochemistry and Molecular Bio

Biofilms are a major contributor to antibiotic tolerance. Biofilms are tightly regulated communities of matrix-associated bacteria that act as a physical barrier to protect bacteria from unfavorable conditions. *Vibrio* are marine bacteria that use biofilms to inhabit a wide range of ecological niches. With rising ocean temperatures, due to climate change, pathogenic *Vibrio* species are becoming a rising threat. *Vibrio fischeri*, a non-human pathogen, uses biofilms to form symbiotic relationships with the Hawaiian Bobtail Squid. The *syp* gene locus encodes all the proteins necessary for the regulation, synthesis, and export of the SYP polysaccharide. The SYP polysaccharide is crucial for biofilm formation and is conserved among non-Cholera *Vibrio* species. SypA and SypE are two key regulatory proteins in SYP-dependent biofilm formation. Based on sequence analysis, SypA is a single domain sulfate transporter and anti-sigma factor antagonist (STAS) protein. SypE has a kinase domain similar to well-known anti-sigma factors. SypE also contains both a phosphatase and a REC domain, suggesting a more complex function. Based on homologous anti-sigma factor/anti-sigma factor antagonist proteins, it is expected that SypA would function upstream of SypE to regulate biofilm formation, but this is not the case. Genetic and cellular data suggests that SypE acts upstream of SypA and influences biofilm formation by phosphorylating and dephosphorylating SypA. Additionally, SypA and SypE are not transcriptional regulators like classical anti-sigma factor/anti-sigma factor antagonist proteins. Here, we use a structure-function based approach to characterize and understand the molecular mechanism of these unusual regulatory proteins. We determined the SypE's oligomerization state, explored the structural architecture and mechanism of SypE through computational methods, and observed the effects pH has on SypE architecture. These findings will allow us to determine how SypE regulates *Vibrio fischeri* biofilm formation, and to potentially establish a new archetype of STAS proteins.

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GPP 25 MCSC 253 11:00-11:15

The Effect of Trunk Strength on Knee Biomechanics During a Single Leg Landing Task

Jonathan Cortez, Anthony S. Kulas, Zac Domire, Patrick Rider
Kinesiology

Mentor: Kulas, Anothony S., Kinesiology

Purpose: The purpose of this study is to determine the effect of trunk strength on trunk position and knee biomechanics during a single leg landing task in recreationally active individuals.

Background: Injury to the anterior cruciate ligament (ACL) has long been one of the most prevalent and impactful physical impairments. ACL injuries' complex nature, economic and physical burden, and high incidence rates create a constant need for further research. ACL injuries have numerous risk factors, including anatomical, neuromuscular, and biomechanical. Biomechanically, proper body positioning during dynamic tasks is essential for maintaining the health of the knee joint and reducing injury risk. One of the more important but less studied risks of ACL injury includes proper trunk positioning and its impact on the knee during a dynamic task. Further factors that affect trunk positioning may include the strength of the trunk flexors and extensors. This study aims to investigate the relationship between trunk flexion/extension strength on trunk position and knee joint biomechanics during a single leg landing task.

Methods: A total of 30 college-aged, recreationally active individuals will take part in this research study. Participants will have their maximum isometric trunk flexion and extension strength measured using a HUMAC-NORM dynamometer. Utilizing a Qualysis motion capture system, participants will then perform three single leg jump and landing tasks from three predetermined positions onto an AMTI force plate. These positions include directly behind the force plate, as well as 45 degrees to the left and to the right of the force plate. Analysis of data will include several biomechanical measures at both the knee and the trunk during this landing task as they relate to trunk strength.

Results: The relationship between the biomechanical measures of the knee and trunk and participants trunk strength will be found through a regression analysis. The goal of this research study will be to determine the effect of trunk flexion/extension strength on trunk position and knee joint biomechanics during a dynamic task.

Conclusion: Results will hopefully create a better understanding of the relationship between trunk strength and knee biomechanics during a dynamic task and better understand how ACL injuries incidence rates can be reduced.

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GPP 26 MCSC 253 11:15-11:30

The Effects of Helmet Loads and Disc Degeneration on Cervical Spine Biomechanics

Mackenzie Hoey
Kinesiology: Biomechanics & Motor Control

Mentors: Dr. Zac Domire, Kinesiology Dr. Alex Vadati, Engineering

Introduction

The prevalence of neck pain in fighter pilots has been reported to be as high as 97%. This pain has been linked to their helmets, but the mechanism of pain is undiscovered. There are likely compounding factors, but this study focuses on intervertebral disc (IVD) degeneration as it has been shown that IVD pathology significantly increases within the first 5 years of fighter pilots' careers.

Spine mechanics with IVD degeneration are unpredictable as the IVD is stiffer but more compressible. Studying IVD degeneration *in-vivo* is difficult, so this study uses finite element analysis to model neck loading with healthy and degenerated IVD properties.

Methods

The simulations used a validated cervical spine model and were solved with LS-Dyna. Two loading scenarios were tested: healthy discs (HD) and degenerated discs (DD) at the C5C6 IVD. The model was loaded with gravity followed by muscle activation and the helmet load. Muscle loads were approximated by collecting activation ratios from an OpenSim model and scaling the percentage to electromyography data. Change in foraminal space height was calculated at C4-C7. Peak compressive pressure was collected in each disc and facet joint for the same 3 vertebral levels.

Results

Average foramen height decrease was 5.45% (HD) and 8.06% (DD) from initial height of 7.85mm. The largest height decrease was 12.45% at the C5C6 level in the DD condition.

The average peak compressive pressure was 0.99 MPa (HD) and 1.14 MPa (DD) in the discs and 0.62MPa (HD) and 0.75 MPa (DD) in the facet joints. Peak compressive pressure always occurred at the C5C6 level with values of 1.58 MPa (HD) and 2.73 MPa (DD).

Discussion

The reported disc pressures are on the same order of magnitude as those recorded *in-vivo*. Compression at levels adjacent to C5C6 stayed the same or decreased in DD, meaning loads may have dissipated to surrounding tissues not equipped for load.

A nerve root is 5mm in diameter, taking up 65% of the IVD foramen height. A 12.45% decrease in foramen height at the level of the degenerated disc increases the chances of nerve root compression significantly.

Previous studies do not use muscle activation, and they apply a uniform approximated load to each vertebra. Increased muscle activation was required in the DD condition because decreased IVD height caused ligament laxity and instability. Thus, increased muscular loads are placed on the spine with disc degeneration that may cause pain and tissue dysfunction.

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GPP 27 MCSC 253 11:30-11:45

Ecdysone signaling in the *Drosophila* germline regulates a stem cell transcriptional program

Lauren Jung
Alexandria Warren
Molecular Biology and Biotech

Mentor: Elizabeth Ables, Biology

A tightly regulated network of signals coordinates the division of *Drosophila* ovarian germline stem cells (GSCs) and differentiation of their daughter cells to produce viable oocytes. Bone morphogenetic proteins (BMP) are one of the signals important for stem cell self-renewal secreted locally from cells adjacent to GSCs. The steroid hormone ecdysone is produced by cells farther away from GSCs but is necessary for GSC self-renewal. How these two signals converge mechanistically to control GSC proliferation and differentiation is largely unknown. Ecdysone elicits a diverse array of transcriptional responses across tissues by binding to a heterodimeric complex composed of Ecdysone Receptor (EcR) and Ultraspiracle (Usp). To illuminate whether EcR facilitates autonomous reception of ecdysone in the germline, we built germline-compatible genetic tools to manipulate EcR levels or activity. We find that over-expressing either EcR.A or EcR.B1 isoforms in germ cells results in undifferentiated GSC-like germ cell tumors. Germ cells over-expressing EcR remained mitotic and aggregated into egg chambers, reminiscent of cells with over-active BMP signaling. In tumorous ovaries, stem-like cells were also identified outside of their normal niche, suggesting that these cells remain competent to respond to BMP ligand. We show that the tumor phenotype is ecdysone-dependent, as over-expression of an EcR.B1 transgene that cannot bind ligand suppresses tumor development. Moreover, restricting over-expression of EcR to more differentiated cysts failed to produce the tumor phenotype. Utilizing single-cell RNA-sequencing, we find that EcR over-expressing ovaries and overactivated BMP signaling ovaries have remarkably similar transcriptomes. These data suggest that EcR promotes differentiation of germ cells by directly regulating components of the BMP signaling pathway and that low levels of EcR expressed in wildtype GSCs is sufficient for ligand-dependent activation of an ecdysone-responsive transcriptional program. Illuminating a novel role for ecdysone signaling in germ cell development is important for understanding how diet-derived systemic signals impact stem cells and reproduction.

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GPP 28 MCSC 253 11:45-12:00

Young female EDS mice show increased detrusor sensitivity and contraction to muscarinic stimulation

Soumya Kamath, Andrew Readyoff, Nick Williamson, Everett Minchew, Espen E. Spangenburg
Biomedical Sciences

Mentor: Johanna L. Hannan, Physiology

Ehlers-Danlos syndrome (EDS) is an inherited connective tissue disorder characterized by collagen abnormalities, leading to tissue fragility. Individuals with EDS often experience urinary incontinence, pelvic pain, and sexual dysfunction, with a higher prevalence in women (73-89%). Classic EDS (type 1) arises from mutations in the collagen type V (COL5a1) gene, pivotal in fibrillogenesis regulation. The goal of our study is to determine the role of collagen V in the female pelvic floor of mice. We hypothesize lower collagen V levels in EDS mice would lead to more frequent voiding, decreased bladder contraction, and increased vaginal contraction.

We assessed 16-week wild-type (WT; Col5a1 +/+) and heterozygous (EDS; Col5a1 +/-) mice (n=13-14). Bladder function was evaluated through void spot assays, and tissue bath experiments were conducted on bladder and vaginal strips. Contractions were induced by high potassium to assess tissue viability, followed by concentration-response curves to carbachol and norepinephrine in the bladder and vagina, respectively. Bladder electric field stimulated (EFS) contractions, with or without atropine (cholinergic antagonist) and PPADS (purinergic antagonist), were measured. Additionally, relaxation curves to DEA NONOate and EFS were assessed in the vagina.

At 16 weeks, body and bladder weights between genotypes were unchanged. Young female EDS mice had no change in voiding frequency (WT: 2.59 ± 1.0, EDS: 2.00 ± 0.8; $p=0.0536$). No significance was observed in the total void area or primary void size. At lower carbachol concentrations, EDS mice contracted higher than WT mice ($p<0.05$) reflective in the significantly increased EC50 (WT: -6.8 ± 0.4, EDS: -7.3 ± 0.6; $p<0.05$). Overall EFS-mediated contractions were similar, but EDS mice exhibited greater cholinergic inhibition to atropine. Contractions to high potassium and norepinephrine, and relaxation to DEA NONOate and EFS in vaginal strips were no different between groups ($p>0.05$).

In conclusion, young female EDS mice demonstrate greater contraction and sensitivity to cholinergic stimulation. In contrast, EDS did not impact vaginal smooth muscle physiology. Ongoing studies will assess bladder, vaginal and pelvic floor muscle morphology, and pelvic floor muscle contractility. Our preliminary data demonstrate potential for advancing our understanding of urinary incontinence mechanisms in EDS.

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GPP 29 MCSC BBT 2:00-2:15

Magneto-mechanical cellular cytoskeletal disruption of breast cancer cells
Yara Maayah
Biomedical Physics

Mentor: Juan Beltran-Huarac, Physics

While cancer treatment methods have proved effective, new targeted approaches that spare healthy tissues are the future of cancer therapeutics. One of these targeted approaches is to utilize the naturally occurring, compromised states of cancerous cells. One such compromised state is the integrity of the actin cytoskeleton and lack of cellular repair. Magnetically actuated iron oxide nanoparticles have been shown to induce cell death in cancerous cells. However, the mechanism for inducing cell death requires further study and evidence. Our study plans on providing evidence that the mechanism for cell death is cytoskeletal disruption. Low frequency, non-heating, alternating magnetic fields are used to actuate starlike iron oxide nanoparticles (SNPs), whereby their mechanical motion is anticipated to disrupt the actin filament cytoskeleton and induce cell death. Cell viability studies (PrestoBlue and Live/Dead cell assays) were conducted to study the tolerability of SNPs by a healthy breast cancer cell line (MCF-10A) as well as three breast cancer cell lines (MCF-7, LCC-6, and MDA-231) at different concentrations and time points. Cell viability studies were also used to assess the effectiveness of different magnetic field parameters. We then plan to apply alternating magnetic fields to actuate SNPs and study their interaction with subcellular components, particularly the actin filaments that comprise the cell cytoskeleton. We will perform cell uptake, confocal microscopy, and Transmission Electron Microscopy (TEM) before and after magnetic field exposure for comparison purposes. Cells alone, cell plus SNPs, and cell plus magnetic fields will be used as controls. This will enable us to uncover the mechanism of cell death with this approach and demonstrate the efficacy of this approach in treating breast cancers. This approach will bring forth new opportunities in cancer therapeutics, all while being noninvasive to preserve patient quality of life and reduce treatment time compared to traditional treatments.

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GPP 30 MCSC BBT 2:15-2:30

Magnetic extracellular vesicles as therapeutic agents to treat breast cancer

Samuel Minier
Medical Physics

Mentor: Beltran-Huarac, Juan, Physics

Millions of people are impacted and die every year due to cancer. The World Health Organization has labeled it as the second leading cause of death globally, with approximately 9.6 million deaths reported in 2018. This places an enormous responsibility on healthcare professionals to improve existing treatments and develop new approaches to address this major societal problem. Nanoparticle-based approaches have shown to have promising targeted cancer capabilities when integrated to magneto-mechanical stimuli. This can be accomplished by the actuation of PEG-coated superparamagnetic iron oxide nanoparticles (PEG-SPIONs) using alternating magnetic fields, which induces mechanical agitation causing cellular death. One of our goals in our research is to improve the internalization of PEG-SPIONs using biological vehicles, such extracellular vesicles (EVs). We aim to investigate how these SPION-containing EVs (magEVs) behave in cell culture media and in contact with cells, and to better understand the delivery of SPIONs intracellularly. To produce magEVs, we collect the media of cancerous mouse T-11 cells that have been exposed to PEG-SPIONs at a concentration of 10 μg/ml. The media then goes through differential ultracentrifugation to isolate EVs from other cellular materials present in the media. After isolation, a bicinchoninic acid (BCA) assay is used to determine the concentration of magEVs, DLS and NTA

to ascertain their size distribution, and VSM and ICP-MS to assess their magnetic response. This provides guidance to conduct further proceeding tests. Western blot and qPCR are then performed to characterize three specific markers, CD9, CD63, and CD81. TEM and confocal microscopy will be used to visually examine the PEG-SPIONs inside of EVs. magEVs will be then reintroduced to T-11 cells (healthy breast cells will be used as control) followed by biodistribution studies and magnetic fields exposures to assess cell killing via magneto-mechanical actuation. This technology has the potential to advance the fields of nanomedicine and cancer therapeutics, and exhibits a great translation opportunity into the clinic.

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GPP 31 MCSC BBT 2:30-2:45

Exploring the Role of a Putative *Brucella* Exopolysaccharide Biosynthetic Pathway in *Brucella* Virulence

Jodi M. Ogle
Microbiology and Immunology

Roy M Roop, Microbiology and Immunology

Jodi M. Ogle[1]; Dariel A. Hopersberger[1]; Gail G. Hardy[2]; Ian S. Barton[1]; Connor B. Cribb[1]; Clay Fuqua[2]; R. Martin Roop II[1]

[1]Department of Microbiology and Immunology, Brody School of Medicine, East Carolina University
[2]Department of Biology, Indiana University

Brucella spp. are the causative agents of brucellosis, which is one of the most prevalent worldwide zoonoses. Brucellosis is marked by spontaneous abortion and infertility in natural animal hosts and flu-like illness along with undulant fever in humans. Belonging to the *Rhizobiales* order of alpha-proteobacteria, *Brucella* spp. are closely related to both pathogens and symbionts of plants, including the plant pathogen *Agrobacterium tumefaciens*. Despite differences in host preference and pathogenicity, members of alpha-proteobacteria often share genes and pathways that contribute to successful host interactions, offering insights into key virulence determinants.

Agrobacterium tumefaciens encodes a Wzx-Wzy-like polysaccharide biosynthetic pathway that generates a unipolar polysaccharide (UPP) expressed on one pole of the cell which is crucial for surface attachment and biofilm formation. *Brucella* spp. encode homologs of many of the *Agrobacterium upp* genes, suggesting that *Brucella* has the potential for UPP production. Preliminary data with a *Brucella abortus* mutant lacking the *uppC* and *uppE* genes, which encode the outer membrane polysaccharide transporter and the initiating glycosyltransferase components, respectively, of the UPP biosynthetic pathway, show attenuation in both macrophages and mice, implicating the *Brucella* UPP's involvement in virulence. However, the precise function of the *Brucella* UPP pathway and the specific contributions of the *upp* genes to virulence remain unclear.

Here, we implement a heterologous complementation approach to identify individual *upp* genes in *Brucella* that can restore wild-type levels of biofilm production in *Agrobacterium tumefaciens*

upp mutants. This approach aims to determine the roles of *upp* genes in *Brucella* polysaccharide biosynthesis, and ongoing research will delve more in-depth into the impacts of individual *upp* genes on *Brucella* virulence.

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GPP 32 MCSC BBT 2:45-3:00

TP63 mutations cause defects in keratinocyte cell-ECM adhesion and migration

Maddison N. Salois, Saiphone Webb,
Biomedical Sciences

Mentor: Maranke I. Koster, Anatomy and Cell Biology

Ankyloblepharon ectodermal dysplasia and cleft lip/palate (AEC) is a rare disorder that is caused by mutations in the *TP63* gene. AEC patients experience severe skin fragility leading to the formation of large skin erosions. Currently, there are no treatments or cures for these skin erosions in AEC. To investigate the mechanisms that lead to the devastating skin fragility, our laboratory has developed complimentary *in vitro* and *in vivo* systems. We have generated three AEC patient-derived induced pluripotent stem cell (iPSC) lines that can be differentiated into keratinocytes (iPSC-K). Additionally, we have corrected the disease-causing mutation thereby generating conisogenic keratinocyte pairs that differ only with respect to the presence or absence of the *TP63* mutation. RNA sequencing and Western blot analyses identified a downregulation of hemidesmosomal components in AEC iPSC-K. Hemidesmosomes are multi-protein cell adhesion structures that connect keratinocytes to the underlying extracellular matrix (ECM) and are crucial for providing structural integrity to the skin. Specifically, we observed a downregulation of ITGA6, ITGB4, PLEC, DST, COL17, and LAM332 as well as two focal adhesion components, ITGA2 and ITGA3. The downregulation of these proteins appears to be caused, at least in part, by aberrant ERK signaling in AEC iPSC-K. To further investigate the functional consequences of these molecular defects, we have developed human keratinocyte cell lines that express the same disease-causing mutation as the AEC iPSC-K used in our study (AEC-NTERT cells). Importantly, the AEC-NTERT model replicates the downregulation of hemidesmosomal and focal adhesion proteins. Further, we observed impaired adhesion and migration of AEC-NTERT cells on several ECM substrates. Additionally, we found a downregulation of key adhesion and migration proteins in transgenic mice expressing TP63-AEC transgenes and in AEC patient skin. Together these data suggest that abnormalities in keratinocyte adhesion and migration are contributing factors to the skin fragility in AEC patients. Finally, our model systems mimic the defects observed in AEC patient skin, thus allowing us to further investigate the cellular and molecular mechanisms contributing to AEC skin fragility. Increased understanding of these mechanisms may lead to the future development of novel therapies and improve patient quality of life.

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GPP 33 MCSC 125 12:45-1:00

Myoferlin regulates integrin α4 expression to promote invasion by HTLV-1-infected T-cells

Kawsar Sarker
Interdisc Biological Science

Mentor: Isabelle Lemason, Microbiology and Immunology

Kawsar Sarker, Nicholas Polakowski, Kimson Hoang, Isabelle Lemason

Human T-cell Leukemia Virus type-1 (HTLV-1) is classified as a complex retrovirus that primarily infects CD4+ T-cells *in vivo*. It is currently estimated that 5-10 million people worldwide are infected by this virus. Although most HTLV-1 infected individuals remain asymptomatic, 5% develop adult T-cell leukemia (ATL). ATL is characterized by the aggressive proliferation of infected CD4+ T-cells that often infiltrate various organs causing a fatal malignancy and there are no effective therapeutic options to treat ATL. The exact molecular events that regulate ATL infiltration remains unclear. We recently found that myoferlin (MyoF) is abnormally expressed in HTLV-1-infected-T cells. MyoF is a membrane-associated cellular protein that has variety of cellular function such as membrane repair, vesicle trafficking, and receptor dependent endocytosis. Current evidence indicates that overexpression of myoferlin is involved in the proliferation, invasion, and migration of cancer cells. We found that shRNA-mediated knockdown or pharmacological inhibition of MyoF in HTLV-1-infected cells impairs adhesion to endothelial target cells and extra cellular matrix. We also observed that knockdown of MyoF reduces the transmigration and invasion of HTLV-1-infected cells through endothelial monolayer. Adhesion of leukocytes to the endothelial surface is the critical step of T-cell invasion. Through RNA-seq analysis, we found that knocking down of MyoF significantly reduces *ITGA4* mRNA levels. We confirmed reduced expression of ITGA4 in MyoF-knockdown HTLV-1-infected cells. ITGA4 encodes integrin α4, which forms a heterodimer with β1 subunit to form VLA-4. VLA-4 then binds with the surface adhesion molecule VCAM-1 to on endothelial cell to facilitate cell adhesion and signaling events that lead to the cell migration. We found that MyoF knockdown reduces the binding of HTLV-1-infected T-cells to VCAM-1-coated plates. Based on our data, we propose that MyoF promotes the invasion HTLV-1 -infected T-cells by regulating the expression integrin α4.

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GPP 34 MCSC 125 1:00-1:15

Increased Sensitivity to Postural Perturbation Following COVID-19 Infection

Brittany Trotter, Kendall Nelson, Mackenzie Hoey
Kinesiology

Mentor: Zachary J. Domire, Kinesiology

Linda P. Bolin, PhD, RN, ANP, BCB, FAHA - Department of Nursing Science, East Carolina University
Stacey A. Meardon, PT, PhD - Department of Physical Therapy, East Carolina University
Nicholas P. Murray, PhD - Department of Kinesiology, East Carolina University
Zachary J. Domire, PhD - Department of Kinesiology, East Carolina University

There is increasing evidence of long-term effects indicative of central nervous system involvement following COVID-19 infection. Assessment of postural sway, a measure of static stability, can reveal even mild impairments in sensorimotor control due to disease or injury. The purpose of this study was to investigate the effects of both acute and long COVID-19 infection on sensorimotor control through postural sway assessment. We hypothesized significant differences in center of pressure (COP) 95% confidence ellipse area would be seen between those who have experienced a COVID-19 infection and whose symptoms resolved within 4 weeks (ACUTE), those who had COVID-19 and at least one symptom persisted longer than 4 weeks (LONG), and those with no history of COVID-19 infection (CONTROL). COP was measured during quiet standing on a force plate during eyes-open (EO), eyes-closed (EC), and a virtual reality balance task consisting of a baseline eyes-open measurement (VR), visual perturbation with "moving room" (MR), and a recovery period in the VR environment following cessation of the moving room (RC). COP data was then processed using a custom MATLAB script and data was analyzed with an RMANOVA. Differences within the groups across conditions were noted. There were no significant differences in 95% confidence ellipse area between conditions in the CONTROL group ($n = 17$). A significant increase in area was seen in the ACUTE group ($n = 20$) between the EO (M = 33.37mm) and EC ($p = 0.03$, M = 53.66mm), VR ($p = 0.007$, M = 48.56mm), and RC ($p = 0.03$, M = 105.41mm) conditions. Additionally, significant differences were identified in the LONG group ($n = 15$) between the EO (M = 23.16mm) and EC ($p = 0.036$, M = 45.73mm), VR ($p = 0.004$, M = 41.96mm), and MR ($p = 0.04$, M = 40.98mm) conditions. Additional differences in COP measures were also evident. Results indicate individuals who have experienced COVID-19 infection may be more sensitive to mild perturbations of balance than those who have not been infected. However, these results do not discriminate between acute and long COVID.

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GPP 35 MCSC 125 1:15-1:30

The pH-sensing G protein-coupled receptor GPR68 is a novel controller of vascular smooth muscle cell phenotype

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Mentor: David A. Tulis, Physiology

Transition of vascular smooth muscle (VSM) cells from a contractile, quiescent phenotype to a non-contractile, proliferative phenotype is a key feature of many cardiovascular diseases (CVDs), which

are the most common cause of morbidity and mortality in North Carolina, the United States, and worldwide. Controllers of phenotypic modulation are clinically important yet are incompletely characterized, and the goal of this study was to determine a role for the pH-sensing G protein-coupled receptor GPR68 in phenotypic transition of VSM cells. We hypothesized that GPR68 controls VSM cell phenotype by promoting the expression of key cytoskeletal and contractile proteins and, in turn, inhibiting VSM cell proliferation. Primary VSM cells from wild type (WT) and GPR68 knockout (KO) mice were harvested and grown in normoxic or hypoxic conditions, followed by analyses of mRNA and protein expression and cell proliferation. RT-qPCR confirmed successful induction of hypoxia through increased expression of GLUT-1, VEGFa, and HIF1a. GPR68 was also upregulated in hypoxia compared to normoxia. Western blot and RT-qPCR analyses demonstrated increased expression of the cytoskeletal and contractile proteins SM22a, calponin-1, and vinculin amongst others. Results also showed that KO cells had significantly increased cell proliferation compared to WT cells. Additional preliminary findings suggest that GPR68 controls VSM cell phenotype through the small GTPase Rap1a. These results support the study of GPR68 as a novel modulator of VSM cell phenotype and its potential as a therapeutic target in CVD.

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GPP 36 MCSC 125 1:30-1:45

Infant Mesenchymal Stem Cell Response to Chronic *in Utero* Metformin Exposure from GDM Pregnancies

Ericka M. Biagioni
Cellular & Molecular Bioenerg

Mentor: Broskey, Nicholas, Kinesiology

Ericka M. Biagioni[1], John C. Rowe IV[1], Sripallavi Yendamuri[1], Breanna L. Wisseman[1], Donghai Zheng[1], Kelsey H. Fisher-Wellman[1], P. Darell Neufer[1], Linda E. May[1], Nicholas T. Broskey[1]

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INTRODUCTION & OBJECTIVES: Offspring born from metformin treated gestational diabetes (GDM) pregnancies experience altered growth patterns that increase the risk for developing cardiometabolic diseases later in life. The adaptive cellular mechanisms underlying these patterns in offspring remain unclear. Therefore, the objective of this study was to determine if chronic *in utero* metformin exposure in GDM pregnancies elicits infant cellular metabolic adaptations. **METHODS:** In a cross-sectional design, 22 pregnant women diagnosed with GDM and solely on metformin (Met; n=12) were compared to those treated exclusively by diet (A1DM; n=10). GDM was diagnosed between 24-28 weeks gestation by 2-hour 75g oral glucose tolerance test. Women were matched for age, race, BMI, and infant sex. Umbilical cord derived mesenchymal stem cells (MSCs) were used as a model to study infant metabolism *in vitro*. Mitochondrial content was assessed by Western blot and intracellular lipid content was measured by Oil Red O staining. Substrate oxidation and insulin action were measured with ^{14}C radiolabeled glucose, palmitate, and oleate at baseline and following a 24-hour lipid challenge. A 2-way ANOVA and t Test were used to

determine significant differences between groups. **RESULTS:** No differences in gestational age at delivery (p=0.55), infant blood glucose at delivery (p=0.52), birth weight (p=0.88), ponderal index (p=0.23), or measures of infant abdominal (p=0.38), chest (p=0.88), or head (p=0.46) circumference were observed between groups. MSC outcomes revealed no differences in substrate metabolism except for lower rates of oleate oxidation among Met-MSCs at baseline (p=0.03). No differences in mitochondrial content or lipid content existed. **CONCLUSIONS:** Infant MSCs from metformin treated GDM pregnancies display no differences in substrate oxidation, before or after lipid incubation, albeit for baseline oleate oxidation. No differences in lipid storage or mitochondrial content existed. These cellular outcomes may not explain the altered growth patterns in infants exposed to metformin *in utero*.

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GPP 37 MCSC 125 1:45-2:00

Occupational Therapy and the Americans with Disabilities Act: Examining Practitioners' Knowledge, Attitudes, and Implementation

Ellen Cahoon, OTS
Occupational Therapy

Anne Dickerson, PhD, OTR/L, SCDCM, FAOTA, FGSA, Occupational Therapy

Purpose: To assess the current level of understanding regarding Americans with Disabilities Act (ADA) provisions among occupational therapy practitioners (OTP). A lack of knowledge of ADA can restrict the scope of occupational therapy direct intervention and consultatory roles. **Methods:** Stratified random survey design from AOTA's membership based on relevant employment setting (n=1000). A combination of two existing surveys was used to assess OTP's attitudes, knowledge, and implementation. Demographics and preferred resources were also collected. Descriptive and exploratory inferential statistics are being used to explore the ongoing data. **Results:** OTPs have completed the survey with a mean of 25±11 years of experience. Education levels included AS (0.7%), BS (33%), MS (48%), and doctoral (18%); with no significant differences in level of knowledge. Most participants (89-96%) agreed/strongly agreed that the ADA was important for clients, and OTP's role included advocacy, empowerment, and client education about the ADA. However, most respondents answered 60% or more of the knowledge questions incorrectly or "I don't know." Significant differences were found between the knowledge test and the frequency of ADA education activities (p < .001) and attitudes toward the ADA (p < .001). **Conclusion:** Despite most agreeing that ADA education and advocacy are part of their scope of practice, OTPs lack the knowledge. This is associated with lower advocacy in practice and highlights a gap in the practical understanding of the ADA. These results are important to policy and practice. Understanding the ADA is crucial for therapists and OTPs to empower clients to self-advocate for accommodations and to report violations.

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GPP 38 MCSC 125 2:00-2:15

Impact of Fatigue on Metatarsophalangeal Joint Loads During Load Carriage

Ankur Padhye
Kinesiology

Mentor: John Wilson, Physical Therapy

Ankur Padhye, Stacey Meardon, Junfei Tong, Jaques Reifman, and John Willson

Purpose: The high volume and intensity of physical training faced by military service members aids to a high incidence of lower extremity injuries, particularly in females. Metatarsals are a commonly reported injury site in service members and may be linked with a proximal shift in force under the toes to the metatarsal region during military tasks like prolonged rucking. However, to date, internal metatarsophalangeal (MTP) joint contact forces (JCF) developed over the course of military training activities are unknown. Thus, the purpose of this study was to compare MTP JCF at the beginning and at the end of a 5km rucking task in physically active females.

Subjects: 21 females (22.4 yr, 1.65 m, 58.2 kg) with a physical activity rating of 7.4/10.

Materials and Method: Synchronized left foot 3D marker data (200 Hz), ground reaction forces (GRF) (2000 Hz), and plantar pressure data (100 Hz) were recorded before and after a 5 km rucking task at 1.5 m/s walking speed with load carriage (22.7 kg). Plantar pressure informed GRF were input to foot and toe regions of a MTP joint model to estimate MTP joint moments and reaction forces using inverse dynamics and toe flexor muscle force using subject specific moment arms. Resultant JCF (RJCF) were calculated at each MTP joint and average peak RJCF, RJCF impulse, and RJCF loading rates over 5 stance phases were compared before and after the rucking task using paired t-tests (α=.05).

Results: First MTP joint peak, impulse, and loading rate were 3 to 4 times higher than all other MTP joints. Following the rucking task, 1st MTP joint RJCF impulse decreased 11% (p=.04) and RJCF loading rate decreased nearly 18% for the 2nd (p=.01), 3rd (p=.01), and the 4th MTP joint (p=.02). Peak RJCF at the 2nd, 3rd, and the 4th MTP joints also decreased but the change was not statistically significant (p=.06).

Clinical Relevance: These results inform our understanding of in vivo tissue MTP loads experienced during military-relevant tasks. The reduction in the RJCF properties with exertion may represent decreased MTP joint contributions to forward propulsion and is consistent with existing literature reporting lower toe pressure following exertion. These results also suggest that the highly repetitive nature of rucking may promote the high incidence of metatarsal injuries but that the joint loads do not increase as over the course of a rucking task. This could inform metatarsal injury prevention efforts in female service members.

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GPP 39 MCSC 253 2:15-2:30

Mining for Cryptocurrencies, Extracting from Communities: A Case Study of Belvoir

Victor Ihuka
Geography

Mentor: Bee, Beth, Geography

Exposures to pollution and other environmental risks are distributed unequally by race and class (Bullard, 1999). Hundreds of studies conclude that, generally, ethnic minorities, indigenous persons, people of color, and low-income communities confront a higher burden of environmental exposure from air, water, and soil pollution from industrial facilities (Holifield, 2001).

In the Fall of 2021, Compute North (a Minnesota-based technology firm) sought a special use permit to operate a cryptocurrency mining facility in Belvoir, Pitt County. The project prompted protests when it became clear the proposed site was close to an elementary school in the predominantly Hispanic and African American community (Livingston, 2021).

This case study examined how residents, community organizations and key decision makers responded to the proposed facility, what roles they played in shaping the decision-making, and to what extent environmental justice considerations influenced the process and subsequent outcome.

Even though cryptocurrency is a virtual currency, its production is not done in isolation. Cryptocurrency has spatial and social implications for the communities where mining occurs (Atkins et al., 2021).

Some studies have explored the energy consumption and carbon emissions of cryptocurrency mining and the noise pollution associated with crypto-mining, which can have significant environmental impacts (Atkins et al., 2021; Greenberg & Budgen, 2019). There is also concern about the slew of electronic wastes created by the specialized hardware required to mine crypto (de Vries & Stoll, 2021). One key area that has not gotten any attention in academic scholarship is the environmental justice dimensions of crypto-mining facilities siting.

Using the theoretical frameworks of Environmental Justice (procedural, recognition, and distributive justice), I analyzed the data (interviews, news articles, minutes of public hearings, etc) through the lens of narrative analysis to identify themes and patterns within the stories and to understand the social and cultural context in which the stories are situated.

Preliminary results show that the procedures for decision making for the cryptocurrency facility, while adhering to the rules, did not consider Procedural Environmental Justice. Procedural justice can be achieved by increasing community participation in the decision making process to ensure equitable outcomes in similar contexts.

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GPP 40 MCSC 253 2:30-2:45

Buyout programme experiences and perspectives of local public officials in eastern North Carolina.

Nelson Adeniji, Integrated Coastal Sciences

Mentor: Meghan Millea, Economics

Eastern North Carolina (ENC) has been buffeted by compound coastal water events (CCWEs), making residential buyouts that seek to move households and communities out of flood risk areas, an important flood hazard mitigation tool. However, little is known about the experiences of local public officials implementing buyout programs in rural coastal regions such as ENC in the United States. Using data from focus group interviews conducted with 24 emergency managers, planners, elected officials, and other public officials, we examine residential buyout programs in ENC from the perspective of local public officials. According to ENC officials, while property attachment, social ties in the community, and financial considerations are key drivers for residential property owners in rural ENC considering a buyout, the governance of buyout programs remains a complex, lengthy process lacking adequate communication and leads to uncertainties and for local public officials and property owners during the buyout. The uncertainty can be temporal, economic, or related to housing security. ENC officials recommend providing alternative mitigation options for small rural communities and simplifying and streamlining the buyout process along with improving communication throughout the buyout cycle to mitigate uncertainties in the buyout program.

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GPP 41 MCSC 253 2:45-3:00

Does elderspeak facilitate comprehension in older listeners? Evidence from eye-tracking.

Rose Baker
Commun Sciences and Disorders

Mentor: Matthew Walenski, Commun Sciences and Disorders

Background
Cognitive ageing among older adults may lead to increased effort required to understand spoken language, presenting a real communicative need for accommodation. Elderspeak is a communication strategy used to accommodate older people. It is characterized by simplified, repetitious language, slow speech, and high pitch. However, older adults often feel that exaggerated elderspeak is patronizing.

Objectives
In this study we examine whether certain elderspeak strategies bridge a communication gap between younger and older adults, by testing different elderspeak strategies that modify either linguistic dimensions of what you say (simplified, repetitious language) or acoustic dimensions of how you say it (slowed speech rate, higher pitch). We examine this issue with an auditory visual-word eye tracking and pupillometry experiment. Eye tracking will provide a measure of comprehension as the intended route is compared to the route that the participant's eyes take through a city. Pupillometry will indicate the cognitive effort associated with sentence processing.

Method
Students from ECU (n = 20) and older adults from the community (n = 20) will participate. During the experiment participants listen to prerecorded directions and try to follow the indicated route on a map with their eyes. An eye tracking machine tracks the shifting gaze of a participant as they look at the map on the computer screen. The eye tracker also gathers pupillometric data, which indicates the changing diameter of a participant's pupil in response to changes in processing effort. We examine five conditions for the recorded directions: normal (baseline), linguistically simplified, linguistically repetitious, slowed rate of speech, and high pitched speech. We will also gather survey data about how stressful or patronizing each speech condition is.

Hypotheses
We predict that in all five conditions, older adults will spend less time looking at the correct route on the map, and will exhibit higher cognitive effort at following the routes than younger participants (controls). Further, we predict that linguistic adjustments will make it easier to follow map directions than acoustic adjustments do, for all ages. Finally, we predict that the improvements at following directions will be larger for older adults than for younger adults, both for linguistic adjustments and for acoustic adjustments.

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GPP 42 MCSC 253 3:00-3:15

Perceived Competence, Achievement Goal Orientations, and Psychological Outcomes in PE

Stephanie Fuller
Sport and Exercise Psychology

Mentor: Thomas D. Raedeke, Kinesiology

Physical activity is known to have overwhelmingly positive outcomes in terms of both physical and mental health. Physical education is one way that middle and high school students experience physical activity (Standage, Duda, & Ntoumanis, 2003). One framework that can be used to examine behaviors in physical education is achievement goal theory (Nicholls, 1984).

Goal orientations represent an individual's definition of success in achievement settings. Achievement goal theory explains that goal orientations may be task (mastery) or ego (performance) focused. Individuals who endorse a task orientation emphasize the importance of effort, improvement, and skill mastery. Conversely, individuals who endorse an ego climate focus on norm-referenced standards and social comparison processes to define success in terms of doing better than others. They emphasize the importance of winning and competitive outcomes. Task orientations have been linked to adaptive outcomes such as enjoyment and effort, while ego orientations have been associated with more maladaptive outcomes (Biddle et al., 2003; Lochbaum et al., 2016, 2019).

The outcomes of goal orientations may be dependent on perceived ability. For example, an individual who is highly task oriented and has high perceived ability would view challenge as a positive growth experience, and they would strive for improvement and mastery. If the individual is task oriented but possesses low perceived competence, they might define success based on learning, improvement, and effort. On the other hand, if an individual is highly ego oriented with high perceived ability, they would strive to outperform others and gain recognition. However, if an individual is ego oriented and has low perceived ability, they might experience anxiety and pressure in challenging situations.

Therefore, the current study had two aims. First, we set out to identify profiles of PE students' perceptions of competence and motivational climate using Latent Profile Analysis (LPA). The we examined how perceptions of effort, enjoyment, and pressure differed based on profiles. LPA identified 6 profiles. Further analysis indicated that a task orientation is associated with positive outcomes, regardless of ego orientation and perceived ability. This suggests that students who adopt a task orientation experience more positive outcomes than individuals in alternate profiles, regardless of ego orientation and perceived ability.

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GPP 43 MCSC 253 3:15-3:30

Unveiling the Intersection: Campus Climate and Mental Well-being Among LGBTQ College Students

Haiden Hice
Human Develop and Family Sci

Mentor: Komoski, Mary Catherine, Human Dev and Family Science

Objectives: Campus Climate is often used to describe the multitude of subjective and objective factors that make up a university's environment as well as the prevailing attitudes and perceptions on said university's campus. (Cress, 2002, Peterson & Spencer, 1990, Rankin & Reason 2008, Vaccaro, 2012). This study explores the relationship between the perception of campus climate and the levels of depression, anxiety, and stress experienced by LGBTQ college students.

Methods: Participants were eligible for this study if they were at least 18 years old, enrolled in college, and personally identified as LGBTQ. Recruitment was conducted through online measures via flyers and email campaigns. Participants clicked on the link and conducted a 15-minute survey asking them questions related to their LGBTQ identity, mental health, and their perception of campus climate.

The participant's mental well-being will be evaluated using the Depression Anxiety Stress Scale-21. The Depression Anxiety Stress Scales 21 (DASS-21) is a short form of Lovibond and Lovibond's (1995) 42-item self-report measure of depression, anxiety, and stress (DASS). The DASS-21 is separated into 3 sections (Depression, Anxiety, Stress) with 7 questions in each section. This scale is assessed using a 4-point Likert scale with a higher overall score indicating greater amounts of depression, anxiety, and stress.

Individuals' perceptions of the current climate were evaluated by the Assessment of Campus Climate for Gay, Lesbian, Bisexual, and Transgender persons (Rankin, 2003) The entire survey is 24 questions broken up into three parts with eight questions in each part. Part one of this assessment is asking individuals about their own experience with harassment on campus. Part two is about their feelings about the campus climate with their own experiences but also their perception of campus climate overall. Part three is about the campus response regarding LGBTQ issues and concerns. This section asks participants to rate the campus response in general.

Anticipated Results: This study seeks to understand the relationship between campus climate and mental well-being in LGBTQ college students. We hypothesize that there is a bidirectional relationship between the perception of campus climate and depression, anxiety, and stress.

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GPP 44 MCSC 253 3:30-3:45

Subjective Age and Effective Leadership: Age-Differentiated Perspectives on Employee Motivations

Seth Jones
Psychology, Industrial/Organizational

Mentor: Courtney Baker, Psychology

Given the rise of age diversity within organizations, this study investigates how subjective age, defined as how people physically, mentally, and emotionally feel their age as compared to their actual age, impacts the relationship between motivation, perceptions of work, senses of workability and flourishing, and perceived leadership support. Self-Determination Theory suggests that different motivational processes will lead to different workplace and stress-related outcomes. Research suggests that older workers are often motivated to continue working when they derive meaning from their jobs (St-Onge et al., 2022). Conversely, younger workers may be driven by external factors like extrinsic rewards (Baltes & Baltes, 1990). Further, autonomous motivation, or when an employee is operating under the conditions of engaging in their job for pleasure, is likely to lead to less strain and better employee wellbeing (Fernet & Austin, 2014), which is more common in those who feel younger at work. Whereas those who are controlled motivated, when an employee engages in their role from an internal or external pressure to avoid negative emotions or pressure from others, are likely to experience more strain and diminished wellbeing, and is more common in those who feel older at work. While evidence suggests that autonomous motivation outperforms controlled motivation in predicting work-related outcomes (Van den Broeck et al., 2021), supervisors need to find ways to provide support to their subordinates. As such, this study considers age-differentiated leadership, which describes a leader who adjusts their leadership style to support the different needs of aging workers (Wegge et al., 2012) as means to benefit employees with differing viewpoints of their age, workability, and motivation. Data consists of self-report measures from 516 full-time employees through Amazon's Mechanical Turk (MTurk). The current study aims to determine mediation relationships through path analysis modeling. Given that older workers may be differentially motivated to continue working, it is imperative that managers understand how to facilitate the best motivations for older workers to ensure valuable employees are retained.

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GPP 45 MCSC 249 11:30-11:45

Does My Friend Like My Romantic Partner? Links Among Relationship Work With Partners and Friends and Physiological Implications

Siera Kee
Marriage and Family Therapy

Mentor: Jakob Jensen, Human Dev and Family Science

Kayla Reed Fitzke, Matthew Fish

We examined romantic, social, and physiological variables associated with partners discussing romantic challenges together and with friends, a process known as relationship work (RW). Actor-partner interdependence models examining 71 heterosexual, young adult couples and their friends suggested perceived and actual social network approval and dyadic adjustment were each associated with partners' RW patterns. Heart rate variability (HRV), as measured by the time-variable of the root mean square of successive differences (RMSSD), readings revealed links between males' RMSSD and RW and social network approval, but no associations were found for females. Findings inform researchers regarding links between romantic, social, and physiological functioning.

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GPP 46 MCSC 249 11:45-12:00

Assessing bias in personal exposure estimates when indoor air quality is ignored: A comparison between GPS-enabled mobile air sensor data and stationary sensor network data

Abdulahi Opejin
Geography

Mentor: Misun Hur, Geography

Abdulahi Opejin [a] and Yoo Min Park [b]
[a]Department of Geography, Planning, and Environment, East Carolina University
[b]Department of Geography, University of Connecticut

This study evaluates bias in personal exposure estimates when indoor air quality is not considered in exposure assessment research. Focusing on eastern North Carolina, it compares exposure estimates

derived from real-time personal air sampling (GeoAir2.0) collected in indoor and outdoor environments with those from the outdoor low-cost sensor (PurpleAir) network data. The study identifies significant differences between the two estimates, with PurpleAir data consistently overestimating levels of exposure to air pollution. The differences in weekday vs. weekend exposure are more pronounced in the GeoAir2.0 dataset compared to the PurpleAir data, indicating the impact of indoor activities. Moreover, exposure variations across different microenvironments, notably in residential spaces, are significant.

Classifying participants into three income groups, the study finds that the GeoAir-based estimates appropriately captured exposure disparities among income groups, which were not evident in the PurpleAir-based estimates. The analysis reveals that there is no significant difference in exposure estimates among different income groups when considering only outdoor air quality. However, when indoor air quality is integrated, significant disparities emerge, emphasizing the importance of considering both environments in exposure assessments and environmental justice research. This highlights the limitations of previous environmental justice studies focusing solely on outdoor air data, potentially underreporting social disparities.

In conclusion, the study emphasizes the significance of integrating indoor air quality data in exposure assessments to mitigate bias. It also underscores the importance of personal air sampling data in environmental justice studies, providing a more accurate representation of exposure disparities among different social groups.

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GPP 47 MCSC 249 12:00-12:15

Relationships among Cumulative Life Stress, Interoception, and Psychological Presentations with Somatic Features

Alia Simon
Health Psychology

Mentor: Christyn Dolbier, Pyschology

Introduction: Interoception is a construct encompassing conscious and unconscious awareness of one's physiological state, as influenced by the integration of sensations detected and interpreted by the nervous system. Exposure to heightened or chronic stress is likely to contribute to dysregulated interoceptive processes, diminishing one's ability to perceive internal signals accurately and adaptively. This may contribute to bodily distrust and adverse mental health outcomes. To date, this line of research remains in its infancy. The current study sought to bridge this gap by exploring interoceptive accuracy and awareness as a mediator for the relationship between cumulative life stress and symptoms of psychological disorders with somatic features.

Methodology: A sample of undergraduates at a large Southeastern university was recruited in Spring 2023 and Fall 2023 ($N = 639$); $M_{age} = 18.80$ ($SD = 0.95$), majority non-Latinx, White, female, and continuing-generation students. Participants completed an online survey, including the Stress and Adversity Inventory (cumulative exposure to acute and chronic life stressors), Multidimensional

Assessment of Interoceptive Awareness-2 (attentional style when interpreting and attending to bodily states), Interoceptive Accuracy Scale (subjective accuracy of internal bodily signals), Generalized Anxiety Disorder 7, Social Phobia Inventory, Post-Traumatic Stress Disorder Checklist 5, Eating Disorder Diagnostic Scale, Somatic Symptom Scale 8, Patient Health Questionnaire 9 (depression), Panic Disorder Screener, and Whitley Index (health anxiety).

Results: Data have been collected and are undergoing further analysis to inform results. It is hypothesized that interoceptive awareness and accuracy will partially account for relationships between cumulative life stress and the frequency of symptoms of psychological disorders with somatic features.

Discussion: Once data analysis has been finalized, findings will yield the potential to inform future longitudinal studies examining temporal relationships between these variables. Gaining insight into interoceptive patterns associated with common psychological disorders provides insight for tailoring transdiagnostic psychometric tools and interventions informed by mechanisms that influence the mind-body connection.

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GPP 48 MCSC 249 12:15-12:30

Adverse Childhood Experiences, Risk Taking, and Protective Factors

Daniel Stickel
Pediatric School Psychology

Mentor: Jeannie Golden, Psychology

Prior research has discovered many detrimental effects of adverse childhood experiences (ACEs). While these outcomes can have far-reaching effects into adulthood, experiencing ACEs can also exert more proximal impacts on children. An outcome of recent interest in the literature is increased risk-taking behavior. The current study was designed to investigate the possible relationship between ACEs and risk taking in children in the Adolescent Brain Cognitive Development (ABCD) Study funded by the NIH. Additionally, the presence of a close friend and school protective factors will be investigated as potential moderators in the hypothesized relationship between ACEs and risk taking.

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GPP 49 MCSC 249 12:30-12:45

Intentions Defined: How Students' Entrepreneurial Attitudes and Perceptions Are Shaped From a Student Consultant Internship Program

Seth Jones
Industrial/Organizational Psychology

Toan Tran,
Business Management

Mentor: Dennis Barbara, Business Management

Emily Yaeger, Ph.D | Assistant Professor, Department of Recreation Sciences, Interim Director of the Crisp Small Business Resource Center in the Miller School of Entrepreneurship

Dennis Barber III, Ph.D | Associate Professor, Miller School of Entrepreneurship

Tristyn Daughtry, MBA | Rise29 Program Manager, Miller School of Entrepreneurship

This research explores whether participation in a rural small business student consulting internship statistically and significantly affects students' Intentions to Launch a Business (Intentions) (Liñan & Chen, 2009); Reflection (Kember et al., 2000; Lundmark et al., 2019); Competencies (Morris et al., 2013); Entrepreneurial Attitude Orientation (EAO) (Bolton & Lane, 2011); Perceived Behavioral Control (PBC) (Liñan & Chen, 2009); and Personal Attitudes towards Entrepreneurship (Attitudes) (Liñan & Chen, 2009). Each of these variables tie to a learning outcome of the student consulting program. Utilizing path analysis modeling, the current study aims to determine mediation relationships between participants before and after participating in the program. Results from this analysis will inform future inclusion of these variables in a model that will investigate predictors of each of these learning outcomes. Theoretically, this study considers the Entrepreneurial Event Model, which describes the process entrepreneurial opportunities are formed and how they influence entrepreneurial intention and behavior (Duong & Le, 2021; Le et al., 2023; Anal & Singh, 2023). This provides the study with a framework for understanding how entrepreneurial opportunities are formed and how they influence individuals' intention to engage in entrepreneurial activities. Additionally, this highlights the importance of perceived desirability and feasibility, as well as entrepreneurial self-efficacy, in shaping entrepreneurial intention. A theoretical implication is the role of perceived desirability and perceived feasibility in shaping entrepreneurial intention (Alvarez & Barney, 2007). Perceived desirability refers to the attractiveness of creating one's own enterprise, while perceived feasibility refers to the belief in one's ability to successfully start and manage a business (Alvarez & Barney, 2007). These two factors play a crucial role in influencing individuals' intention to initiate entrepreneurial events (Alvarez & Barney, 2007).

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GPP 50 MCSC 249 12:45-1:00

Development of a Socio-Hydrological Model for a Coastal Watershed: Using Stakeholders' Perceptions

Mahesh R Tapas
Inter Applied Data Analytics

Mentor: Gregory Howard, Economics

Environmental and human systems are dynamic. Most hydrological models simulate a single response in watershed behavior from a particular change in the surrounding environment. Stakeholders play a key role in the dynamic nature of a watershed, and including their responses can help us comprehensively model watershed responses. In a coastal agricultural watershed, the non-linearity of the human-environmental system further increases due to the intense effects of climate change, making stakeholders' perceptions even more important. Agricultural productivity is being reduced in areas experiencing sea level rise (SLR) and saltwater intrusion. Agriculture is a major nutrient source to coastal waters worldwide, making farmers chief stakeholders. We anticipate farmers will change their land use land management (LULM) decisions in response to changes in policies developed to mitigate climate change issues. This study will develop a novel methodology to explore how farmers' perception of SLR,, ecosystem health and policy changes affect their LULM decisions and how these LULM decisions can affect nutrient concentration in a coastal agricultural region.

Our study will focus on the Tar-Pamlico River basin in eastern North Carolina (ENC). We will use interviews and surveys of at least 60 local farmers by random sampling to incorporate their perceptions into the model. The interview questions will be based on different policies (e.g. nutrient taxations and subsidies) under current and future climate change impacts, excess nutrients in the watershed and SLR. By integrating farmers' perceptions in Soil and Water Assessment Tool Plus (SWAT+), we will develop a socio-hydrological model. Farmers' interview data will help us understand their probable LULM strategies, such as changes in crop rotation, adding riparian buffers, or changes in nutrient application practices. We plan to forecast the watershed nutrient concentration changes through midcentury that result from farmers' probable LULM decisions by altering specific parameters and inputs to SWAT+. This unique methodology for developing a socio-hydrological model can help policymakers develop mitigation strategies for degrading ecosystem health in ENC and can be transferred to other coastal regions globally.

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GPP 51 MCSC 253 12:15-12:30

Using Gafchromic films for dosimetry of low-energy protons produced in the ECU accelerator laboratory.

Homeira Faridnejad
Biomedical Physics

Mentor: DeWitt, Regina, Physics

Different types of radiation are used to kill cancer cells. Proton beams are excellent for this purpose because they deliver most of their energy in a narrow volume in the body. These beams are produced in the ECU accelerator lab and experiments in this lab are ongoing to study the biological effectiveness of proton beams in killing cancer cells. To evaluate the results correctly, it is crucial to know the exact radiation dose that was delivered to the cells.

The goal of this dissertation is to test and develop different methods to measure accurately the radiation dose delivered during cell experiments in the ECU accelerator lab, including Gafchromic radiotherapy films, an ion chamber (IC), and thermoluminescent dosimeters (TLD). Gafchromic films are the first method we have studied. They change their color as a function of absorbed dose. We tested EBT-3, EBT-4, MDV-3, EBT-XD, and HDV-2 Gafchromic films with 2, 2.5, 3, and 4 MeV proton energies in the ECU accelerator lab. We found that HDV-2 is the best film for all energies, and MDV-3 and EBT-4 are suitable as well for 4MeV protons. These films were calibrated by giving well-known doses with an X-ray source in the Brody School of Medicine. Color-versus-dose calibration curves were established.

Next, ion doses of known magnitude were administered to the films with different ion energies, and calibration curves for photon beams were created. These are used to evaluate unknown radiation fields and doses during cell experiments. In my presentation, I will describe the methods and results of this first part of my dissertation, and I will provide a summary of the next steps.

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GPP 52 MCSC 253 12:30-12:45

Behavioral and survival impacts of salinity on white shrimp *Penaeus setiferus*

Chloe Gabriel[1], Amy Fowler[2], James Morley[1]
Biology

Mentor: April Blakeslee, Biology

In this project, I aimed to determine the low-end salinity tolerance of the ecologically and commercially valuable Atlantic white shrimp, *Penaeus setiferus*. Prior research has determined the high-end salinity tolerance of this species, but to date, we do not yet know their low-end salinity tolerances. This kind of knowledge is important for understanding changing ecosystems as a result of climate change, the impacts of salinity on shrimp species, and aiding in proper fisheries management. I conducted an experiment where I exposed subadult *P. setiferus* shrimp to three different low-end salinity treatments (2, 5, and 15 ppt) over a 2-week period. Two trials of the experiment were conducted, using white shrimp collected from Engelhard, NC in Pamlico Sound (September (trial 1), October (trial 2)). Mortality and behaviors such as molt frequency, activity, and feeding were used as metrics to examine low-end salinity tolerance. We found that shrimp can tolerate salinities as low as 2 ppt but showed significant stress behaviors and higher mortality compared to the other two salinities. My work could be applied to future ecophysiology research in the species and also provide insight into potential management strategies for the shrimp fishery.

1) East Carolina University 2) George Mason University

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GPP 53 MCSC 253 12:45-1:00

Time-Resolved Spectroscopic Analysis of Avian Cryptochrome 4 Reveals Key Features in Electron Transport Chain Critical for Magnetoreception

Wyatt Guy
Chemistry

Mentor: Dr. Adam Offenbacher, Chemistry

Dr. Eefei Chen, University of California Santa Cruz, Department of Chemistry and Biochemistry
Dr. David Kliger, University of California Santa Cruz, Department of Chemistry and Biochemistry

Every year, migratory birds use earth's geomagnetic field to navigate thousands of miles, mostly during the night. However, the mechanism by which this 'magnetoreception' process takes place is not fully understood. Recent advances in biochemical research have implicated a blue-light sensitive flavoprotein, cryptochrome 4 (CRY4), as a potential magnetoreceptor. Found in the retina of the birds' eyes and upregulated during seasonal migration, CRY4 possesses a DNA photolyase homology domain, equipped with a carboxy-terminal tail (CTT). In addition, it harbors an oxidized flavin adenine dinucleotide (FAD_{ox}) chromophore, which upon exposure to blue-UV light participates in rapid electron transfer (ET) reactions with a chain of four tryptophan (Trp) amino acids. The resulting electron spins on the flavin anion radical and Trp cation radicals are considered 'coherent' – a quantum phenomenon. This property is sensitive to the directionality of external magnetic fields. Protonation of the FAD-radical results in release of the CTT producing the signaling state of CRY4. A question in this field is how the conformational change of the CTT (classical property) is related to the quantum properties (electron spin coherence). Preliminary time-resolved, transient absorption spectroscopy (TAS) has revealed rapid reduction of the flavin chromophore to generate the flavin anion radical and production of the Trp cation radical. The spectral feature from the Trp cation radical subsequently decays on the microsecond timescale prior to protonation of the FAD anion radical, implicating the oxidation of a solvent-exposed tyrosine. These TAS data provide the first suggestive evidence for the role of a tyrosine radical. The formation of a Tyr radical has important implications in the link between quantum mechanical spin coherence and the conformational change to the CTT of CRY4 to promote biological signaling.

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GPP 54 MCSC 253 1:00-1:15

Biochemical and structural studies of unusual lipoxygenases from pathogenic fungi

S. Gage Hill
Chemistry

Mentor: Adam R. Offenbacher, Chemistry

Lipoxygenases (LOXs) are a family of non-heme oxidoreductases that oxidize polyunsaturated fatty acids into important signaling molecules. They are widely represented in plants and animals. More recently, LOXs have been discovered from pathogenic fungi. For example, a LOX has been identified in *Magnaporthe oryzae (Mo)*, or rice blast fungus. *M. oryzae* is considered the most destructive

plant pathogen and affects a third of the world's rice crops. Since they are secreted by their host, *Mo*LOX and other fungal LOXs have been considered as targets for development of novel anti-fungicides. *Mo*LOX uses a manganese cofactor and generates a unique bis-allylic 11*S*-hydroperoxy product that may contribute to leaf necrosis. The manganese cofactor in *Mo*LOX is ligated by the sidechains from three histidine, and an asparagine (N473) as well as a water molecule and the carboxylate from the C-terminus. To better understand how the reactivity of manganese is controlled, a mutational study of primary and second shell ligands was performed. Two residues of note are N473 and a second-shell glutamine sidechain (Q281), which forms hydrogens bonds with N473. Kinetic and structural results stemming from mutation of these residues, and their contribution to function, will be presented. Overall, the mutations of these residues have provided insight to Mn-LOX reactivity dependence on the symmetry of the metal-ligand coordination.

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GPP 55 MCSC 253 1:15-1:30

Constraints on subvolcanic magma plumbing system evolution from crystal size distribution analysis of igneous groundmass, Henry Mountains, Utah

Tess Oldroyd-Johnson
Geology

Mentor: Eric Horsman, Geology

Volcanism is driven by magma systems in Earth's shallow crust, which can be very dynamic and are commonly built through multiple injections of magma. Recognizing these separate magma injections can be difficult because differences in texture, geochemistry, etc. may be subtle or non-existent. However, differences in magma injection crystallization histories may be recognizable through analysis of the late-crystallizing groundmass in porphyritic subvolcanic igneous rocks. In igneous bodies built from component magma sheets, early injections cool rapidly relative to later injections, resulting in distinct groundmass crystal size distribution (CSD) in the youngest, slowly cooled magma sheets compared to older, faster cooled sheets. Previous work demonstrates the ~28 Ma Copper Ridge laccolith (Henry Mountains, Utah) was constructed at a depth of ~2 km from at least two texturally distinct igneous sheets stacked atop one another, and suggests these two sheets may themselves include multiple injections of magma. For this work, we test the hypothesis that the relative timing between intrusive sheets in a laccolith can be constrained using CSD analysis of groundmass texture.

To test this, we collected a suite of porphyritic diorite samples from a natural cross-section through the entire 400-m-thick Copper Ridge intrusion, including samples at well-exposed upper and lower contacts of the laccolith with sedimentary host rock, at contacts with an intercalated layer of host rock within the laccolith, and at spaced intervals within the previously recognized upper and lower igneous sheets themselves. CSD analysis was conducted on EBSD mineral phase maps of quartz, anorthite, and orthoclase in the groundmass (crystals <100 microns). Preliminary results suggest the upper sheet was intruded after the lower sheet, and the lower sheet is built of three or more component pulses of magma. Ongoing work includes adding data from more samples and

synthesizing results from three analyzed mineral phases. We discuss the implications for both the construction history of this shallow magma system and other shallow magma systems.

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GPP 56 MCSC 253 1:30-1:45

Cryptic cohabitation: The quest to divulge arthropod communities and plant selection in the nests of the Prothonotary Warbler (*Protonotaria citrea*) in eastern North Carolina

Skadi Kylander
Biology

Mentor: Brewer, Michael, Biology

Birds are not the only living things in bird nests. Bird nests also develop microhabitats that arthropods (aka "bugs") find desirable. Some of these arthropods are avian ectoparasites, like mites and lice, that feed on birds, while others depredate those ectoparasites, and still others consume plants used in nest construction. Many of these arthropods are very small, and most of the past nest arthropod research has focused on only a few species (perhaps due to limitations of conventional methods); novel environmental DNA techniques may permit more complete community characterizations. The nest protection hypothesis states fresh plant material in nests may discourage ectoparasite community development because those plants produce compounds that negatively affect certain arthropods. Studies of birds that select vascular plants inconsistently support this hypothesis, but little is known about birds that use bryophytes like mosses. With this project, I will characterize nest arthropod communities in the nests of the Prothonotary Warbler (*Protonotaria citrea*), a watchlist species that uses bryophytes in its nests and the only cavity-nesting warbler in eastern North America, nesting in five forested wetland habitats in eastern North Carolina. The field sites used in this project were established by the Department of Biology at Chowan University (Murfreesboro, NC). I will use environmental DNA to characterize the nest arthropod communities and will assess the applicability of the nest protection hypothesis by identifying and analyzing bryophytes used in nests. Information learned from this project can be used to inspire future studies and to focus conservations strategies for this watchlist species in habitats threatened by the consequences of global climate change and sea level rise.

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GPP 57 MCSC 253 1:45-2:00

Predator effects on prey communities differ based on predation strategy and spatial scale

Jasper Leavitt
Int Dct Prg Bio, Biomed, Ch

Mentor: David Chalcraft, Biology

The biodiversity of a region (gamma diversity) depends on how many species occur in an average habitat patch within the region (alpha diversity) and how much variation there is in the identities of species present in patches within the region (beta diversity). Models suggest that both generalist and specialist predators should reduce alpha diversity, but generalist predators would enhance beta diversity while specialist predators would reduce beta diversity. Such differences are expected as generalist predators enhance vulnerabilities to extinction in all species by reducing their population numbers while specialist predators enhance vulnerabilities of their preferred prey. We conducted an experiment in artificial ponds to assess the effects of one specialist predator (sunfish) and two generalist predators (newts and *Anax* dragonfly nymphs) on the alpha, beta and gamma diversity of aquatic insects present in ponds. We found 70 taxa in the artificial ponds across all treatments. Sunfish presence reduced alpha diversity by an average of 5.9 taxa and reduced gamma diversity by an average of 10.6 taxa compared to ponds that contained no predators, but there was not an effect on beta diversity. The presence of either newts or *Anax* did not affect diversity compared to predator free ponds. These results indicate that the effect of predators on prey diversity varies with scale and type of predator present but the particular patterns of change that we observed are not always consistent with that predicted by theory.

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GPP 58 MCSC 249 9:30-9:45

Biodiversity and habitat complexity as indicators of community assembly following oyster reef restoration

Grace Loonam
Biology

Mentor: April Blakeslee, Biology

Grace Loonam[1], Rachel Gittman[1], Ulises Mendoza[1], Chris Moore[2], Emory Wellman[3], April Blakeslee[1].

[1]East Carolina University, USA. [2] Florida Atlantic University, USA. [3]University of Florida, USA.

While anthropogenic ecological degradation has posed significant challenges on a global scale, human-induced changes to habitats and communities provide opportunities to not only investigate the resilience and recovery of communities following disturbance, but also how they assemble and shift over time. Habitat restoration offers a way to study these changes while also providing a mechanism for restoring lost ecosystem function and services following human disturbance. Two restoration approaches were implemented in 2018 in the Rachel Carson Reserve in Beaufort, North Carolina: a traditional shell bag approach, and a novel biodegradable substrate, OysterCatcher™. My project compares these approaches to each other and with nearby natural reefs to examine measures of habitat complexity and community composition five years post-restoration. I use established protocols to characterize habitat complexity including oyster reef parameters (live oyster densities, oyster sizes, reef dimensions). Community succession and diversity are assessed using passive samplers that recruit reef-resident organisms and their parasites. I also use the trematode parasites of eastern mud snails (*Ilyanassa obsoleta*) as surrogates of biodiversity, as parasite diversity is often an

indicator of trophic structure and complexity. This work will illustrate the applicability of restoration as a tool for studying ecological succession.

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GPP 59 MCSC 249 9:45-10:00

Using the Population Genetic Structure of a Unique Parasite to Investigate Diamondback Terrapin Dispersal

Garrett J. Maggio
Int Dct Prg Bio, Biomed, Ch

Mentor: April Blakeslee, Biology

Garrett J. Maggio[1]; April M.H. Blakeslee[1]; Krista A. McCoy[2,3]; Michael W. McCoy[2,3]
1 - East Carolina University
2 - Florida Atlantic University
3 - FAU Harbor Branch Oceanographic Institute

Many apex predators are experiencing population declines due to anthropogenic activities, causing other organisms that require the presence of these predators to also face declines. Obligate parasites provide a conspicuous example of organisms that may become extirpated alongside vertebrate hosts. Recently, parasites with complex, multi-host life cycles have become recognized as valuable tools for investigating the population ecology of their hosts. One such parasitic taxa, digenean trematodes (i.e., flukes), can only disperse as far as their most motile host species can carry them, resulting in congruent dispersal rates for both species. Typically, definitive hosts are vertebrates, meaning that flukes might act as proxies for the population connectivity and genetic structure of apex predators. To investigate this question, we analyzed the population genetics of *Pleurogonius malaclemys* (the terrapin fluke) as a proxy for its definitive host *Malaclemys terrapin* (the diamondback terrapin), which is experiencing declines in its western Atlantic range due to historic overharvesting and contemporary threats. The terrapin fluke was collected from its abundant intermediate host, *Ilyanassa obsoleta* (the eastern mudsnail), at multiple sites between Massachusetts and Florida where both host ranges overlap. DNA sequencing of fluke tissues at the COI mitochondrial marker revealed high degrees of genetic structure, likely due to known low dispersal rates of terrapins. In addition, several novel populations of the terrapin fluke were identified, thereby confirming the presence of terrapins at these sites. Overall, this study is a critical step towards using the fluke as a tool in terrapin research, and also provides a baseline for our knowledge of the genetic diversity and population structure of the fluke. Future studies will investigate the degree to which terrapin and fluke population genetic structures are correlated. If similarities are detected, the fluke could be a valuable tool for better understanding terrapin population connectivity and bolstering conservation efforts.

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GPP 60 MCSC 249 10:00-10:15

Parasite component community structure within an epiphyte-grazing host indirectly influences the productivity of a seagrass ecosystem

Meghan A. Nadzam
Biology

Mentor: April Blakeslee, Biology

Meghan A. Nadzam[1,2*], Joseph P. Morton[3], Gordon He[3], Catherine Brenner[3], Magdalena Phillips[3], and Brian Silliman[3]

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[3]Duke University Marine Lab, 135 Duke Marine Lab Rd, Beaufort, NC, 28516, USA.

While recent experiments have revealed single parasite species can impact ecosystem structure and functioning through their effects on host behavior, it is unclear how multiple species of parasites may comparatively do so – even though this is the more common state in nature. In this study, we experimentally manipulated the presence of the three most common trematode species (*Himasthla quissetensis*, *Lepocreadium setiferoides*, and *Zoogonus lasius*) of the epiphyte grazing marine snail, *Ilyanassa obsoleta* (eastern mudsnail), in a seagrass (*Halduli wrightii*) ecosystem. We then quantified subsequent changes to epiphyte biomass and seagrass growth. Trematode infection generally decreased epiphyte fouling of seagrasses and increased seagrass growth, and the magnitude of this effect depended on trematode species. *Himasthla quissetensis* yielded the greatest reductions in epiphyte biomass and increases to seagrass growth; *L. setiferoides* yielded middling effects; and *Z. lasius* yielded no significant effects relative to uninfected controls. These results demonstrate that the indirect influence of parasites may vary with parasite composition. Additionally, our findings underscore the potentially positive roles of behavior-altering parasites in seagrass ecosystems such as increases of seagrass blade growth and photosynthesis rates.

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GPP 61 MCSC 249 10:15-10:30

Surface modification of magnetic nanoparticles for cancer treatment through magneto-mechanical actuation

Jarrett Nagy
Medical Physics

Mentor: Dr. Juan Beltran-Huarac, Physics

Undergraduate Research Assistant: Oise Abhulimen
Lab Affiliation: Magnetic Formulations & Bionanotechnology Lab

One of the ever-increasing hospital demographics is cancer patients. It is projected by the American Cancer Society that in 2024 there will be over 2 million new cancer cases and 0.61 million cancer deaths. Most of the approved treatments for cancer cases use harmful ionizing radiation and chemotherapy drugs. Making it pertinent to find a treatment for cancer that limits the detrimental side effects that cause harm during and after treatment. We propose a treatment using superparamagnetic iron oxide nanocubes coated with nitrodopamine-polyethylene glycol (ND-PEG SPIONs) and alternating magnetic fields (AMF) to cause cell death. In this treatment, ND-PEG is synthesized through two acid-base reactions and one simple replacement reaction. Acid base reactions use NDHCL, $NaNO_2$ and sulfuric acid to make $NDHSO_4$. Simple replacement reaction uses $NDHSO_4$ and PEG under nitrogen purging to synthesize ND-PEG, which will be confirmed via FTIR testing. Then, SPIONs will be coated with ND-PEG through PEGylation in which the PEG polymer binds to a N-terminal or thiol in a selective/reversible manner. NDPEG is used due to its hydrophilic nature, which facilitates stable suspension in cell culture media. After coating, the stability and presence of the ND-PEG SPIONs will be tested using DLS, FTIR and TEM. Mammary triple-negative phenotype epithelial tumor (T-11) cells will then be exposed to ND-PEG SPIONs at different concentrations and incubation times. Particle-containing cells will be treated by AMFs, which can induce changes in cell structure and function through magneto-mechanical actuation (MMA). In particular, we aim to kill T-11 cells by disrupting the cytoskeleton selectively. Cell death will be measured by conducting cytotoxicity assays using the PrestoBlue reagent assay and flow cytometry. We anticipate magnetically-actuated ND-PEG SPIONs will induce shear stress on the cytoskeleton as they realign to the polarity-changing field causing cell death. This new method of cancer treatment will allow for a more effective localized treatment and brings forth new arenas in cancer therapeutics.

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GPP 62 MCSC 249 10:30-10:45

Mean System Energy for Particle Pairs in High Energy Physics

Okey Ohanaka
Applied Physics

Mentor: Lin, Ziwei, Physics

In physics, we often examine properties of particles using statistical tools. For example, we use Maxwell-Boltzmann statistics to determine the mean energy of individual particles. In high energy physics, however, it is of interest to determine the squared collision energy between pairs of particles, described by the Mandelstam variable, s. We derived a mass dependent probability density function for s using Boltzmann statistics. We verify our analytical results using numerical simulations to generate 50 million particles for which we calculate the distribution of s values. The mass-dependent s distribution allows us to calculate any quantities related to the collision energy of massive particles. Based on these results, we found the mean kinetic energy for a Boltzmann gas in the high-mass limit to be 1.5T, where T is the temperature. The high-mass limit corresponds to non-relativistic particles. This result coincides with the single particle mean energy from the equipartition theorem.

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GPP 63 MCSC 249 10:45-11:00

Comparing the Optically Stimulated Luminescence Response of Quartz for Beta Irradiation and X-ray Irradiation.

Noah Pope
Medical Physics

Mentor: DeWitt, Regina, Physics

Optically stimulated luminescence (OSL) is a technique for radiation dosimetry. Upon stimulation with light the OSL dosimeters emit luminescence; the intensity of the luminescence signal is proportional to the absorbed dose. A beta source is used to calibrate the OSL system so that the OSL response can be converted to a dose. Because beta radiation and X-rays are fundamentally different (electrons and photons, respectively), we expect the OSL response of a sample to be different depending on the type of radiation. This means that a dose calculation using OSL would be incorrect, if the sample was exposed to X-rays and the OSL response was calibrated using a beat source. Because of this dose calculation discrepancy, we developed a conversion factor to convert the OSL response of beta irradiation to X-ray irradiation at different X-ray energies. We irradiated quartz samples using an X-ray source to get the OSL response from X-rays. We didn't know the dose rate of the X-ray source that we used for our irradiations, so we had to create a calibration curve using Gafchromic film and compared it to irradiations from an X-ray source with a known dose rate. We found that at low energies, around 20keV, we had to irradiate our samples with X-rays for more than 4 times as long to get an equivalent OSL response to beta irradiation. At higher energies, around 50keV the ratio of the X-ray response to the beta response was almost 1 to 1.

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GPP 64 MCSC BBT 12:00-12:15

Benchmarking charge and baryon stopping in isobar collisions with AMPT

Mason Ross
Biomedical Physics

Mentor: Ziwei Lin, Physics

The stopping of baryons is an important unsolved problem in understanding the fundamental structure of baryons. Charge and baryon number are carried by quarks in the standard framework of QCD. In conventional models such as A Multi-Phase Transport Model(AMPT) there is higher net charge stopping than net baryon stopping and we explain these results in terms of the asymmetric relationship between the strange and antistrange quark rapidity distributions. Alternatively, the baryon junction model was proposed in the 1970s as a carrier of the baryon number to explain baryon excess in the midrapidity region. The results

generated by AMPT can serve as a useful baseline for future work investigating the carrier of baryon number through isobar collisions.

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GPP 65 MCSC BBT 12:15-12:30

Using electrical resistivity tomography (ERT) to investigate the role of artificial channels on saltwater transport, Hyde County, NC

Elnaz Pezeshki
Integrated Coastal Sciences

Mentor: Stephen Moysey, Geological Sciences

Elnaz Pezeshki[1,2], Matthew Sirianni[2,3], Stephen Moysey[2,3], Alex Manda[2,3], Andrea Gibbs[4]
[1]Integrated Coastal Sciences, East Carolina University, Greenville, NC, United States
[2]Water Resources Center, East Carolina University, Greenville, NC, United States
[3]Department of Geological Sciences, East Carolina University, Greenville, NC, United States
[4]Agriculture Extension Agent, Hyde County Center, N.C. Cooperative Extension

Hyde County, North Carolina (NC) is a low-lying coastal agricultural area that is currently experiencing negative impacts from soil salinization and saltwater intrusion. Over the past half century, an extensive network of drainage ditches was constructed to lower the groundwater table and increase agricultural productivity in the region. Previous work has observed saltwater movement into agricultural areas adjacent to the coast via these drainage ditch networks, however the vertical and horizontal extent and evolution of salt plumes adjacent to ditches is not well established, particularly under varying environmental conditions. Thus, in order to better understand subsurface salt transport in ditch-drained agro-systems, we deployed time-lapse electrical resistivity tomography (ERT) arrays consisting of 72-electrodes at a 0.5 m spacing to investigate the amount, distribution, and evolution of salts adjacent to three drainage ditches in Hyde County, NC. Ditch 1 is located along the southern edge of the field site and is directly connected to the Pamlico Sound. Ditch 2 is located to the northwest of Ditch 1 and in an area with low reported crop yields and is hydraulically connected to Ditch 1. Lastly, Ditch 3, is located on the northern edge of the field site and does not have a hydraulic connection to Ditch 1 or 2. Overall, conductivity values in the surveys ranged from 6 to 400 mS/cm, with the highest values observed adjacent to Ditch 1. High conductivity values (>150 mS/cm) are observed immediately adjacent to Ditch 1 and 2 and ERT data from Ditch 2 show a high conductivity plume (>200 mS/cm) up to 4 m below the ditch that extends to the north of the ditch and into the agricultural field. In contrast to Ditch 1 and 2, Ditch 3 has the lowest observed conductivity (<100 mS/cm). These results suggest that the role of ditches in facilitating saltwater transport in coastal areas is not uniform and requires a deeper understanding of the overall hydraulic context.

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GPP 66 MCSC BBT 12:30-12:45

Rewilding the River: Assessing the Environmental Effects and Regulatory Influences of the Condit Dam Removal Process

Neda Safari
Geography, Environment and Planning

Jacob Petersen-Perlman
Geography, Environment and Planning

Mentor: Scott Lecce, Geography, Planning and Envir

There are more than two million dams in the United States, and a considerable portion of them are either non-operational or approaching the end of their designed lifespan. However, this emerging trend is new, and the majority of dam sites have not undergone thorough research and assessments after their removal to determine the overall effectiveness of restoration initiatives, particularly in the case of large-scale dams that may significantly impact their surrounding areas. A crucial factor to consider is the lack of specific regulations pertaining to dam removal at the federal level. Consequently, other environmental regulations that were not originally designed with dam removal considerations are used to execute these projects. This can result in delays or challenges for dam removal initiatives. The process of removing dams is usually the most important first step to restore the ecological and biological health of the river, but often there is a lack of measurable indicators to assess if it has achieved its intended objectives. In addition, the majority of studies on dam removal are only short-term and focus on a particular measure of response. Therefore, it is essential to conduct extensive and continuous monitoring to analyze the river's response throughout every aspect.My study is divided into two sections.

The first section of my research will analyze the establishment and utilization of dam removal laws and regulations in the Condit Dam removal process. I will highlight the areas where the frameworks for policy and dam removal projects remain in need of improvement in order to facilitate successful dam removals in the future. In this part, I will review the policies and plans that affected the decision-making process to remove the Condit dam while also looking at how they impacted the physical changes to the river after the dam was removed. In the second section, I will look at the effects of the dam removal over a decade later and attempt to determine how the river's physical response has been impacted by this modification. (I will exceed the word count if I explain more) My study aims to investigate the Condit dam removal process and its impact on the ecological response of the river. I anticipate identifying areas for improvement in policies pertaining to dam removal projects and exploring ways to enhance them to ensure improved project outcomes in the future.

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GPP 67 MCSC BBT 12:45-1:00

Exploring Climate Resilience Planning in Lower-Income Small-Scale Fishing Communities

Zack Shepard, Daniel Walker, Marissa Diaz, Braden McPhillips
Integrated Coastal Sciences

Eric Wade, Integrated Coastal Programs

Climate change is a powerful force that impacts the lives of humans across the globe, especially those whose livelihoods are intertwined with the ecology of a given system, such as small-scale fishers. However, historically, the voices of such communities have been overlooked or have carried little weight during climate resilience policy planning and implementation. In the context of climate resilience planning, lower-income communities, such as those in northeastern North Carolina, are especially vulnerable to climate change's social and environmental impacts. This research sought to address this gap by investigating the unique challenges and opportunities faced by both fishers and aquaculture specialist. Our objective was twofold: how do small-scale fishers in northeastern North Carolina conceptualize coastal hazards, and how do fishers' responses to hazards interact with their sense of place and livelihoods? To accomplish this, we purposefully sampled fishers using a mixed-method approach, combining semi-structured interviews and values mapping. We found that many of the participants resided within the county for decades. Although they noted the decline in fisheries catch, they expressed hope for new industries such as aquaculture. Participants generally agreed that the fisheries industry has experienced change, with varying causes for the change. The key themes in fishers' response to change were community cohesion, community independence, and place identity. Our study shows that fishers' response to change is tied to their sense of belonging and place attachment. This demonstrates the importance of considering resource users' diverse relationships with the environment when developing adaptation and resilience plans.

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GP 1 10:00-12:00

Hemodynamics analysis in a patient with end stage renal disease under hemodialysis via arteriovenous fistula with pulmonary hypertension

Fatemeh Bahmani
Postdoctoral Scholar

Mentor: Stephanie M. George, Engineering

Fatemeh Bahmani (1), Kaitlin Southern (1), Alex Vadati (1), Veeranna Maddipati (2), Stephanie M. George (1)

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Arteriovenous fistula (AVF) hemodialysis in end stage renal disease (ESRD) patients may lead to pulmonary hypertension (PH), left ventricle dysfunction and heart failure. Cardiovascular problems are the main cause of high mortality rates among ESRD patients who undergo hemodialysis via a surgically created AVF. Understanding the role of arteriovenous fistula creation and characteristics on pulmonary artery (PA) hemodynamics and cardiac output could assist in managing treatment plans and performing kidney transplant before cardiac failure occurs. The goal of our study is to use computational fluid dynamics (CFD) to model the subject-specific blood flow in the pulmonary artery and arteriovenous fistula in a single ESRD patient who was undergoing hemodialysis and developed pulmonary hypertension. This is a unique case study as the imaging data used to create both models were acquired at the same time from the same patient. Different hemodynamic parameters for both the pulmonary artery and the arteriovenous fistula obtained from CFD simulations will be analyzed. Based on the echocardiography data from other studies higher AVF blood flow rates are observed in ESRD patients with PH which is correlated with high cardiac output and high cardiac index. Our AVF flow rate of 1967.494 mL/min obtained from PCMRI is relatively high compared to normal. We have obtained an mPAP value of 54 mm Hg from RHC, mean wall shear stress of 10.67 dyn/cm^2 for PA and 5.33 dyn/cm^2 for AVF from CFD. Our results and data from other studies show lower values of WSS in PH patients compared to normal which could be used as a measure for PH diagnosis. Our future goal is to recruit more patients to study the effect of AVF alterations on pulmonary artery hemodynamics.

GP 2 10:00-12:00

ANALYZING THE EFFECT OF REBAR HEATING ON BRIDGE STRUCTURES: SURFACE TEMPERATURE IMPLICATIONS

Pablo Nunez Hernandez
Mechanical Engineering

Mentors: Suranga Gunerathne, Ph.D.,P.E.
Amin K. Akhnoukh, Ph.D., P.E., A.C.
Engineering

This study presents a comprehensive simulation-based analysis aimed at enhancing the safety of bridge decks in cold climates by preventing ice formation through the optimization of embedded heat sources within transversal rebars. Utilizing ANSYS software, we meticulously model the thermal behavior of bridge decks, incorporating accurate dimensions, material properties, and environmental conditions to assess the effectiveness of heat sources under varying temperatures.

Our approach is the integration of "Mean Minimum Temperature" data from the U.S. Climate Normals dataset, spanning from 1991 to 2020, to represent the coldest average temperatures for each state in the USA. This data serves as a reference for our input parameters, ensuring that our thermal simulations are applicable across diverse climatic conditions. Further, we calculate the convective coefficient using experimental data and formulas for convection over a flat surface, under the assumption of stagnant air conditions with a minimal velocity of 0.25 meters per second. This critical parameter allows us to model the heat transfer dynamics with high fidelity.

By systematically varying the power of the embedded heat sources, our study identifies the minimum required heat input to maintain the bridge deck surface temperature above 2 to 4 degrees Celsius, the target temperature for avoiding the risk of ice formation. This methodology is applied across approximately 300 simulations, covering a range of conditions for each state, thereby providing a comprehensive understanding of the thermal management needs for bridge infrastructure in the USA.

GP 3 10:00-12:00

On Time in Game-Based Education: An Educator's Experience Desining an Adult Educational Game

Lina Flowers
Adult Education

Mentor: Xi, Lin, Interdisciplinary Professions, Education

In this presentation, I share my experience designing an educational game, as part of the Master of Art in Adult Education program. I designed "The Canaries: A Confectioner's Paradise" for postsecondary learners seeking hands-on experience in manufacturing. The product is chocolate wafers, and the place is a tropical island. However, the underlying concept can be applied to manufacturing in various contexts as it involves practicing decision making in real estate, operational management, and human resources. Bringing prototypes of the game to life was made possible through an international collaboration between East Carolina University (ECU), USA and Xi'an Jiaotong-Liverpool Universities (XJTLU), China. While_"The Canaries: A Confectioner's Paradise" is still a work in progress, producing two prototypes by two separate groups of students revealed several important considerations in educational game design, especially regarding process flow and time management.

GP 4 10:00-12:00

Assessing Land Cover Change Land Cover Use (LCCLCU) In Jamaican Mangroves: A 30-year assessment of drivers of ecosystem gains and losses.

Maria Gomez Saldarriaga
Integrated Coastal Sciences

Mentor: Greg Howard, Economics

Mangrove ecosystems in Jamaica provide essential ecosystem services to coastal communities, such as coastal protection, carbon sequestration, and nutrient cycling. However, these ecosystems are vulnerable to natural and anthropogenic drivers of loss, such as extreme weather events, urbanization, and conversion to agriculture and aquaculture. Over the years Jamaica has experienced rapid coastal urbanization and tourism expansion. While this has led to economic growth, it has exerted significant pressure on mangrove ecosystems ultimately creating an inverse relationship between economic development and environmental sustainability. However, recently, the Jamaican government has recognized the storm attenuation potential of these intertidal wetlands and has taken several steps to protect and preserve mangrove ecosystems. These include legal directives, the designation of sanctuaries, community outreach, and restoration initiatives. In order to understand how mangrove habitat has increased or decreased with these socio-economic and political interactions, this study explores the impact of Land Cover Change and Land Cover Use (LCCLCU) on Jamaican mangrove ecosystems over a 30-year period. The study uses Landsat 5,7, and 8 imagery and implements two established frameworks, the Continuous Change Detection and Classification (CCDC) and Terrachange, to conduct a controlled evaluation of their capacity to accurately capture and analyze land cover dynamics under the unique environmental and anthropogenic pressures faced by Jamaican mangroves. The CCDC framework employs post-classification comparisons of different time periods, while Terrachange uses image differencing and spectral unmixing to classify land cover and detect land cover change. Cross validation and accuracy metrics are used to compare the outputs of the framework's implementations, this permits the selection of the most suitable method to identify drivers of mangrove gains and losses, as well as evaluating the effectiveness of mangrove reforestation efforts in the coastal areas. In turn, this understanding can inform and guide conservation efforts while simultaneously supporting sustainable development strategies in the country.

GP 5 10:00-12:00

Combining Style Transfer capabilities with the Segment Anything Model

Seyedhadi Seyed
Data Science

Mentor: David Hart, Computer Science

Recent advances in artificial intelligence have increased the capabilities of image editing tools. For example, Style Transfer techniques let users apply the artistic properties of one image to another, allowing for new creative workflows and outputs. Style Transfer and most AI tools, however, are

designed to operate on entire images, not on regions within an image. Last year, the Segment Anything Model was introduced. This AI can quickly and automatically separate out every object in an image. This model pays attention to the edges and fine details of objects, creating image masks of similar quality to professional photoshop users. By having accurate and individualized masks for each object, precise edits can be made that only affect these specific regions.

My work looks at fusing whole-image AI techniques such as Style Transfer with the new Segment Anything Model. By considering features statistics, blending, and other techniques, I hope to be able to create better ways to edit images one piece at a time. This should give users more creative control and expressive capabilities.

GP 6 10:00-12:00

The Perils of Generative Model Inbreeding: Evaluating the Consequences of Cross-Model Training in Large Language Models

Gabrielle Stein
Computer Science

Mentor: Nic Herndon, Computer Science

What happens when the output of generative AI models is included in the training data of new models? With the rise of generative AI content online, and considering most training materials are sourced from the internet, concerns have arisen about how this content might taint future training datasets. Currently, there is limited research on the impact of models consuming other models' output. Most existing research focuses on the effect of models consuming their own output, and even that research is in its infancy. Recent studies have shown that the output of self-consuming models degrades with each successive generation of re-training, a phenomenon coined as "model collapse." Guaranteeing a certain percentage of human-generated data in training datasets could potentially mitigate the effects of "model collapse." Given that AI models are here to stay, the methods for developing new models will need to evolve to address this issue, ensuring that AI development can continue to progress and improve.

GP 7 9:30-11:30

Effects of social dominance on the morphological and functional activity of the hypothalamic A11 dopaminergic nucleus

Carrie Adams
Biology

Mentor: Fadi Issa, Biology

The primary objective is to examine how social dominance affects the structural and functional organization of the hypothalamic A11 dopaminergic nucleus in zebrafish (*Danio rerio*). We hypothesized that the A11 nucleus is prone to socially induced plasticity to regulate motor activity. Recent evidence has shown that once dominance is established between two male zebrafish, the

startle escape and swimming behaviors of dominants vs. subordinates differ significantly: Sensitivity of the startle escape response increases significantly in subordinates relative to dominants; and dominants increase their swimming activity while subordinates significantly decrease theirs. Previously, we demonstrated that the number of the A11 nucleus dopaminergic neurons are significantly higher in dominants vs. subordinates, and this difference correlates with status-dependent differences in synaptic contacts. The objective of this project focuses on the prevalence of dopaminergic neurons in the hypothalamic A11 brain region to understand the diversity and comparisons of neuron prevalence amongst dominant and subordinate zebrafish. Using a combination of histological approaches by staining for PCNA and AIF and double transgenic zebrafish Tg(*dat:egfp/vglut2:rfp*), the primary focus is to determine whether the effect of social dominance is due to neurogenesis, apoptosis or a change in cell identity. We are testing the notion that as social dominance matures the A11 nucleus experiences an induction of neurogenesis in dominants but not subordinates. Alternatively, the increase in A11 cell number might be due to a shift in cell identity whereby dopaminergic neurons switch to glutamine releasing cells. Results from this project will improve our understanding of the impact of social dominance on brain structure and function in zebrafish and other vertebrate social species.

GP 8 9:30-11:30

Effects of perfluorooctanoic acid or high fat diet on whole body metabolism.

Aya Ahmed[1], Matthew Wittenborn[1], Jamie DeWitt[2]
Int Dct Prg Bio, Biomed, Ch

Mentor: Tracey Woodlief, Pharmacology & Toxicology

Pharmacology & Toxicology, Brody School of Medicine, East Carolina University, Greenville, NC[1], Environmental & Molecular Toxicology, College of Agricultural Sciences, Oregon State University, Corvallis, OR[2]

Exposure to PFAS elicits metabolic responses, affecting body weight, liver function, peroxisome proliferation, and fatty acid profiles. Current research primarily relies on retrospective studies, making it challenging to distinguish acute from chronic effects. In this study, we assess whole-body bioenergetics through the day and nighttime evaluations of respiratory exchange ratio (RER) and maximum oxygen consumption (VO$_2$max (ml/hr/kg lean mass)). Adult female C57BL/6 mice (6-8 weeks old) were orally exposed to 0 or 7.5 mg/kg PFOA for 1 or 15 days. Simultaneously, a group received a 60% high-fat diet for 1 or 15 days. After 15 days, PFOA increased relative liver weights by 96% ($p < 0.0001$) and ACOX-1 activity by 357% ($p < 0.0001$), while the high-fat diet showed no significant changes. Whole-body metabolic measures revealed differences. After a 1-day exposure, RER was lower at nighttime in the control and PFOA groups (12%, $p < 0.03$) compared to the high-fat diet group, and VO$_2$max was significantly reduced in the PFOA group (22%, $p < 0.02$) versus the high-fat group. After a 15-day exposure, daytime RER decreased in the PFOA group (7%, $p < 0.0004$) compared to the control and high-fat diet groups. Daytime VO$_2$max (ml/hr/kg lean mass) was lower in the PFOA group (6%, $p < 0.010$) compared to the control but higher in the high-fat diet group (37%, $p < 0.0001$). Nighttime VO$_2$max (ml/hr/kg lean mass) was higher in the high-fat diet group (32%, $p < 0.0001$) compared to the control and PFOA groups. In conclusion, our study highlights distinct whole-body metabolic effects of a high-fat diet and PFOA exposure in

experimental animals, suggesting differential impacts on metabolic markers, emphasizing the need for further investigation into PFAS-induced metabolic dysfunctions and their implications for human health.

GP 9 9:30-11:30

Estrogen-Dependent Upregulation of Cardiac Per2 and Heart-specific miRNAs are associated with Decreased Blood Pressure and Myocardial Oxidative Stress in Ovariectomized Rats

Syed Anees Ahmed[1]
Postdoctoral Scholar

Mentor: Abdel A. Abdel-Rahman[1]
Baohong Zhang[2]

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Reduced levels of endogenous estrogen (E_2) following menopause contributes to increased oxidative stress and risk of cardiovascular disease (CVD). The onset of early menopause is linked to a 25% higher risk of CVD. The effect of E_2 on female reproductive organs influences circadian rhythms and the associated circadian genes/proteins (e.g., period 2; Per2). Nonetheless, it remains unknown if a similar circadian pattern exists in the female heart and is related to E_2-mediated cardioprotection. The aim of the present study was to determine if restoration of cardiac Per2-regulated microRNA (miRNA) and redox homeostasis contributes to cardioprotection conferred by E_2 replacement in E_2-deficient females. Rats were subjected to ovariectomy (OVX) 2 weeks before beginning a 2-weeks E_2 or vehicle treatment. In parallel studies, mean arterial pressure (MAP) was measured by radiotelemetry. The body weight of OVX rats (294.42±2.50 g) was increased compared to E_2-treated (263±6.00 g) and sham (247.75±1.91 g) rats, but heart weight/body weight ratios were similar. Diurnal variations revealed E_2-dependent reduction in MAP (101.92±1.76 mmHg vs 111.39±0.37 mmHg) during light and dark phases but no effect on myocardial contractility throughout the observation period. Furthermore, hearts of E_2-treated OVX rats exhibited: (1) higher Per2, cardioprotective miRNAs (miRNA1, 133a, 208a, and 499) expressions, mALDH2 (21.8±1.19 mOD/min vs 15±1.3 mOD/min), and catalase activities (74.7±3.6 units/mg protein vs 47.2±4 units/mg protein); (2) lower cardio-detrimental miRNA (miRNA652), ROS, Carbonyl, MDA and HO-1 levels. The reported Per2/HO-1 reciprocal relationship was more evident during the daytime and correlated with the associated upregulation of the protective heart-specific miRNA in E_2-replete rats. In conclusion, our data suggest that E_2-dependent restoration of Per2-miRNA homeostasis mitigates cardiac oxidative stress in OVX rats. This is the first evidence to show an E_2-dependent elevation of cardiac Per2 expression in relation to reduced MAP and cardiac oxidative stress in E_2-replete rats. These findings unravelled new interplay between E2 and cardiac Per2 regulated heart-specific miRNAs and highlight circadian proteins as novel targets for conferring cardioprotection in menopausal women.

GP 10 9:30-11:30

Enhancing Neuroimaging Data Integrity: A BIDS and MRIQC-Based Pipeline for Quality Control and Standardization

Bo Ao
Biomedical Physics

Mentor: Francis A.M. Manno, Physics

Bo Ao[1], Itza Sanchez Moncada[1], Giulianna Catalano[2,3], Dhwani Hada[2],

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Background: Neuroimaging research depends on the quality and consistency of MRI data. Current challenges include the lack of standardized data formatting and variable no-reference Image Quality Metrics (IQMs). This study leverages the Brain Imaging Data Structure (BIDS) and MRI Quality Control (MRIQC) to enhance MR image quality evaluation, crucial for eliminating data compromised by noise and artifacts. **Objectives:** The study has three objectives: (1) to develop an automated pipeline for converting MRI data to BIDS format, incorporating MRIQC for quality assessment to reduce manual image checks; (2) to apply this pipeline across various neuroimaging datasets to analyze IQM variances in conditions like hearing loss and neurodegenerative diseases; (3) to improve normative metrics for MRI quality control using aggregated IQMs, setting new quality benchmarks in MR imaging. **Methods:** The methodology encompasses: (1) conversion of MRI datasets to BIDS format using dcm2bids tools; (2) MRIQC application to gauge quality metrics such as contrast-to-noise ratio and signal-to-noise ratio; (3) comparative analysis with ABIDE standards to identify datasets with insufficient quality. **Results:** In its second phase, the study shows promising early results. We've successfully converted many datasets to BIDS format, and initial MRIQC tests highlight diverse image quality metrics. Comparing these metrics to ABIDE standards, our pipeline efficiently filtered out low-quality MRI data, surpassing traditional manual checks. These early insights are paving the way for a deeper understanding of quality issues in neuroimaging data, setting robust groundwork for future phases. **Conclusions:** The integration of BIDS and MRIQC is expected to streamline neuroimaging data processing, enhance data reliability, and contribute to the establishment of robust quality metrics. This pipeline is poised to set new standards in MRI data quality, potentially improving the precision of neuroimaging research across various medical conditions.

GP 11 9:30-11:30

Optimizing the isolation of meiotic spermatocytes and post-meiotic spermatids from the mammalian testis

Heather A. Belcher
Postdoctoral Scholar, Biomedical Physics

Mentor: Christopher B. Geyer, Anatomy and Cell Biology

Heather A. Belcher, Bryan A. Niedenberger, Emma A. Gilbert, and Christopher B. Geyer

During spermatogenesis, which is the developmental process by which sperm is formed, germ cells transition from mitotic spermatogonia to meiotic spermatocytes to post-meiotic spermatids before developing into sperm. The germ cells at each of these different developmental stages co-reside within the seminiferous tubules of the testis, alongside somatic Sertoli cells, and are surrounded by an interstitium containing numerous other somatic cell types including macrophages, Leydig cells, and endothelial cells. This plethora of different cell types makes isolating large numbers of germ cells at specific stages of their development a considerable challenge. Current approaches utilize specialized protocols with expensive equipment, induce considerable stress to the cells, and often result in low cell numbers with marginal purity. These technical hurdles have prevented researchers from obtaining large and pure populations of germ cells for biochemical assays in order to define mechanisms regulating germ cell development.

Here, our laboratory has endeavored to optimize an inexpensive, gentle, and straightforward protocol to isolate enriched populations of meiotic spermatocytes and post-meiotic spermatids. We are utilizing bovine serum albumin (BSA) density gradients in order to separate out the different germ cells from a single cell suspension containing the cells from the seminiferous tubules of adult mouse testes. The smaller, less dense post-meiotic spermatids stay at the top of the density gradient, while the larger, denser, meiotic spermatocytes fall toward the bottom of the gradient, with the rest of the cell types settling in between the two.

We are currently able to obtain approximately 2-5 million post-meiotic spermatids with 85% purity and 1 million meiotic spermatocytes with 50% purity from the testes of a single adult mouse. We are continuing to alter the percentages and volumes of BSA within the gradient, the amount of time the cells have to settle, as well as the protocol for obtaining the single cell suspension in order to improve the purity of the isolated cells. Our goal is to obtain >80% pure isolations for the cells of interest.

GP 12 9:30-11:30

Utilizing murine models of pertussis to evaluate a novel mRNA diphtheria, tetanus, and pertussis vaccine

Graham Bitzer
Postdoctoral Scholar
Microbiology and Immunology

Mentor: Roy Roop, Microbiology and Immunology

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Bordetella pertussis (*Bp*) causes a potentially severe respiratory disease known as pertussis. Previously, a whole-cell pertussis vaccine (wP) was used to reduce case numbers but due to reactogenicity and safety concerns, it was replaced in the US with an acellular pertussis vaccine (aP). A rise in pertussis cases post-aP adoption supports investigating novel vaccine strategies to reduce *Bp* exposure to susceptible populations. We hypothesize that a next generation mRNA vaccine will reduce *Bp* bacterial burden and protect against pertussis symptoms compared to aP vaccination.

We previously observed that vaccination with an mRNA version of the aP vaccine induced IgG antibody titers against pertussis antigens similar to the aP control group. However, a benefit of an mRNA vaccine is the ability to add antigens of interest not present in aP vaccines. We expanded the previous mRNA vaccine to include four additional antigens of interest (SphB1, BrkA, TcfA, RTX). In this study, we evaluated the immunogenicity of this novel mRNA vaccine (mRNA-DTP10) in BALB/c mice. Overall, mRNA-DTP10 reduced bacterial burden on days 1, 3, and 7 post-challenge in the lung and trachea of mice compared to our aP control. The mRNA-DTP10 vaccine also reduced leukocytosis, a hallmark sign of pertussis, to non-challenged (NC) levels. Further, we optimized the pertussis toxin (PT) mRNA and evaluated protection with a direct PT challenge. BALB/c mice were vaccinated with aP, wP, or mRNA-DTP10 and challenged with PT 2-weeks post-boost. Mice vaccinated with either mRNA-DTP10 or aP reduced leukocyte and neutrophil counts comparable to NC mice at 3 days post-challenge.

Finally, we transitioned to a coughing rat model of pertussis to evaluate protection from a coughing phenotype. Young Sprague-Dawley rats were primed and boosted with aP, wP, or mRNA-DTP10 and subsequently challenged with aerosolized *Bp*. We observed that mRNA-DTP10 reduced rat cough counts and bronchial restriction to levels seen in aP vaccinated rats and comparable to NC rats. In addition, all vaccine groups reduced bacterial burden 1- and 9-days post-challenge in the lung, trachea, nasal associated lymphoid tissue, and nasal lavage.

In summary using several experimental models, the mRNA-DTP10 vaccine provided protection from *Bp* challenge comparable or better than aP vaccination. Currently, we are performing serological surveys in non-human primates to determine the viability of mRNA-DTP10's as a vaccine candidate.

GP 13 9:30-11:30

Sexually Divergent Estrogen-dependent Regulation of Cardiopulmonary Connexin-43

Collin Brinkley
Pharmacology and Toxicology

Mentor: Abdel A. Abdel-Rahman, Pharmacology and Toxicology

Collin Brinkley, Syed Anees Ahmed, Abdel A. Abdel-Rahman

Males and post-menopausal females are at a higher risk of developing cardiopulmonary diseases compared to premenopausal females or postmenopausal females on estrogen replacement therapy (ERT). While early start of ERT following menopause restores the cardioprotective effects conferred by endogenous estrogen (E_2) in females, the implications of chronic E_2 therapy on male cardiopulmonary health has yet to be addressed. This is important given the use of E_2 for gender affirming therapy. In this study, we focused on Connexin-43 (Cx-43), a pivotal mediator of physiological intercellular communication and signalling, which ultimately maintains cardiopulmonary function. The latter was assessed by echocardiography to measure ejection fraction (EF), fractional shortening (FS), and left ventricular end diastolic diameter (LVEDD). Female rats were subjected to ovariectomy (OVX) 2 weeks prior to an 8-week E_2 or vehicle treatment. Males received the same E_2 or vehicle treatment. Western blot analysis conducted on lung and heart tissues revealed no significant difference in Cx-43 expression between the OVX+vehicle and OVX+E_2 groups. However, Cx-43 expression was substantially reduced in E_2-treated, compared to vehicle-treated, male rats. Additionally, functional comparisons between OVX+vehicle and OVX+E_2 groups showed enhanced EF and FS in the E_2 treated OVX rats. By marked contrast, comparisons between male+vehicle and male+ E_2 groups revealed reductions ($P<0.05$) in EF and FS in the E_2 treated male rats. In conclusion, our findings present the first evidence of E2-mediated sexually divergent effects on the expression of cardiopulmonary Cx-43 expression as well as on cardiac ejection fraction and fractional shortening.

Keywords: estrogen, sex differences, connexin-43, cardiovascular function, cardiopulmonary, gender affirming therapy

GP 14 10:00-12:00

Oligomannose N-glycans Promote Invasiveness and EGF Stimulated Growth in Neuroblastoma

Adam Burch
Biochemistry and Molecular Bio

Mentor: Ruth Schwalbe, Biochemistry and Molecular Bio

Burch AP, Hall MK, Schwalbe RA

Despite drastic improvements to the treatment of the pediatric cancer Neuroblastoma (NB), the five-year survival rate of high-risk NB patients remains under 50%. For this reason, new and improved diagnostic and/or therapeutic targets are necessary. One such target is N-glycosylation of proteins. Aberrant N-glycosylation has been observed in many cancer types, including NB, but there is no consensus as to what N-glycans contribute to aggressive tumor behavior. Here we explore the implications of high oligomannose N-glycan content expressed in human NB progression, which has recently been attributed to promoting cell invasiveness in rat NB cells. By CRISPR/Cas9 knockout of *MGAT1* in the human NB cell line, BE(2)-C, we were able to produce BE(2)-C(-*MGAT1*) cells, resulting in virtually exclusive expression of oligomannose N-glycans. We found that BE(2)-C(-*MGAT1*) cells had increased invasiveness and cell-cell adhesion, but reduced proliferation relative to BE(2)-C cells. In addition, we also examined the EGFR signaling cascade in BE(2)-C and BE(2)-C(-*MGAT1*) cells to further explore the low proliferative but highly invasive phenotype of BE(2)-C(-*MGAT1*) cells. We found that EGFR expressed in BE(2)-C (-*MGAT1*) are decorated with primarily oligomannose N-glycans, have an increased response to EGF, but are more prone to degradation relative to EGFR expressed in parental BE(2)-C cells. Overall, we support oligomannose N-glycans as a contributor to heightened NB invasiveness, and further enhanced cell proliferation rates via EGFR signaling. This work further highlights the importance of considering the role of N-glycans in the progression of NB and other cancers alike, in the hopes to develop new and improved therapeutic/diagnostic targets.

GP 15 10:00-12:00

Investigating the role the polar autotransporter adhesin genes encoded by *Brucella* have on crossing mucosal barriers and virulence.

Connor Cribb
Microbiology and Immunology

Mentor: R. Martin Roop, Microbiology and Immunology

Connor B. Cribb, Graham J. Bitzer, Ian S. Barton, Daniel W. Martin, R. Martin Roop II

Brucella spp. are stealthy pathogens and evade the immune system to establish a chronic infection in the host. During a natural infection, *Brucella* must cross mucosal barriers to reach their replicative niche inside host macrophages. A set of polar autotransporter (AT) adhesin genes (*btaE, btaF,* and *bmaC*) encoded by *Brucella* have been shown to aid in attachment to mammalian cells. These AT-adhesins have been linked to virulence but only through the oral-gastral route of infection.

The genes encoding these AT-adhesins are strongly repressed by the global virulence regulator MucR and in the absence of MucR, expression of these genes increases by as much as 11-fold. MucR has been shown to act as an H-NS like gene silencer, binding to low consensus AT-rich regions of DNA and repressing target gene expression.

One of the important functions of H-NS and H-NS-like proteins is to prevent the unnecessary expression of virulence genes until they are required during the infectious process, at which time

antagonistic transcriptional activators (i.e. 'counter-silencers') responding to host-specific environmental cues overcome repression of these target genes.

We aim to understand the precise regulatory relationship between MucR and the counter-silencers that ensure the proper temporal expression of these AT-adhesin genes and the effect of dysregulation/de-repression of these genes on virulence. We will utilize biochemical and genetic approaches, along with cell culture and mouse models of infection to test the hypothesis that these adhesins are important for crossing mucosal barriers upon initial infection but their unregulated production is detrimental to maintaining chronic persistence in the host.

GP 16 10:00-12:00

Higher Sensitivity of Sprague-Dawley Rats Sub-strain to Vascular Endothelial Cell Growth Factor Receptor Inhibition Leads to Pulmonary Arterial Hypertension.

Mary Donovan
Pharmacology and Toxicology

Mentor: Abdel A. Abdel-Rahman, Pharmacology and Toxicology

Pulmonary arterial hypertension (PAH) is a progressive vasculopathy characterized by elevated pulmonary arterial pressure and right ventricle (RV) hypertrophy, and eventual right-heart failure. PAH pathophysiology is complex, requiring multi-factorial insults to induce the disease. Specifically, the injection of vascular endothelial growth factor (VEGF) receptor inhibitor Sugen 5416 (SU) + 3-week exposure to chronic hypoxia model is the most favored model. Unfortunately, difficulties in maintaining hypoxia and limited access to hypoxic chambers represent major hindrance to using this PAH model in preclinical research. Studying rat strain responses to SU can contribute to the development of an affordable PAH model and increase PAH research accessibility forgoing the current necessary hypoxic exposure. Previous studies have found certain strain (CD) of Sprague-Dawley (SD) rats from Charles River Laboratories express heightened sensitivity to the SU injection, developing PAH without hypoxic exposure. However, comprehensive evaluation of PAH pathophysiology in this model was not conducted. Therefore, the goal of this study was to evaluate the cardiopulmonary hemodynamic response of SD-CD rats from Charles River Laboratories (Raleigh, North Carolina) to the SU injection and understand its influence on clinical and experimental PAH mediators. Our results show SU injected rats exhibited: 1) Elevated right ventricle (RV) and LV afterload; 2) Significant cardiac hypertrophy and RV dilation; 3) Cardiac fibrosis; 4) Upregulation of the lung and RV pro-inflammatory endothelin-1 (ET-1), TNF-α and IL-6 signaling; 5) higher endothelin-1 (ET-1) and its ETA/ETB receptors ratio, along with downregulation of the cardioprotective protein, bone morphogenetic protein receptor 2 (BMPR2), in the lungs. Therefore, SD-CD rat strain constitutes a valuable sensitive model for simple PAH induction via a single injection of SU for conducting clinically relevant mechanisms, and for identifying novel therapeutic targets for the treatment, of this debilitating disease.

GP 17 10:00-12:00

SK1 Is Upregulated Following Spinal Cord Injury in Zebrafish Affecting Recovery and Regeneration

Patrick Garrett
Int Dct Prg Bio, Biomed, Ch

Mentor: Karen Mruk, Pharmacology and Toxicology

Spinal cord injury affects a large population of people annually, however, there has been little progress for patients for improving their recovery. Small conductance calcium-activated potassium channels (SK) are activated by an increase in cytosolic Ca^{2+} and determine the hyperpolarization following an action potential, in turn affecting the firing rate. They have been indicated to be involved in spinal cord injury and there has been progress with recent studies in zebrafish, but they are still understudied. Therefore, we sought to determine whether SK channels are involved in recovery and/or regeneration after spinal cord injury. Are SK channels differentially expressed after spinal cord injury, and if so, where? To answer these questions, we used whole mount in situ hybridization, RT-qPCR, and behavioral tracking. We found that expression of SK1 mRNA was upregulated following spinal cord injury and that administering a channel activator and inhibitor affected behavior differently.

GP 18 10:00-12:00

Tissue-Intrinsic Signaling Effects on Niche Formation in Drosophila Gonads

Ariel Harrington
Biology

Mentor: Lauren Anllo, Biology

Stem cells play an important role in tissue maintenance and self-renewal. A cellular microenvironment, the niche, is required to help maintain or differentiate stem cells. Understanding how a niche forms and functions is thus key to studying stem cells. The stem cell niche in the male Drosophila gonad provides an optimal model to study niche formation. Drosophila are easily genetically modified, and this model allows us to visualize complete niche formation with subcellular resolution live and in vivo. The testis niche forms at the anterior of the embryonic gonad. Directly opposite of that position is a group of somatic cells referred to as male specific gonadal precursor cells (msSGPs) that eventually develop into the terminal epithelial (TE) cells of the larval gonad. Ablation of these msSGPs results in a niche that clusters away from the anterior of the gonad. This, in combination with the specific positioning at the posterior, suggests a possible repulsive cue originating in these cells that serves to localize the niche. Firstly, this study aims to identify what those repulsive signals are and how they regulate niche formation at the anterior. Recent scRNA sequencing data have suggested candidate signals expressed in TE cells. We have confirmed that Nord, one of these signals, is expressed in msSGPs . We are currently testing Nord for a role in niche localization. Secondly, we want to determine the cell biological role of the msSGPs during niche formation and migration. Cell

migration requires organized polarization of the F-actin cytoskeleton and adhesion proteins. We know that when msSGPs do not form, the niche appears dispersed or less compact. We see niche cells spread out further along the gonad wall closer to the posterior end. Using antibody staining techniques and quantitative post-acquisition image analysis, we will quantify positional accumulation of F-actin and E-cadherin in mutant and control lines to assess a role for msSGPs regulating cell migration. Ultimately, this study will provide a better understanding of factors that influence niche formation. Concepts such as niche regulation of stem cell fate and niche-stem cell intercellular communication are easily and quickly identified through Drosophila genetics and have proven applicable in other systems. Our work thus has potential to enhance our broader understanding of cell movement required to assemble the stem cell niche during organogenesis.

GP 19 10:00-12:00

Quantification of Neutrophil Morphology through Diffraction Imaging

Ismail Ibrahim
Biomedical Physics

Mentor: Xin Hu, Physics

As an important part of the human immune system, neutrophils are developed within the bone marrow and then released when they are fully mature. However, during an infection the demand for more neutrophils can exceed the current supply that results in immature neutrophils being released into the blood stream. If we can identify immature neutrophils in the blood stream that would indicate the body is undergoing an infection. There are 6 stages of maturity for a neutrophil: myeloblast, promyelocyte, myelocyte, metamyelocyte, band cell, and polymorphonuclear. Each stage of maturity for a neutrophil has a distinct morphology. The ability to quantify a neutrophil's morphology would give valuable insight into diagnosing diseases quicker. Existing methods for quantifying neutrophil morphology are either qualitative or label-intensive and inaccurate. This research project is aimed at quantification of neutrophil morphology by analysis of diffraction images and confocal images of single neutrophils. Currently we are using laser confocal microscopy to obtain a stack of sliced images of stained neutrophils. Using an in-house MATLAB program called CIMA, we can build 3D models of imaged neutrophils to obtain up to 30 morphologic parameters for characterization of neutrophils. Next, these images are placed into a commercial light scattering program called ADDA to obtain Mueller matrix data. Using this data, we can put this into a ray tracing program to obtain diffraction images. The overall goal is to create a quick label free method to quantify neutrophil morphology. In this presentation, we will demonstrate different intracellular organelles of neutrophil and compare to the existing methods of characterization of neutrophil immaturity in literature.

GP 20 10:00-12:00

The pH-sensing G protein-coupled receptor GPR68 directs vascular proteome remodeling

Madison Williams
Physiology

Mentor: David A. Tulis, Physiology

Madison D. Williams[1], Kristen R. Carraway[2], Kyle D. Mansfield[2], Tonya N. Zeczycki[2], and David A. Tulis[1]

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Maladaptive vascular remodeling is a common feature of many cardiovascular diseases (CVDs), including aneurysm, atherosclerotic plaque development, and peripheral arterial disease. Many factors have been identified as controllers of pathologic vascular remodeling, but discrete regulators of vascular proteome remodeling remain incompletely understood. The goal of this study was to characterize the pH-sensing G protein-coupled receptor GPR68 as a novel modulator of the vascular proteome. We hypothesized that GPR68 protects against maladaptive vascular remodeling through upregulation of cytoskeletal and contractile proteins and small GTPases. Thoracic aortae were harvested from wild-type (WT) and GPR68 knockout (KO) mice and were snap-frozen for proteomics analysis or digested for VSM cell culture in vitro under normoxic and hypoxic conditions. Induction of hypoxia was confirmed through upregulation of GLUT-1, VEGFa, and HIF1a via RT-qPCR analysis, as well as increased expression of GPR68 under hypoxic conditions. Preliminary findings from LC-MS/MS proteomics revealed increased abundance of cytoskeletal and contractile proteins in thoracic aortae and VSM cells from WT mice, including SM22a, calponin-1, vimentin, vinculin, and tropomyosin 1 and 3. Multiple small GTPases were upregulated in the thoracic aortae and VSM cells from KO mice, including Rab5a, RhoA, and RhoC. These findings support the protective role of GPR68 against adverse vascular remodeling.

GP 21 1:00-3:00

Development of novel compact wind tunnel for testing efficacy of insecticide formulated products in mosquitoes

Will Murray
Environmental Health

Mentor: Stephanie Richards, Health Education and Promotion

Will Murray[1,2], Sinan Sousan[2,3], Avian White[1,] Kaya Peyton[4], Raven Slade[1,] Stephanie Richards[1,5]

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[5]Project Mentor

BACKGROUND. Ultra-low volume (ULV) space sprays aerosolize insecticide formulated products (FP) to contact flying mosquitoes, while barrier sprays expose mosquitoes to FP residue on vegetation and other surfaces. Centers for Disease Control and Prevention bottle bioassays used to assess insecticide resistance are based on residual active ingredient (AI) exposure and do not directly relate to FP efficacy. The current pilot study developed a novel compact wind tunnel for mosquito exposure to FP. Caged *Aedes albopictus* and *Culex pipiens/quinquefasciatus* were exposed to undiluted Biomist®3+15 FP (permethrin AI) or air (control) within the wind tunnel, transferred to new cages, and held in a 28°C incubator. Separate mosquitoes were exposed to residual permethrin AI (8 μg/mL) in bottle bioassays. Mortality was monitored 15, 30, 60, and 120 min post-exposure.

RESULTS. Chi square tests ($P<0.05$) showed significantly higher mortality in *Aedes* compared to *Culex* populations for most time points in both bioassay and wind tunnel exposure groups. As expected, mosquitoes exposed to Biomist®3+15 showed higher mortality rates than bottle bioassay exposure to permethrin. Two *Culex* colonies resistant to permethrin in bottle bioassays were susceptible to Biomist®3+15 in the wind tunnel.

CONCLUSION. The novel compact wind tunnel developed here may be an alternative to field trials for testing FP efficacy, avoiding factors such as weather, logistical planning, and extended personnel hours. The wind tunnel could allow programs to conveniently test efficacy of multiple FP. Comparisons of different insecticide exposure methods provide practical information to inform operational decisions.

GP 22 1:00-3:00

Physical Characterization and Cellular Testing of Polymeric Micelle Formulations for Intravenous Delivery of Hydrophobic Anticancer Drugs

Ashton Norris, Tyler King, Rukiyah Van Dross, Kathleen Thayne
Chemistry

Mentor: Colin S. Burns, Chemistry

The compound 15-deoxy, Δ12,14-prostaglandin J2-ethanolamide (15d-PMJ2) is a novel anti-cancer agent identified by our laboratory (1). It is currently being developed as an intralesional injection for melanoma skin cancer. Tumors of animals treated with 15d-PMJ2 exhibited significantly reduced growth and mean weights compared with vehicle and untreated animals. Although the focus of 15d-PMJ2 has been on melanoma, experimental data from our lab has demonstrated activity against several different cancer cell lines, including colorectal cancer. However, use of 15d-PMJ2 against these cancers, especially in the form of intravenous delivery, has been limited as 15d-PMJ2 has poor water solubility and its lipophilic profile may lead to adipose tissue sequestration. To test its efficacy targeting multiple forms of cancer in vivo, we are developing a micellar approach to achieve intravenous delivery to cancer. Micelle formulations generally improve drug delivery to the tumor sites and allow for the tailoring of the pharmacokinetic profile of hydrophobic drugs, such as 15d-PMJ2. Here we will be presenting the physical characterization of the empty and drug-loaded micelles including critical micelle concentration, encapsulation efficiency as well as cytotoxicity in mouse colon cancer cell line (CT26.WT cells).

GP 23 1:00-3:00

Modeling of blood pressure wave propagating in artery

Yonghong Qin
Biomedical Physics

Mentor: Xin Hu, Physics

Cardiovascular diseases (CVDs) are the leading cause of death and disability worldwide. It is critically important to understand the fundamental mechanisms underlying light-tissue interaction related to pulsatile blood pressure wave (BPW) for optical detection of CVD related biomarkers. We have performed hydrodynamic simulation of pulsatile BPW propagating in an artery tube in different configurations of artery size and wall elasticity. An open-source software of SimVascular has been used to interactively create the vessel geometry, boundary conditions and solver parameters needed for simulation of BPW and blood flow in deformable 1D model with computationally inexpensive mathematical representations. A series of idealized compliant arterial models have been investigated to represent the radial and ulnar arteries that are relevant to the analysis of Photoplethysmography (PPG) signals. The Navier-Stokes equations for incompressible Newtonian fluids has been solved in an 1D model of deformable vessels. We have developed parameters of blood flow rates as inflow boundary condition which is a function of pressure history and also wave conditions at the far end boundary. An iterative algorithm was applied to select appropriate parameters for the outflow boundary conditions. This 1D model can be used to efficiently quantify the complex relations between heartbeat driven BPW and elastic properties of deformable artery walls.

GP 24 1:00-3:00

Deciphering the Role of Renin-Angiotensin-Aldosterone System in Hypertension: A Comprehensive Study on Receptor Dynamics and Left Ventricular Function

Berwin Singh Swami Vetha
Postdoctoral Scholar

DaQuan Mebane

Mentor: Azeez Aileru, Dental Medicine

The Renin-Angiotensin-Aldosterone System (RAAS) plays a significant role in both systemic and neurogenic hypertension. Bath applied vasoactive peptide of RAAS, angiotensin II (AngII), evoked dose-dependent synaptic transmission in sympathetic ganglia. In (mREN2)27 transgenic rodents, an

overexpression of mouse Ren2d gene leads to the development of hypertension, mediated by the RAAS axis, and exaggerated sympathetic nerve activity (SNA). In (mREN2)27 transgenic rodents, there is a significant increase in cardiovascular responses compared to Hannover Sprague Dawley (HnSD) control. The increases in systolic blood pressure and heart rate were normalized by candesartan, an angiotensin receptor blocker (ARB), suggesting an impact of RAAS on cardiovascular responses. Current investigation aims to determine the consequence of circulating AngII peptide in RAAS-mediated receptors and determine the implication of sarcolemmal Sodium-Calcium exchanger (NCX) and Na/K ATPase (NKA) pump in (mREN2)27 transgenic homozygous rat heart strain. Protein expression and mRNA profile for AngII receptor subtype-1 (AT_1R) showed a significant increase compared to the HnSD. There are significant decreases in the protein expression for G protein-coupled receptor (GPCR); the MAS1 proto-oncogene protein (MAS) and AngII receptor subtype-2 (AT_2R) in the (mREN2)27 transgenic strain compared to HnSD group. The MAS receptor mediates the metabolite of AngII; the Ang1-7 along with GPCR-coupled AT_2R to suppress the enhancing effect of AngII. These results suggest that AT_1R mediates sarcolemmal excitability and coupling contraction in hypertension, the MAS receptor along with AT_2 receptors serves as the protective arm of AngII. Further, there was an increase in protein expression for membrane bound NKA isoforms and it is believed to have triggered an influx of calcium ($[Ca^{2+}]_i$) through NCX. Gene expression PCR report for NCX showed an increase in transcription profile while the key regulators of cellular calcium homeostasis, SarcoEndoplasmic Reticulum Calcium ATPase (SERCA) pump showed a significant diminution in the gene transcription profile for SERCA, suggesting a reduction in Ca^{2+} reuptake in RAAS-mediated hypertension.

GP 25 1:00-3:00

The transcriptomic cortical alterations in profound hearing loss

Xuan Wang
Medical Physics

Mentor: Francis A. M. Manno, Physics

Xuan Wang, Itzamná Sánchez-Moncada, Bo Ao, J. Tilak Ratnanather, Francis A. M. Manno

The broad significance of your research to medicine or engineering. Hearing loss has a profound effect on speech/language development in children and elicits functional deficits; nevertheless, little is known concerning structural-genetic reorganization. Studies of bilateral deaf individuals have revealed increased gray matter and decreased white matter in Heschl's gyrus (Emmorey et al., 2003; Smith et al., 2011), superior temporal gyrus (STG) white matter deficits (Shibata, 2007), and cortical thinning (Li et al., 2012). Neuroimaging studies give clues as to how reorganization occurs, as the lack of binaural input appears to alter Heschl's gyrus and the temporal lobe by changing gray matter and white matter relationship. Our objective is to assess the effect of profound hearing loss using MRI volume-based morphometry, shape metrics, and transcriptomics.

Your major research hypothesis or question and approach. Methods and participants: 42 children (n = 18 bilateral, prelingual) or unilateral hearing loss (left n= 10, right n= 14, perilingual) participated with 43 age and sex matched controls (range 6 months to 18 years). Children were an homogeneous group persons having profound sensorineural hearing loss (≈ 90 db) bilaterally or

unilaterally. Structural MRI three-dimensional (3D) sagittal T1-weighted magnetization-prepared rapid gradient-echo (MP-RAGE) sequences assessed volume, shape and transcriptomics metrics using a segmentation pipeline (Mori et al., 2016). The null hypothesis for our HL children was asymmetry, torque, shape metrics of hemispheric twist and gene expression changes would not be different compared to our control group and would be different based on side of restriction due to changes in hemisphericity.

Results: Asymmetry metrics were significantly different between hearing loss groups and controls. Left unilateral hearing loss was most pronounced. A metric of hemispheric twist revealed little global Yakovlevian torque occurring due to hearing loss; however, local torque in regions such as the STG and Sylvian fissure were grossly affected. Shape metrics revealed the shift of volume was likely due to the brain twisting about the axis to compensate for hearing on one side versus the other. Several genes were of considerable interest: 1) NLGN3- Neuroligin-3 (cell adhesion molecule - autism spectrum disorder), 2) MAP6- Microtubule Associated Protein 6 (signalling for axonal growth), and 3) SNCA - alpha-synuclein (related to Alzheimer's).

GP 26 1:00-3:00

Overexpression of the Ecdysone Receptor promotes an undifferentiated transitional state during germline stem cell differentiation

Alexandria Warren, Lauren Jung
Molecular Biology and Biotech

Mentor: Elizabeth Ables, Biology

In the *Drosophila* ovary, many signaling pathways are required for the regulation of germline stem cell (GSC) self-renewal and differentiation. Ecdysone Receptor (EcR) and Ultraspiracle (Usp) come together to form a complex that binds the steroid hormone, ecdysone, triggering a variety of transcriptional responses. To investigate the direct role of ecdysone in the germline, genetic tools were built to manipulate the expression of EcR isoforms EcR.A and EcR.B1. Driving overexpression of either EcR isoform in the germline results in undifferentiated germ cell tumors and decreased number of GSCs. A similar phenotype is seen when overexpressing BMP signaling or repressing bam, indicating a link between ecdysone and BMP signaling. Stem-like cells were identified in these tumorous ovaries outside of the normal stem cell niche. No tumor phenotype was seen when restricting EcR overexpression to 8- or 16-cell cysts. These data indicated that the low levels of EcR expressed in the GSCs are sufficient for normal oogenesis, but overexpression of EcR in GSCs prevents cystoblast differentiation resulting in germ cell tumors. Single cell RNA sequencing was performed to identify differences in germ cell gene expression between EcR.B1 overexpression and the over-active BMP receptor, Thickveins (Tkv). The similarities seen in these transcriptomes confirm the suspected link between ecdysone and BMP signaling.

GP 27 Cancelled

GP 28 9:30-11:30

Adjusting Curriculum Based on Student Needs

Elizabeth Browning
Elementary Education

Mentor: Kristen Gregory, Elem Educ Middle Grades Educ

Teachers are constantly looking at new ways to impact our students and reflect upon what they have completed and what they still need to work on. This reflection was done through an adjustment process, within the district provided curriculum, based on the teacher reflecting upon their own teaching practices. This study was conducted within a general education classroom. My overall question that I looked to answer is 'What kinds of strategies does a kindergarten teacher use to support various student reading groups within low performing, rural, Title 1 elementary school?' This study will not only benefit myself, but also every other teacher who is reflecting upon their own teachings to best benefit the needs of their students. I conducted a mixed methods action research study that allowed me to collect data on my own teaching practices as well as create my own reflectional data, both were for me to use in my future teachings. I collected two data sources: an adjusting lesson plan and a weekly reflection on my teachings each week for six weeks. I used open coding to identify themes of how and why I have adjusted my instruction. I then started my collection of quantitative data by using descriptive statistics to identify frequency counts for patterns of changed instruction. It is anticipated that I will have collected enough data to help me within my teachings in the future for the needs of my students.

GP 29 9:30-11:30

Utilizing Feminist Rhetoric to Foster Engagement in First-Year Composition Courses

Jackie Derritt
English-English Studies

Mentor: Wendy Sharer, English

This research explores the integration of feminist rhetorical strategies within first-year composition courses, focusing on the application of these strategies in major projects at East Carolina University (ECU). The study aligns with ECU's Writing Across the Curriculum outcomes, emphasizing projects like "Writing to Reflect," "Writing to Analyze," and "Writing to Persuade," culminating in a reflective letter. Embracing counterstorytelling, diverse perspectives, and advocating for transformative change, this research contends that incorporating feminist rhetorical strategies enriches writing experiences by encouraging reflection, analysis, and the development of persuasive skills for societal advocacy. Additionally, the study investigates how students not identifying within marginalized groups benefit academically and emotionally from these approaches. By weaving feminist rhetoric into a first-year composition course, this overview asserts that students can articulate their perspectives with depth, empathy, and an understanding of language's power and discourse.

Defining feminism encompasses a diverse range of ideologies aimed at advocating for gender equality and addressing gender-based discrimination across various spheres. Rhetorical feminism responds to hegemonic rhetoric by respecting marginalized experiences, engaging with provisional audiences, and addressing exigencies within these communities. Traditional rhetorical approaches in first-year composition often overlook these values, perpetuating toxic masculine ideals. To address this issue, I proposes a course overview built on feminist rhetorical strategies (and personal experience with these)that enrich students' understanding of rhetoric, broaden perspectives, and empower critical engagement with language, power, and identity in discourse. This approach values differences without imposing ideologies on dominant groups.

As a prospective English community college educator committed to inclusive and empowering learning environments guided by feminist principles, I aim to cultivate classrooms that value diverse experiences, challenge norms, and empower students to actively contribute to a more equitable society.

GP 30 9:30-11:30

Do Fidgets Improve Classroom Behaviors?

Amber Ellis
Elementary Education

Mentor: Kristen Gregory, Elem Educ Middle Grades Educ

There are many different interventions within schools that have been used for attention deficit hyperactivity disorder, also known as ADHD. One of the newest and more divisive interventions is the usage of fidget devices. This quantitative, action-research study sought to find if fidget devices can impact the behaviors of students who have been diagnosed with ADHD. The study was designed to last for two weeks. The study took place in a rural, Title I elementary school second grade classroom. The study focused on four students who have been diagnosed with ADHD. The following data points were collected: a pre-intervention survey that identifies student knowledge and feelings about fidgets using a Likert scale, direct observation and tallying of disruptive behaviors using a behavior tracking log, and a post-intervention survey to identify student knowledge and feelings about fidgets after the intervention which also uses a Likert scale. The researcher organized the data, then compared the data using inferential statistics and independent T-tests. This study will have a direct impact on the researcher's personal instruction while also helping inform other educators about the impacts of using fidget devices within the classroom.

GP 31 9:30-11:30

Investigating Factors that Influenced the Motivation and Accountability of Seventh Grade Middle Schoolers

Tara Forehand
Social Studies

Mentor: Kristen Gregory, Elem Educ Middle Grades Educ

Motivation and accountability among seventh grade middle schoolers continues to be a growing concern for educators. Educators are working tirelessly to recognize and understand the motivational beliefs of the students they teach. The purpose of this mixed methods study was to investigate and answer the question: What factors are influencing the motivation and accountability of seventh grade middle schoolers in social studies and language arts? Mixed methods research was used to analyze survey data and identify factors influencing the motivation and accountability of these students. Data were analyzed using Qualitative survey responses with open and axial coding and quantitative responses were analyzed using descriptive statistics. Analysis of the survey data from the seventh grade social studies and language arts students could undoubtedly benefit administrators, educators, parents, and students. The results of this study have the potential to equip educators with practical strategies and solutions to combat the growing concern of motivation and accountability while creating a more effective and impactful learning environment for all students.

Keywords: student motivation and accountability, influences, academic learning, survey design

GP 32 9:30-11:30

Fostering Team Science Competencies within CUREs: Analysis of biology student writing prompts

Fiona Freeland
Int Dct Prg Bio, Biomed, Ch

Mentor: Heather Vance-Chalcraft, Biology

Course-based undergraduate research experiences (CUREs) allow for students to participate in an authentic research experience within the context of a course, broadening student participation in research and increasing their engagement with science. Although scientific research is often being completed through collaborative networks, very little training is provided to students to prepare them to work effectively as a team in research or professional settings. To encourage the development of team competencies among students, we incorporated interventions from the field of team science within 3 biology CURE courses to prepare students to work effectively as team members. One way we evaluated the impact of these interventions was through course-specific writing prompts assigned during the final three weeks of the semester, asking students to create a plan of action in response to a subject-specific problem. These prompts specified that students should include a "Team Science Plan" section in which they should describe the team they would assemble to solve the problem and how that team would function to accomplish their goals. To analyze this section of the writing prompts, qualitative codes were developed deductively under parent nodes drawn from core competencies outlined in team science literature: student knowledge regarding teams, identification of skills associated with effective teamwork, and attitudes toward working as a team. Emergent codes were then added iteratively to describe team-based strategies commonly included by students. A total of 25 writing prompts from three biology CUREs were analyzed. The percentage of responses with the following parent nodes was 80% for identifying instances of knowledge, 68% for skills, and 28% for attitudes. Students most commonly described instances of task understanding/role knowledge (76%), communication (64%), and collective efficacy (56%) as important team learning outcomes. This work helps to evaluate students' team

science competencies after participation in these training interventions. The high proportion of students indicating knowledge regarding the benefits of teams and skills important for effective teamwork provides evidence that team science training has facilitated the development of competencies regarding teamwork, suggesting that these students are now able to facilitate more efficient research teams.

GP 33 9:30-11:30

¡Bienvenidos a ECU! Increasing Hispanic enrollment at ECU.

Rich Klindworth
Higher Education Admin

Mentor: Crystal Chambers, Educational Leadership

Over the past several years there has been growing worry of an impending enrollment "cliff" in higher education. This has led to university leaders and others in higher education to brainstorm ways on how to survive this prognostication. In reality, however, the numbers do not show a "cliff" at all, but a drop for certain demographics, and more of a steady increase or small decrease for other groups. But it is within this fear of an enrollment cliff that this problem of practice began.

At East Carolina University, while applications for admission have increased among all demographics, student enrollment has decreased. Across the United States generally and, the State of North Carolina specifically, the Hispanic population is growing. The Hispanic population at ECU also continues to increase, however, the yield of Hispanic students from being admitted to enrolling is low, approximately 18 to 20 percent. This means, Hispanic students thought enough of ECU to apply, but eight out of 10 were not enrolling.

To address this challenge, Acevedo-Gil's college choice theoretical framework of college-conocimiento was utilized to shape an intervention that would directly address the needs of a first-generation Hispanic college student. The data shows this intervention works on helping students with their college process, how to apply to college, how to pay for college, the ability to see themselves in college, and even increase their likelihood of enrolling in ECU.

A college education is not only a benefit for the Hispanic individual or their family, but also the communities in which they live – including the United States as a whole. Hispanics can have a major impact on the United States economy and, as noted by Elliott and Parks (2018), have the ability to become the "cornerstone of tomorrow's workforce" (p. 12). According to the Georgetown University Center on Education and the Workforce (2024) 72% of future jobs will require a postsecondary degree. A four-year degree or more can fulfill the specialization that will be needed for a future workforce and improve one's social mobility. Yet, the benefits of degree completion cannot be yielded before enrollment; hence, the purpose of this study focusing on Hispanic student recruitment in Eastern North Carolina. As this dissertation shows, utilizing a college-conocimiento

approach is an effective way to change that narrative – and future studies may show how it works for all students, not just Hispanic students.

GP 34 1:00-3:00

Parental Involvement with Homework During Elementary Years

Elizabeth Lasson
Elementary Education

Mentor: Kristen Gregory, Elem Educ Middle Grades Educ

The following study was created to look deeper into parental involvement during elementary years, with a focus on involvement with homework. The purpose of this research was to find solutions to the issue of low parental involvement during elementary years. Therefore, the design chosen for the study was the action research design with a mixed methods methodology. Through the study, the researcher found answer(s) to the following research question: What are effective strategies for K-5 schools, teachers, and parents to increase effective parental involvement with homework at home? The researcher used online surveys to collect data from parents, teachers, and administrators. The survey data were analyzed using descriptive statistics and open coding. All educators, schools, parents, and students can benefit from the study as an increase in supportive parental involvement with homework has positive effects in a variety of educational aspects.

GP 35 1:00-3:00

The Link between Consistent Social Emotional Learning and Student Academic Performance

Jenna McLawhorn
Elementary Education

Mentor: Kristen Gregory, Elem Educ Middle Grades Educ

In this mixed methods study, the focus was on elementary teachers' perceptions on the correlation between consistent social emotional learning and student academic performance. Consistent social emotional learning is having a set time allotted to teach social emotional learning skills and not teaching the skills sporadically during the school year. The purpose of this study was to observe the opinions of elementary teachers on if they had allotted time to teach social emotional learning skills in the classroom, if and how they taught social emotional learning skills to their students, if their district had a social emotional learning curriculum, and how they believed consistent social

emotional learning teaching has impacted student academic performance. The research focused on the following question: What are elementary teachers' perceptions when it comes to the correlation between consistent social and emotional learning and overall student performance? Data were collected through a social media survey that has reached 50 plus elementary teachers from various regions around the country. Qualitative data were analyzed by open coding through the open-ended questions on the survey and quantitative data were analyzed through descriptive statistics. Teachers and schools will be most impacted by my study because they will see the importance of having time to teach social emotional learning with the support from school administration and how this impacts student academic performance.

GP 36 Cancelled

GP 37 1:00-3:00

Creative Atmospheric Conditions Presentations Through the Use of Guided Research Inquiry-Based Instruction: Action Research Proposal

Zion Streeter
Science Education

Mentor: Tammy Lee, Math, Science, & Instr Tech Ed

The purpose of this paper was to address the issue of the lack of motivation and engagement in secondary students learning science education topics. The study will use a guided research inquiry-based instruction practice to help address the issue of the study. Students will be creating a creative atmospheric conditions presentation and research speech. The goal of this research is to help find new teaching approaches to help motivate and engage students with learning science subjects. The study used qualitative observational tools to measure the student's motivation and engagement throughout the study. The results from the study will show students' development of their critical thinking and problem-solving skills. By the end of this study, students should be able to develop a detailed explanation of the atmospheric conditions topic they choose to research. The guided research inquiry-based instruction approach allows students to use their interests, beliefs, and values in their learning.

GP 38 Cancelled

GP 39 1:00-3:00

Parents' and Teachers' Perceptions of the Effectiveness of Preschool in Terms of Mathematical Kindergarten Readiness

Stephanie Wood
Tchr Ldrshp Elem School

Mentor: Kristen Gregory, Elem Educ Middle Grades Educ

Kindergarten readiness has long been a concern and topic of conversation, especially in high-poverty areas. Despite efforts to provide free or income-based preschool services to children from low-income families, these students are still arriving to kindergarten underprepared. While a great deal of research has been conducted on kindergarten readiness in terms of pre-literacy skills, very little research has been done on kindergarten readiness in terms of mathematical literacy. Additionally, little research has been conducted on the perceptions of the effectiveness of attending a preschool program in preparation for kindergarten. Some parents choose to ready their children for kindergarten by enrolling them in a preschool program while others elect not to do so. Thus, this qualitative case study investigated the following research question: What are parents' and teachers' perceptions of the effectiveness of preschool programs as it relates to the mathematical readiness of rising kindergarteners at a rural Title I elementary school in the mid-Atlantic United States? This study utilized a researcher developed survey to attempt to identify the perceptions of parents and teachers of kindergarten students in a Title I elementary school in rural Eastern North Carolina. The data collected from the survey were analyzed using open coding. The results of this study will inform parents of kindergarten students, preschool teachers, kindergarten teachers, and elementary administrators about parents' and teachers' perceptions of kindergarten readiness in terms of mathematical literacy.

GP 40 1:00-3:00

Effects on Student's Performance from Parent Knowledge of Self-Contained and Inclusive Classrooms

Sonomia Lewis
Elementary Education

Mentor: Kristen Gregory, Elem Educ Middle Grades Educ

This study examines parent awareness and how this can benefit students through the use of survey responses from two groups of participants. The purpose of this study is to examine the advantages of parent awareness regarding the benefits of self-contained and inclusive classroom settings available in elementary schools. This study answers the following research question: how do parents and teachers use their knowledge of self-contained and inclusive classroom settings to support kindergarten and first-grade students? Using mixed methods research and surveys, the data collected provides an outlook of where educators and parents stand in their understanding and involvement in the success of their kindergarten and first-grade students and children. Data will come from participants in two groups: educators, such as Kindergarten teachers, First-grade teachers, EC Teachers, Guidance Counselors, and parents of Kindergarten students. This research study includes the use of open-ended and Likert questions and will be analyzed through descriptive statistics. The results from this study will inform those within the educational community of how the knowledge of self-contained and inclusive is perceived within the minds of teachers and parents. It is anticipated that the data presented will benefit those elementary school professional positions and parents. It will also benefit the overall outlook of education for shareholders.

GP 41 9:30-11:30

Comparison between WBGT App Prototype and WBGT Monitor to Assess Heat Stress Risk in Groundskeeping in an Eastern North Carolina University Setting

Bridget Angol
Environmental Health

Mentor: Jo Anne Balanay, Health Education and Promotion

The wet bulb globe temperature (WBGT) index is the preferred environmental heat metric for occupational heat-related illness (HRI) prevention. However, WBGT data may not always be easily accessible for workplace heat stress evaluation. Thus, there is a need for well-designed WBGT-based tools that offer reliable, more accessible, and cheaper WBGT risk information for HRI prevention. A WBGT web app prototype was developed by ECU professors to calculate the current and forecasted WBGT, but it has not been tested for accuracy. The purpose of this study is to assess the reliability of the app prototype in providing accurate heat stress risk information for groundskeepers in eastern North Carolina by comparing the WBGT indices and risk levels from the app ($WBGT_{app}$) with those derived from the heat stress monitor ($WBGT_{ins}$). Heat stress monitoring was conducted on campus using a heat stress monitor. The outdoor WBGT index was recorded for 81 days, and the hourly mean WBGT indices were compared to the ACGIH Threshold Limit Values and action limits for heat stress. Risk levels were assigned to WBGT indices based on workload. The WBGT app was used to record hourly WBGT indices and risk levels. Data analysis was conducted using t-tests, Pearson correlation tests, and cross-tabulation to assess the app's reliability in evaluating workplace heat stress risk. The study found that the hourly mean WBGTapp index was significantly higher ($P<0.01$) than the $WBGT_{ins}$ index, but the difference between the overall average of the daily mean $WBGT_{app}$ and the daily mean $WBGT_{ins}$ was not statistically significant. There is a strong, positive correlation between the hourly mean $WBGT_{app}$ and $WBGT_{ins}$ indices ($r=0.94$, $P<0.01$), between the daily mean $WBGT_{app}$ and $WBGT_{ins}$ indices ($r=0.97$, $P<0.01$), and between the daily maximum $WBGT_{app}$ and $WBGT_{ins}$ indices ($r=0.94$, $P<0.01$). The hourly mean $WBGT_{ins}$ indices ranged from 8.35- 33.03°C, while the hourly mean WBGTapp indices ranged from 6.11-37.78°C. The app correctly identified 73-88% of minimal-risk conditions, depending on workload type. and was most reliable in identifying extreme-risk conditions at 97%, 95%, and 93% for light, moderate, and heavy workloads, demonstrating its capability to protect workers, especially for severe heat stress risk conditions. The WBGT app prototype is a promising tool for assessing heat stress, providing early warnings, and offering affordability and convenience for occupational heat stress prevention.

GP 42 9:30-11:30

Feasibility and acceptability of a mindfulness-based virtual reality program to promote mental health in older adults

Marcos Ardon Lobos
Recreation Sciences

Mentors: Jaehyun Kim, Matthew Fish, Recreation Sciences

The World Health Organization (2022) is estimating a significant growth for the aging population for the near future. A large proportion of the older population (i.e., about 1 in 5 older adults) suffer from both diagnosed and sub-clinical mental health conditions (Karel et al., 2012). However, evidence indicates that older adults are less likely to access mental health services than younger populations due to stigma and limited mental health literacy (Sadowski & Khoury, 2022). One critical need researcher noted is an innovative solution to the delivery of geriatric mental health care. One technology we propose to meet this need is a virtual reality mindfulness-based intervention (VR MBI). Currently, our Phase I research is underway, using EEG assessment only (CNS measure) to assess the effects of the VR MBI on their emotional states among college students. In our proposed Phase II study, we will replicate methodological techniques (i.e., one group pretest-posttest) with the addition of an ANS/HRV measures (Body Health Analyzer [BHA]). The BHA is a low-cost, easy to use/accessible, and non-stigmatizing ANS/HRV measures. Thus, the aims of this proposed Phase II study are to (a) pilot-test the acceptability and feasibility of the VR MBI and (b) examine the preliminary health benefits of the VR MBI for older adults. Specifically, this study will test the effects of the VR MBI on their emotional states using both HRV and EEG and provide the basis for gauging the acceptability of the innovative VR MBI to older adults. We believe that this study using HRV and EEG technologies will provide more objective and accurate measures of VR program fidelity and program effectiveness. Furthermore, this study will provide practitioners with a protocol for VR MBIs, which they can immediately deliver to their older adult clients

GP 43 9:30-11:30

Primary Tracheal Cancer: An Exploration Into the Treatment Outcomes, Demographic Trends, and Histology in the United States from 2000 - 2018

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Medicine

Mentor: James E. Speicher, Cardiovascular Sciences

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Background: Primary tracheal cancers (PTC) account for 0.2% of all respiratory malignancies with an estimated incidence of 2.6 new cases per one million people in the US. Given the rarity of these cancers and paucity of data in the literature, we sought to determine the demographic and treatment patterns of PTC in the US. **Methods:** A retrospective cohort study utilizing the Surveillance, Epidemiology, and End Results (SEER) database sponsored by the National Cancer Institute (NCI) was conducted for patients in the US with a diagnosis of PTC between 2000 and 2018. Univariate, multivariate, and survival analyses were performed using 95% confidence intervals [CI] and a p-value

< 0.05 indicating significance. **Results:** 689 patients with PTC were identified, with 53% of these cases being squamous cell carcinoma (SCC) and 17% being adenoid cystic carcinoma (ACC). Comparison of five-year overall survival (OS) was stratified by treatment modality, disease stage, and histology. Multi-factor analysis only demonstrated significance regarding disease histology (p=0.005). Asian patients with SCC had decreased five-year OS compared to White or Black patients (n=12; hazard ratio (HR)=0.19 and 0.20, and p=0.003 and 0.006, respectively). Patient age < 65 years was associated with increased survival (HR=0.48; p<0.001); there was no difference in survival based on sex or marital status (sex: HR=1.03; p=0.733; marital status: HR=1.07; p=0.568). Five-year OS for patients with tracheal ACC was 84%, compared to 29% for patients with tracheal SCC. The five-year OS for patients with local SCC who received surgery or radiotherapy (RT) was 40%, compared to 22% for patients that had local SCC who did not receive surgery or RT (p = 0.023 for surgery; p = 0.045 for RT). The five-year OS for patients with regional SCC who received surgery or RT was 40% and for patients with regional SCC who did not receive surgery or RT was 24% (p = 0.040 for surgery; p = 0.013 for RT).

Conclusions: Patients with tracheal ACC had greater five-year OS compared to patients with tracheal SCC. Those with local or regional SCC that received surgery or RT saw survival benefit. Patients with ACC had no survival benefit from any treatment modality regardless of stage. Patients aged < 65 years had increased survival and Asian patients with SCC had decreased survival. Further investigation into potential differences in survival among various chemotherapeutic regimens and socioeconomic factors is warranted.

GP 44 9:30-11:30

Self-Objectification in Collegiate Female Athletes

Rebekah J. Bergquist
Kinesiology

Mentor: Bhibha M. Das, Kinesiology

Rebekah J. Bergquist, BS & Bhibha M. Das, PhD, MPH, FACSM

Self-objectification is the psychological process in which individuals view themselves as an object made up of parts for evaluation and is an important factor to consider in body image research. High values placed on physical appearance can adversely affect female body image and therefore negatively impact mental health. The sporting context provides a unique environment for female athletes to view their bodies. Despite competing in a domain that should celebrate the body's functionality, female athletes are subject to comparing themselves to society's feminine, slender body ideal. Higher values placed on physical appearance are associated with negative mental health outcomes and lower quality of life.

PURPOSE: To assess the importance collegiate female athletes place on appearance and functional based attributes.

METHODS: Female college student athletes between the ages of 18-25 years were recruited to take an online survey. Data collected included demographics (e.g., age, race, sport) and body image,

including the Self-Objectification Scale. The Self-Objectification Scale ranges from -36 to 36 with higher values demonstrating a greater emphasis on appearance and lower values representing a greater emphasis on competence.

RESULTS: Participants (N=67; 20.6± 1.9 years, 82% White) represented nine different sports including track and field (23), softball (7), lacrosse (10), cross country (3), soccer (5), dance (11), volleyball (6), swimming and diving (1), and tennis (1). Scores from the Self- Objectification Scale showed that female athletes had a greater emphasis on appearance related attributes (5.37 ± 24; range -36–36).

CONCLUSIONS: Female athletes appreciate appearance related factors of body image more than competence related factors despite participating within a sector that requires physical competencies unrelated to outward appearance. Due to the negative outcomes that result from self-objectification and the wide spread of the collected data, more research is warranted among the athletic population. Future research should explore how self-objectification differs between sport types to reveal which athletes are more at risk for objectifying themselves. Additionally, future interventions should look at ways to promote body functionality over appearance in athletic and physically active female populations.

GP 45 9:30-11:30

Unveiling Sperm Capacitation Dynamics: A Novel Spectral Flow Cytometry and Stochastic Modeling Approach

Benjamin Brisard
Int Dct Prg Bio, Biomed, Ch

Mentor: Cameron Schmidt, Biology

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Mammalian sperm undergo a maturation process known as capacitation, either in the female reproductive tract or under in vitro conditions, to become competent for fertilization. Despite advancements in understanding capacitation's molecular mechanisms, challenges persist, notably in high-precision sperm selection for assisted reproductive technologies like intracytoplasmic sperm injection. The phenotypic heterogeneity and dynamic changes exhibited by capacitating sperm pose difficulties for selection, with sperm heterogeneity and the role of sperm subpopulations in fertility remaining largely unexplored. Currently, there are no quantitative models and few experimental techniques to explore large-scale signaling kinetics or the emergent properties of subpopulations. Here, we introduce a novel 'high-dimensional' culture array system combined with spectral flow cytometry to analyze sperm phenotype heterogeneity at single-cell resolution in large cell populations

and examine the dynamic interplay between intracellular calcium levels and the acrosome reaction in capacitating mouse epididymal sperm. Additionally, we employ stochastic modeling to predict individual sperm capacitation trajectories from cell population-scale data. This approach not only fills a crucial gap in sperm biology research but also sets the stage for advanced 'next generation' male fertility diagnostics, with implications for clinical, agricultural, and basic reproductive biology research.

GP 46 9:30-11:30

Injuries and Fatalities in NC Farming, Logging, and Fishing: 2017-2023

Anna Doub
Public Health, Epidemiology

Mentor: Robin Tutor Marcom, North Carolina Agromedicine Institute, Public Health

Introduction
In North Carolina, agriculture, forestry, and fishing are top supporters of the economy. In North Carolina, about 17% of the workforce is employed in agriculture. Each year in the United States there are approximately 669.5 fatalities in the agriculture, forestry, and fishing industries. The aim of this study is to find how many injuries and deaths there are in North Carolina among the agriculture, forestry, and fishing industries from 2017 to 2023. The results of this study will be used to determine what safety awareness and prevention programs need to be implemented.

Methods
Reports were gathered from AgInjury News, news articles, and Google searches. Reports were based on three industries: agriculture, logging, and fishing. All reported incidents were from North Carolina from 2017 to 2023. A database was created in MS Excel using variables provided in the reports including, industry, location, age, incident, and result. Variables were codded using SPSS v24. Data analysis was performed using SAS 9.4.

Results
A total of 113 reports were identified. Location, industry, injury or fatality incidents, and other variables are described using the data analysis that was ran. A North Carolina County map was also created to show the spread of incidents across the state, including adjustments for industry and injury/fatality.

Conclusion
The database can provide information on the number of injuries and fatalities that occur among each of the described industries in North Carolina. From the data analysis, statistical trends are recognized, leading to a focus on highly occurring incidents. This database will allow researchers, policymakers, and public health officials to gain knowledge about the specific circumstances and risks that have led to injuries and deaths. Prevention strategies and awareness can be created to inform all who are involved in these industries.

GP 47 10:00-12:00

Social anxiety in People Who Stutter

Amber Faircloth
Rehabilitation Sciences

Mentor: Patrick Briley

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Background: For people who stutter (PWS), anticipation of stuttering can lead to feelings of heightened stress in communication experiences, even those that are experienced_on a regular basis. Therefore, a common occurrence in stuttering is social anxiety. In therapy, a challenge when addressing social anxiety is time and compliance to using speech techniques outside of a clinical setting. Virtual reality might offer a solution to this problem. A first step to determine the effectiveness of this solution is evaluating if the physiological changes experienced as a consequence to social anxiety are the same in real world and virtual reality environments. In this study we assess if virtual reality technology can simulate the physiological symptoms that PWS experience in real world speaking environments. This research will investigate how PWS physiologically respond to speaking environments and if it can be simulated in virtual environments. This study will measure the physiological responses prior to and during speech attempts.

Inclusion criteria: Participants will be native English speakers who have been diagnosed as people who stutter with no self-reported history of concomitant speech, language, cognitive, visual, reading or hearing deficits.

Method: We will use BioNomadix Smart Center Essentials System to record heart rate, respiration, pulse, and electrodermal activity on participants during real-world communication scenarios and in virtual reality communication scenarios. Analysis will be conducted on AcqKnowledge Software.

Results & Conclusions: This study will compare physiological measures as a consequence to anxiety in real world and virtual speaking opportunities. Data generated from this study will establish a baseline for psychosocial responses and if virtual reality simulates a real-word experience.

GP 48 10:00-12:00

Association of Timing and Displacement Measures with Bolus Clearance Ratio following Intensive Prophylactic Therapy in Head and Neck Cancer Patients

Mark Gardener
Communic Science & Disorders

Mentor: Deirdre Larsen, Communic Science & Disorders

Background: Efficiency of the swallow can be disturbed by head and neck cancer (HNC) and its treatment due to changes in duration and extent of swallowing movements. These disturbances can result in increased residue after the swallow, placing patients at risk of choking. Prophylactic swallowing exercises targeting pharyngeal constriction, airway closure, and opening of the esophagus have been introduced to reduce pharyngeal residue. However, prophylactic exercise programs can be incredibly taxing to patients and can result in poor adherence, and ultimately poorer swallowing outcomes long-term. Identification of specific timing and displacement measures on video fluoroscopy (VF) that reduce pharyngeal residue can aide in development of targeted treatment plans for patients with HNC. **Objective:** To determine the association of timing and displacement measures of swallowing with amount of pharyngeal residue in HNC patients following intensive prophylactic treatment. **Methods:** This study is in progress. Fifteen HNC subjects attended pre- and <6 weeks post- cancer treatment for VF. The 5cc, 10cc, and 20cc thin liquid trials as well as 3 cm^3 paste trials on VF were analyzed. Duration of pharyngeal constriction (PCR), airway closure (AEC), and opening of the esophagus (UESopen), as well as their respective displacement measures were taken during each trial. A random selection of 20% of the data was re-rated by the same rater and repeated by an additional blind rater. Intraclass correlation coefficients will be determined for intra- and inter-rater reliability. Analysis of the association between timing and displacement measures of PCR, AEC, and UESopen with bolus clearance ratio (BCR) will be determined using appropriate nonparametric tests. Bolus size (5cc, 10cc, versus 20cc) and type (liquid versus paste) effect will also be determined. **Anticipated Results:** Results will determine which measures more greatly associate with reduced pharyngeal residue. It is hypothesized that timing measures will associate with reduced pharyngeal residue when considering bolus size. However, it is further hypothesized that both timing and displacement measures will be needed for reduced pharyngeal residue when considering bolus type.

GP 49 10:00-12:00

Effects of Maternal Exercise on Infant Mesenchymal Stem Cell Mitochondrial Functioning, Content, and Infant Body Composition in Early Infancy

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Bioenergetics and Exercise Sci

Mentor: Linda May, Kinesiology

Maternal exercise (ME) can improve infant metabolic health (i.e., body composition); however, mechanistic insight behind these adaptations remains understudied. Maternal obesity has been linked to lower infant mesenchymal stem cell (MSC), a model for the investigation of infant tissue metabolism, oxidative capacity, AMPK activity, and increased infant adiposity, showcasing the susceptibility and responsiveness of mitochondrial biology to prenatal influences. On the contrary, it remains unknown if the beneficial effects of ME on infant body composition are associated with changes in MSC mitochondrial capacity. Females between the age of 18 and 40, <16 weeks' gestation were randomized to either 150 minutes of moderate-intensity aerobic, resistance, or combination exercise per week, or a non-exercising control. At delivery, MSCs were isolated from umbilical cords and mitochondrial functional capacity was assessed using high-resolution respirometry. Western blots were used to determine AMPK activation, PGC1, SIRT1, and OXPHOS content. Infant body fat percentage and fat-free mass were calculated using standard

equations at 1 and 6 months of age. Unpaired t-tests, ANOVAs and ANCOVAs were used to determine statistical significance between groups. There were no phenotypic differences between exercise modes (p>0.05) for any MSC outcomes (p>0.05). MSCs from infants of all ME had significantly (p<0.05) higher MSC intact cell respiration, independent of any differences in permeabilized cell capacity, substrate preference, and conductance (p>0.05). Further, we observed similar OXPHOS protein expression and citrate synthase activity (p>0.05), suggesting similar mitochondrial content between groups. We observed higher AMPK activation and PGC1 (p<0.05), and SIRT1 content (p=0.08). Infants from exercising mothers had significantly higher (p<0.05) lean body mass, lower BMI (p<0.05), and a trend toward lower adiposity at 1 month of age (p=0.1). Infant mitochondrial respiration was inversely associated with infant adiposity at 6 months of age. These data suggest that infants exposed to exercise in utero are relatively leaner than same-age infants not exposed to exercise in utero, and this is associated with higher infant MSC mitochondrial respiration and activation of energy sensing and redox-sensitive proteins. Collectively, ME could influence the trajectory of offspring metabolic health and reduce the transgenerational propagation of metabolic disease.

GP 50 10:00-12:00

Skeletal muscle metabolism inconsistent with whole-body metabolic flexibility in overweight, nondiabetic individuals

Polina Krassovskaia
Cellular & Molecular Bioenergetics

Mentor: Nicholas Broskey, Kinesiology

Polina Krassovskaia, Filip Jevtovic, Marta Chorzepa, Terry Jones, Charles Tanner, Donghai Zheng, Walter Pories, Lynis Dohm, Joseph Houmard, Nicholas Broskey

Metabolic inflexibility is the inability to appropriately switch substrate use in response to a metabolic challenge and is seen in individuals with metabolic disease. Metabolic inflexibility can be observed in seemingly healthy individuals, potentially predisposing them to metabolic disease. The goal of this study was to examine if whole-body metabolic inflexibility is reflected by differential substrate use at the skeletal muscle (SkM) level.

This study recruited young (27 $\pm$ 8 years) healthy individuals with overweight. Anthropometric measures, VO$_2$max test, hyperinsulinemic-euglycemic clamp, and a *vastus lateralis* biopsy was performed. Based on difference in the respiratory quotient (ΔRQ) during the clamp, participants were median stratified to a "metabolically flexible" (FLEX) (ΔRQ>0.06; n=10) or "metabolically inflexible" (INFLEX) (ΔRQ<0.06; n=9) group. SkM biopsy samples were assessed for substrate oxidation with ^{14}C-pyruvate and ^{14}C-palmitate, mitochondrial respiration, and muscle fiber type. Data was analyzed with descriptive statistics, Mann-Whitney U-test, and Student's t-test.

FLEX had a lower BMI than INFLEX (26.4 $\pm$ 1.3 vs 28.7 $\pm$ 1.5 kg/m^2; p=0.002) but had a similar percentage of body fat (p=0.3) or lean mass (p=0.2). Groups did not differ in age (p=0.06), VO$_2$max (p=0.3), M value (p=0.1), or basal RQ (p=0.5). FLEX had lower palmitate oxidation than INFLEX (p=0.03) and trended towards a higher ratio of pyruvate to palmitate oxidation (p=0.06). Incomplete

palmitate oxidation was also higher in FLEX (p=0.003). Groups did not differ in mitochondrial respiratory capacity (p=0.3) or fiber type (p=0.9). ΔRQ was significantly associated with the M value (p=0.02, r=0.55) and did not associate with fiber type (p=0.6, r=0.16).

FLEX and INFLEX individuals differ in substrate oxidation in SkM tissue with INFLEX showing greater and more efficient fat oxidation. Differences in ΔRQ are not influenced by muscle fiber type.

GP 51 10:00-12:00

Exploring Protective Factors Against Adverse Childhood Experiences in Primary Care: A Systematic Review Based on Ungar's Socio-Ecological Resiliency Model

Betül Küçükardalõ-Cansever
Medical Family Therapy

Mentor: Angela Lamson, Human Dev and Family Science

Betül Küçükardalõ-Cansever, MA, PhD Candidate in Medical Family Therapy
Abby Elizabeth Caldwell, BS in Biology
Natalia Sira, PhD, MD
Angela Lamson, PhD, LMFT

Background: Adverse childhood experiences (ACEs) profoundly impact physical and mental health throughout one's lifespan. While research reports on assessment of ACEs in primary care (PC), less is known about protective factors – crucial for fostering resilience. Using Ungar's Socio-ecological resilience model, this systematic review investigated how protective factors are assessed within PC screening for ACEs and their potential to influence patient/health outcomes. **Methods**: PubMed, PsycINFO, and CINAHL from database inception were searched up until September 30, 2022. Studies without language and country restrictions were included. A comprehensive search strategy across multiple databases yielded 764 initial studies. Following duplicate removal and a two-stage review process with the inter-rater agreement (Cohen's κ = .583, .677), 27 articles met the inclusion criteria. Each screened adult patients (≥18 years) for ACEs within PC settings and/was assessed for at least one protective factor. The results were synthesized qualitatively. **Results**: Studies varied widely in the specific protective factors that were measured. Based on Ungar's model of resilience, individual factors such as relationships, identity, and power/control were frequently assessed, in addition to community/social factors such as cohesion, material resources, and social justice. Only two articles meaningfully addressed cultural adherence. These findings reveal potential gaps in understanding how certain protective factors may promote better biopsychosocial-spiritual health for patients in PC settings, especially within diverse cultural contexts. **Conclusions**: This review highlights the need for PC research to broaden its focus on a wider spectrum of protective factors, addressing their potential to mitigate the effects of ACEs. It underscores the importance of Ungar's

Socio-ecological model for its comprehensiveness yet calls for more culturally sensitive assessment tools and interventions. Understanding which protective factors are most potent within PC settings could enable targeted support and optimize patient health outcomes.

GP 52 10:00-12:00

Soleus Cross-Sectional Area and Fiber-Type Shift at the Intersection of Age and Exercise

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Physical Therapy

Mentor: Ted G. Graber, Physical Therapy

Justin McCrary1,*, Anna Webster1,*, Emily Bowser2, Emily Rust2, Ted G. Graber1,2,3,4
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Previous research has shown that sarcopenia (age-related loss of muscle mass and strength) results in loss of function and independence, frailty, and increased mortality in later years. In prior work, our lab and others have demonstrated age-related decline in physical function, the efficiency of Ca^{2+} handling mechanisms and force/power production within the mouse muscle. Exercise is a promising intervention to preserve function as we age. We previously demonstrated that endurance exercise training can preserve physical function in mice. Our current study quantifies changes in muscle fiber cross sectional area and fiber-type due to the interaction of aging and exercise training in male C57BL/6 mice soleus (SOL) muscle. SOL is part of the plantar flexor muscle group and is a mixed fiber-type postural/locomotion muscle that contains MHC (myosin heavy chain) type 1 (slow twitch), type 2a (fast twitch), and type 2x (faster twitch) myofibers. We hypothesize that changes in the cross sectional area or fiber-type will not fully account for impaired function. For our study, we used immunohistochemistry to identify fiber type (stained for MHC 1, 2a, and 2b) and cross-sectional area (CSA, stained for laminin, a sarcolemma protein, to outline the myofibers) in cryostat sliced SOL cross-sections of adult (10m, month of age) and older adult (26m) sedentary (adults, n=20 ; older adults, n=10) or trained (performed 12 weeks of high intensity interval training; adults, n=20 ; older adults, n=10) mice from a previous study. With images taken on an EVOS fluorescent microscope, we determined fiber-type and CSA using ImageJ software. Statistical analysis of fiber-type and CSA is being completed at time of abstract submission and will be ready for the presentation. Linear regression analysis will be used to identify any correlation between changes in muscle fiber cross sectional area/fiber type and function.

GP 53 10:00-12:00

Tensor Veli Palatini Differences Between Children With and Without Cleft Palate: A Preliminary Volumetric Analysis

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Communication Sc and Disorders

Mentor: Jamie L. Perry, Communication Sc and Disorders

Background: Approximately 90% of children with a history of cleft palate report having otitis media with effusion (OME), a middle ear pathology primarily caused by dysfunction of the eustachian tube (ET). Literature has reported that correct functioning of the ET is linked to a velopharyngeal muscle known as the tensor veli palatini (TVP). The TVP originates near the ET and the base of the skull, wraps around the hamulus, and then becomes tendinous and creates the palatine aponeurosis near the soft palate. It is through contraction of the TVP that the ET dilutes, thereby equalizing pressure between the surrounding environment and the middle ear. This equalization of pressure by the ET then allows for proper sound transmission and effective fluid drainage in the ear. Previous literature has already reported that there are significant connections between middle ear pathologies in children with a history of cleft (e.g., OME) and dysfunction of the tensor veli palatini muscle. However, there is limited literature describing the anatomical differences of the tensor veli palatini in this clinical child population. The purpose of this study is to examine potential volume differences of the TVP in children with repaired cleft palate compared to children with non-cleft anatomy. **Methods:** This study will utilize 3D MRI images from 20 children (15 healthy controls and 5 patients with a history of cleft palate) matched for age and sex. Overall TVP volume will be measured using Amira Visualization Software to obtain quantitative volumetric measurements for comparison. **Results:** Data analysis is ongoing and is expected to be completed by April 2024. **Conclusion:** Describing potential differences in TVP muscle volume between the two child populations (i.e., cleft anatomy vs non-cleft anatomy) will provide invaluable information regarding audiological presentation of the patient population. Results from this study will also lay the framework for increasing understanding of anatomical differences among children with a history of cleft palate and can contribute to the surgical planning process for this population.

GP 54 1:00-3:00

Event-related potential (ERP) measurement of noun and verb production in aphasia

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Communication Sc and Disorders

Mentor: Matthew Walenski, Communication Sc and Disorders

In the United States, about 800,000 strokes occur every year. Strokes frequently cause aphasia, which is characterized by deficits in language production, comprehension, or repetition. However, with the exception of comprehension and a small number of studies of noun production, measurement of these language functions in aphasia has largely not taken advantage of the rich and sensitive data provided by neuroimaging techniques, such as event-related potentials (electrophysiology). Here we

aim to fill that gap, and examine the production nouns and verbs with event-related potential measurements of brain function. In this study, English-speaking individuals who have aphasia are recruited, as well as a group of healthy participants. We aim to compare participants with agrammatic aphasia (who may be particularly impaired at verb production) against participants with anomic aphasia (who may be particularly impaired at noun production). Participants are shown pictures (one at a time, on the center of a computer screen) of an object or of a person or animal performing an action, and are asked to produce the corresponding noun or verb as quickly and accurately as possible. During the task, we measure the brain's electrical response using ERPs. Of particular interest will be the time period just before the response is produced, which may reveal effects due to lexical retrieval and planning of the response. The main goal is to examine the moment-by-moment processing that contributes to noun and verb production, and whether abnormal processing is revealed by abnormal electrical activity, for nouns or verbs in agrammatic or anomic aphasia.

GP 55 1:00-3:00

Functional and Temporal Velopharyngeal Muscle Movements During Speech

Samantha J. Power
Rehabilitation Sciences

Mentor: Jamie Perry, Communic Science & Disorders

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Introduction: The velopharyngeal mechanism is muscular valve required for adequate speech production. During the production of oral phonemes, the velum elevates to the posterior pharyngeal wall to close the velopharyngeal port, separating the oral and nasal cavities. The site of closure is typically the point of contact between the velar knee and the posterior pharyngeal wall. In rare instances, velopharyngeal closure is made below the velar knee. Velopharyngeal muscle movement, including velar movement, can be visualized using magnetic resonance imaging (MRI). Velar elevation may be viewed from a sagittal plane during sustained phonation using MRI. Recently, dynamic MRI protocols have allowed for real-time analysis of velopharyngeal muscle movement during speech. Utilizing static and dynamic MRI protocols in conjunction may provide useful insight into muscle function and temporal factors involved in closure of the velopharyngeal port in both typical and atypical closure patterns. **Aims:** 1. To describe function of individual velopharyngeal muscles involved in velopharyngeal closure and 2. To describe temporal factors of velopharyngeal muscle movement during speech production. **Methods:** This case study will utilize Amira

Visualization Software to isolate velopharyngeal muscles during phonation in a 3D static magnetic resonance image. Velopharyngeal muscles of interest will then be tracked through speech production utilizing dynamic MRI methods. **Results:** Data analysis is still ongoing, and result are expected in March 2024. **Conclusions:** This study will provide an understanding of velopharyngeal muscle function during speech and temporal factors necessary for achieving velopharyngeal closure.

GP 56 1:00-3:00

Comparison of displacement measures on modified barium swallow studies between symptomatic and asymptomatic people with cricopharyngeal dysfunction

Alyssa Rowe, Wilson Wysor
Communication Sc and Disorders

Mentor: Deirdre Larsen, Communication Sc and Disorders

Background: Adequate opening of the upper esophageal segment (UES) is essential for clearance of food and liquid through the pharynx (i.e., throat). Cricopharyngeal dysfunction (CPD), or reduced opening of the UES, can lead to foods or liquid staying in the throat. CPD is seen more often in elderly adults (over 65 years). Potential mechanisms of CPD include reduced constriction of the pharyngeal muscles, hyoid elevation, or extent of UES opening. As a result, people with CPD may display coughing, choking, or globus sensation. However, not every person with CPD experiences these symptoms. **Purpose:** The intent of this study is to determine if displacement measures related to UES opening differ between symptomatic and asymptomatic subjects with CPD on modified barium swallow studies (MBSS). **Methods:** This is on ongoing retrospective analysis of 28 MBSS obtained from Our Lady of the Lake Regional Hospital in Baton Rouge, Louisiana as well as University of California, Davis. Participants include 14 symptomatic subjects with CPD age-matched with 14 asymptomatic subjects with CPD over 65 years of age. Measures include extent of pharyngeal constriction (PCR), hyoid elevation, and UES opening (UESMax) as well as percentage of bolus clearance (BCR; i.e., residue). All measures will be obtained by a trained, blinded rater using Swallowtail (Belldev Medical, Inc) during a 20 cc Level 1, thin bolus and a 3-5 ml Level 4, pureed bolus. Thirty percent of the images ($n = 9$) will be measured by second trained, blinded rater. Inter-rater reliability will be assessed using intraclass correlation coefficients. Appropriate nonparametric tests will be conducted to determine group differences in PCR, hyoid elevation, UESMax, and BCR as well as the overall association of PCR, hyoid elevation, UESMax, with BCR. **Results:** Results will be used to better delineate specific displacement measures that may contribute to complaints of dysphagia. Based on these results, implications for future considerations will be outlined. **Conclusions:** Ongoing investigation of specific *displacement measures* may further illuminate features of atypical swallowing to improve assessment on MBSS. This research can be applied to further treatment for individualized care for people with CPD by a speech-language pathologist.

Return to Run Protocols and Load Protocols and Loud Progressions for Bone Stress Injury: A Rapid Review

Emily Seguin
Physical Therapy

Mentors: Sarah Johnson, PT, DPT
Stacey Meardon, PT, PhD

Bone stress injury (BSI) is common in athletic populations due to overuse resulting from accumulation of microdamage that exceeds bone remodeling. Early diagnosis and proper treatment of BSI are vital for return to sport or running. Treatment of BSI often includes a temporary cessation of running, followed by a load progression and return to run (RTR) program based on BSI severity and symptoms. The purpose of this rapid review was to summarize what is known and assess the literature related load progressions and RTR protocols following BSI.

Using systematic search methods and quality assessment, a rapid review was conducted in July 2023 in PubMed. The search terms ((bone stress injury) OR (stress fracture)) AND (running) AND ((return to running) OR (return to duty) OR (acute to chronic workload) OR (load progression) OR (load management) or (functional progression) or (periodization)) yielded 117 results. Titles and abstracts were searched for inclusion criteria and the following factors were examined and quantified: study type, population, and level of evidence using the Oxford Centre for Evidence-Based Medicine Levels of Evidence. Articles were reviewed for the inclusion of BSI severity recommendations, evidence-based recommendations, load progression prior to RTR initiation, criteria to start RTR, and criteria to progress RTR.

5 articles met inclusion criteria and included 2 general reviews, 2 case reports, and 1 clinical commentary. All articles included mechanism-based reasoning for RTR progressions supported by primary literature. Civilian athletes were the primary focus population in all articles with 2 articles specifying young adults. 2 articles discussed severity of BSI, but no articles included specific severity-based RTR programs. Load progression prior to RTR was advised in 3 articles with advice ranging in methods of training. 4 articles included criteria for initiating RTR and criteria to progress RTR.

In total, 5 out of 92 articles included specific guidelines, but recommendations for load progression were limited. Specific criteria for RTR based on BSI severity was generally lacking. Despite mechanistic support from the literature, levels of evidence associated with the articles were low.

BSI are complex injuries that require management based on injury severity. To better manage BSI, more evidence is needed to inform optimal load progression prior to RTR, progression of RTR protocols, and BSI severity-based protocols.

Intraductal Carcinoma of the Prostate (IDC-P): Treatment, Demographic, and Geographic Trends in the United States

Taylor Stamey
Medicine

Mentor: Andrew Ju, Radiation Oncology

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¶These two authors contributed equally to this work.

Background: Intraductal carcinoma of the prostate (IDC-P) is considered both a distinct entity (found alone in ~3% of prostate biopsies) and negative prognostic factor of prostatic cancer (identified in ~20% of all patients with prostate cancer). IDC-P represents aggressive disease, and is associated with increased metastasis, recurrence, and prostate cancer-specific death. Given the mortality and rarity of this disease, we analyzed demographic and treatment trends of patients diagnosed with IDC-P in the US.

Methods: A retrospective cohort study utilizing the SEER database sponsored by the National Cancer Institute (NCI) was conducted for patients with a diagnosis of IDC-P between 2000-2018. Univariate, multivariate, and survival analyses were performed on demographic and treatment characteristics using 95% confidence intervals [CI] and a p-value < 0.05 indicating significance.

Results: 1003 patients with complete follow-up and survival data were identified. Patients with local disease that underwent radical prostatectomy without radiotherapy (RT) had increased five-year overall survival (OS) compared to those that only received RT (99% vs 75%; p<0.001); those with regional disease did not (p=0.617). No survival benefit was seen among patients that received RT in addition to radical prostatectomy compared to those treated with radical prostatectomy solely (p=0.770 for local disease and 0.909 for regional disease). Lymph node (LN) examination, performed in 33.1% of patients, yielded increased five-year OS compared to absence thereof (99% versus 73%; p<0.001). The 2.7% of patients that received chemotherapy (CTX) saw no survival benefit in the setting of distant disease (n=14; 0% versus 78%, respectively; p<0.001). Single patients saw decreased OS compared to married ones (hazard ratio (HR)=0.83; p=0.050) and patients younger than 65 years saw increased survival (HR=0.89; p=0.002). On multivariate analysis, the interaction between stage, surgical treatment, and RT demonstrated a difference in five-year OS (p=0.020).

Conclusions: This analysis demonstrates survival benefit with radical prostatectomy solely versus treatment with RT among patients with local IDC-P and did not find benefit with CTX in patients with distant disease. Patient age and marital status may have implications for patient outcomes. Further investigation into specific treatments, socioeconomic factors, and disease surveillance measures for patients with prostate cancer is warranted.

GP 59 1:00-3:00

Effect of High Intensity Interval Training on Physical and Cognitive Function in Middle-Aged Male C57BL/6 Mice

Justin Stephenson
Exercise Physiology

Mentor: Ted Graber, Physical Therapy

Justin Stephenson[1], Tuan Tran[2], Ted Graber[1,3,4,5]

Background: The world population is aging exponentially, and with advancing age comes the onset of chronic disease and loss of functional aptitude. Exercise, while not a cure, is a promising intervention that may slow age-related decline in both physical and cognitive function. Valid preclinical models of exercise are needed to help establish molecular mechanisms. HIIT (high-intensity interval training) is a popular time-saving form of endurance exercise previously shown to preserve physical function in older adult mice, yet it has not been studied in the context of middle-aged mice or cognitive function. Therefore, the primary purpose of our study was to assess the effects of HIIT on physical and cognitive performance in middle-aged mice, compared to sedentary controls. We hypothesized HIIT would preserve function compared to sedentary mice. **Methods:** C57BL/6J male mice (12 months old at start and 17 months at finish) obtained from Jackson Laboratories were group housed and fed/watered ad libitum. They were randomized into exercise (HIIT, n=8) and sedentary control (SED, n=7) groups. HIIT exercised using a 12-week individualized progressive volume protocol, and SED received a sham treatment. To measure functional and cognitive performance (pre- and post-) we used: treadmill, inverted cling, grip meter, rotarod, and voluntary wheel running, open field, y-maze, novel object recognition, and puzzle box. We measured body composition, muscle wet mass, and isometric tetanic plantar flexor torque. **Results**: We used SPSS (v29) to assess significance with Student's t-test. HIIT significantly increased endurance capacity (+36.42% change in treadmill score, p=0.002). Little evidence of change was shown for the other physical function parameters, body composition or cognition. had mixed results with little evidence of exercise influence. Body composition, muscle mass, and torque also did not alter significantly as a result of the exercise. **Discussion**: Contrary to previous research, the current study found little effect of HIIT on body composition. Regarding the lack of cognitive maintenance observed, at only 17 months of age, the mice may not experience any cognitive deterioration. Thus, the HIIT intervention may not have had an opportunity to influence cognitive function maintenance. Our next step is to assess young adult mice to establish a CAB baseline, and evaluate older adult cognitive response to HITT.

GP 60 9:30-11:30

Development of 2D environmental dose-rate mapping of rock materials for OSL-dating

Mohammad Nazmul Alim
Biomedical Physics

Mentor: Regina DeWitt, Physics

When minerals or grains are exposed to ionizing radiation, energy accumulates in their crystal structures. Optical stimulation, provided by LEDs, lasers, or IR lights, enables us to release the energy from samples and to obtain optically stimulated luminescence (OSL) signals, which are proportional to the absorbed dose. By using the OSL emitted from these minerals and the dose rate, i.e. the rate of radiation exposure, we can determine how long ago they were exposed to sunlight or sufficient heating. Recently attempts have been made to obtain 2D OSL maps from rock surfaces. For dating purposes, dose maps require corresponding 2D maps for the dose rate. The goal of my dissertation is to obtain such 2D profiles of the radiation in rock surfaces and to test different approaches.

OSL itself can be used for mapping the radiation environment. Several materials suitable for OSL measurement, such as BeO, Al_2O_3:C, and CaF_2, can detect beta and gamma radiation from rock samples. These materials are available as films or imaging plates, and CCD cameras or semiconductor diode array detectors can be used to obtain a radiation map. Recently, methods have become available that allow mapping radiation directly, such as Timepix detectors and beta autoradiography. Timepix utilizes a semiconductor detector array to store collected charges, with image acquisition software facilitating further data processing. Beta autoradiography systems employ an image sensor to temporarily store radiation-based energy patterns from samples. The image reader translates sensor signals into digital form, and the image processor converts them into grayscale, depicting the luminescence signal distribution.

For our first trial, we tested five types of films (HD V2, EBT3, EBT4, MDV3, and EBT XD) to determine if they could be used for dose measurement from rock samples. We exposed them to low-dose gamma radiation. However, the results were not suitable for reading information or image acquisition. I have just started my dissertation work. I will present the motivation and plan for my dissertation and show the first results.

GP 61 9:30-11:30

The Investigation of the Soil Seedbank in a Long-term Mowing and Fertilization Experiment

Skyler DeWall
Biology

Mentor: Carol Goodwillie, Biology

Seedbanks, the assemblage of dormant seeds found in soils of a plant community, play a vital role in plant community dynamics, and can aid in environmental restoration efforts. Studies have shown that fire suppression, anthropogenic nutrient addition and human-altered hydrology all have negative effects on aboveground vegetation, such as a decrease in biodiversity. However, little is known about the effects of these factors on seedbanks. In this study I investigated how fertilization and disturbance (mowing) have affected the seedbank community in a 20 year-long experimental study of a coastal plain wetland. The results have shown that the aboveground vegetation is vastly different in each treatment plot. After 20 years, unmowed plots are dominated by tress with limited understory, while the mowed plots are dominated by fast growing species. We collected soil samples from each plot at two depths and used the seedling emergence method to characterize the soil seedbank community in a growth room experiment. Long-term fertilization could alter seedling emergence either through its effect on the aboveground community or through direct effects on germination. To explore this, I conducted an additional growth room experiment comparing seedling emergence with or without the addition of nutrients to soils of both fertilized and unfertilized plots. I then conducted multiple univariate and multivariate analyses to investigate the effects of treatments on diversity, density and composition of the seedbank and aboveground vegetation. I found that fertilization and mowing positively influenced both the total number of seedlings and the number of species that emerged. The addition of nutrients increased both the number and diversity of the seedlings. I calculated a Sorenson similarity index to compare aboveground and belowground communities and explored how the treatments have affected similarity. This data set is important because seedbanks are highly understudied, and they are vital to the future and potential of the restoration of plant communities._

GP 62 9:30-11:30

OptoProfilin: A Single Component Biosensor of Cellular Stress

Jahiem Hill, Noah Mann, Kenneth Wang
Chemistry

Mentor: Robert Hughes, Chemistry

Purpose: Profilin is an actin-binding monomer closely linked to the unusual cytoskeletal structures formed in cells in the presence of energetic and oxidative stress. We have discovered that an optogenetic profilin can be used as a single component biosensor for studying these anomalous cytoskeletal structures. This optogenetic switch can form the basis for biosensors strategically designed for early detection of neurodegenerative diseases such as Alzheimer's, Parkinson's, and ALS or neurodegenerative disease progression. While a large body of work closely links profilin activity with cellular stress and neurodegenerative disease, this, to our knowledge, is the first example of profilin as an optogenetic biosensor of stress-induced changes in the cytoskeleton.

Results: Light activation of the profilin construct in HeLa cells in the absence of a CIB binding partner was sufficient to induce a subcellular localization response, with an apparent targeting of focal adhesions. To demonstrate that the observed localization pattern was consistent with that of focal adhesions, immunostaining for Paxillin, a focal adhesion localized protein, was performed, with the results demonstrating that optically activated OptoProfilin is co-localized with focal adhesions. Optoprofilin function was also investigated in HEK 293, NIH 3T3, and N2a cells.

Conclusion: The optogenetic profilin has been shown to localize at the focal adhesions and be a possible biosensor precursor to many neurogenerative diseases. Further research will be conducted to identify the association of these focal adhesion to cluster transformations and the driving factors.

GP 63 9:30-11:30

Facile Synthesis of Beta Cyclodextrin Derivative

Thomas Hu, Greyson Sanchez
Chemistry

Mentor: Robert M. Hughes, Chemistry

Cyclodextrin (CD) as a type of cyclic oligosaccharide commonly contains 6 to 8 glucopyranose forming a hollow truncated cone-like structure with a lyophilic surface on the outside and a hydrophobic cavity inside the cone. Because of its unique structure and easy complexation with many biomolecules, it has played a significant role in water solubility improvement, slow-release, and transportation of hydrophobic molecules, especially drug molecules. However, crude beta-cyclodextrin has its limitations in water solubility and target cell specificity. Therefore many derivatives of cyclodextrin have been synthesized. In this project, many previous routes of beta-cyclodextrin have been examined to find a stable method for synthesizing 6A-Azido-6A-deoxy-beta-cyclodextrin for azide-alkyne cycloaddition click reaction.

GP 64 9:30-11:30

Structure and Dynamics of 15-Lipoxygenase-2

Andrew Jakobowski
Chemistry

Mentor: Adam R. Offenbacher, Chemistry

Lipoxygenases (LOXs) are a family of iron enzymes that catalyze the peroxidation of polyunsaturated fatty acids to generate oxylipins, which in animals play essential roles in signaling. In humans, LOX function presents a double-edged sword as they have known involvement in resolving and promoting chronic inflammation. Human 15-lipoxygenase-2 (15-LOX-2) is the focus of this study. 15-LOX-2 oxidizes arachidonic acid (AA) to produce 15-hydroperoxyeicosatetraenoic acid (15-HPETE). 15-HPETE has been known to promote chronic inflammation through oxidizing low-density lipoprotein (LDL) but can also produce lipoxins that naturally resolve inflammation. 15-

LOX-2 has two Ca^{2+} binding sites in the PLAT domain. The presence of Ca^{2+} and membrane increases its activity through conformational changes. Therefore, understanding the thermodynamic profile of Ca^{2+}-binding to C2-domains can provide labile and structural information. When Ca^{2+} binds to the PLAT domain a loop is predicted to undergo a structure change to act as a membrane anchor increasing protein-membrane interactions. Recent experimental advances in understanding these Ca2+-dependent, protein-membrane interactions will be presented. Resolving these interactions may inform on the future development of 15-LOX-2 specific inhibitors that target the protein-membrane interactions.

GP 65 1:00-3:00

Like two peas in a pod: The co-occurrence of metal and antibiotic resistance genes across aquatic ecosystems

Cory Joyner
Biology

Mentor: Erin Field, Biology

Antibiotic resistance in environmental microbiota is a naturally occurring, yet looming threat to global society, estimated to contribute to over 10 million deaths annually by 2050. While human contamination from industrial activity and wastewater worsens this in natural environments, it has been noted that genes conferring resistance to metals (MRGs) may enhance antibiotic resistance genes (ARGs), leading to their persistence due to shared export mechanisms and closely regulated transcription or translation. However, the occurrence and relative abundance of MRGs and ARGs remains poorly understood across global waters and geographies. We initially hypothesized that genes encoding multidrug efflux pumps and resistance to highly toxic metals like mercury were to be the most abundant in aquatic ecosystems, especially those prone to accumulating waste, such as estuaries. To study this, 861 metagenomes from 43 different aquatic shotgun sequencing projects were downloaded from the MG-RAST server and geographically characterized by hemisphere, country, continent, and salinity. After quality control, remaining sequences were annotated using the two-step ARG_oap pipeline built from the Structured Antibiotic Resistance Gene and Bacterial Metals and Biocides databases. Currently, the raw gene counts are being analyzed to find differentially abundant ARGs and MRGs using DESeq2 with geographical contrasts in place. Initial data suggests that the ARG types for polymyxin and bacitracin and MRG types for chromium and copper are found widely across global waters. These results will further our understanding of the aquatic resistome, as well as provide insight into bodies of water at risk of harboring antibiotic resistance due to metal co-contamination.

GP 66 1:00-3:00

Investigating links between pectin dynamics and meristem activity in maize

Charles Maus
Molecular Biology and Biotech

Mentor: Beth Thompson, Biology

Charles Maus, Daniel Maynard, Hailong Yang, Beth Thompson

Plant meristems serve as a center for growth; they house stem cells that both self-renew and provide cells for organogenesis. All plant cells, including meristematic cells, are surrounded by rigid cell walls, a complex polysaccharide matrix that must be remodeled when cells expand and divide. Most plants have Type I cell walls, which have relatively high levels of pectin. In contrast, maize and other grasses have Type II cell walls, with significantly lower levels of pectin and a greater abundance and variety of hemicelluloses. Despite the importance of meristems and the cell wall in regulating plant growth, relatively little is known about how the cell wall is integrated with meristem function, although pectin is emerging as a key component in Type I plant cell walls. For example, in Arabidopsis, demethylestification of pectin is required to increase cell wall extensibility and promote primordia outgrowth. The role of pectin in plants with Type II cell walls, including maize, is much less clear. Maize contains multiple meristem types that vary in determinacy, phyllotaxy and primordia identity, and thus is an excellent system to investigate the links between the cell wall and meristem function. We first investigated the role of pectin in maize floral meristems using three monoclonal antibodies that recognize specific pectic epitopes. Interestingly, pectin accumulates differently in the upper and lower florets. In the upper floret, demethylesterified pectin accumulated in initiating organ primordia, similar to Arabidopsis, whereas methylesterified pectin accumulated on the apical surface of the meristem. In contrast, relatively little staining for either epitope was observed in the lower floret. We also examined the localization of a specific epitope of another pectin, rhamnogalacturonan-I (RG-I), which interestingly, accumulated specifically at the boundary between the upper and lower floret. To further understand the role of pectin in meristems, we are examining the localization of these three pectic epitopes in other inflorescence meristem types, in vegetative shoot meristems, and in developmental mutants that alter meristem activity. Indeed, pectin accumulation is altered in bearded-ear mutants, which have defects in floral meristem determinacy and identity. Our results suggest that despite its low abundance in Type II cell walls, pectin is remarkably dynamic during maize development and may contribute to meristem growth dynamics.

GP 67 1:00-3:00

Population demographics and parasite prevalence of the non-native green porcelain crab (*Petrolisthes armatus*) at the northernmost limit of its range

Mic Schulte
Biology

Mentor: April Blakeslee, Biology

Schulte, M., Gittman, R.K., Geesin, M.E., Zamudio-Jimenez, E., Stancil, C.K., Blakeslee, A.M.H.

Climate change has been implicated in the rise in coastal temperatures around the world. Species that have historically been found in marine and estuarine environments at lower latitudes have migrated polewards, taking advantage of increasingly favorable conditions in temperate regions. These climate-induced range expansions may impose negative effects on native species by introducing novel species interactions, including parasites and increased competition for resources. A phenomenon known as the "Caribbean Creep" highlights the occurrence of biological invasions/range-expansions of marine/estuarine species from the Caribbean into temperate regions

along the southeastern United States coastline. One species that has creeped its way northward is the green porcelain crab (*Petrolisthes armatus*), an intertidal and subtidal filter-feeding crab often found near oyster reefs. As part of an ongoing oyster reef restoration monitoring project, my research aims to investigate population demographics and parasitism in *P. armatus* at the northernmost limit of its range. Passive-sampling devices were deployed at various habitat types to compare benthic organismal biodiversity, including non-native porcelain crabs. Our study sites along the central North Carolina coast experienced an increase in abundance of green porcelain crabs from 2022 to 2023. We also report the first detection of a parasitic bopyrid isopod (*Aporobopyrus curtatus*) within *P. armatus* in the state of North Carolina. Altogether, my research will allow us to gauge the status of *P. armatus* populations with respect to coastal restoration efforts and help us better understand their community-level impacts, biogeography, and overall demographic success in this system.

GP 68 1:00-3:00

Transcriptomic analysis of white-fingered mud crabs uninfected and infected with a castrating parasitic barnacle.

Carter Stancil
Int Dct Prg Bio, Biomed, Ch

Mentor: Michael Brewer, Biology

Carter Stancil, Michael Brewer, April Blakeslee, Zac Tobias, Carolyn Tepolt

The incorporation of genomics into evolutionary ecology studies has greatly enhanced our understanding of processes governing the natural world However, this improvement is not evenly distributed across all species. Parasites with endoparasitic life stages are often treated as "contaminants" and removed from analyses focused on their host species. Similarly, for parasite-focused efforts, it can be extremely difficult to physically isolate parasite tissue from their hosts for sequencing. These difficulties are magnified when the parasite and host are closely related and intimately intertwined. One example is the white-fingered mud crab *Rhithropanopeus harrisii* and its parasitic barnacle *Loxothylacus panopaei*, which are both crustaceans. *Rhithropanopeus harrisii* is native to the Atlantic east coast and the Gulf of Mexico, while *L. panopaei* is native to the Gulf of Mexico but was introduced through oyster shipping to the Chesapeake Bay ~60 years ago. The invasive populations of *L. panopaei* have since spread southward, connecting the invasive and native ranges in northeast Florida. The host crab and parasitic barnacle share the same subphylum but are members of deeply-diverged Classes; neither group is well-represented in genomics databases. Due to conserved genes shared by all Crustacea, using current curated databases could return many of the same results. Additionally, many existing published crab sequences might inadvertently contain undetected parasites that are mislabeled as the host. use a phylogenetic approach to isolate *L. panopaei* sequences from infected *R. harrisii* transcripts. Combining ecology and bioinformatics, I extracted transcripts of brachyuran crabs available on GenBank and reviewed their life histories. Six crab samples that were deemed extremely unlikely to have a crustacean parasite were selected, as well as six free-living (non-parasitic) barnacle samples. These sequences, *R. harrisii* (uninfected and infected), and two *L. panopaei* samples were then clustered based on similarity scores. I was able to determine which gene families belong to *L. panopaei* based on the clustering. Finally, after extracting the *L. panopaei* sequences, we conducted a population genomics analysis of *L. panopaei* populations

from the native and invasive ranges. My research is significant because it represents a novel application of a phylogenetic approach to transcriptomics and population genomics analyses.

GP 69 1:00-3:00

Artificial Reefs as Climate Refugia: Investigating How Man-Made Habitat Affects Changing Spawning Phenology and Distribution in Groupers and Snappers

Charles Veith
Biology

Mentor: Rebecca Asch, Biology

Groupers and snappers serve as important mesopredators of reef environments and possess notable commercial and recreational fisheries. Spawning is energetically costly, leaving spawners vulnerable to other environmental stressors. Most species in these families form fish spawning aggregations (FSAs), wherein large groups of spawning adults converge on specific sites to spawn; however, due to climate change and overfishing, these aggregation sites may be under threat. A previous study found that snapper FSAs were more resilient than grouper FSAs to future projections of increased sea surface temperatures. This study incorporated spawning sites and potential habitats from natural reef location data only. Despite this, it has been established that many species in both families use artificial reefs as general habitat, and for four species, artificial reefs serve as spawning sites as well. Using a Non-Parametric Probabilistic Ecological Niche model (NPPEN), I will assess whether artificial reef sites in the Subtropical/Tropical Western Atlantic can influence the distribution of spawning habitat for species in both families by comparing model outputs with and without artificial reef location data across a couple of future climate scenarios. Based on preliminary findings, I hypothesize that the snapper species selected for this study will have less overall projected shifts in potential spawning sites compared to grouper species. I also hypothesize that models that include artificial reef data will trend towards showing greater areas of potential spawning habitat versus model outputs that do not. Overall this study will provide an insight into how man-made habitats can mitigate habitat loss related to climate change for large reef species.

GP 70 Cancelled

GP 71 9:30-11:30

Voices of Student Parents at East Carolina University

Madison Dickson
Human Development and Family Science

Mentor: Dr. Sharon Ballard, Human Development and Family Science

This project's focus is to discover the effectiveness the COMPASS (Childcare On-campus: Maximizing Parents' Academic Support and Success) program has on current East Carolina University students who are parents. Students who are parents may experience additional stressors such as childcare and financial needs, mental health, etc. During the 2021- 22 school year, there were

1557 undergraduate and 1122 graduate students who were parents supporting children at East Carolina University. The COMPASS program, funded through a US Department of Education grant, is designed to support student parents through subsidized childcare in our campus child development center, an evening childcare program, and wrap around support services. The mission of COMPASS is to provide affordable childcare on campus and other specialized wrap-around resources that support student-parents in achieving their academic goals and to maximize retention of student-parents at East Carolina University. The DOCC (Drop Off Child Care) is an evening child care on a sliding fee scale for student parents at East Carolina University that is a part of the COMPASS program.

Two focus groups were held to learn more about the impact of both COMPASS and DOCC (Drop Off Child Care) on student parents. The focus groups were hosted by COMPASS team members to determine the program's benefits and needs. The DOCC focus group was held on January 31, 2024, where five parents attended, representing three families. The second focus group, COMPASS, was held on February 8th, 2024, and six parents/caregivers attended, representing four families. My role included assisting in developing focus group questions, facilitating a group, transcribing, and evaluating the results. The focus groups were recorded and took place in the Rivers Building, which is connected to the Nancy Darden Child Development Center. Some preliminary themes that emerged from the focus groups were validation of the student parent experience, knowledge of existing resources and need for additional resources, and need for student parent community. Overall student parents expressed the ability to focus more on school (e.g. attending class, study groups) due to the additional resources (e.g. child care) provided by COMPASS.

GP 72 9:30-11:30

The Physical and Mental Health Care Outcomes of Integrated Care: A Systematic Review

Rylan Hellstern
Medical Family Therapy

Mentor: Jake Jensen, Medical Family Therapy

Integrated primary care (IPC) is a proposed alternative system to health care aimed at increasing access and improving both quality care and health outcomes for all patients regardless of social location. With the healthcare system currently dominated by a high prevalence of major medical and mental health chronic comorbidities, integrated care works to promote holistic health by combining treatment for biological, psychological, and social domains. In order to further solidify the importance of IPC in comparison to the traditional methods of healthcare delivery, outcome measurement is essential and can help bolster the claim that such a shift in patient care can improve holistic health. This systematic review sought to understand the current established literature that has accounted for both physical and mental health outcomes in IPC settings. Systematic searches within the databases of PsychINFO, Embase, and PubMed initially identified 2,729 studies that fit

our predetermined criteria. Studies were included if they were within a setting that met our definition of IPC and tracked for both physical and mental health indicators. Results are currently under examination and conclusions will be drawn from analyses thereafter.

GP 73 9:30-11:30

Mindfulness-Based Virtual Reality in Combination With Expressive Writing to Determine the Impact on Anxiety and Mental Health in College Students

Lyndsee M. Holder
Recreation Sciences

Mentor: Dr. Matthew Fish, Dr. Bhibha M. Das, Dr. Jaehyun Kim

In 2022, the American College Health Association research found that 77% of college students experienced moderate to serious psychological distress, with 35% of students diagnosed with anxiety and 27% depression. Anxiety is a feeling of intense, excessive worry and fear about everyday situations; feelings of anxiety may result in an increased heart rate, breathing rate, and feelings of tiredness. A commonly used intervention in minimizing anxiety symptoms is mindfulness, virtual reality, and expressive writing. These interventions all focus on redirecting thoughts away from the anxiety trigger or determining why a situation may result in anxiety symptoms. Mindfulness-based Virtual Reality (MBVR) is an immersive, engaging intervention that takes the participant through a body scan and brings active attention to how the individual's body is breathing, the weight of their limbs – practicing mindful awareness of what the body is feeling. Expressive Writing (EW) is a paradigm that was initially researched and developed by Pennebaker. EW is built based upon moderately open-ended instructions that foster letting go and opening up about emotional events and investigating potential implications. Currently, a research gap exists in the area of combining the interventions of MBVR and EW. This research is aimed to determine the potential effect(s) that combining MBVR and EW may have on college student's anxiety, stress, and affect.

GP 74 9:30-11:30

The relationship between isotopic evidence of childhood diet and childhood rickets in a 19th century Jordanian Bedouin population

Delphi Huskey, Robert Tykot
Anthropology

Mentor: Megan Perry, Anthropology

The site of Tell Hisban offers a unique perspective on the history of metabolic disease amongst 19th-century Middle Eastern Bedouin populations. Compared to regional samples from the same period, Hisban has a high rate of childhood metabolic disease, including rickets. Many infants at the site died with active rickets, and analysis of interglobular dentin (IGD) in adult dentition identified adult survivors of childhood rickets. Vitamin D deficiency is typically linked to insufficient UVB radiation, while cultural or other biological risk factors can play important roles, particularly in an environment with adequate levels of sunlight. Here, we use stable isotope analysis ($\delta^{13}C$ and $\delta^{15}N$) of

incremental dentin samples from three adults with evidence of childhood rickets and three without to identify a relationship between childhood diet and weaning patterns and vitamin D deficiency. The isotopic evidence suggests any variation in diet and weaning practices was not linked to rickets. Understanding the weaning history and early childhood diet of adults who survived rickets in infancy can illuminate potential risk factors and provide comparative material for eventual isotopic analysis of individuals who did not survive rickets in infancy.

GP 75 9:30-11:30

Cervical Cancer Prevention Behaviors in Black Women

Angela Johnson, Brianna Bush, Emma Muscari, Michelle Ruiz, Laura Palmo
Health Psychology

Mentor: Lisa C. Campbell, PhD, Health Psychology

Black women are considered the most vulnerable population for Cervical Cancer (CC), due to high rates of human papillomavirus (HPV) acquisition, slower HPV clearance rates, lower likelihood of engaging in routine pap smears, and low HPV vaccine uptake. Despite these persistent vulnerabilities, there is a dearth of literature on the systemic and attitudinal barriers that contribute to disparate CC outcomes. Thus, the present study aimed to explore culturally relevant facilitators and barriers to CC prevention via an online quantitative survey. Guided by the Health Literacy Skills Framework and Black Feminist Thought complementary frameworks, the following study examined perceived eHealth literacy, CC knowledge, CC attitudes, provider recommendations and gendered racial microaggressions (GRM) to better understand how Black women's oppressive intersecting identities shaped their CC health perspectives. Participants (N=146) were enrolled at ECU. Most participants were freshmen (69.9%), non-Hispanic Black (89.7%), cis-gender women (74.8%), identified as heterosexual/straight (66.4%) and between the ages of 18 to 26 (M =19.21, SD =1.77). Descriptive statistics and regression analyses were employed to examine the prevalence of CC prevention behaviors and the relationships between various ecological variables and CC prevention behaviors, respectively. Most participants had received at least one-dose of the HPV vaccine (59%) and all age-eligible participants had received a pap-smear once in their lifetime. A vast majority (93%) considered themselves to have high eHealth literacy but did not demonstrate adequate CC knowledge (90%). Over half (54.1%) of the participants reported inadequate HPV vaccination recommendation from their providers. Notably, participants who were confident in their ability to understand online health information were more likely to have greater CC knowledge and more positive beliefs toward the HPV vaccine and pap-smears. Higher stress appraisals of GRM predicted more positive CC screening and HPV vaccine beliefs, suggesting that GRM does not appear to negatively relate to CC prevention beliefs and may drive positive attitudes for reasons that are unclear. With Black women continuing to bear a disproportionate burden of this disease, results from the present study can provide insight into developing culturally tailored interventions on settings young Black women frequent, that may reduce the prevalence of CC in Black women in later adulthood.

GP 76 9:30-11:30

Serious Games in Support of School Consultation: An Examination of a Novel Approach to Behavior Intervention in Middle School Classrooms

Kelly Lojinger
Pediatric School Psychology

Mentor: Brandon Schultz, Psychology

Kelly Lojinger (B.A.), Abby Miller (B.A.), Brandon Schultz (Ed.D.), Steven Evans (Ph.D.)

Teacher training programs rarely provide more than one class on behavior management, leaving teachers to learn classroom management skills 'on the job.' One strategy to build capacity among teachers is school consultation, which involves a triadic relationship between a behavior specialist (i.e., consultant), a teacher (i.e., consultee), and one or more student clients. But questions persist regarding the degree to which teacher consultees implement behavior interventions as intended, particularly for clinical subpopulations like students with Attention-deficit Hyperactivity Disorder (ADHD). In the present study, we examined the success of school consultation across two conditions. The first ($n = 15$) was an evidence-based approach to school consultation called the Challenging Horizons Program, mentor model (CHP-M). The other condition ($n = 16$) was an experimental approach to consultation combining the CHP-M with a novel educational game, called ATHEMOS, intended to remove some initial intervention burdens from teachers by teaching ADHD coping skills (e.g., organization, planning) directly to students. We compared the relative dose of intervention across the two conditions, as measured by intervention sessions, and coded audio recordings of the interactions between the consultants and teachers to assess the degree of agreement on goals and tasks, as well as overall interprofessional bond. The results of this study provide insight into the potential of serious games to strengthen in-service school consultation efforts.

GP 77 10:00-12:00

Multiple Group Categorical CFA: Comparisons of NC and SC Elementary Students on Social Emotional Health Survey-Primary

Kaitlynn Carter
Pediatric School Psychology

Mentor: Brandon Schultz, Psychology

Brandon Schultz, EdD, NCSP
Alexander Schoemann, PhD
Mark Weist, PhD

The Social Emotional Health Survey-Primary (SEHS-P) measures the subscales of gratitude, zest, optimism, and persistence. These four subscales are used to compose the overall construct of covitality defined "as the synergistic experience of well-being that results from the interactions of

multiple school-grounded positive traits in youth" (Furlong et al., 2013, p. 753). During the current study, the SEHS-P was used to measure North Carolina and South Carolina elementary students' (n=1,167, schools=16) well-being and school engagement. Demographic information, including gender, ethnicity, state, grade level, and survey completion status, was collected and analyzed. We investigated measurement invariance across the four subscales and, in turn, the higher order variable of covitality using multiple-group categorical confirmatory factor analysis. We compared responses across states (North Carolina, South Carolina), grade (third, fourth), gender (male, female), and ethnicity (Black, White). The current study found configural, weak, strong, and latent mean invariance across states, gender, and grade on the four subscales of gratitude, zest, optimism, and persistence. After adding covitality as a higher order variable, configural and weak invariance held when compared to strong invariance models. The current study found configural, weak, and strong invariance across ethnicities (Black, White) on the four subscales. After adding covitality as a higher order variable, configural and weak invariance held when compared to strong invariance models. These results add to the literature for SEHS-P's generalizability across elementary student populations.

GP 78 10:00-12:00

Disparities in anxiety, depression, and perceptions of school climate between Latino English Language Learners (ELL) and Latino non-ELL students.

Abby Miller and Kelly Lojinger
Spec in School Psychology

Mentors: Brandon Schultz and Mark Weist, Psychology

This study investigates disparities in anxiety, depression, academic achievement, and perceptions of school climate between Latino English Language Learners (ELL) and Latino non-ELL students. Researchers often overlook the language heterogeneity within the Latino population, instead focusing mostly on comparisons between Latino students and their non-Latino peers. But at the individual level, one of the most widely documented risk factors for Latino students is language proficiency, particularly among the ELL subpopulation. This study aims to fill a gap in the literature by disaggregating Latino students based on the distinct needs of ELLs. Participants in this study are current fifth grade students enrolled in a school mental health study underway in 16 public elementary schools in North and South Carolina (N = 1,216). We will compare ELL status Latino subgroups ($n \approx 126$) on the PROMIS Anxiety and PROMIS Depression scales, the Social Emotional Health Survey, and the PBIS School Climate Survey. Our findings will inform culturally responsive educational and behavioral health interventions for Latino students.

GP 79 10:00-12:00

Exploring the Impact of Pre-Medicare Coverage Gaps on Healthcare Utilization Among Older Adults: A Study of Medicare Enrollees in the United States

Jada L. Morris
Sociology

Mentors: Yan Zhang, Sociology
Dmitry Tumin, Pediatrics

This study investigates the relationship between gaps in health insurance coverage prior to Medicare eligibility and subsequent changes in healthcare utilization among older adults in the United States. Medicare serves as the primary healthcare system for individuals aged 65 and above, offering access to essential medical services and security to seniors nationwide. Despite this, a significant portion of Americans aged 55–64 experience interruptions in health insurance coverage.

Through an examination of Medicare enrollees within the HRS 2004-2006 dataset, we aim to determine whether experiencing coverage gaps before becoming eligible for Medicare is associated with lower utilization of preventive care services after gaining Medicare coverage. We hypothesize that individuals with a history of coverage lapses will present a decrease in attendance at primary care appointments following enrollment in Medicare.

The study draws upon existing literature highlighting the challenges faced by uninsured older adults in accessing preventive care, often resorting to emergency department visits for healthcare needs. Additionally, gaps in coverage may lead to delays in diagnosis and treatment, inconsistent access to medications, and increased reliance on emergency room services post-Medicare enrollment. Our objective is to provide insights into the factors influencing healthcare utilization among older adults transitioning to Medicare, with a focus on the impact of pre-Medicare coverage lapses. Our hope is that by understanding these dynamics, policymakers and healthcare providers can develop targeted interventions to address gaps in coverage and promote equitable access to preventive care services for aging populations.

GP 80 10:00-12:00

Where the 'Middle' is Our Specialty: The Tuscarora as Middlemen at Fort Neoheroka

Mallory Purser
Anthropology

Mentor: Charles Ewen, Anthropology

Long before Europeans stepped foot on North American soil, the indigenous societies had extensive trade networks. These indigenous societies, like the Tuscarora and the Occaneechi began to incorporate and adapt European trade goods into their already established trade networks. They decided which items they traded and which they retained for their own use. The Occaneechi were middlemen between Europeans and tribes in the Piedmont. The Tuscarora appear to have occupied a similar niche in the Coastal Plain.

GP 81 10:00-12:00

Using stable carbon and nitrogen isotope values to estimate exposure to agricultural chemicals among green monkeys (Chlorocebus sabaeus) in St. Kitts

Emilia N. Rose
Anthropology

Mentor: James E. Loudon, Anthropology

This study examines the relationship between stable carbon (δ13C) and nitrogen (δ15N) isotope values and exposure to pesticides among green monkeys (Chlorocebus sabaeus) on St. Kitts. Specifically, of concern is the risk of toxic exposure to pesticides among crop feeding monkeys. Accordingly, we analyzed hair samples from 20 individuals across 10 social groups for δ13C and δ15N values and the presence of the insecticides, acetamiprid and methomyl, which are associated negative health outcomes. Given habitat and human interaction types, we placed the groups into three broad categories: "agricultural," "forest," and "community." Specifically, those in the agricultural category were predicted to test positive for both insecticides and exhibit high δ13C values and low δ15N values due to crop consumption. Of the 9 monkeys in the agricultural category, we detected methomyl in 4 and acetamiprid in 1. Four monkeys in the settlement category were also positive for methomyl, indicating exposure through market foods rather than crop consumption. While δ13C (P<0.01) and δ15N values (P<0.05) were significantly different among categories, δ13C values were lowest within the agricultural category (contrary to expectations); however, δ15N values were lowest in this group as predicted. In sum, we found support for predictions regarding agricultural chemical exposure (e.g., methomyl) and stable isotope values (e.g., low δ15N). The application of analytical chemistry for understanding green monkey ecology has promise, but a fuller understanding requires primate observations and ethnographic data. Moreover, this work has implications for human health given similarities in physiology, diet, and exposure to the same agricultural chemicals.

GP 82 10:00-12:00

Mental Health Concerns and Help Seeking Behavior among Latinx College Students

Michelle Ruiz, Health Psychology
Angela J Johnson, Laura Altagracia Palmo

Mentor: Lisa Campbell, Psychology

Latinx college students tend to report a greater prevalence of mental health (MH) concerns compared to non-Latinx White students, and simultaneously tend to underutilize MH services, indicating an unmet need for MH care among Latinx college students. The present study evaluated rates of mental health concerns, in addition to help-seeking behavior among Latinx undergraduate students at East Carolina University via an online survey. Participants included 126 students, ages 18 to 25 years (M = 19.62, SD = 1.58), who identified as Latino/a/x or Hispanic. Additionally, 19.8% of participants were first-generation immigrants, 50.8% of participants were 2nd generation immigrants, and 28.6% were 3rd generation immigrants, the majority of whom spoke both English

and Spanish (78.6%). In terms of nationality, the total sample was representative of fourteen nationalities, with the majority being Mexican (44.4%) or Puerto Rican (15.9%).

Results indicated mild anxiety and depressive symptoms and low mean levels of drinking in the current sample. Descriptive analyses further indicated that third generation immigrants reported greater levels of anxiety, depression, and alcohol use compared to first- and second-generation immigrants. Additionally, transgender and LGB participants reported greater anxiety and depressive symptoms, lower mean levels of alcohol use, and greater mental health care utilization, comapared to cis-gender and heterosexual participants, respectively. When asked about help-seeking, 61% of participants acknowledged seeking care for MH concerns in the past year. Of those who sought out care, the majority reported seeking help from a primary care physician for MH concerns (76%). The remainder of participants reported seeking help from a MH professional, such as a psychiatrist, licensed counselor, or psychologist, in addition to a variety of informal MH resources, including self-help resources, religious counseling, and support groups.

Taken together, it appears that Latinx college students underutilize MH care resources, potentially due to insufficient knowledge of available resources or greater MH stigma. As PCPs appear to be the commonly used source of care, college campus might consider including psychoeducational materials related to MH in student health or primary care offices, integrating MH services into primary care, and training physicians to screen for MH concerns in a culturally sensitive manner.

GP 83 10:00-12:00

Exploring Literature on Black Women's Experiences with Perinatal Loss, Grief, and Coping

Annagrace Saufley
Human Develop and Family Sci

Mentor: Sandra Lookabaugh, Human Develop and Family Sci

In general, the loss of a child is considered one of the most devastating losses a person can experience, with parents feeling the pain of the death for decades afterwards (Rogers et al., 2008). Perinatal loss, encompassing deaths occurring between 20 weeks gestation and 28 days of age (Barfield, 2016), is distinct from the loss of older children due to its ambiguity and tendency to be disenfranchised (Lang et al., 2011). Black women have the highest rates of perinatal mortality in the United States, with infants born to Black mothers 2.4 times more likely to die than infants born to White mothers (Ely & Driscoll, 2023). Despite this glaring health disparity, few research studies on Black perinatal grief and coping have been conducted. This comprehensive literature review will synthesize identified articles published since 2000 that focus on perinatal loss within Black women. Stroebe and Schut's (1999) Dual Process Model of Coping with Bereavement (DPM) will be used as a guiding framework from which to analyze the studies..

GP 84 10:00-12:00

Pouring Over the Past: Interpreting Life at a Colonial Tavern

Addison Siemon
Anthropology

Mentor: Charles Ewen, Anthropology

Taverns were a central part of the Colonial social, economic, and political world. Archaeological investigations at a Colonial tavern in Brunswick Town, North Carolina give insight into these aspects of 18th-century life. Studying the architecture and items left behind using a combination of traditional and neoteric methods tells us much about daily life at one of North Carolina's most significant historic ports.

GP 85 1:00-3:00

The Heart of the Problem: Assessing the Relationship between Workaholism and Health-Related Outcomes

Adam Tresidder
Industrial-Organizational Psychology

Mentor: Shahnaz Aziz, Psychology

Workaholism is defined as "an inner pressure or compulsion to work; persistent, uncontrollable thoughts about work; feeling negative emotions when not working or when prevented from working; and excessive working that goes beyond what is required and expected" (Clark et al., 2020; p. 1286). In recent years, workaholism has been shown to be negatively associated with both physical and psychological health (Aziz & Moyer, 2018; Aziz et al., 2015; Aziz et al., 2017; Clark et al., 2016; Clark et al., 2020; Salanova et al., 2016). We aim to assess if workaholic employees foresee or worry about negative health outcomes. If our results are significant, we will provide future directions regarding a leader's responsibility to implement effective barriers to work and potential interventions within organizations. By doing so, we suggest managers can improve employee health and reduce the potential onset of chronic diagnoses. We hypothesize a direct relationship between workaholism and heart anxiety (H1), psychological well-being (H2), work-life balance (H3), and psychological well-being (H4). Based upon potential significant findings, recovery experiences will be tested as a moderator in the relationships between workaholism and heart anxiety (H5) and workaholism and psychological well-being (H6). Furthermore, work-life balance will be tested as a moderator in the relationships between workaholism and heart anxiety (H7) and workaholism and psychological well-being (H8). Measures include the Multi-Dimensional Workaholism Scale (Clark et al., 2020), Work-Life Balance Assessment (Brough et al., 2014), Recovery Experience Questionnaire (Sonnentag & Fritz, 2007), Ryff's Psychological Well-Being measure (Ryff & Keyes, 1995), and the Cardiac Anxiety Questionnaire (Eifert et al., 2000). Participant and employee demographic variables will be collected and assessed as extraneous variables. The sample will consist of a random selection of faculty and staff at a southeastern university. An online survey will be administered with the approval of a university-based Survey

Review and Oversight Committee. Data analyses will be conducted with correlations and multiple regressions. We will use Hayes (2017) PROCESS to assess the potential influence of moderating relationships.

GP 86 1:00-3:00

Every Therapist Needs a Therapist: A Tentative Theory Exploring How Therapists-in-Training and Recent Graduates Decide to Attend Therapy

Mary Wheeler
Marriage and Family Therapy

Mentor: Andrew Brimhall, Human Dev and Family Science

Therapists and mental health professionals have the honor to sit with people through some of their most vulnerable moments, in both joy and pain. Therefore, making the decision to become a therapist is no small feat, nor is the subsequent training that follows. Given the nature of the profession, many therapists and therapists-in-training have sought personal therapy to assist in managing the accompanying emotional and psychological demands. The purpose of the present article is to explore the process that therapists-in-training in marriage and family therapy masters programs go through whilst deciding whether to pursue personal therapy, and how this has impacted their experiences within their program. Researchers and other professionals have been interested in the experiences of therapists as clients and how this has impacted their clinical work. Furthermore, training programs across a variety of disciplines often face the dilemma of whether they should mandate their trainees to participate in personal therapy. Specific factors include: a) perceived support received both within and outside a graduate program; b) adjustment to graduate level study; and c) history of adversity or trauma. Recommendations are made to training programs so they can provide better support to therapists-in-training who hopefully improve the physical and emotional needs of their own clientele.

GP 87 1:00-3:00

The effects of self-efficacy on the temporal and behavioral consistency on pre-performance routines in an ROTC shooting task.

John White-Singleton
Sport and Exercise Psychology

Mentor: Christine Habeeb, Kinesiology

Shooting is one of the most essential skills an Armed Services member possesses. However, the training soldiers receive is limited. Factors such as self-efficacy and pre-performance routine consistency are not included in weapons training by the US Military. Self-efficacy (confidence in oneself; Bandura, 1986) has been shown to be one of the strongest predictors of individual sport performance. Moran (1996) defined pre-performance routines as "a sequence of task-relevant thoughts and actions which an athlete engages in systematically prior to their performance of a specific sports skill" (p. 177). Lonsdale and Tam (2008) observed the temporal and behavioral

consistency of basketball players' free throws and found that adherence to a behaviorally consistent routine led to higher performance. A gap that remains in the literature is understanding how self-efficacy and pre-performance routines are related and together shape performance outcomes. Addressing this knowledge gap could help the Armed Forces perform better as it will provide insight into how psychological factors impact the shooting process. Therefore, this study aimed to investigate the pre-performance routines as a mechanism of the relationship between self-efficacy and performance. Forty-five cadets conducted a shooting simulation task that tested their ability to accurately hit five targets at three distances (100, 150, and 200 meters) in three shooting positions (prone, kneeling, and standing) for a total of 45 shots. Before attempting the shooting task for each position, participants were asked to rate their self-efficacy on the upcoming task using a 10-point Likert Scale. During the shooting task, a BioPak system measured the respiration rate of the participants via a chest strap. Data analysis is in process. For the data analysis, a custom-designed MATLAB program will allow for the data to be analyzed and any correlations between efficacy, breathing, and performance while shooting to be observed. These findings will improve how the military conducts weapons training, improving the greatest asset of our military, the soldier.

GP 88 1:00-3:00

Prediction to the MAX(ent): Comparing Logistic Regression Predictive Models to Maximum Entropy Models in the North Carolina Coastal Plain

Libby Wruck
Anthropology

Mentor: Charles Ewen, Anthropology

Predictive models have been used within archaeology since the 1980s – while many aspects of these models have improved over time with the development of new technologies, the use of logistic regression models has remained the same. This paper compares the effectiveness of Logistic Regression and Maximum Entropy (MaxEnt) models in archaeological predictive modeling, within Pitt County, NC. MaxEnt, a machine learning program made by ecologists, may offer more accurate predictions for archaeological site locations compared to the traditional logistic regression approach. Using environmental data and site locations in Pitt County, this thesis aims to build and compare both models.

GP 89 1:00-3:00

Dead Men Tell No Tales, But Animal Bones Do

Jay Mayfield-Loomis
Anthropology

Mentor: Charles Ewen, Anthropology

The Golden Age of Piracy occurred between 1650 to 1720 and saw a rise of piracy in the Atlantic ocean and its coasts. Surviving writings have given us an idea of what life on a ship may have been like for a sailor, but the lack of literature concerning pirates leaves a gap in our knowledge. There has

been an ongoing interest in studying faunal remains on sunken vessels, but excavation of pirate ships have have not studied animal bones form these wrecks. *Queen Anne's Revenge* sunk in 1717 and has faunal remains recovered from over 40% of the ship which can be studied to create an understanding for the food being consumed on board a pirate vessel. This thesis aims to identify and present all of the currently known faunal remains from Blackbeard's wreck to help us compare a pirate's diet to their contemporary counterparts.

GP 90 1:00-3:00

Lost not Found: A comparative analysis of the Cape Creek site and its connection to the Lost Colony

Autumn Saski
Anthropology

Mentor: Charles Ewen, Anthropology

The Lost Colony of 1587, a captivating and mysterious tale in American history, centers around over 100 English settlers who vanished without a trace on Roanoke Island in present-day North Carolina. Despite clues like the word "CROATOAN" carved on a palisade post, their fate remains unknown. Cape Creek on Hatteras Island is an archaeological site that has been linked to this colony. Along with Native American artifacts recovered are European items, suggesting a connection to the Lost Colonists. To test this hypothesis, a comparative analysis with Native American and European sites aims to clarify the site's true nature. Evidence suggests repurposing of the European artifacts by the Croatoan Native Americans, challenging assumptions about European occupation. The information recovered at Cape Creek extends our understanding of the Native inhabitants and their role in early American history.

GP 91 WRC-A 2:30-4:30

Assessment of Dry Detention Basins to Evaluate Retrofit Potential for Water Quality

Joseph Abuarab
Geology

Mentor: Michael O'Driscoll, Integrated Coastal Programs
Guy Iverson – Health Education and Promotion
Rob Howard - Department of Geography

Greenville is a city in the North Carolina Coastal Plain, approximately 20 miles upstream of the Pamlico River Estuary. As such, it is an area known for low-lying terrain, vast floodplains, and experiences frequent inundation from large storms. Greenville employs various stormwater control measures (SCMs) to reduce the effects of stormwater runoff on local streams. Dry detention basins (DDBs) are a standard SCM in the city. Dry detention basins are designed to retain stormwater and temporarily reduce peak flow impacts downstream [e.g., flooding and channel erosion]. As an SCM, the function of dry basins is volume control; however, they provide limited water quality treatment. Recent research has shown that dry detention basin retrofits may improve the quality of effluent

flow. A LiDAR and GIS model was created to identify previously unmapped DDBs in Greenville, and field reconnaissance was performed to verify results from the model output. Initial mapping efforts suggest that over 250 DDBs are present in the city. This database will identify DDBs that can provide substantial pollutant reductions with retrofits. Initial efforts to evaluate DDB stormwater response included instrumenting five "maintained" and five "unmaintained basins for continuous water level monitoring in October 2023. Future work will include storm-event sediment and nutrient sampling to evaluate current water quality treatment and the potential improvements retrofits could provide (e.g., stormwater treatment wetland, infiltration basin). Initial surveys indicated that some DDBs in the city are naturally converting to wetlands due to shallow water table conditions. Enhancing the wetland conditions at these sites may provide water quality treatment benefits.

GP 92 WRC-A 2:30-4:30

Mapping Nearshore Bathymetry for Coastal Resilience in the Caribbean

Daystar Babanawo, Siddharth Narayan
Integrated Coastal Programs

Mentor: David Lagomasino, Integrated Coastal Programs

The Caribbean is highly vulnerable to the impacts of cyclone activities with increasing socioeconomic impacts and damages over the years. Projected sea level rise is expected to exacerbate the cyclone activities in the region and there is a need to gather relevant data to accurately predict cyclones for coastal resilience. Bathymetry is a critical variable that is important in hydrological modeling, particularly in the complex nearshore environment. Nearshore bathymetry maps show the depth and underwater seascape structure and form the bottom boundary for modeling the change in water levels from offshore to onshore during storms. Wave dissipation and currents are very sensitive to small changes in bathymetry, underscoring the importance of understanding nearshore bathymetry. However, the best available bathymetry data for many developing and small island nations is often limited to coarse-scale global datasets that do not capture complex coastal features. Bathymetry data are costly to obtain through in situ measurements at large spatial and temporal scales, hence this study aims to map nearshore bathymetry in the Caribbean using Ice, Cloud, and Elevation Satellite (ICESat-2) photon counting lidar data in combination with Landsat 8 OLI optical imagery to create Satellite-Derived Bathymetry models. Classification of Sub-aquatic Height Extracted Photons (C-SHELPh) Algorithm was used to extract the bathymetric photons which were used to calibrate and validate the Landsat 8 OLI Satellite-Derived Bathymetry models. Imagery from Landsat 8 OLI collects information in the blue, green, and red wavelengths that are sensitive to water penetration and can be used for water depth estimation at wider coverage. The results were presented as median composite bathymetry maps with RMSE of ~0.3 m and RMSE% of ~7% across the region. These maps will be useful in modeling storm surges and cyclones in the Caribbean, enabling vulnerable areas in the region to prepare and implement adaptive measures. Moreover, the data and algorithms will be made available in an open-source format, thereby allowing for the democratization of bathymetry data.

GP 93 WRC-A 2:30-4:30

Spatial dynamics of mangrove mosquito communities: temporal shifts, connections to environmental conditions, and associations with human–mosquito interactions

Kinsey Blumenthal
Integrated Coastal Programs

Mentor: David Lagomasino, Integrated Coastal Programs

Kinsey Blumenthal, David Lagomasino, Aaron Kipp, Stephanie Richards, Lawrence Reeves, Rachael Gitman

Wetland ecosystems, particularly mangroves, have a long association with mosquitoes and the diseases they carry. This widely held idea has contributed to ecologically devastating projects like draining the Florida Everglades in the early 1900s. Overall, negative perceptions of mangroves have reversed with acknowledgement of mangrove importance from providing storm surge protection for local communities to contributing to global carbon sequestration. The role of mangroves in human health, however, remains largely unexplored. This poster presents ongoing research that combines health, natural, and social science to identify the implications of mangrove mosquito ecology for human disease exposure risk. The project is currently focused on investigating connections between mosquito biodiversity, mangrove forest structure, and human–mosquito interactions in the Everglades. Data collected in a 2013 study of the Everglades will be used to generate a baseline of comparison for upcoming 2024 fieldwork to assess mosquito community change over time. The influence of environmental health on shifts in mosquito communities will be analyzed using Landsat satellite imagery to identify disturbance legacies of the mangrove complex since 2013. Connections between forest structure and mosquito biodiversity will be quantified using LiDAR data from Global Ecosystem Dynamics Investigation sensor onboard the International Space Station and 2024 mosquito data. Associations between mangrove mosquito communities and humans will be examined using field and predictive modeling of mosquitoes with information on human–mosquito interactions. Human–mosquito interaction data comes from mosquito bite diary surveys administered online to park personnel and visiting researchers working in Florida mangroves. These surveys consist of two parts: a general questionnaire on perspectives, knowledge, and experiences with mosquitoes; and a week-long daily log on bites received and annoyance experienced from mangrove mosquitoes. Information from this project can be used in predicting human–mosquito interactions as species distributions shift in response to changes in forest structure from climate change, extreme weather events, and human disturbance.

GP 94 WRC-A 2:30-4:30

Industrial Fishing and its Impacts on Food Security: A Systematic Review

Samantha Farquhar
Integrated Coastal Sciences

Mentor: Nadine Heck, Integrated Coastal Sciences

This systematic review aims to explore the relationships between industrial fishing activities and food security, employing the PRISMA methodology . Initial searches yielded 983 publications, which were distilled to 57 relevant articles for in-depth analysis after the screening process. These studies span from 1997 to 2024, covering a diverse range of geographical contexts, and cover a variety of scales from local community impacts to national and global trends. Overall, four principal themes related to the perceived positive and negative, direct and indirect impacts of industrial fishing on food security were identified., including 1) Industrial Fishing activities provide jobs to local populations of which earnings are used to purchase other food items; 2) Industrial fishing activities provide fisheries products to local markets which are used as a common food source; 3) Industrial fishing activities damage the environment, leading to a decrease in the availability of catch for food or livelihood; 4) Industrial fishing activities outcompete local users and export catch to distant markets, thereby decreasing available food to local communities. However, these themes were derived from a wide range of methods and the use of diverse data sources. There was a notable deficiency in comprehensive, long-term data that encompassed both the complexities of industrial fishing—such as catch data and effort—and the multifaceted nature of food security, including household consumption patterns. This lack of integrated data leads to research that was skewed towards either fishing activities or food security in isolation, hindering a holistic understanding. This lack of a holistic approach can lead to an oversimplification of food security as being directly correlated with fisheries production. The need for an integrated research approach is emphasized, one that considers both the direct and indirect effects of industrial fishing on food security, combining detailed fisheries data with in-depth analysis of household behaviors and socio-economic structures to develop more effective policies and interventions for supporting fisheries-dependent communities.

GP 95 WRC-A 2:30-4:30

Factors influencing nitrogen treatment performance of in-stream and stormwater outfall regenerative stormwater conveyances in the NC Coastal Plain

Colin Finlay
Int Dct Prg Bio, Biomed, Ch

Mentor: Ariane Peralta, Biology

Colin Finlay[1,2], Michael O'Driscoll[2,3], Ariane Peralta[1,2]

1. Department of Biology, East Carolina University
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3. Department of Coastal Studies, East Carolina University

Sediment microorganisms can decrease riverine nitrogen (N) loads by converting water soluble N (e.g., NO_3^-) to gaseous N (e.g., N_2). Domestic and industrial activities can provide N sources to urban streams, and impervious surface area decreases opportunities for microbial nutrient processing, by causing flashier flows and reducing infiltration. To reduce urban flooding and improve water quality, the City of Greenville, NC, installed an in-stream regenerative stormwater conveyance (RSC) and a stormwater outfall RSC, which has a smaller catchment area than the in-stream RSC. The in-stream RSC provides N treatment during baseflow but has limited treatment

during stormflow, whereas the stormwater outfall RSC likely provides subsurface N treatment via infiltration, but less N treatment annually. Following installment, monthly water quality and discharge data were collected from the in-stream RSC (July 2020 to June 2021). Median total dissolved N concentrations declined by ~15% along the in-stream RSC. Flow rates and seasonal temperature fluctuations influenced N treatment and prompted ongoing investigation. Seasonal sediment denitrification potential assays revealed greater in-stream vs. outfall RSC sediment denitrification rates across seasons, and the highest denitrification potential measured in the summer. The installation of the in-stream RSC was found to increase hydraulic residence time (HRT) from <1 hour to approximately 7 hours, enhancing nutrient treatment. Ongoing work examines how sediment dynamics influence HRT over time and will estimate N treatment during Tropical Storm Ophelia. Improved understanding of N treatment in different RSC types will help inform maintenance strategies and provide preliminary estimates of annual RSC N treatment.

GP 96 WRC-A 2:30-4:30

Evaluation and application of a soil water content metric in North Carolina watersheds

Jennifer Fulcher
Geology

Mentor: Alex Manda, Geological Sciences

This study will evaluate a new metric for assessing soil water content (SWC). The metric, originally developed by others, is defined as the difference between the seasonal mean SWC at shallow and deep soil layers and can be used to evaluate how soil moisture content is related to climate drivers (e.g., precipitation and temperature). The metric is useful for characterizing hydrological responses during wet and dry periods across a watershed. In this study, we will address the following research question: How effective is the new soil moisture metric in assessing soil water content in eastern North Carolina? Our research will test the application of the new metric by analyzing precipitation data along with SWC distributions at various soil layer depths at sites in eastern North Carolina. Replicating this study in North Carolina will demonstrate the applicability of the metric outside of the original study areas and further the understanding of hydrogeological processes. This metric may then be used by other stakeholders such as local farmers and policy makers for sustainable land use practices and agricultural productivity.

GP 97 WRC-A 2:30-4:30

Foraminifera as Indicators of Sediment Transport by Hurricanes, Onslow Bay, NC.

Asher Jacobik
Geology

Mentors: Stephen J. Culver, David J. Mallinson, Geological Sciences

The seabed of Onslow Bay, NC consists of semiconsolidated to consolidated Oligocene and Miocene lithofacies partially covered by thin and patchy modern sediments. Previous work has identified six distinct foraminiferal biofacies in the Oligocene and Miocene deposits. This study

investigates whether foraminifera and sediment characteristics can be used as indicators of sediment transport from the inner shelf seabed of Onslow Bay to Bear Island barrier island. Three stations were occupied over the location of each of the six biofacies. Samples were collected at each station using a Shipek grab sampler. Foraminifera, two hundred per subsample, were picked from the top 1 cm of sediment and bottom 1 cm of sediment in each sample. The grain-size of 40 g of sediment in each subsample was determined at 0.5 phi intervals from 4 to -2 phi by dry sieving. The foraminiferal and sediment characteristics will be compared to existing foraminiferal and sediment grain-size data from Bear Island to investigate whether the source of sediments and patterns of sediment transport by hurricanes and other major storms can be recognized.

GP 98 WRC-B 2:30-4:30

Calibration of two electromagnetic induction (EMI) sensors for their use in soil conductivity mapping of salinated agricultural fields.

Blake King
Geology

Mentors: Alex Manda and Matthew Sirianni, Geological Sciences

Saltwater intrusion has been affecting coastal communities for over a century, damaging both fresh groundwater supply and soil productivity. When soil salinity values are too high, plants are not able to effectively draw out the nutrients they need, which causes negative impacts on coastal agricultural practices. Aerial electromagnetic surveys are conducted along coasts worldwide to map saltwater intrusion and soil/rock properties, but they are limited by low resolution. The purpose of this study is to use traditional soil salinity measurement techniques to create a calibration for two different shoulder carried electromagnetic induction (EMI) sensors. These sensors will be used to map soil conductivity at an agricultural field site in Hyde County, North Carolina, to determine the spatial distribution and mode of transport of salt to the site. The EMI collected conductivity data will be cross referenced with electrical resistivity tomography (ERT) data to further ensure the calibration's accuracy. Determining and quantifying the scale of saltwater intrusion at this site will allow property owners to make appropriate decisions on future farming practices to maximize crop yield and profits. This study will also allow a comparison between two different EMI sensors to identify their strengths and weaknesses in soil conductivity mapping for saltwater intrusion.

GP 99 WRC-B 2:30-4:30

Assessing Changes to Sediment Transport, Microfauna, and Seabed Morphology Related to a Coastal Restoration Project: Sugarloaf Island, NC

Kristen N. Malosky
Geology

Mentors: David Mallinson, Steve Culver, Geological Sciences

Sugar Loaf Island is a spoil island within Bogue Sound, off the coast of Morehead City, NC, and acts as a fetch-limited barrier island, protecting the mainland from erosion due to wind and wave energy.

Currently, the shoreline of Sugar Loaf is eroding, making it the focus of a shoreline restoration project. The project plan calls for the implementation of wave attenuation devices (WADs), subaquatic vegetation (SAV, i.e., seagrass), oyster reefs, and a rock revetment to try to boost the island's resilience and reduce erosion. The size and composition of sediments, the distribution of foraminifera species, and the mapping of sediments and bedforms on the seafloor can provide information on sediment sources and transport, erosion patterns, and storm impacts in the area. We are using foraminifera, sedimentology, and side-scan sonar imagery to understand sediment transport and erosion. A baseline dataset developed before restoration begins will be compared to data after restoration to assess the impacts of the project. We are doing this by documenting the living and dead foraminiferal assemblages and conducting grain size analyses around the island before and after the installation of the structures. Side-scan sonar surveys will also be conducted before and after to map seafloor sediments and bedforms as well as bathymetry. This study will contribute to future coastal restoration efforts and hurricane transport research.

GP 100 WRC-B 2:30-4:30

The impact of hurricanes on the resilience of spot (*Leiostomus xanthurus)* off the North Carolina coast

Jessica N Miller
Biology

Mentor: Rebecca G Asch, Biology

In eastern North Carolina, hurricanes and marine fishing activity wield substantial influence over both living marine resources and the socio-economic well-being of the coastal communities that are reliant on them; however, there is currently sparse and contradictory information on the effect of strong storms on coastal fish populations. Previous efforts to study adult fish movement have been unintentionally punctuated by storms to reveal novel behavioral patterns but these studies typically focus on a single hurricane event, preventing us from detecting generalizable patterns. This project aims to intentionally examine population responses in North Carolina state waters by combining several existing long-term Southeast US fisheries datasets to assess the impact of hurricanes on abundance and catch across life stages of an abundant coastal fish species, the spot (*Leiostomus xanthurus*). Utilizing models, the goal of this research is to identify which life history characteristics render resilience or vulnerability to storms, while considering factors such as hurricane intensity, accumulated rainfall, and the annual timing of hurricanes. A preliminary study using these same data sets looked at the effects of hurricanes on the juvenile and adult stages of a similar species, the Atlantic croaker (*Micropogonias undulatus*). Based on those results, we hypothesize that hurricane activity will have a negative effect on commercial and recreational landings but will result in an increase in juvenile abundance in Pamlico Sound. If successful, these methods could contribute to a vital facet of economic and ecological emergency response planning for regional fisheries management.

GP 101 WRC-B 2:30-4:30

Improving the Coastal Carbon Cycle with Space Based Observations of Reef Complexity

Shalimar G. Moreno
Integrated Coastal Sciences

Mentor: David Lagomasino, Integrated Coastal Sciences

Coral reefs build a 3D structure made of calcium carbonate ($CaCO_3$) that is precipitated by calcifying organisms including corals, encrusting algae, and invertebrates. Coral reef $CaCO_3$ accretion occurs when calcification exceeds dissolution and bioerosion, accounting for about 50% of the global shallow water $CaCO_3$ production. A reef carbonate budget quantifies the net gain or loss of $CaCO_3$ to a reef system which is affected by numerous processes such as biological net calcium carbonate production, net sediment production and transport, physical erosion, and cementation. The carbonate budget is an important metric for reef health as it can indicate shifts in community assemblages and changes in reef complexity, directly linking to ecosystem services. In the Atlantic, there has been a region-wide decline in coral cover and reef complexity, resulting in decreased carbonate production. Bermuda hosts the most northern extent of the shallow-water coral reefs in the Atlantic Ocean and experiences dynamic seasonal and interannual changes of calcification and production due to local biological and offshore processes. Understanding the relationship between reef biogeochemical processes and the changes to the CO_2-carbonate chemistry is complex and has led to a growing interest in coral reef calcification and dissolution.

A combination of methods will be used to measure *in situ* reef metabolic processes and then spatially upscale to the platform with remote sensing datasets to quantify carbonate budgets. The remote sensing analysis includes data from NASA's ICESat-2 to develop a satellite-derived bathymetry map from shallow (<40 m) coastal measurements. This data was retrieved using a python tool (icepyx), bathymetric photons were extracted using an automated water depth detection algorithm (C-SHELPh), and then processed on the cloud computing platform Google Earth Engine. The bathymetric model was used to develop a coastal complexity map based on rugosity, also known as surface roughness. The Benthic Terrain Modeler tool calculated rugosity using different metrics such as Vector Ruggedness Measure and Surface Area to Planar Area. The complexity model will be used to characterize reef sites of interest that will be sampled later this year. From these results, we anticipate understanding the relationship between rugosity and net ecosystem calcification for an integration of our reef metabolic measurements and remote sensing methods to scale up carbonate budgets.

GP 102 WRC-B 2:30-4:30

Hydrogeophysical investigation of Shackleford Banks using electrical resistivity tomography examining freshwater availability and quality

Jack Rizzolo
Geology

Mentor: Matt Sirianni, Geological Sciences

Shackleford Banks, a remote barrier island located along the Outer Banks of North Carolina, is notable for its wild horse population and pristine conditions compared to nearby, developed islands. Pressures such as climate change and sea-level rise have caused the National Park Service (NPS) to be concerned about the quantity and quality of the island's freshwater aquifer and its ability to support local wildlife. Given the island's remote location and a lack of monitoring resources, there is little historical hydrogeological data to inform NPS decision making. To inform NPS decision making, observational data will be collected over a 1.5-year study examining hydrological, hydrogeophysical, and vegetation variation. The study will be conducted using seasonal electrical resistivity tomography (ERT) surveys, monitoring salinity and water levels at well installations, weather monitoring, vegetation surveying, and groundwater modelling. The survey will produce a seasonal time-lapse of ERT data to proxy salinity and make connections to hydrological and vegetation data, creating a baseline for future research. These results will support NPS strategies to preserve Shackleford Banks and the other barrier islands of the Outer Banks from future climate-related damage.

GP 103 WRC-B 2:30-4:30

Pay Attention to Small Flooding: A Review on Socio-Economic Risks of High-tide Flooding

Yicheng Xu
Integrated Coastal Sciences

Mentor: Siddharth Narayan, Integrated Coastal Sciences

Coastal regions in the United States are increasingly confronted with High Tide Flooding (HTF), a phenomenon exacerbated by sea-level rise (SLR) and influenced by factors such as El Niño, land subsidence, and human modifications to coastlines. Often characterized as "nuisance flooding," these events are small in magnitude yet frequent, marking a significant shift in coastal flooding patterns. Since the 1980s, the incidence of HTF has surged, particularly along the East and Gulf Coasts, where the number of days impacted by high tide floods has risen sharply. This trend presents complex challenges for coastal communities, with effects extending beyond environmental damage to include profound socio-economic risks. Given the variability in how HTF is defined and assessed across different locales, this study seeks to clarify the socio-economic threats posed by HTF in the United States. Through a systematic literature review across multi-disciplinary studies, this research aims to consolidate current knowledge on the socio-economic impacts of HTF, which range from disruptions to transportation, drainage and sewage systems, airports, seaports, public parks, and tourism, to adverse effects on local businesses, public safety, mental health, physical well-being, and water quality. However, the studies of HTF are still in their early stages, and the vulnerability associated with this emerging threat merits further exploration. Particularly, after identifying the qualitative socio-economic risks of HTF, quantifying these risks could significantly enhance our understanding of community vulnerabilities to this hazard.

GP 104 WRC-B 2:30-4:30

Assessing Nutrient Reduction of Town Commons Creek's Green Infrastructure

Brice Long
Engineering

Mentor: Alex Manda, Geological Sciences

Brice Long (Department of Engineering and Technology), Neda Safari (Department of Geography, planning, and Environment), Skyler Morris (Department of Biology), Lucia Wall (Department of Environmental Studies and Biology), Dr. Moysey (Department of Geological Science), Dr. Manda Department of Geological Science), Dr. O'Drsicol (Department of Costal Studies), Dr. Sirianni (Department of Geological Science)

In eastern North Carolina (NC), there is an excess amount of nutrients being put into the storm water systems of local towns. These nutrients come from fertilizers and usually cannot be treated before they enter NC water ways. Since storm water flows over mostly impermeable surfaces, the water does not get treated naturally by plants and soil that help reduce the amount of nutrients flowing into water ways. An excess of nutrients can cause harmful algae blooms which can cause a drop in oxygen levels in the water, and potentially harming living organisms. A possible solution to this problem is green infrastructure. Green infrastructure can help reduce nutrient levels by using retention basins and bioretention cells. They can help reduce nutrients naturally by using material that aid in the reduction of nutrients.

The objective of this study is to evaluate the effectiveness of green infrastructure at removing nutrients from storm water entering the system. This was accomplished by comparing data collected at two different sites over a 12-month period. The first was along Town Commons Creek, a tributary of the Tar River. The Town Creek site marks the point where water enters the green infrastructure. The second site was on the Tar River, and this site marks the point where the water exits the system. Water samples were collected at the Town Commons creek and the Tar River sites to evaluate nitrate and phosphate concentrations in the system. The water samples were analyzed using a nutrient analyzer. The effectiveness of the green infrastructure was determined by quantifying the concentrations of nutrients entering and leaving the system. The results from this study will be useful for quantifying the amount of nutrients being removed by the green infrastructure. This study will test the hypothesis that green infrastructure are effective at reducing nutrient concentrations in storm waters.

GP 105 WRC-C 2:30-4:30

WaterCorps - A student led environmental consulting organization: Updates and Opportunities

Braden McPhillips
Management Accounting

Mentor: Matthew Sirianni, Geological Sciences

Braden McPhillips, Camryn Landreth, Nicholas Kruchten, Matthew Sirianni

East Carolina University's (ECU) WaterCorps program is a student-led consulting-style organization that focuses on geoscience workforce skills development. Unlike traditional student research experiences, WaterCorps participants operate in real-world project-based work environments that parallel what is found in the environmental or engineering consulting industries. In WaterCorps, students take on various paid roles (i.e. interns, staff, and project owners) and are responsible for engaging with internal and external partners to scope projects that address client needs. Projects span four different service lines (Field, Lab, Data Analysis, & Communications) and have included: 1) development and delivery of educational materials for young students and industry professionals; 2) water quality field monitoring and lab analysis along the Tar-Pamlico River; and 3) deploying and maintaining environmental sensors in partnership with ECU's Environmental Sensing and Data Network. Through WaterCorps, students are exposed to the societal relevance of their work and gain real-world context for the value of the technical skills and disciplinary knowledge they receive during their degree. Here, we detail: 1) the creation and evolution of the WaterCorps workforce development pathway, 2) services WaterCorps provides to community partners, 3) results from several ongoing projects, and 4) student perceptions on how WaterCorps has shaped their professional identity.

GP 106 WRC-C 2:30-4:30

Seasonal and Spatial Variability of Recreational Water Quality at Nags Head, NC

Austin Newton
Biology

Mentors: Manda, Alex, Moysey, Stephen, O'Driscoll, Michael,

Seasonal tourism is known to have impacts on local populations in coastal communities. The Town of Nags Head has some of the highest population variance of any town within North Carolina during peak tourism season (April to September) and non-peak tourism season (October to March). This leads to increased recreational water activity in the warmer months. This study aims to evaluate seasonal water quality dynamics of local water bodies in the Town of Nags Head. Enterococci bacteria are opportunistic pathogens that originate from the GI tract of endotherms and can cause infections or indicate other potentially harmful viruses or bacteria. Based on the EPA BEACH ACT an Enterococcus Single Sample Max (ESSM) exceedance of over 104 coliform-forming units (CFUs) of bacteria per 100 ml of water is considered unsafe water for human recreation purposes for Tier 1 sites. Beaches and water bodies with daily recreational use are classified as Tier 1 sites and have these highest standards.

Data analysis conducted of publicly available water testing data sourced from the North Carolina Department of Environmental Quality (NCDEQ), focused on the Town of Nags Head and surrounding NC water testing sites. The 77 testing sites in the data set from the years 1997-2023 archived by the N.C. Recreational Water Quality Program's staff have been examined for the number of exceedances per site. Preliminary results demonstrate the occurrence of the highest number of exceedances during the months of July, August, and September. Evaluation of this data set in conjunction with ArcGIS spatial pattern analysis seeks to explain any statistically significant

observances and potential linkages to recreational water safety. Future work will aim to evaluate potential bacterial sources in and around Nags Head to help mitigate water quality issues.

GP 107 WRC-C 2:30-4:30

Factors That Affect Polyphosphate-Accumulating Organism Performance in Enhanced Biological Phosphorus Removal

Autumn Robinson
Int Dct Prg Bio, Biomed, Ch

Mentor: Erin Field, Biology

Autumn Robinson[1], Ketan Chamakura[1], Katherine Foster[1], Anna Koirala[1], Gary Li[1], Natasha Bell,[2] Erin Field[1]

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The formation of anoxic dead zones in water bodies due to nutrient loading from point sources like wastewater treatment plants (WWTPs) is a prominent issue in ecosystem preservation. Many WWTPs use polyphosphate-accumulating organisms (PAOs) to remove phosphorus from wastewater during enhanced biological phosphorus removal (EBPR). The EBPR process is effective but occasionally fails, and the reasons behind EBPR failure are debated and largely unknown. To identify potential causes of EBPR failure in WWTPs and understand how PAOs act during failure events, we collected microbial samples directly from the Greenville Utilities Commission (GUC) WWTP bi-weekly over seven months. This sampling strategy allowed us to capture samples when EBPR effectively removed phosphorus below the GUC WWTPs target threshold (EBPR+) or ineffectively removed phosphorus, with phosphorus levels above the target threshold (EBPR-). We hypothesized that PAOs will be present and functioning when EBPR is running effectively and absent and nonfunctioning when EBPR is not running effectively. Amplicon sequencing, metagenomics, and metatranscriptomics of these samples are currently ongoing to compare bacterial composition and activity during EBPR+ and EBPR- conditions. We will correlate those results with environmental data taken during sampling (such as pH, temperature, and dissolved oxygen) to determine conditions that promote effective and ineffective EBPR. We are also conducting fluorescence-activated cell sorting to collect PAOs directly from the WWTP to produce genomes for comparison to the community data to better understand how PAOs respond during EBPR+ and EBPR- conditions. Understanding what factors promote effective and ineffective EBPR and how PAOs act under these scenarios will help us find ways to prevent EBPR failures and recover from failures faster when they occur. Limiting EBPR failures will help reduce eutrophication events and allow WWTPs to remain under their phosphorus limitation thresholds as nutrient discharge restrictions become stricter.

GP 108 WRC-C 2:30-4:30

Socio-ecological Restoration at the Boundary
Integrative Monitoring in South Florida Protected Areas

John Edward Sabin III
Integrated Coastal Sciences

Mentor: Cynthia Grace-McCaskey, Integrated Coastal Sciences

How will conservation areas in South Florida continue to change because of ongoing restoration efforts? Ecosystem restoration practitioners in the Global North aim for adaptive management in a time of increasing uncertainty. To reconcile competing socio-ecological futures in South Florida, this project integrates discursive narrative analysis, spatial modeling, and intuitive data visualization to guide a holistic monitoring approach during the restoration of the Florida Everglades. Projects like the East Coast Buffer (ECB) and the Western Everglades Restoration Project (WERP) represent ongoing attempts in Everglades restoration to acquire and protect degraded landscapes adjacent to protected areas, such as Everglades National Park and the Big Cypress Preserve. This interdisciplinary framework seeks to build a socio-ecological model of ecosystem restoration through this synthesis of qualitative and quantitative data as it relates to the transformation of cultural landscapes at the periphery of the built environment.

Insights provided through this research suggest that panarchy as a conceptual tool best facilitates the co-production of knowledge in large-scale restoration projects threatened by environmental amnesia. I developed a landcover change ranking system through expert knowledge consultation, remote sensing, and GIS to understand the shifting physiognomic structure of landscapes affected by restoration activities in the ECB. I bridge this modeling framework into the content of WERP to showcase how the restoration game progresses under new challenges to the role of wilderness in South Florida. The insights provided through this investigation also guided the creation of an accompanying ArcGIS Story Map, an online spatial presentation platform that integrates the research components of the greater project into a place-based narrative helpful for education and collaboration.

GP 109 WRC-C 2:30-4:30

Hybrid constructed wetlands for treatment of marine aquaculture wastewater

Kimiya Yousefi
Int Dct Prg Bio, Biomed, Ch

Mentor: Randall Etheridge, Engineering

Kimiya Yousefi, Department of Chemistry, East Carolina University
Natasha Bell, Department of Biological Systems Engineering, Virginia Tech
Randall Etheridge, Department of Engineering, East Carolina University
Steve Hall, North Carolina State University, Biological and Agricultural Engineering.

This study introduces an innovative approach for treating backwashed aquaculture wastewater from a Recirculating Aquaculture System (RAS) located at North Carolina State University's Marine Aquaculture Research Center (MARC) in Marshallberg, NC. The methodology entails the on-site pilot-scale implementation of hybrid constructed wetlands (HCWs), with the primary objective of efficiently removing crucial nutrients, including ammonia, nitrite, nitrate, and phosphate, present in the backwashed wastewater from the marine RAS. HCWs, a technique predominantly employed in Europe and Asia for municipal wastewater treatment, incorporate various zones of vertical subsurface flow (VSF), horizontal subsurface flow (HSF), as well as surface flow CWs.

A four-stage pilot-scale HCW system was designed and constructed during Fall 2023, and monitoring will be initiated in early 2024. The HCWs stages of treatment include: #1 VSF gravel cell, #2 HSF crushed concrete cell, #3 woodchip bioreactor, and #4 a floating treatment wetland (FTW). A significant challenge of using constructed wetlands for treatment from marine RASs lies in the high levels of salt present in the wastewater. To overcome this limitation, the implemented HCW design includes the salt tolerant plant species *Spartina alterniflora*. This approach not only addresses nutrient removal but also provides additional ecological benefits, such as creating habitat and biomass for value-added operations.

The (HCW) system will undergo systematic monitoring, including collection of grab samples for analyses of NH_4-N, NO_3+NO_2, PO_4-P, total nitrogen, total phosphorus, dissolved organic carbon DOC, alkalinity, and chemical oxygen demand (COD) on a weekly basis. Additionally, water quality parameters including temperature, pH, turbidity, and dissolved oxygen (DO), will be continuously monitored (every 20 minutes) using in-situ multiparameter water quality sondes. This integrated strategy ensures a thorough and continuous evaluation of the HCW system's performance and water quality parameters.

In the initial stage (#1), a substantial removal of total nitrogen is anticipated in the vertical flow wetland, leveraging both nitrification and denitrification processes. Stage #2 aims to achieve heightened phosphate removal through adsorption and precipitation. Stage #3 is expected to achieve denitrification. Stage #4 focuses on polishing and further nitrogen and phosphorus removal.

GP 110 WRC-C 2:30-4:30

Analyzing Public Support for Sustainable Hog Production in North Carolina

Katie Wagner
Political Science

Mentor: Samantha L. Mosier, Political Science

Agricultural operations play a crucial role in the economic and cultural prosperity of the eastern coastal plains. In North Carolina alone, farm operations generate billions of dollars in state revenue. However, the industrialization of operations has introduced new obstacles, particularly within the hog farming industry. It is essential to understand the ongoing public debates regarding current practices in concentrated animal feeding operations (CAFOs) and new state-level legislation, given the ubiquity of these institutions in North Carolina. The objective of this study is to determine why opposing narratives within the hog farming industry persist and identify which narratives are most

prevalent. Through the lens of the Narrative Policy Framework (NPF), this research study explores how specific narratives develop to influence public attitude towards hog farming, and consequently shape and are shaped by broader policy discourse in Wayne County, North Carolina. At the meso-level of analysis, the NPF suggests community survey respondents, producers, and legislative powers or organizations may each hold their own, potentially opposite, narratives which exist simultaneously and in conflict. Recognizing diverse perspectives within the hog farming industry is key to environmental awareness, informed policymaking, and the construction of subsystem beliefs.

GP 111 WRC-C 2:30-4:30

Utilizing the Calm Before the Storm: An Exploration of Disaster Mitigation in Princeville, North Carolina

Alexandra Stevenson
Integrated Coastal Sciences

Mentor: Cynthia Grace-McCaskey, Anthropology

Climate change increases flooding events globally, with affluent populations having more access to recovery resources. However, marginalized communities within these populations do not have access to the same resources. Literature regarding the recovery of Princeville, North Carolina (NC), from Hurricane Floyd in 1999 and Hurricane Matthew in 2016, states disaster management fails to address residents' needs and concerns vis-à-vis past and future flooding. I provide an overview of the compounding hazards residents face and use a political ecology lens to analyze data collected with participant observation and interviews to describe residents' concerns, and to what extent mitigation strategies account for such concerns. Additionally, I will provide examples of the mitigation strategies that have been implemented by state and federal emergency management agencies since this research was conducted.

GP 112 WRC-C 2:30-4:30

Exploring the Implementation of Urban Social-Ecological Gradient Analysis

Roshan Saud
Geography

Mentor: Steven M. Richter, Geography, Planning and Environment

A refined comprehension of the conditions of urbanization is essential to a healthy and just future, especially given emergent climatic conditions. Fortunately, spatiotemporal analysis is increasingly capable and accessible due to improvements in remote sensing and geoprocessing. But data alone is insufficient. Integrative theory is necessary to comprehend complex, human-environmental phenomena. Toward this end, the urban ecological concept of an urban-to-rural gradient is a useful tool for comprehending spatial heterogeneity across and within urban systems. Despite conceptual richness, implementation of the gradient concept remains under-examined in the study of urban systems and conditions. This paper filles this gap by exploring the challenges and opportunities of gradient implementation through comparative analysis of gradient models for 370 US metro regions.

The basis for each model is a linear regression model that plots distance from a central point (city hall address) against a different outcome variable. But, there are different approaches to measuring distance. Absolute distance fails to account for the irregular shape of urban regions, so a second normalized distance will also be used. A variety of outcome variables are analyzed against the absolute and relative distance measures, including socio-demographic (population density, income, etc.), physical (imperviousness, tree canopy), greenhouse gas emissions, public health, and environmental risk data. The combination of approaches yields more than 20,000 individual models. Comparative analysis of model significance, fit (R-square), and model parameters (slope and y-intercept) demonstrate that normalization of distance improves model fits, though overall model performance differs across the broad set of outcome variables. Though urban-to-rural gradients accurately describe many urban social-ecological phenomena, they are not universal. Through systematic comparison of gradient models, this work contributes to broader research on urban systems, spatiotemporal data science, and urban analytics.

Graduate Student Online Poster Presentation Abstracts

Elementary Education

Student Perceptions on whether the AIG Isolation Model Impacts their Social or Emotional Well-Being

Christina Broodno
Elementary Education

Mentor: Gregory, Kristen
Elementary Education and Middle Grades Education

Student social emotional wellness is of prime importance as it is a promising way to educate already high-performing students. This study discusses the perceptions of social and emotional well-being of academically or intellectually gifted (AIG) students in a self-contained classroom. Many students who are part of the AIG model are taught in isolation instead of inclusion. The context is a K-11 partial Greek immersion charter school in an urban area of the mid-Atlantic United States. This research study aims to determine whether third, fourth and fifth grade students who are part of the AIG isolation model perceive their social or emotional well-being is being impacted by their self-contained setting. The primary research question is: Do students perceive their social or emotional well-being is impacted in the AIG isolation model? This research study is a mixed methods, survey design using a Google form from which data will be analyzed using descriptive statistics and open coding. The research will benefit the administration, teachers and parents at this Greek immersion school by informing them on how the AIG students perceive the AIG model is impacting their social and emotional wellness.

Keywords: AIG, School Climate, Student Perception, Student Enrichment

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Dual Language Immersion Impacts on Academics and Student Behavior

Stephanie Brooks
Teacher Leadership Elementary Education

Mentor: Gregory, Kristen
Elementary Education and Middle Grades Education

How do students in grades 3-5, in a Dual Language Immersion program, compare to general education students in academics and classroom behavior? My study addressed a specific population of students, in grades 3-5, who are enrolled in a two-way Dual

Language Immersion program and examine whether their test scores are higher and if positive classroom behavior is more frequent than their counterparts. The impacts of this research are great due to the fact that Dual Language Immersion programs are steadily increasing throughout the nation. I utilized a quantitative study with an action research design. The data sources that were collected included standardized testing data from a North Carolina ELA Check-In, a district math Common Interim Assessment and a DESSA screener that is focused on social-emotional competencies. These assessments were collected during a middle of year testing window. The collected data was de-identified and analyzed using t-tests. The many groups of people that benefit from this study include students, teachers, administrators, and community members as we seek to create equitable classrooms school-wide.

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Dual Language Models-A/B vs Roller Coaster

Migdy Gonzalez
Teacher Leadership Elementary Education

Mentor: Gregory, Kristen
Elementary Education and Middle Grades Education

This research is about two dual language models: the A/B module where students spend one day with the English teacher and one day with the Spanish teacher and the roller coaster model where students spend the half of the day with the English teacher learning English language arts and the other half of the day learning Spanish language arts and math in Spanish. This research was conducted in an elementary school located in a suburban area. It is a Title 1 school where all students receive free breakfast and lunch. The purpose of this research was to compare the assessment data of students in first grade who were in kindergarten last year with the A/B model to those who are in kindergarten this year in the roller coaster model. The assessment data were collected from mClass (for reading fluency) and Fastbridge (for math). The data were analyzed using independent t-test analysis. The results of these tests (benchmark, below, well below) will be used and it is anticipated that with the de-identified data that I will collect, I will be able to compare the students' performance in each model.

Keywords: dual language, A/B model, roller coaster, data analysis, kindergarten

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The Underserved Gifted Population

Gracey Guagliardi
Elementary Education

Mentor: Gregory, Kristen
Elementary Education and Middle Grades Education

Gifted education students require additional planned instruction to meet their educational needs. Teachers and parents are typically unaware of what gifted education students should be receiving - often seen as more, complex work that can be completed independently. Gifted education programs are also culturally underserved, meaning many populations are unrepresented. Thus, the purpose of this study is to explain what gifted programming is and to establish a diverse, gifted education program nationwide by determining how we can create a uniform, diverse entrance assessment to create programs that represent multiple populations and cultures. Qualitative research will be conducted using surveys and interviews to allow teachers, parents, and students to provide feedback on gifted programs in their school. The following research question will be investigated: How can we, as educators, create a diverse gifted education program by prioritizing a uniform, inclusive entrance evaluation? Anticipated findings from the research will help develop stronger gifted programs and provide information on why universal entrance criteria is needed across all school systems.

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Multi-Tiered Systems of Support

Kelly Hefner
Elementary Education

Mentor: Gregory, Kristen
Elementary Education and Middle Grades Education

In the state of North Carolina, teachers must use the Multi-Tiered Systems of Support, which is a framework that provides a tired infrastructure and uses the data to give direct support to all student needs in the public-school systems. Teachers use the mClass (DIBELS) assessment scores to measure growth of students on an MTSS plan. However, teachers are unaware of the expected growth for students in each of the eight subskills. The subskills are letter sounds, decoding, word reading, reading accuracy, reading fluency, basic comprehension, oral language, and vocabulary. This study will be conducted using second grade data at a rural Title One elementary school in the mid-Atlantic United States. The purpose of this study is to measure the average growth of second grade students through MTSS in a rural elementary school. I will investigate the

following question: What are the growth averages for eight sub-skills between the beginning of the year (BOY) and the middle of the year (MOY) MTSS data charts for second grade students in a rural Title One elementary school during the 2023-2024 school year? The primary research method for this study is quantitative and the design I will be using is action research. I will be doing an independent t-test using a data chart from our MTSS interventions. Students, teachers, parents, and the school board will benefit from data findings from this research study.

Keywords: Multi-Tiered Systems of Support (MTSS), tiers, subskills, progress monitoring, mClass, DIBELS

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Effect of Color Integration on Basic Math Fact Accrual, Retention, and Retrieval

Erin Heistand
Elementary Education

Mentor: Gregory, Kristen
Elementary Education and Middle Grades Education

In response to the persistently low proficiency levels in math among my school district's middle-grade students, this research explores the potential impact of color integration on basic math fact accrual, retention, and retrieval. The study specifically focuses on 6th-grade students in a Title I urban school setting, aiming to investigate the correlation between the use of color, particularly red, in basic facts instruction and students' progress in addition, subtraction, multiplication, and division. While color integration has been extensively researched in language accrual, there is a notable gap in its application to mathematics. This experimental and quantitative study employs difference scores, presented through tables and line graphs, to analyze the effectiveness of color association in improving math fact fluency. The research aims to benefit not only the students, but also their families, teachers, principals, and district stakeholders.

The literature review underscores the scarcity of research on color association in basic math facts, emphasizing the need for innovative strategies to address math fact accrual. The identified gaps in research highlight the significance of the current study, aiming to explore the potential benefits of color integration, specifically using red, in improving math fact fluency among 6th-grade students in a Title I urban school. Ideally, findings from this research will provide a long-term benefit to my math intensive students as well as to other grades of students within the school district and beyond. Math intensive is a period during our day after students receive the prescribed curriculum. This time allows practice and reinforcement of concepts learned during the regular math instruction.

In conclusion, this research project addresses a critical gap in the literature by exploring the impact of color integration on basic math fact accrual, retention, and retrieval. The study's potential to benefit students, teachers, and other stakeholders makes it a valuable addition to the existing body of research on math education.

Keywords: basic facts, math fact fluency, middle grades education, color association

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School Strategies for Parent Involvement and School Climate

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Elementary Education and Middle Grades Education

In education today, a lot of educators speak about the lack of parental involvement in schools. They blame their students' academic failure and behavior on the parents because they are not involved in their child's education. Lack of parental involvement seems to be more common in Title-1 Schools. This mixed-method study used a survey design to collect multiple viewpoints of parent involvement and school climate from administrators, staff members, and parents at two suburban elementary schools in the same county.

Data were collected from parents through a researcher-created digital survey. Questions in this survey asked what meetings and activities are being offered to parents, how parents are involved in the school and/or their child's education, and what barriers are keeping parents from being involved. Parent responses to these questions will provide schools with a better idea of what they can do to help all parents be involved with their child's education. Data were also collected from administrators and staff members through a researcher-created digital survey. This survey asked staff members how they feel their school is doing to promote parent involvement in their school, their opinion of how involved staff members feel they are in the planning and decision-making process in their schools, and how valued they feel by their administration to understand the overall climate of the schools. Data from this study were analyzed using descriptive statistics and open coding to identify what strategies Title-1 schools should implement to increase parental involvement and school climate.

Keywords: school strategies, parental involvement, school climate, elementary schools, Title-1 schools

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Impact of Elementary School Class Size: Teachers' Perceptions

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Class size can be defined as the number of students in the classroom and can have a positive or negative impact on students' behavior and academic achievement. Previous studies have focused on students' test scores and/or class data from previous grades compared to current grade-level data. Throughout the previous studies, I noticed that there was not a focus on class sizes and the impact it has on students' scores and/or behavior. Throughout the grade levels, the class size increases allowing more students to be in the classroom. Teachers and students are impacted by class size, and it is important to understand the positive and/or negative teacher perceptions. This study aimed to understand teachers' perceptions of class size and the impact it has on students' behavior and academics in elementary schools. The purpose of this study was to investigate how class size impacts students' behavior and academic achievement through the perceptions of educators. This study utilized a qualitative approach to collecting data using an online survey. Results collected from the survey were analyzed using open coding. The results of this study could potentially benefit teachers, students, and policy makers.

Keywords: elementary, student behavior, class size, academic achievement, teacher perceptions, qualitative

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Understanding Reading Motivation in the 5th Grade Classroom

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Students in upper elementary grades are the age group where educators begin to see motivations for reading decrease. Without the motivation to read, students are less engaged in their daily classroom instruction and less likely to complete independent reading outside of school (Wigfield, 2016). In this mixed methods study, I strategized methods to increase the reading motivation of fifth grade students in a rural Title One elementary school. Intrinsic and extrinsic strategies were put into practice as regular classroom instruction to see which methods may be the most beneficial for motivating

this specific group of students. Both types of motivators were integrated into the regular classroom instruction of fifth graders. Reading motivation can be obtained through multiple different strategies, some of which will benefit students more long term, such as intrinsic, and others that are more temporary, such as extrinsic. After incorporating these strategies into my instruction, students completed a survey with open ended questions as well as Likert scale questions in order to determine the answer to the research question. This study was mixed methods in order to utilize data from both types of survey questions. Descriptive statistics was used on Likert scale questions, while open coding was used on open ended questions. The results of this study will inform what is hindering the motivation of fifth graders to read and what strategies can be used to enhance their motivation. Educators of upper elementary and middle grade students can benefit from the findings in this research to understand which motivational strategies will be the most effective and what may be decreasing their students reading motivations. Parents of these students can also benefit to better understand how to motivate their students to read or complete other assignments. Lastly, students themselves will benefit because they will be able to understand themselves better and advocate for what they need in order to maintain motivation.

Keywords: reading motivation, fifth grade, rural school, intrinsic, extrinsic

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Comparing Reading Horizons and mClass Phonemic Awareness Scores

Sloane McConnell
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Mentor: Gregory, Kristen
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The topic of my research proposal is the Science of Reading, but more specifically I chose to look at phonemic awareness scores of students who are assessed and progress monitored frequently. These assessments are given to students through programs that follow the science of reading framework. The purpose of my research was to test for a correlation among two programs' phonemic awareness assessments. The research question that I investigated was "How do mClass and Reading Horizons scores correlate for students who are below grade level?" The methodology that I chose is quantitative data and the research design was action research with a correlation. The two data sources that were used for this methodology were a Reading Horizons phonemic awareness assessment as well as a mClass phonemic awareness assessment. It is anticipated that there will be a strong correlation between these two assessments due to the fact that they are both data points used strongly in the school system. Teachers and educators who administer these assessments would benefit from this research because they will be able

to see if there is a correlation between these two data sources and whether or not this correlation is strong.

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Learning Through Play!

Sarah Morgan
Elementary Education

Mentor: Gregory, Kristen
Elementary Education and Middle Grades Education

In this study, the focus was on play-based instruction and the effects it has on academic, social, and emotional success in a kindergarten classroom. Elementary students are by nature social beings and are drawn towards interacting and playing. Young students have been tasked with sitting for longer periods of time causing challenges for many. They have been required to keep up with high stake assessments, which is why the issue needs to be addressed. The purpose of this study was to determine if kindergarten students can be successful academically, socially, and emotionally through play-based learning centers. This research study was beneficial to my own teaching practice as well as my colleagues to ensure age- appropriate learning strategies are provided for kindergarten students. The study participants consisted of 13 kindergarten students, in a rural area, Title 1 primary school grades Pre-k through 3rd grade. The classroom that the study took place in involved 1 English as a second language student, 1 hearing impaired student, and 11 regualr education students. During my qualitative action research study, data was collected using observations, student interviews, student work samples, and my own teacher reflection journal. All participant work samples and interviews were de-identified. The data was analyzed for a common theme and findings were reported through a narrative discussion. The data collected was used to make informing conclusions about the effectiveness of play-based learning centers in the kindergarten classroom.

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The Impact of Effective Instructional Strategies for Gifted Students

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Elementary Education and Middle Grades Education

In the challenging field of Title One urban schools, intermediate teachers struggle with the task of providing gifted students with proper instructional strategies when there were limited resources and financial constraints. Recognizing the diversity of learning preferences among gifted learners, this study dove into the innovative instructional strategies used by educators to address the unique needs of these students. In a mid-Atlantic urban school system, a fixed budget for gifted programs needs innovative approaches for Title One schools. Gifted cluster classrooms are designed to meet the needs of high-achieving students and identified gifted students, and can lack certified teachers which raises the question about the fairness of fund allocation and purchasing necessary materials.

Focused on grade levels 3-5 in title one intermediate schools, this qualitative and quantitative study aimed to reveal the various instructional strategies used by teachers to enrich gifted students. This study explored the professional development offered by administration and schools to help guide teachers who are less experienced. Data were collected from administration, teachers and parents through digital and paper surveys. To analyze the data, I used descriptive statistics coding to identify interconnected themes and reported the findings to the research question. By investigating instructional strategies that challenge students without overwhelming them with excessive work, the study hoped to enhance the instruction for this group of students. The research seeked to benefit both those in gifted clusters and those identified as gifted in general education classrooms. The study aimed not only to enhance the educational experiences of these students but also to give to the ongoing discussion on equity and excellence in education, ensuring that all minds, regardless of background received an enriching education.

Keywords: gifted, gifted cluster, AIG, teacher, instructional strategies

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Scholar Perception of the Purposes for Reading

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Students in testing grades are constantly being asked to read passages for comprehension-based purposes. This study exposed participants to different types of formats of texts to expand their understanding of the purpose(s) of reading texts outside of reading passages. The topic of my study is students' reading for purpose. My research problem is that scholars are not sure about what their purpose is for when they are reading outside of the classroom. Thus, the study focused on what the scholars' preferences are when they are reading for enjoyment. In this qualitative, action research study, I presented students with different genres and formats of texts over the course of four weeks. Then, I collected data on student perceptions through a survey. I analyzed these data using open coding. Third grade students that attend a Title I urban school that are reading below grade level are the students that are participants in this study. It is anticipated that the scholar perception of the purpose(s) of reading will change now that they have been exposed to different types of text and that they will begin to want to read on their own for fun. I anticipate that teachers will be able to use the data to help with encouraging student reading for fun.

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A Cross-Sectional Study of Co-Teaching Strategies Utilized in Inclusion Classrooms in Rural Elementary Schools

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Many strategies are utilized in the classroom to help our exceptional needs and low-performing students academically. Co-teaching is an instructional strategy in education involving collaboration between general and special education teachers in the inclusion setting. Inclusion is providing additional support for learners within the general education classroom. The focus of this research is to understand what co-teaching strategies are being utilized and the effectiveness of the strategy in rural elementary schools in North Carolina. For my research methodology, I utilized a mixed-method approach. For my

research design, I utilized a cross-sectional survey approach. The cross-sectional survey incorporated open-ended and closed questions. The survey looked at the following co-teaching strategies: one teach-one observe, one teach-one assist, teaming, station, parallel, and alternative teaching. The eligible participants for the study included general and special education teachers who previously or currently co-teach. I analyzed the data using descriptive statistics and open coding. This study will benefit students and teachers in inclusion classrooms. The results of the study will inform elementary inclusion teachers of effective and ineffective teaching strategies to assist teachers in their teaching practices.

Keywords: inclusion, co-teaching, rural

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Instructional Strategies that Enhance High Writing Motivation in First Grade Students

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Mentor: Gregory, Kristen
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Several studies have been conducted to determine the cause for low-writing motivation in students (Göçen, 2019; Troia et al., 2012). In order to help enhance high writing motivation, many studies have also researched to determine the most effective instructional strategies that support student motivation. However, research surrounding first-grade students in a rural, Title I school setting is still sparse. The purpose of this mixed method research was to determine the most effective instructional strategies that enhance high writing motivation in this special demographic of students. In this experimental study, students completed a pre-survey to gather their opinions of different writing strategies. Next, I implemented three instructional strategies that have been promising in enhancing writing motivation: explicit instruction on and implementation of the writing process, implementation of creative writing activities and student choice of writing assignments, and implementation of individual student writing conferences. Students then completed a post-survey after these instructional strategies were implemented in the classroom. Using open coding to analyze the data from these two surveys, I determined which strategies the students found most effective in enhancing their writing motivation. This research benefits first grade students who struggle to stay motivated to write. It will also support educators seeking instructional strategies to enhance writing motivation in first grade students.

Keywords: teaching, writing, assessment, motivation, instructional strategies.

Teachers' Perceptions of the Effectiveness of Conscious Discipline in Elementary School

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This research study aims to investigate teachers' perceptions of the effectiveness of the Conscious Discipline curriculum in contemporary educational settings. Conscious Discipline, a widely adopted social-emotional learning program, was designed to foster a positive classroom environment, enhance students' self-regulation skills, and improve classroom management. This program requires not only the student but also the teacher to take a breath and deal with the situation in a calm conversational way. The goal of this program was to teach students strategies to independently handle and solve problems while also having the teacher learn these strategies first so they use these same ideas with the class. However, more empirical research has yet to explore teachers' perspectives on this curriculum's practicality, efficacy, and overall impact within diverse educational contexts. The study employed a qualitative research design, incorporating surveys to gather comprehensive data from a diverse sample of teachers across different grade levels. Qualitative data were collected through a structured survey instrument, measuring teachers' experiences and perceived effectiveness of Conscious Discipline in enhancing students' socio-emotional development and behavioral outcomes. Through open-coding analysis, the qualitative data aimed to uncover patterns, challenges, and success stories, providing a richer understanding of the curriculum's impact on both teachers and students. The outcomes are anticipated to inform educators, administrators, and policymakers about the curriculum's strengths and potential areas for improvement, thus guiding evidence-based decision-making in the realm of socio-emotional education. This research was done in hopes that teachers can understand the curriculum better and it can improve students' use and success with the curriculum as well. In conclusion, this research study seeks to bridge the gap between theory and practice by investigating teachers' perceptions of the Conscious Discipline curriculum. By illuminating the lived experiences of educators, this study provides actionable recommendations for optimizing the implementation of Conscious Discipline and fostering positive educational environments conducive to the holistic development of students.

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North Carolina's Third and Fifth Grade Science Classrooms' Emphasis on Teaching the Ocean

Eleni Blackley
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Math, Science, & Instr Tech Ed

The ocean covers over 70% of the Earth and it is important that being science literate also means being ocean literate. This study will be looking into third and fifth grade teachers across the state of North Carolina and their emphasis on teaching about the ocean in their science classes. This study will survey third and fifth grade teachers in all three regions of North Carolina, the Coastal Plain, Piedmont, and Mountain regions will all be surveyed. Surveys will be analyzed to find similarities and/or differences amongst the geographical location and teachers' personal emphasis on teaching about the ocean. The survey will consist of open-ended questions and questions that follow the 5-point Likert scale. Surveys will be distributed through email using the web-based software Qualtrics. This study will also review literature regarding ocean literacy, previous studies on teacher understanding of the ocean, and how their understanding impacts how/if they teach the ocean in their science classrooms.

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Can High Schoolers Really Argue?

Jessica Burch
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This study aims to use argumentation instruction to teach chemical bonding to high school students and see the impact on students' ability to demonstrate knowledge by writing their own arguments supported by evidence. Using argumentation in the chemistry classroom gives students the opportunity to learn valuable skills they can use in their future. Students will create a pre and post argument. For the pre argument students will be given chemicals to choose from, this being things they have seen in class previously, while the post assessment will be a chemical species of their choosing. Students will be graded with a rubric that consists of 3 levels (level 1 being the lowest – not able to write argument and support with evidence to level 3 being the

highest – argument is well thought out, evidence is clear and science content is correct). Through the process students will be able to reflect and grow int heir understanding of writing an argument, which will in turn show depth of student understanding of chemical bonding.

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Examining the Impact of Animal Ambassadors on Student Interest in Environmental Education Topics

Megan Campbell
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Math, Science, & Instr Tech Ed

This study examines the impact animal ambassadors have on student interest in environmental education topics. This study will use qualitative data to determine the change in student interest before and after a lesson. The lesson will be administered to half of the population in their regular classroom setting and to the other half in a common setting with animal ambassadors from Wild at Heart Wildlife Sanctuary. The population for this study consists of 100 fourth-grade students across 4 classes at Southwest Elementary School in Jacksonville, North Carolina. Each research group will consist of students from two classes. Participating students will complete a Likert-style survey before and after the lesson to rate their interest in topics such as native wildlife and pro-environmental behaviors. For each group, the difference between pre- and post-lesson survey responses will be attributed to a change in interest after being exposed to lesson content. The expected results are that both groups will be more interested in native wildlife and pro-environmental behaviors after the lesson, but the group that receives the lesson with the animal ambassadors present will show more positive change in interest levels.

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The Power of Argument: Enhancing Student Understanding of the Nature of Science through Argument-Driven Instruction

Adrienne Evans
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Many students lack a strong understanding of the Nature of Science (NOS), hindering their ability to think critically and fully appreciate science's dynamic tendencies. This action research project investigates the potential of Argument-Driven Instruction (ADI) to bridge this gap of knowledge in chemistry students. ADI involves constructing and critiquing arguments based on evidence, mirroring core NOS concepts such as evidence-based reasoning and the ever-evolving understanding of scientific knowledge. A custom teacher-derived assessment will be used as a pre-test and post-test to determine the efficacy of using ADI as an intervention to increase student understanding of NOS. The expansive aspects of NOS often make it difficult to teach it as a stand-alone topic, but ADI's emphasis on inquiry-based skills and critical thinking aligns well with NOS principles. This project holds promise for transforming how NOS is approached in chemistry classrooms, ultimately promoting a generation of scientifically literate, confident, and curious learners.

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If a picture is worth a thousand words, will you remember them?
How do student-chosen images affect their retention and recall of Science Vocabulary in a digital note-taking setting?

Patricia Burgin Fernandez
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Math, Science, & Instr Tech Ed

My research aims to investigate whether students' choice of images impacts their ability to retain the meaning of a word when using digital notetaking methods. Specifically, I am exploring whether 5th-grade elementary school students can better remember weather-related vocabulary definitions when they can connect them to a computer-based graphic. Teachers have been inquiring about the most effective note-taking method for enhancing information retention among students. To delve deeper into this topic, students will be using a county-issued 1:1 device to take notes for two weeks. During the first week, students will create a two-column note in a Word Document for the given word and definition. In the second week, they will add a third column for the graphic. The multimodal assessment will evaluate the retention of vocabulary among the 5th-grade students. Based on my research, I expect that the insertion of a graphic will contribute positively to students' retention of vocabulary.

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The Effect of Project-Based Learning on Student Motivation and Attitudes Toward Science Education

Payton Harrell
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Motivation and attitudes are intrinsic factors that help students become successful in the classroom. **Purpose:** The purpose of this action research study is to examine how motivation and attitudes are influenced by project-based learning in a high school academic biology class. **Methods:** For this study, a mixed-method design to gather qualitative and quantitative data. Semi-structured interviews will be used for qualitative data. Quantitative data will be obtained from questionnaires such as the *Science Motivation Questionnaire,* and *Biology Attitude Scale.* Surveys will be conducted pre-test and post-test to show changes between motivation and attitude from the start to the end of the unit. The data will be collected from 31 (9th/10th grade) high school students in an academic biology class. **Expected Outcomes:** The expected outcomes from the research will have an increased mean score to show growth in motivation, attitudes, participation, and engagement towards academic biology.

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Virtual Simulations in the Science Classroom: Investigating the Influence of Gizmo's Based Experiments on Student's Misconceptions

Elizabeth Proctor
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Mentor: Lee, Tammy D
Math, Science, & Instr Tech Ed

Understanding of the significance of sunlight, nutrients, and reproduction in plants is crucial for advancing one's knowledge in the field of science. Nevertheless, the majority of students encounter challenges comprehending plant function, particularly in its connection to pollination. This study utilized a combination of quantitative and qualitative methods, as well as action research, to examine the influence of a virtual manipulative tool called Gizmos on students' academic achievement in the subject of plant structure and function. The study also examined students' perspectives on the intervention that was based on Gizmos. A multistage sampling method was employed to choose 21 eight and nine-year-old students from a school in Greenville, North Carolina.

These students were subjected to a Gizmos-based lesson intervention on plant function and pollination. Data was collected through pre-test, post-test, and interviews.

Investigating the Efficacy of Gamification Integration within the ADDIE Instructional Design Framework for Enhancing High School Student Engagement and Learning Outcomes

Nicholas Rambaldi
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Mentor: Lee, Tammy D
Math, Science, & Instr Tech Ed

This research project tackles the challenge of high school student engagement and science retention by integrating gamification into the ADDIE instructional design framework. It employs a mixed-methods approach, involving high school students at Garnet Magnet High (Wake County, NC) in a gamified Cell Biology unit.

Quantitative analysis assesses the impact of gamification on science retention through pre- and post-test scores, employing descriptive statistics and correlation analysis for insights into overall performance and engagement-retention relationships. Qualitative analysis entails interview transcriptions and reflections, focusing on engagement, motivation, and learning outcomes.

This study offers a comprehensive view of gamification within ADDIE, highlighting its effectiveness in enhancing student engagement and science retention. The findings contribute to the ongoing dialogue on innovative instructional design practices in high school education.

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Nature Place Based Experiences in Science Education: Impacts on Participants

Allison Schaefer
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Math, Science, & Instr Tech Ed

This research study aims to determine if nature place based experiences have impacts on the participants in their personal and professional lives after the experience has concluded. This study will be surveying and interviewing participants in place based experiences at East Carolina University from the last 5 years. The survey will be asking

participants about their experience, what they learned, how they learned it, and if it is still affecting them today. The interviews will then take place with a portion of those surveyed, and go deeper into these participants' experiences and the post-trip impacts that these experiences have had on them in their personal and professional lives. Previous longitudinal studies suggest that carefully designed outdoor and environmental education programs have a life-long impact (Takano, 2020). The purpose of this study is to advocate for the use of nature place based experiences in education to help students become lifelong learners.

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The Impacts of Artificial Intelligence on Vocabulary Development and Student Engagement during Inquiry-Based Learning Experiences

Mattie Skinner
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Mentor: Lee, Tammy D
Math, Science, & Instr Tech Ed

This study aims to use a quantitative group comparison design to investigate the impact of artificial intelligence on student vocabulary development and engagement when utilized as an instructional support during an inquiry-based learning experience. Students will be randomly assorted into a control or an experimental group. Both groups will complete the same inquiry-based experience with assistance from traditional classroom resources, such as teachers and search engines. However, the control group will receive additional assistance from the generative artificial intelligence known as Chat GPT. After the inquiry-based learning experience, all students will complete the same 10-question multiple-choice vocabulary assessment and 10-question Likert scale engagement survey. Descriptive statistics will be utilized to compare vocabulary assessment and engagement survey results between the experimental and control groups. It is anticipated that students in the experimental group will score higher on the vocabulary assessment and demonstrate increased signs of engagement when compared to the control group.

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Taking Notes on Earth: A Comparison of Note Styles in Earth & Environmental Science

Noelle Stevens
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Mentor: Lee, Tammy D
Math, Science, & Instr Tech Ed

Science education research has long investigated the benefits of different note-taking styles in student learning. However, there is a paucity of research on Earth Sciences, as most focus on the biological and physical sciences. Prior research indicates that interactive notebooks (INBs) are promising avenues to consider for optimizing note-taking in science courses. The researcher's prior experience with utilizing INBs in classes has also made them curious on the benefits. The scores of Earth science students who did and did not utilize INBs on a pre- and post-assessment concerning a topic in the course will be compared. Data has yet to be collected or analyzed, but we expect to see more growth (as measured by scores on the post-assessment) from those who utilized INBs. The results of this study will help the researcher better meet the needs of their students, and also help other educators in selecting note-taking styles.

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Teaching Science in Nature: A Hands-on Approach to Enhance Comprehension of Ecosystems

Janice Tyciak
Science Education

Mentor: Lee, Tammy D
Math, Science, & Instr Tech Ed

The following study researches the impact of presenting science in an authentic environment and on how it improves the understanding of 5th grade students on the topic of ecosystems. Using a qualitative approach, students will demonstrate their understanding of ecosystems, by creating a drawing of their findings. Students participated in an inquiry lesson through the use of a bush or small tree on campus, to duplicate an outdoor, miniature ecosystem. This provided students with a hands-on look at ecosystems and how they can be large like the entire school or small like a simple bush. Their task with this project, was to "shake" a small tree or bush and observe everything that came out and make conclusions as to how the ecosystem gathers energy and relies on everything to function. Students then drew and labeled a picture of the ecosystem they investigated. The data was collected and analyzed based upon the scoring guide of a teacher rubric used to grade the quality of the scientific parts of the illustration. The quality of the drawings submitted, and the data collected confirmed that students developed a deeper understanding when they were removed from the typical classrooms setting and experienced a hands on and natural approach to scientific topics.

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Caring for the Caretakers: Building Resilience in Alternative Licensed Teachers through the Implementation of a Social and Emotional Needs Professional Development.

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Educational Leadership

Mentor: Lewis, Travis
Educational Leadership

Across America, public schools face the challenges of educating children with a limited workforce. The number of people choosing to enter college from high school majoring in education has been declining. At the same time, the number of people exiting the field of education has been steadily increasing. This has led to a deficit of licensed teachers seeking employment. To compensate for this shortage, education systems have created alternatives for people to teach. These alternatives allow people who have not completed a college education pathway to teach. These alternative licensed teachers hired must teach while learning the craft of effective teaching. In addition to teaching, these alternative licensed teachers face challenges with the daily tasks of education, managing classroom behavior, helping students who have social and emotional needs, and meeting educational performance expectations. These challenges require teachers to be resilient so that they do not take a toll and lead to secondary trauma and burnout. This research study aimed to analyze the impact that implementing resilience skills to teachers would have on teacher self-efficacy. The Collaborative to Advance Social Emotional Learning (CASEL) Framework is what grounded and guided this study. CASEL is an international organization focused on establishing social and emotional learning (SEL) in the school setting. This study was conducted in a school district in eastern North Carolina. It focused on alternative licensed teachers in grades K-5. The study looked at the impact of Resources for Resilience professional development on teacher self-efficacy in the areas of instructional strategies, classroom management, and student engagement. The study further examined the impact of coaching beyond professional development on teacher self-efficacy.

Findings from this study indicate that professional development in resilience positively impacted teacher self-efficacy regarding classroom management. When provided with professional development that teaches resiliency strategies along with coaching, teachers will implement the tools with success with their peers, students, and themselves. However, this study recognizes that more work is needed in this area and provides recommendations to assist school systems and educators in helping teachers build self-efficacy and provide tools to aid them in remaining in a resilient zone.

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Biomedical Physics

Analysis of Fibrin Fiber Polymerization

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Biomedical Physics

Mentor: Hudson, Nathan
Department of Physics

Fibrin fiber networks form the structural component of blood clots. Fibrinogen, a protein found in blood plasma, polymerizes in the presence of thrombin into a network of fibrin fibers. The initial stages of fibrin polymerization and the final structure of the fibrin network are mostly known. The intermediate phase, on the other hand, is not fully understood. Many studies have investigated the polymerization process, but it is challenging to obtain high resolution images of fibrin polymerization to measure blood clot features such as length, diameter, and density of crosslinks due to fiber mobility. Hence, the goal of this project is to analyze the fibrin fibers in the intermediate phase. Fibrin polymerization was recorded via light sheet microscopy. Using the Imaris software, the longitudinal growth, angle of the crosslinks, type of crosslinks, and fluorescence intensity of the fiber was measured and recorded. The Measurement Points feature was used to measure the length of the fiber and angle of the crosslink, and the Spots feature was used to measure the fluorescence intensity of the fiber. Preliminary results will be presented. Since there are noticeable differences in the clotting features when comparing a normal clot to a clot from someone with diabetes, the long-term goal of this project is to connect the mechanisms of blood clot formation to diseases. By understanding how the structure is formed, it is possible to identify how diseases affect the polymerization process.

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Nursing and Social Work

Hypoglycemia Events in Patients Who Receive Treatment for Hyperkalemia

Eileen Briggs, BSN, RN
MS Nursing—Adult Geront Clinical Nrs Spec

Mentor: Julie Linder, DNP, ACCNS-AG, CCRN-K
Adv Nursing Practice & Educ

Introduction "Hyperkalemia is an electrolyte disturbance occurring with increased frequency among patients with chronic kidney disease, diabetes and heart failure." (Montford & Linas, 2017, p. 3155). Hyperkalemia can directly lead to fatal cardiac arrhythmias. Treatment of hyperkalemia includes the administration of dextrose and intravenous regular insulin. The leading and most encountered complication of this treatment is hypoglycemia (Kijprasert et al., 2022).

The data analysis assessed adherence to the hyperkalemia protocol and if there were high incidences of preventable hypoglycemia, which is a blood glucose below 70, with any opportunities for process improvement. **Methods:** Chart audits from March 2023-August 2023 were conducted for quality improvement purposes. Inclusion criteria were patients who experienced a potassium level greater than 5 millimoles per Liter and received a one-time dose of Regular insulin. These chart audits determined if the organization's hyperkalemia protocol was followed, and hypoglycemia episodes were captured and treated appropriately. **Results:** Using Slicer Dicer in EPIC, the electronic medical record, and the Medication Administration Record for instances of one-time dose regular insulin administration, a total of 191 orders met inclusion criteria. Excluded were OR/Procedural areas, pediatric patients, and code blue events. Approximately 75 patients were excluded due to receiving one-time doses of regular insulin for hyperglycemia and not hyperkalemia. **Conclusion:** Patients who receive treatment for hyperkalemia are at increased risk of having hypoglycemic episodes. Use of the hyperkalemia treatment protocol in its entirety is the best way to ensure correct monitoring and correction of these episodes should they occur. The first step of the protocol is a point of care baseline blood glucose. The baseline glucose then guides the amount of D50W (50% Dextrose) injection to give. The data analysis revealed of the 191 hyperkalemia treatments administered, 13% resulted in hypoglycemia and of those only 3 incidences occurred after not being treated with the correct amount of D50W per protocol. Lastly although MAR documentation has room for improvement, the correct number of D50W vials were dispensed and administered 90% of the time and preventable hypoglycemia rates are low.

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A Journey Toward Eliminating Central Line-Associated Bloodstream Infections

Patricia Donnelly
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Central vascular access for critically ill patients is a life-saving procedure that increases their risk of bloodstream infection by 200%. A central line-associated bloodstream

infection (CLABSI) costs a healthcare system anywhere between $21,000 to $100,000. More importantly, it increases the patient's mortality rate, making CLABSI the most common hospital-acquired condition (Savage et al., 2019).

A concurrent review and tracking of the adherence to the central line insertion practices (CLIP), will reduce CLABSIs. Maximizing technology with reports from the electronic medical record as opposed to a manual tracking and reporting process increases the data's validity (Noaman et al., 2019). This project utilized a dashboard displayed via the facility intranet platform and an audit process of all patients with central lines. The team: an infection prevention nurse, a critical care Clinical Nurse Specialist (CNS), an infectious disease physician, and the unit's nurse leader performed audits together weekly. The audit includes photographing the lines with opportunities as a teaching guide (with the patient's consent, of course). Access to audit results of key elements related to the care associated with a central line generates participation from the clinical team. Key elements include the type of central line, line days, reason for line continuation, and the daily review of documentation. The dashboard, which displays the total number of all hospital-acquired conditions allows for a quick reference of the facility goal status. Although access to the audit tool and the results are granted to all units, only the CLABSI team is allowed to input or change data reflected on the dashboard, preserving the integrity of the data.

The analysis of the process, the investigation of compliance of CLIP bundle utilization, and the interdisciplinary collaboration effectively reduced the number of CLABSIs and maintained the rate of reduction while strengthening the unit's commitment to evidence-based practice.

The duration of this process will remain in place until CLABSIs are eliminated. This process ensures accountability and supports the effort of the CLABSI team. In conclusion, the process, the data sharing, the unit accountability, and the communication promote adherence to best practices. This could be applied to other hospital-wide initiatives.

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Enhancing Fall Detection and Response in Long-Term Care Facilities: One Intelligent Bracelet at a Time.

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Background: Falls among long-term care facility residents in the United States pose a significant challenge, leading to both physical and cognitive suffering and substantial financial burdens. It is estimated that about $50 billion to $754 billion is spent each year in the U.S. on non-fatal and fatal falls among adults aged over 65. Additionally, individuals with cognitive impairment face even higher risks. **Solution:** The project proposes an intelligent bracelet that detects and distinguishes between high and low-impact falls. Upon detection, the bracelet triggers an overhead alarm and sends an immediate notification to the assigned nurse or nursing assistant. The bracelet is designed to be non-latex, flexible, waterproof, and rechargeable, ensuring ease of use and durability. It enables monitoring and assessing unwitnessed falls, directly alerting staff without needing third-party intervention. **Pros and Cons:** The bracelet offers a cost-effective solution compared to existing smartwatches, with no monthly fees and minimal ongoing monitoring requirements. However, it necessitates regular charging and incurs a one-time cost for patients. Additionally, its effectiveness relies on patients consistently wearing the bracelet. **Metrics for Measurement:** Post-fall outcomes will be assessed using incident reports and the TRIPS form, with data compared before and after implementation. The SMART model will guide evaluation efforts. **Cost Analysis:** The proposed system eliminates additional monitoring expenses and staffing needs, significantly reducing costs compared to competitors like the Apple Watch. It offers a cost-effective solution for long-term care facilities. **Conclusion:** The intelligent bracelet presents a promising innovation for enhancing fall response in long-term care facilities. Its simplicity improves patient compliance and comfort while enabling swift post-fall assessments, reducing morbidity and mortality rates. Moreover, its cost-effectiveness can align with most organizational and budgetary goals and meet the national patient safety objectives. The bracelet usage can improve patient outcomes and nursing practices in memory care facilities.

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Enhancing MyChart Bedside Utilization: A Comprehensive Education Initiative for Patients and Staff

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Introduction: In the evolving landscape of healthcare, effective communication and engagement are paramount. This abstract outlines a graduate project aimed at providing comprehensive education to both patients and staff to increase the utilization of MyChart

at bedside during the admission process.

Methods: The project focused on designing and implementing an education program tailored to the unique needs of patients and healthcare staff. For patients, informational sessions were conducted during admission, emphasizing the benefits of MyChart in facilitating real-time communication, accessing health records, and actively participating in their care journey. Staff education involved targeted training sessions to enhance proficiency in incorporating MyChart seamlessly into bedside interactions.

Implementation: The education program was rolled out in collaboration with the interdisciplinary healthcare team. Interactive in-person education sessions, informative pamphlets, and video tutorials were used to cater to diverse learning preferences. A phased approach was adopted, ensuring gradual and comprehensive integration of MyChart into bedside practices. Continuous feedback loops were established to address concerns and adapt the education strategy based on real-time insights.

Results: Preliminary results indicate a notable increase in MyChart utilization at bedside by both patients and staff. Surveys conducted post-implementation revealed improved patient satisfaction, enhanced staff efficiency, and a positive shift in the overall hospital experience. The project's success is attributed to the collaborative efforts of the project team, ongoing feedback mechanisms, and a tailored educational approach.

Conclusion: This graduate project showcases the efficacy of a targeted education initiative in promoting the use of MyChart at bedside during admission. The positive outcomes highlight the potential for enhancing patient and staff engagement through technology-enabled solutions. As healthcare continues to embrace digital advancements, investing in comprehensive education remains a crucial strategy for maximizing the benefits of such tools in improving patient care and overall hospital operations.

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Asian American immigrants' language accessibilities, interpreter training, and providers' expectations. How can the medical community make language "justice for all"?

Kaitlin E Gray
Social Work

Mentor: Lee, Mi Hwa
Social Work

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Medical interpreter services play a crucial role in fulfilling the promise of "Justice for all," a fundamental principle that attracts many immigrants to the United States. Although numerous medical facilities provide in-person/phone interpretation services and materials in English and Spanish, there is a notable lack of support for the Asian American community, particularly printed and electronic materials in their languages. This gap highlights the importance of expanding medical interpreter services to ensure equitable healthcare access for the Asian American community.

There is a growing body of literature concerning medical interpreter services; however, there is a limited amount of research on the viewpoints of Asian American immigrants. It has been reported that 58% of these immigrants require interpretation services for their medical care. As the Asian American population continues to increase, it is crucial that we address this issue and give it proper attention. The purpose of this study is to conduct a scoping review of healthcare communication barriers and language accessibility in Asian American immigrants. Specifically, the study examined the viewpoints of three distinct parties: healthcare providers, Asian American medical interpreters, and Asian American patients - experiences with medical interpreter services and training for Asian American language users.

Four different databases were used to search articles, including Pubmed, PsychInfo, MDPI, and Google Scholar. The following keywords were used in the search: "Asian American", "medical interpreters", "interpreter training", "healthcare providers", "education", "experience", "perceptions", and "perspectives". Studies published since 2000 were included. A total of 4,543 articles were identified through initial searches across all four databases, with some duplicates. After removing articles which were not studying Asian language users, duplicates and studies conducted outside of the US, 79 articles were selected for initial review, out of which 49 were deemed suitable for inclusion in this scoping review.

We are currently in the process of reviewing the articles, and preliminary findings will be presented at the RCAW conference.

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Art and Design

The Science and Visual Representation of Memories

Kristen Baucom
Art

Mentor: Tisnado, James R
Art and Design

How are memories stored in our brains, and when revisited, to what extent are they altered? I have started building a body of work which reflects my past experiences of growing up in an ever-changing environment. Aside from a small collection of family photos and home videos, what I have from my childhood is predominantly my memory of it. As I have started to recollect these memories to create artworks out of clay and other media, I find myself drawing inspiration from a combination of my own remembered experiences and of those that have been shared with me by my family. Since memories are not recorded like a film, but rather the fragments are rebuilt and reshaped to some extent each time they are recalled, the art that is derived from this content has resulted in works that are somewhat dreamlike in nature. I am cognizant that neuroscience is largely intertwined with my creative process, and will be researching the science of memories more in depth to better guide my artmaking.

WRC 113
CAR's History of Fighting for Justice and Supporting Working People
Don Cavellini, Eddie Williams
Pitt County Coalition Against Racism (CAR)
A collection of photos, flyers, and other aspects of our 281 plus years history of fighting for the rights of minorities and workers in eastern North Carolina.

WRC 114
Impacts on the Biodiversity, Abundance, and Community Composition of Fish Larvae and Zooplankton Due to Ship-Channel Dredging
Rebecca G. Asch, Naomi Jainarine, Abigail Alford, Brian Bartlett, Christine Chan, Elise Easterling, Esra Gokturk, Peyton Jackson, Taniya Johnson, Caitlin McGarigal, Quentin Nichols, Brianna Salazar, Jalen Walker, Zachary Reece Warfel, Ceilia Wood, Mae Wright
Department of Biology, ECU
Ship-channel dredging is necessary in many estuaries to maintain navigable waterways for maritime commerce. Nonetheless, it can have negative impacts on water quality and coastal ecosystems via release of suspended sediments, mobilization of pollutants, declines in dissolved oxygen, noise pollution, and mortality of organisms entrained in the dredge. To reduce these impacts, dredging in the Albemarle-Pamlico Estuarine System (the second largest estuarine complex in the continental United States) has been restricted to winter when few fishes utilize it as a nursery. However, during 2020-2022, dredging was permitted in summer on a temporary basis. We conducted a before-after-control-impact study examining how dredging affected abundance, biodiversity, and community composition of fish larvae. Larvae were collected at the site of a >35-yearlong monitoring program (Beaufort Inlet Ichthyoplankton Sampling Program [BIISP]) and inshore and offshore stations historically sampled by the South Atlantic Bight Recruitment Experiment (SABRE). Nearly 33,000 larvae from 68 taxa were sampled in the first year of this study. Density of larvae was depressed at BIISP during dredging, with a recovery following dredging cessation. Seven of the nine most abundant taxa at BIISP exhibited significant changes consistent with negative impacts of dredging. Species richness and Shannon-Wiener diversity declined during dredging with little-to-no recovery afterwards. At SABRE stations, larval density and species richness were also depressed close to intense dredging one month after dredging cessation. Since dredging impacts on water quality were short lived and localized and no impacts on zooplankton density were detected, we hypothesize that changes among fish larvae may be due to shifts in larval origin if spawning fishes avoided dredged areas. Continued summer dredging could have implications for the reproductive success of forage fishes and commercially and recreationally important species.

WRC 115
ROCK Museum
Kaye Lee Brady
ROCK Museum - Kaye Lees Corner Foundation
Includes fliers about classes, the museum, location, outreach, community involvement, request for volunteers & speakers etc.

WRC 116
Greenville Rotary Community Work
Hunt McKinnon
Greenville Rotary
Information on the community work by the Greenville Rotary clubs

WRC 117
A Process for Asset Mapping to Develop a Blue Economy Corridor
Dr. Emily Yeager, Dr. Beth Bee, Taylor Cash, Anjalee Hou, Michael Schilling, Kelsi Dew
Recreation Sciences, ECU
In Spring 2019, researchers from ECU in partnership with Sound Rivers, the conservation non-profit for the Tar-Pamlico River Basin, proposed the idea of identifying non-material QoL assets in the River Basin and subsequently visualizing them on a digital interactive map. Sound Rivers manages the Tar-Pamlico Water Trail which features river access points and reservable camping platforms on a digital interactive map (Sound Rivers, 2016). ECU researchers proposed the new and expanded map to live on Sound Rivers' website with the intention that the camping platform reservation system and existing assets remain in place with the addition of the proposed non-material QoL assets (Eslami et al., 2019). After agreement to partner on the project through a formal memorandum of partnership (MOP) between ECU researchers and Sound Rivers in Spring 2020 (Appendix I), a subsequent Tar-Pamlico BEC advisory group was formed to include the following stakeholders: county economic development directors, parks and recreation departments, tourism authorities, experts/community leaders in each of the eight proposed assets, and residents. To extend agency to residents in the design and content of the corridor beyond the advisory group, we used an appreciative inquiry (AI) approach to identify existing assets within the corridor (Che Aziz et al., 2018). Round one of asset mapping in Spring 2022 consisted of hosting individual asset-mapping workshops in four counties. Round two of asset mapping occurring in Spring 2023 consisted of attending community festivals and events as vendors in each of the counties from the first round of asset mapping.

WRC 118
Communities Thrive Within Strong Networks. Come be a Part of the NC EJ Network.
Dani Lin Hunter and Chris Hawn
NC Environmental Justice Network
The North Carolina Environmental Justice Network supports environmental justice communities across the state with capacity through organizing, communications, financial resources, research, and education. Our poster will highlight the ways that we hope to partner with communities and academics to better support communities' needs. Specifically, it will highlight what we can offer the communities and academics who partner with us and what we need each of them to bring to strengthen our network.

WRC 119
Environmental Justice Work in Sampson County
Hayley Gorham, Sherri White-Williamson, Denise Robinson, Saisha Neilsen, Christian Felipe
Environmental Justice Community Action Network
Poster highlighting EJCAN's work in Sampson County / rural eastern North Carolina on various environmental and social justice issues. Explanation of unique challenges faced by the community,

the cumulative burden of multiple significant polluting industries in the county, and actions we are taking to advocate for change, empower residents, and bring about environmental justice.

WRC 120
Together for a Common Cause? Cooperative Tendencies in Transdisciplinary Research Groups Aimed at Solving Water Quality and Quantity Issues in Eastern North Carolina
Kyra Selina Hagge, Delnaz Amroliwalla, Marcia R. Hale, Poonam Arora, Stephen Moysey
Department of Coastal Studies, ECU
Complex issues like climate change, poverty, and disparity demand a transdisciplinary approach to research, which integrates multiple disciplinary lenses and includes the grounded knowledge of community expertise. Such research has the potential to be transformative in its impact, reshaping related relationships and systems. It also requires researchers to make an upfront investment in learning methods and jargon of other disciplines to cooperate, without an assurance of outcomes. Our NSF Coastlines and People (CoPe)-funded project, includes more than 30 scientists working with community partners to address the environmental justice dimensions of water quality and quantity issues in Eastern North Carolina. Five working groups facilitate the project, including Community Science, Sensing and Monitoring, Environmental Modeling, Social Science and Community Implementation. To better understand our team dynamics and tendencies, we asked our colleagues to respond to a questionnaire with two cooperative game theory measures, the SVO and IPUC, at two team events, an annual retreat and a monthly meeting. The social value orientation (SVO) measure determines whether people are pro-self or pro-social when in interdependent situations. We also used a modified Intergroup Parochial Universal Cooperation (IPUC) game to further understand differences in preferences for in-group versus universal cooperation. Our data show that, as expected, there is variation of SVO within and between working groups that may align with preferences for universal cooperation. We are interested in exploring how this difference can be harnessed for more connected communication and supportive team dynamics, which could ultimately lead to robust outcomes and transformative research.

WRC 121
Leading Inclusive Transformation in the Geoscience Community via an Intercultural Network of Learning Ecosystems - LIT GEO
Adriana Heimann Ríos, Edu Leorri, Alex Manda, Stephen Moysey, Department of Geological Sciences, ECU
Gordana Vlahovic, Timothy Mulrooney, Rakesh Malhotra, and Christopher McGinn (at North Carolina State University) and Angel Acosta Colón and Ricardo Infante Castillo (at the University of Puerto Rico at Arecibo).
Introduction of NSF-sponsored LIT GEO team, project goals, activities, participants, and collaboration opportunities.

WRC 122
Herring Run Creek Tributaries Monitoring Project
Sarah Whifield and 2024 WHS APES Students
Washington High School, Beaufort County School
Engaging high school students in authentic research through biological classification and chemical monitoring of streams that feed into Herring Run Creek/Runyon Creek, tributaries of Pamlico-Tar River Basin.

WRC 123
Impact of Ship-Channel Dredging on Zooplankton Abundance and Species Composition in Summer Months in Beaufort Inlet, North Carolina

Taniya Johnson, Lulea Adams, Abigail Faith, Naomi Jainarine, Rebecca Asch
Asch Lab

In Beaufort Inlet, North Carolina ship-channel dredging has been historically conducted during only the winter to deepen the inlet to support maritime transport. The United States Army Corps of Engineers (USACE) has proposed expanding the dredging season to include summer to reduce costs and increase worker safety. The USACE and state and federal regulatory authorities temporarily allowed dredging year-round from 2020 to 2023, but the anticipated impact of this activity on water quality, fish, and wildlife was unknown. This is a concern because summer is a key season when estuarine habitats inshore of this inlet serve as nurseries for juvenile fishes and invertebrates. The goal of this study is to assess the impact of dredging during the summer on zooplankton biodiversity and density. Zooplankton serves as an important forage base for higher trophic-level organisms. Sampling of zooplankton was conducted on the Piver's Island Bridge in conjunction with NOAA's Beaufort Inlet Ichthyoplankton Sampling Program (BIISP) before, during, and after the dredging during the summers of 2019, 2020, and 2021. A Zooscan was used to produce high-resolution images of subsamples of zooplankton. The images were then uploaded to Ecotaxa, a web application that uses Artificial Intelligence to identify and sort zooplankton samples into 24 taxonomic groups. These data were used to calculate species richness, the Shannon-Weiner Index, the Simpson Evenness Index, and zooplankton density during each dredging period. Preliminary results showed dredging did not have a significant impact on biodiversity metrics and zooplankton density. Our results will inform policy guidance on whether ship-channel dredging activities are safe to permit in the summer months.

WRC 124
Innovation Early College High School (IECHS) Research: Investigating the Effects of Hog Farming on Local Rivers in Eastern North Carolina

Joseline Mata, Kamora Gorham, Joseph Eakes, Alanna Matthews, Abdal Rahman Musallam, Jasmin Perez, Oana Risden, Bobby Bowser, Stephen Moysey

Hog farming is instrumental for the North Carolina economy generating more than $10 billion a year and providing jobs for 40,000 people. North Carolina is the third-largest producer of pork in the United States, with each hog producing about 11 pounds of waste daily. Hog waste contains nutrients such as phosphorus and nitrogen as well as pathogens, and watersheds can be affected by hog waste through rainfall events. Just in 2021, it was reported that one million pounds of hog waste entered Tuckahoe Creek (Neuse River Basin). Furthermore, fishing and swimming in contaminated water may lead to adverse side effects like diarrhea, vomiting, and nausea. This project aims to study water quality in areas with a high concentration of hog farms to determine how nearby hog farms affect local watersheds in the Tar-Pamlico River Basin. To do this, water will be collected from rivers upstream and downstream near industrial hog farms. The samples will be analyzed for ammonia, nitrates, phosphates, and waterborne pathogens. The data gathered from this project will be used to report the effects of hog farms on local watersheds, inform public stakeholders, and potentially aid in further research.

WRC 125
Coastlines and People Community Water Corps
Gigi Otranto, Jalind Lampa, Kent Brantley, Deshawn Matthews, Austin Newton, Emily Killebrew, Lauren Holliman, Dave Schwartz and Tara van Niekerk.
Water Resources Center (WRC) WaterCorps
What does Community Water Corps (CWC) do? The CWC works with communities in Princeville, Greenville, and Nags Head to identify and investigate local environmental issues of concern. We facilitate and co-develop STEM related programs with our community partners that aims to spread awareness and build capacity within local communities.

WRC 126
WaterCorps ~ A Student-Led Environmental Consulting Organization/Updates and Opportunities
Jeffrey McPhillips, Camryn Landreth, Nicholas Kruchten, Matthew J. Sirianni, Stephen Moysey
Water Resource Center (WRC)
ECU WaterCorps program is a student-led consulting-style organization that focuses on geoscience workforce skills development. Unlike traditional student research experiences, WaterCorps participants operate in real-world project-based work environments that parallel what is found in the environmental or engineering consulting industries. In WaterCorps, students take on various paid roles (i.e. interns, staff, and project owners) and are responsible for engaging with internal and external partners to scope projects that address client needs. Projects span four different service lines (Field, Lab, Data Analysis, & Communications) and have included: 1) development and delivery of educational materials for young students and industry professionals; 2) water quality field monitoring and lab analysis along the Tar-Pamilico River; and 3) deploying and maintaining environmental sensors in partnership with ECU's Environmental Sensing and Data Network. Through WaterCorps, students are exposed to the societal relevance of their work and gain real-world context for the value of the technical skills and disciplinary knowledge they receive during their degree.

WRC 127
NC Community Information Portal
Water Resources Center (WRC)
Exploring and supporting environmental justice through collaborative community science.

WRC 128
Investigation of Storm Surge Versus Saltwater Intrusion on Coastal Aquifer Salinization in Hyde County, North Carolina.
Elnaz Pezeshki Stephen Moysey, Alex Manda, Andrea Gibbs, Tyler Palochak, Jon Gullett
Farmers in Hyde County, NC are increasingly reporting low yields as a result of soil salinization. Understanding the cause of this salinization and how it is linked to storms and hurricanes is valuable for planning and forecasting the long-term impacts of climate change. The drivers of soil salinity in coastal regions are likely to be associated with multiple surface water and groundwater processes. For example, storm surge flooding could provide a direct source of salt to soils and groundwater storage. However, farmers anecdotally report that if soils are already saturated prior to the surge

event, the saltwater won't be able to infiltrate into the subsurface, and lasting crop impacts will be minimal. In contrast, saltwater intrusion in surficial aquifers could be an ongoing source of salt to soils during periods with high evapotranspiration rates. To investigate these processes, we instrumented a salt-impacted farm site in Hyde County near Middletown, NC. This field is 800 m away from Middletown Creek, which discharges to the Pamlico Sound 1.5 km downstream from the study site. Three sets of nested piezometers ranging in depth from 1.1-3.4 m were installed at the farm to monitor water levels and fluid electrical conductivity, salinity, and temperature. Additional measurements of salinity were periodically made at various surface water locations in the area. The study site was flooded as a result of storm surge caused by Hurricane Florence in September of 2018. The salinity of flood waters reached 10.7 PPT with observations in Middleton Creek varying between 13-18 PPT in the month following the hurricane. Most monitoring wells did not show significant temporal changes in salinity after the storm, with only one shallow well varying between 2-8 PPT and the other two shallow wells remaining around 5 PPT. Salinities in monitoring wells at about 3 m depth were also static, but observed to have salinities as high as 9 PPT. An extensive zone of high electrical conductivity was verified at this depth using vertical electrical soundings made with a Geoprobe and electrical resistivity imaging surveys. Likewise, grain size analysis of core samples suggests the presence of a high permeability zone at this depth. Thus, it appears that storm surge did not contribute significant quantities of salt to groundwater in this case, whereas saltwater intrusion seems to be occurring via the high permeability zone.