We would like to give a special thanks to ECU School of Art and Design graphic design undergraduate student London Perkins, for his cover design, poster, and program art.

We would also like to recognize MBA student Shona Smith, for her development and management of the abstract book.
Main Campus Student Center

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Make your mark
We are pleased to invite you to participate in the East Carolina University Research and Creative Achievement Week (RCAW). The week of April 1–April 8, 2019, has been set aside to highlight the extraordinary accomplishments of our students in research and creative activities. It is the hope of the organizing committee that you will attend, as much as your time allows, to see and hear what our students have achieved. Also, we hope that you will strongly encourage your students to attend. A partnership of these entities sponsors the event: Division of Academic Affairs, Division of Health Sciences, Brody Graduate Student Association, Graduate and Professional Student Senate, Office of Undergraduate Research, Office of Postdoctoral Affairs, Graduate School, and the Division of Research, Economic Development, and Engagement.

Research and Creative Achievement Week is a showcase of graduate and undergraduate student research and creative activities that are taking place here at ECU. There will be 400 student presentations, an impressive number that reflects the breadth and depth of research and creative activities at ECU in a variety of fields and disciplines. The Graduate and Professional Student Senate will host a TEDxECU on Monday, April 1, at noon. Graduate student oral and poster presentations and the Postdoctoral Scholar poster presentations will also take place on Monday, April 1. Undergraduate student oral and poster presentations will take place on Wednesday, April 3. Also, we have online presentations that can be viewed on the RCAW blog site.

As part of our continuing emphasis on student and student-faculty collaborative work, the International Scholars and Student Symposium will take place on Tuesday, April 2. The College of Education Faculty and Student Research Showcase will be on Wednesday, April 3. The Intersection of Arts and Sciences event will take place on Friday, April 5, along with REDE events and a dance presentation. The entire week is capped off with the presentation of invited student and postdoctoral RCAW award winners, Graduate Faculty Mentor Award winners, Thesis and Dissertation Award winners, and other award winners on Monday, April 8.

Please consider encouraging your classes to attend specific discipline-related oral student presentations throughout the week.

Visit the RCAW blog at http://blog.ecu.edu/sites/rcaw/ for a schedule of events (click on Schedule).

What an exciting week and a great experience for our students! We look forward to seeing you at the new Main Student Center and participating in these events.

March 2019
Program Sponsors

Division of Academic Affairs
Division of Health Sciences
Brody Graduate Student Association
Office of Undergraduate Research
Office of Postdoctoral Affairs
Graduate School
Division of Research, Economic Development, and Engagement

Planning Committee

Tom McConnell: Associate Dean, The Graduate School, RCAW Chair
Mary Farwell: Assistant Vice Chancellor, Division of Research, Economic Development, and Engagement; Director of Undergraduate Research; RCAW co-Chair
Jocelyn Bayles: Nutrition Science, Undergraduate Student
Marquerite Bond: The Graduate School
Madison Boone: The Graduate School
Bob Chin: Technology Systems, College of Engineering and Technology
Kathleen Cox: Associate Dean, The Graduate School
Taylor Dement: Biomedical Physics Student, Thomas Harriot College of Arts and Sciences
Paul DeVita: Kinesiology, College of Health and Human Performance
Christyn DeBier: Psychology, Thomas Harriot College of Arts and Sciences
Nehad Elsawaf: Economics, Thomas Harriot College of Arts and Sciences

Rich Franklin: Assistant Dean, Microbiology & Immunology, Brody School of Medicine
Donna Kain: English, Thomas Harriot College of Arts and Sciences
Margaret Macready: Division of Research, Economic Development, and Engagement
Rebecca Nickle: Microbiology & Immunology, Brody School of Medicine
Plummer Nye: The Graduate School
Shona Smith: MBA Student, College of Business
Virginia Stage: Nutrition Science, College of Allied Health Sciences
Guili Zhang: Special Education, Foundations & Research, College of Education

Technical Committee

Wendy Creasey
Charles Elton
Laurie Godwin
Plummer Nye
Marilyn Linton
Monica Moore

Mike Myles
Matthew Powell
Ginny Sconiers
John Southworth
Eric Williams
Research Week Daily Schedule

RCAW SCHEDULE: April 1 – APRIL 8, 2019
New Main Campus Student Center, 10th Street

April 1 — April 8

APRIL 1
8:15 am – 5:00 pm | Graduate Student Presentations
Oral sessions in Rooms 125, 249, 253
Graduate & Postdoc Posters in Grand Ballrooms
Postdoctoral Scholar Posters in Grand Ballrooms
8:00 am - 10:00 am | GPSS sponsored Coffee with free student professional photos | Piano Bar, 2nd floor
12:00 pm – 1:00 pm | GPSS & TEDxECU presents: Impact | Black Box Theatre

APRIL 2
2:00 pm – 5:00 pm | International Scholars and Student Symposium | Black Box Theatre

APRIL 3
8:15 am – 5:00 pm | Undergraduate Student Presentations
Oral Sessions | Rooms 125, 249, 253
Posters | Grand Ballrooms
12:00 – 1:00 pm | Grad-Undergrad Student mixer | 3rd Floor Deck, east side covered patio
4:00 pm – 6:00 pm | College of Education - Faculty and Student Research Showcase | Black Box Theatre

APRIL 5
2:00 am – 4:00 pm | Biomaterials Research Cluster Lightning Talks
Lightning talks | Room 253
4:00 pm Reception | Room 249
1:00 pm – 4:00 pm | Innovation, Entrepreneurship, Intersection of Arts & Sciences Showcase | Ballroom A
1:00 pm – 2:00 pm | Posters
2:00 pm – 3:45 pm | Oral Presentations & Performances
3:45 pm – 4:15 pm | Provost's Challenge
4:00 pm – 5:30 pm Reception and Awards Ceremony | Room 249

APRIL 8
12:00 pm – 1:30 pm | Student Awards Luncheon (Invitation Only) | MSC Great Rooms 1+2+3
ECU Distinguished Graduate Faculty Mentor Awards
Thesis/Dissertation Awards
RCAW Undergraduate Awards
RCAW Graduate Awards
RCAW Postdoctoral Award
Innovation, Entrepreneurship and Intersection Awards

Lectures & Symposia

Global Issues Virtual Conference
ECU Graduate & Professional Students Appreciation Week
International Scholars and Student Symposium
Innovation, Entrepreneurship, and Intersection of Arts and Sciences Showcase
College of Education - Faculty and Student Research Showcase
The Global Issues Conference will facilitate student-centered discussions with students around the world on topics that impact young people and their futures across the globe.

Sessions (Please click on the links below to join the webinars in Zoom)

- Myths & Legends - Monday, April 1st - 7am
  https://zoom.us/j/379287412
- Education & Methodology - Monday, April 1st - 10am
  https://zoom.us/j/37600861
- Social Change - Tuesday, April 2nd - 7am
  https://zoom.us/j/379287412
- Environmental Issues - Tuesday, April 2nd - 10am
  https://zoom.us/j/37600861
- Business & Economics - Wednesday, April 3rd - 7am
  https://zoom.us/j/379287412
- World Health Issues - Wednesday, April 3rd - 10am
  https://zoom.us/j/37600861
- Global Culture - Thursday, April 4th - 7am
  https://zoom.us/j/379287412
- Education & Methodology 2 - Thurs, April 4th - 10am
  https://zoom.us/j/37600861

The Conference will Operate in a Real-Time Online Environment.

Please Join the Conversation

Contact Parth Dave or Nicholas Mork
davep17@students.ecu.edu
morkn17@students.ecu.edu
ECU GRADUATE & PROFESSIONAL STUDENT APPRECIATION WEEK 2019

GRAD, UNDERGRAD & PROFESSIONAL STUDENTS MIXER

Interested in attending a graduate or professional school? Come meet current Graduate and Professional Students over lunch!

April 3rd, 2019
12 - 1 PM, Main Student Center Deck (3rd Floor)

ECU GRADUATE & PROFESSIONAL STUDENT APPRECIATION WEEK 2019

WHAT'S THE SCOOP?

Stop by to learn how to wear graduation regalia and make your own FREE ice cream sundae!

April 2nd, 2019
12 - 2 PM, Health Science Student Center Lobby
2 - 4 PM, Dowdy Student Store Basement

This event is free and open to all ECU Graduate & Professional Students.
This event is paid for by student fees valid with ECU 1Card. For more information, please contact SAO at 252.737.1808. Individuals requesting accommodation under ADA should contact DSS at least 48 hours prior to the event at (252) 737-1016 (Voice/TTY).
PROGRAM

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

Session 1:
Session Chair: Dr. Nehad Elsawaf

2:45-3:05
Pseudo Node Insertion Method for Drone-Truck Combined Operations, Jinkun Lee, Department of Engineering, East Carolina University, Greenville, NC, 27858, Bhaswesh Sah, and Sung Hoon Chung, Systems Science and Industrial Engineering, Binghamton University, Binghamton, NY, 13902

3:05-3:25
Battling a ‘War within a War’*: The Challenge of Being Female in Africa, Mary Nyangweso, Religious Studies Program, East Carolina University, Greenville, NC, 27858

3:25-3:45
Environmental Impacts of Solar Energy: Equating Energy Production Capacity to Land Use in North Carolina, Jinkun Lee, Marissa Bochenek, Laith Damreh, Cambron Deathrage, John-Andrew Lovins, and John Mori, Department of Engineering, East Carolina University, Greenville, NC, 27858

3:45 PM-4:00 PM
BREAK

Session 2:
Session Chair, Dr. Nehad Elsawaf

4:00-4:20
The role of alveolar macrophage ABCG1 and mitochondrial metabolism in the development of fibrotic pulmonary sarcoidosis, Eman Soliman, M McPeek, A Malur and MJ Thomassen. Department of Internal medicine, East Carolina University, Greenville, NC, 27834

4:20-4:40
Bridging the Gap: What do Latino Parents Need from the Public-School System? Daniela Resendiz, Sarah Daughtridge, Michael Deming, Pramya Pakala, and Bernice Dodor, Department of Human & Family Science, East Carolina University, Greenville, NC, 27858

4:40-5:00
Towards a Sustainable Future: A study in the use of renewable energy for a nationally-renowned park, Praveen Malali, Matthew Yaeger, Julian Brady, and Tarek Abdel-Salam, Center for Sustainable Energy and Environmental Engineering (CSE3), East Carolina University, Greenville, NC, 27858

5:00 Concluding remarks- Dr. Nehad Elsawaf

---

Audience members are welcome to enter and exit between presentations.

Questions email vanscottm@ecu.edu
Faculty

Dr. Shawn Moore
Dr. Dan Dickerson

Research Focus

The Importance of Improving Youths’ Attitudes Toward Science (TAS): A Validation of a Short Form Assessment of Attitudes in Science Constructs for Fourth Grade (AASC-4)

Invited Faculty Roundtable Presenters

Faculty

Dr. Kristin Gehsmann

Presentation

The Importance of Improving Youths’ Attitudes Toward Science (TAS): A Validation of a Short Form Assessment of Attitudes in Science Constructs for Fourth Grade (AASC-4)

Dr. Michael Crowe

Presentation

The Impact of Adaptive, Web-Based, Scaffolded Silent Reading Instruction on the Reading Achievement of Students in Grades 4 and 5

Dr. Kristen Gregory

Presentation

CC Discipline Faculty Attitudes & Self-Efficacy with Literacy Instruction

Dr. Christy Howard

Presentation

Preparing Pre-service Teachers to Make the Literacy –History Connection

Dr. Xi Lin

Presentation

An Exploratory Study Using Dammaku in Online Video Based Lectures

Dr. Christopher Rivera

Presentation

Improving Study Outcomes for College Students With Executive Functioning Challenges

Student Roundtable Presentations

Student

Lauren Browning

Presentation

Student Perceptions of Small Group Instruction in the Science Classroom

Correia, Minh

Presentation

The Impact of Direct Phonics Instruction

Amy Cooper

Presentation

The Effects of Direct Instruction in Thinking Strategies on Reading Comprehension

Courtney Corvin

Presentation

The Impact of Tutoring on the Whole Student

Julie Ham

Presentation

Singing in Social Studies

Maranda Hogel

Presentation

Implementing Instructional Practices and Incentives that Promote Intrinsic Reading and Motivation

Hannah Houchen

Presentation

Phonics in First Grade

Lauren Ingold

Presentation

Literature Circles and their Impact on Reading Comprehension

Allison Morzino

Presentation

Impacts of Read-Alouds on Reading Engagement in Pre-K Students

Kelsey Phillips

Presentation

Real-world Motivation for Low Socioeconomic Students with STEM Career Awareness

Kelsie Roper

Presentation

Understanding Differentiated Talk Moves with English Language Learners

Beth Wantz

Presentation

Exploring the Effects of Book Choice to Motivate Students to Read Independently

Renee Whitaker

Presentation

The Importance of Improving Youths’ Attitudes Toward Science (TAS): A Validation of a Short Form Assessment of Attitudes in Science Constructs for Fourth Grade (AASC-4)

Mentor List

A special thank you to all the mentors that encouraged and worked with students for Research and Creative Achievement Week.

Allen, Elizabeth Twinkle
Alexander, Marrie
Anasia, Arun
Asghar, Ogul Elif
Auck, Rebecca G
Afton, William Leigh
Anderson, Terry Stafford
Akin, Shabazz
Baker, Michael Drew
Balakrishnan, Christopher
Ballard, Shawn M
Banner, Sanshakhi
Baghi, Haile Jacoeb
Bae, Beth Ann
Bao, Martin
Blakesley, April Messick Daughtrey
Blanchoff, Zifayn Mathade
Bell, Linda Prior
Bell, Linda Prior
Bend, Diana Krenzer
Bennet, Heidi Anne
Bever, Kenneth Paul
Bradley, Cassandra
Breath, Jeffrey John
Brewer, Kori Louise
Brewer, Michael Scott
Brendahl, Andrew S
Cabot, Myla Clayton
Caldwell-Davis, Kristin L
Campbell, Lisa
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Carrillo, Ricky Thomas
Chambers, Crystal Kraver
Cheeney, Elizabeth H
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Chos, Ji-Hyun
Christensen, Timothy W
Christian, John C
Clemm, Stefan
Cooper, Hannah
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Cro, Melissa Joan
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Crowe, Allison Laurenah
Culp, Stephen J
Curtright, Laura Marie
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Daniel, Allison S
Daniel, Jason Randolph
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DeWitt, Regina
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Duch, Christopher
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Durand, Alexander Nathaniel
Eagle, John Scott
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Eriksson, Timothy Paul
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Ferrell, Deanna Emme
Field, Erin Kirby
Fink, Matthew Jeff
Fleming, Thomas Ann
Forthofer, Thompson Phillipson
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Garcia, Brandon L
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Gosnell, Carol
Guo, Shanyue
Hansen, Johanna
Harvin, Brandon Lyn
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Hino, Jarniel
Hodgson, Jennifer
Holt, Victoria Tramont
Howard, Gregory Edward
Huang, Hu
Huddle, Glaiza T
Hudson, Nathan E
Hughes, Robert Murray
Humphrey, Charles Patrick
Hua, Minqian
Huston, Elia Gerald
Ina, Fatih Azz
Jensen, Jakob F
Johana, Haeun
Jung, Joe Wise
Kang, So Ae
Kariko, Daniel Joop
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Kotary, Gregory Jude
Kwon, Keith L
Kwon, Tae Nickle
Ko, Kimberly Anne
Kwon, David H
Lake, Dana Marie
Lamb, Alfred C
Lemons, Angela Lynn Smith
Larson, Ken J
Lee, Jihyun
Lee, Mi Hee
Lee, Mye Hae
Lee, Tommy D
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Lin, Zizi
Litwiller, Heather
Litsos, Ken
Lourie, James Ann
Loudner, James Ernest
Love, Brian
Lu, Qian
Lukachuk, Joseph John
Lust, Robert M
Malaf, Prasen
March, Mark D
Mansfield, Kyle David
March, June A
Mathews, Holly F
May, Linda Elizabeth
McChang, Joseph Matthew
McDowell, Kristin Ann Marie
McElroy, Amy Elizabeth
McKee, Jennifer Smith
Miller, Susan B
Mundon, Stiny Augusta
Mudah, Alurin
Mukai, Morvan B
Mitra, Siddhartha
Mitchell, John Christopher
Mickey, Jennifer Scott
Molbury, Annesuha
Moller, Brian Joanne
Murata, Ramiro Mendonca
Muravchuk, Elena Kostantinovna
Murray, Nicholas P
Nassif-Sadik, Tahri, Moh
Najjar, Peter D
O’fhaolais, Adam Richard
O’Halon, Cysthle Collins
Olsen, Carleyson, Maria
Oyin, Michelle Lynn
Papanikas, Maryade
Paynier, Sharon E
Pearler, Jack Edward
Perkins, Arianne Lappago
Perry, James L
Perry, Megan A
Pucci, Everett Carl
Petrie, Walter J
Raftery, John James
Rex, Erienne
Rickenbach, Richard Jacob
Richardson, Stephanie Lynn
Richman, Alice Rongo
Rickenbacker, Thomas M
Rieder, Patrick Michael
Remak, Timothy J
Ripp, Ray M
Roper, Rachel L
Ryan, Courtie Law
Ryan, Teresa Jean
Sargen, Andrew
Schnitzel, Brandie Kyle
Shaneen, Sadie E
Shroshank, Brian M
Shoup, Jeffreir
Simpson, Natalie E
Smith, Rayclid Elizabeth
Soderstrom, Kenneth M
Spricher, James Edward
Sperry, Ann O
Sprague, Mark William
Sproul, Ann Marie
Sproul, Anne M
Stagg, Virginia Carney
Stollinger, Stephen
Summers, Kyle
Swift, Katherine Louise
Svensen, Danna
Swift, Danna
Szelock, Brian
Thomason, James M
Thorup, Carla
Thompson, Deborah
Timmer, James R
Torres, sala Talma
Graduate Oral Presentations

**MSC 125 | Human Health**

**8:15 AM - 10:30 AM**

**G01** 8:15 - 8:30  Effectiveness of Mental Health Programming in Law Enforcement Agencies Across the United States, Kristen Proctor

**G02** 8:30-8:45  Impact of a course-based physical activity program on college students' mental health, Anna Gold

**G03** 8:45-9:00  Investigating Genetic Variants of the LIMS1 Chromosomal Region for Associations with Recurrent Stroke, Catherine Darcey

**G04** 9:00-9:15  Fine-mapping a novel locus on chromosome 1 for association with recurrent stroke, Dunya Safa

**G05** 9:15-9:30  Law Enforcement and Firefighters Physical Activity Study, Jourdyn Holsinger

**G06** 9:30-9:45  A Candidate Gene Study: Finding Associations Between Recurrent Stroke and Genetic Variants of the Five Folate-Mediated One Carbon Metabolism Pathway Genes, Nicole Mitchell

**G07** 9:45-10:00  A metabolomics approach to understanding stroke recurrence in VISP, Kelsey Spragley

**G08** 10:00-10:15  The Effects of High Perceived Exertion on Joint Kinematics during the Power Clean, Theodore Morrison

**G09** 10:15-10:30  Hazard Perception Training for Adolescents with Autism Spectrum Disorder: Using Eye Tracking and Driving Simulation, Tara Baran

10:30-10:45  BREAK

**MSC 125 | Education**

**10:45 AM - 11:45AM**

**G10** 10:45-11:00  Does Teacher Feedback Improve Student Writing?, Kimberly Rogers

**G11** 11:00-11:15  Assessing Pre-Service Early Childhood Teachers' Perceived Preparedness on Early Childhood Social-Emotional Competencies and Resources Needed, Tyla Ricks

**G12** 11:15-11:30  The Impacts of Virtual and Traditional Labs on Student Learning in Middle School Science, Samantha Brown

**G13** 11:30-11:45  Examining the Outcome of Implementing Instructional Practices and Incentives that Promote Intrinsic Reading Motivation, Maranda Hogel

11:45-12:00  LUNCH

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**Graduate Oral Presentations**

**MSC 125 | Natural Sciences**

**1:15 PM - 2:45 PM**

**G014** 1:15-1:30  Evolutionary changes in visual perception following a dietary shift in manakins (Pipridae), Robert Driver

**G015** 1:30-1:45  Parasites as Long-term Indicators of Biodiversity in Restored Coastal Habitats, Christopher Moore

**G016** 1:45-2:00  Debunking 1 + 2 + 3 + ... = -1/12, Jacek Teller

**G017** 2:00-2:15  Towards an improved classification of robber flies (Asilidae) using ultraconserved elements, Christopher Cohen

**G018** 2:15-2:30  Comparative venom gland transcriptomics of the U.S Ctenidae (Order: Araneae), Timothy Cole

**G019** 2:30-2:45  Investigating the αC Connector for Roles in Fibrin Extensibility and Polymerization, Taylor Dement

2:45-3:00  BREAK

**MSC 125 | Humanities**

**3:00 PM - 4:00 PM**

**G020** 3:00-3:15  The Representations of Child Narrators in French Avant-Garde Literature, Rachel Griffith

**G021** 3:15-3:30  Archaeological Investigations of an Early American Farmstead: The Wiley Smith Site, Kelsey Schmitz

**G022** 3:30-3:45  Need for Spanish Medical Interpreters: A Mixed-Methods Study, Corichi Jimenez-Garrido

**G023** 3:45-4:00  Fantastic Things and How we Find Them: Promoting Archaeology at Historic Brunswick Town, Kimberly Byrnes

**MSC 249 | Engineering/Technology**

**8:30 AM - 10:30 AM**

**G024** 8:30-8:45  Improved Strain Analysis of Left Ventricular Function Post Myocardial Infarction in Mice, Danielle Wilson

**G025** 8:45-9:00  Tags-Aware Recommender Systems: A Systematic Review, Babak Maleki Shoja

**G026** 9:00-9:15  Using mechanically robust hydrogels as a base for cartilage tissue engineering, Jacob Ludwick

**G027** 9:15-9:30  Personality Prediction from Online Social Network data and digital footprint, Shahin Taghikhani

**G028** 9:30-9:45  Automatic Text Summarization and Using Cognitive Computing tool to perform Sentiment Analysis on News dataset, Vishwa Patel
Graduate Oral Presentations

MSC 249 | Biomedical Sciences

G09 9:45-10:00  Machine Learning Based Medical Information Retrieval Systems, Akhil Godivada
G10 10:00-10:15  Revenue Prediction, A systematic review, Kaarla Khademorezaan
G11 10:15-10:30  Experimental Assessment of a Subordinate Oscillator Array, Jules Zapanta
10:30-10:45  BREAK

MSC 249 | Natural Sciences

G01 10:45 AM - 11:45 AM

G02 10:45-11:00  Using Environmental DNA to Detect Secretive Marsh Birds, Amberly Neice
G03 11:00-11:15  Cloning and Characterization of Classical Maize Mutant, Polytypic1, Anastasia Amoigrolou
G04 11:15-11:30  Centrifuge Force Fluorescence Microscope, Sean Cavenaugh
G05 11:30-11:45  Characterizing the Microbial Communities on Pappy's Lane Shipwreck, Kyra Price
11:45-12:15  LUNCH

MSC 249 | Biomedical Sciences

1:15 PM - 2:30 PM

G06 1:15-1:30  Glucose transporter 1 (GLUT1) is not necessary for basal or overload-induced glucose uptake in mouse skeletal muscle, Shawna McMillin
G07 1:30-1:45  Demystifying the Role of Matrix Metalloproteinase-12 in Sarcodussa, Nicole Neequaye
G08 1:45-2:00  Neuron Production in Passive Scattering Proton Therapy, Dillon Ellis
G09 2:00-2:15  Centrally Circulating α-Klotho Functions as a Novel Hypothalamic Factor Regulating NPY/AgRP Neuron Activity, Energy Balance, and Glucose Homeostasis in Mice, Taylor Landry
G10 2:15-2:30  Outbreaks of the Measles - New Prospects for a 1000 Year Old Virus, Steven Yuvan
2:30-2:45  BREAK

MSC 249 | Biomedical Sciences

2:45 - 4:00 PM

G04 2:45-3:00  Expression of constitutively active Ca2+/calmodulin-dependent protein kinase kinase α attenuates denervation-induced atrophy in mouse skeletal muscle, Luke Weyrauch
G05 3:00-3:15  AgRP Neuron Activation is Required For Acute Exercise Induced Feeding Behavior in Untrained Mice, Wyatt Bunner
G06 3:15-3:30  Influence of Muscle Phenotype on Ischemic Contractile Function and Capillary Perfusion, Emma Goldberg

Graduate Oral Presentations

MSC 253 | Fine Arts

1:15 PM - 4:15 PM

G03 1:15-1:30  Design Methodology in Natural Material, Junghoon Han
G05 1:30-1:45  Unsweet, Marin Gwyn
G08 1:45-2:00  Metempsychosis, Yichen Guan
G07 1:45-2:00  Cosmetics Under Fire and Fused, Lauren Purcell
G06 2:00-2:15  Archetypes and Explorations of the Unconscious, Amy Gunn
G07 2:15-2:30  Learning to Fail, Epiphany Knedler
2:30-3:00  LUNCH

MSC 253 | Social Sciences

1:15 PM - 4:15 PM

G06 1:15-1:30  Victim Intimidation and Intimate Partner Violence, Ellen Mcadams
G09 1:30-1:45  The Influence of Cannabis on Sexual Functioning and Satisfaction, Amanda Moser
G06 1:45-2:00  "God is a Keeper": A Qualitative Exploration of Religious Coping for African Americans, Jasmine Garland McKinney
G06 2:00-2:15  Emotional Evidence of Change: Highlanders Experiences with Glacial Retreat in the Peruvian Andes, Kara Chipiwalt
G02 2:15-2:30  The Role of Gender in Iranians’ Immigration Related Trauma in the US: A Narrative Analysis Study, Afarin Raisaei

*Co-Presenter
### Graduate Oral Presentations

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<th>Title</th>
<th>Presenter(s)</th>
</tr>
</thead>
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<td>9:00</td>
<td>Reactions to a Sexual Assault Disclosure: Evaluation of an Alternative Scoring Method for the Social Reactions Questionnaire</td>
<td>Laura Haney</td>
</tr>
<tr>
<td>9:15</td>
<td>Family members of patients with ALS: Their BPSS health and overall family functioning</td>
<td>Rachel Williams</td>
</tr>
<tr>
<td>9:30</td>
<td>Efficacy of a brief self-compassion intervention for women with Internalized Weight Bias: A review of project progress and preliminary findings</td>
<td>Erin Haley</td>
</tr>
<tr>
<td>9:45</td>
<td>Benchmarking Integration of Environmental Assessments as Part of Best Practice Heritage Site Management Strategies</td>
<td>Tara Van Niekerk</td>
</tr>
<tr>
<td>10:00</td>
<td>Microbially Influenced Corrosion of Aluminum Aircraft Wrecks in the Pacific</td>
<td>Dominic Bush</td>
</tr>
<tr>
<td>10:15</td>
<td>Sleep Across the Ages: Investigating the Validity of the Adolescent Sleep Wake Scale in a National Sample of Emerging Adults</td>
<td>Nichelle Huber, Alexandra Nicoletta, Jordan Ellis</td>
</tr>
<tr>
<td>10:30</td>
<td>Psychometric Properties of the Physical Activity, Nutrition, and Technology Survey</td>
<td>Karlie Mirabelli</td>
</tr>
<tr>
<td>10:45</td>
<td>Gender Differences in Heart Rate Variability After a Breathing Intervention</td>
<td>Amelia Saul, *Lauren Scroggs</td>
</tr>
<tr>
<td>11:00</td>
<td>Archaeology and Climate Change: North Carolina's Coastal Heritage At Risk</td>
<td>Michael Harrup</td>
</tr>
<tr>
<td>11:15</td>
<td>Adverse Childhood Experiences and Psychological Symptomology: Moderating and Mediating Roles of Mindfulness and Self-Compassion</td>
<td>Lauren Conder, *Erin Haley</td>
</tr>
<tr>
<td>11:30</td>
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### Graduate Poster Presentations

**Ballroom | Social Sciences 8:00 AM - 10:00 AM**

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<td>Laura Haney</td>
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<td>Family members of patients with ALS: Their BPSS health and overall family functioning</td>
<td>Rachel Williams</td>
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<td>Efficacy of a brief self-compassion intervention for women with Internalized Weight Bias: A review of project progress and preliminary findings</td>
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<td>Benchmarking Integration of Environmental Assessments as Part of Best Practice Heritage Site Management Strategies</td>
<td>Tara Van Niekerk</td>
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<td>Microbially Influenced Corrosion of Aluminum Aircraft Wrecks in the Pacific</td>
<td>Dominic Bush</td>
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<td>Sleep Across the Ages: Investigating the Validity of the Adolescent Sleep Wake Scale in a National Sample of Emerging Adults</td>
<td>Nichelle Huber, Alexandra Nicoletta, Jordan Ellis</td>
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<td>Psychometric Properties of the Physical Activity, Nutrition, and Technology Survey</td>
<td>Karlie Mirabelli</td>
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<td>Gender Differences in Heart Rate Variability After a Breathing Intervention</td>
<td>Amelia Saul, *Lauren Scroggs</td>
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<td>Archaeology and Climate Change: North Carolina's Coastal Heritage At Risk</td>
<td>Michael Harrup</td>
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<td>Adverse Childhood Experiences and Psychological Symptomology: Moderating and Mediating Roles of Mindfulness and Self-Compassion</td>
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**GP15**  
RELIIGOSITY: Impact on Love, Relationships and Sexual Values/Behavior, Keely Fox

**GP16**  
Impacts of Preschool Media Use on Behavioral Inhibition, Kelli Long

**GP17**  
Development of a Sustainable Bleacher Garden: Applications of Sustainability in the Carolina Outdoor Education Center’s Expedition Program, Boris Dario Escalona Berbetty

**GP18**  
College students and health care services: Exploration of students’ experiences and satisfaction with medical provider communication, WITHDRAWN

**GP19**  
Professional Collaboration of Family Life Education and Therapeutic Intervention for Adolescents Online, Krista Nichole Hein

**GP20**  
Rubble Along the Road: Determining the Function and Period of Occupation for a Plantation Structure in Brunswick County, North Carolina, Wesley Nimmo

**Ballroom | Social Sciences**

**GP21**  
Metabolic Disease in Juveniles from Ottoman-Era Jordan, Emily Edwards

**GP22**  

**GP23**  
Mental Wellness Programs in Law Enforcement, Cheyenne Franks

**GP24**  
Bioarchaeological Analysis of a Historic North Carolina Family Cemetery, Madison Long

**GP25**  
“This IS HOW I LIKE IT”: Feminist Attitudes and Decreased Orgasm Faking, Taylor Elizabeth Hilliard

**Ballroom | Education**

**GP26**  
Simply the Best for our Students: Connecting Latino Parents and the Public School System, Sarah E Daughtridge

**GP27**  

**GP28**  
An Algorithm for Student Motivation and Achievement , Victoria Gemelli

**GP29**  

**Ballroom | Human Health**

**GP30**  
The Effect of Modeling Instruction on Student Understanding of Evolution and Natural Selection, Colon Wilson

**GP31**  
Effects of Teacher Shortages and Low Retention Rates on Science Achievement, Christopher Stafford

**GP32**  
Combining Environmental Assessments and Social Determinants of Health Screening to Help Improve the Health of Low-Income, Eastern North Carolina Families with Children with Asthma, Gabriel Beattie-Sergio

**GP33**  
The Integration of Equine Therapy within Trauma-Focused Cognitive Behavioral Therapy for Individuals Exposed to Trauma, Nicole L. Davis

**GP34**  
Balance Assessment of Athletes vs.Non-Athletes Utilizing Virtual Reality Controlled by Force Plate Center of Pressure Information; Andrew Jung

**GP35**  
Racial Identification, Autumn Kristyn Scales

**GP36**  
Biomechanical Differences Between Athletes and Non-athletes After ACL Reconstruction, Kelsey Reeves

**GP37**  
AMP Degradation as a Regulator of Maximal Uncoupled Mitochondrial Respiration, Catherine Springer

**Ballroom | Human Health**

**GP38**  

**GP39**  
An Interprofessional Injury Prevention Program for Division I Women's Basketball, Thomas Childers

**GP40**  
The Effects of Hurricane Florence on Wastewater Treatment in Eastern North Carolina, Danielle Diliane Carter

**GP41**  
Prevalence of Asthma Among Hispanic Child Farmworkers in North Carolina, David Wambai
Graduate Poster Presentations

**Ballroom | Engineering/Technology**

**1:30 PM - 3:30 PM**

*GP42* Combining Augmented & Virtual Reality into a Superior Display System, Toan Huynh

*GP43* Modeling and Prediction of Cryptocurrency Prices, Alireza Ashayer

*GP44* Scripting an Automated Score and Message Board; Cyber Security Competitive Labs as a Service (CLaaS), Nicholas Hempenius

*GP45* A computational study of mechanical characteristic of a thrombus, Fatama Huda

*GP46* Intrusion Detection Techniques, Deepthi Lakshminarayana

**Ballroom | Natural Sciences**

**10:00 AM - 12:00PM**

*GP47* Design of a MeV Range particle accelerator beamline for the purpose of Optically Stimulated Luminescence, Joel Pogue

*GP48* Projections of Changes in the Distribution of Nassau Grouper Spawning Habitat Using an Ensemble of Earth System Models, Brian Bartlett


*GP50* Using Digenean Trematode Diversity to Inform Status of Estuarine Fisheries, Timothy Lee

*GP51* Assessment of Barrier Sprays Using Lambda-cyhalothrin (pyrethroid) and Pyriproxyfen (insect growth regulator) in a Residential Environment in Eastern North Carolina, Heidi Knecht

*GP52* Relating groundwater well location and depth to water quality in rural eastern North Carolina, Thomas Vogel


*GP54* New Espirito Santo Virus inhibits replication and spread of Dengue Virus in mosquitoes, Avian White

*GP55* Improve the Estimate of Energy Density in Relativistic Heavy Ion Collisions, Todd Mendenhall

*GP56* Differential gene expression in the upper and lower floret of maize, Hailong Yang

**Ballroom | Biomedical Sciences**

**10:00 AM - 12:00PM**

*GP57* Analysis of functional domains in Tomt, a protein required for mechanotransduction in sensory hair cells, Denise Zangwill

*GP58* Parion Sciences Compound Attenuates Aeroallergen-Induced Responses in House Dust Mite-Sensitive Rhesus Macaques, Hannah Woolard

*GP59* The cation diffusion facilitator family protein EmfA confers resistance to manganese toxicity in Brucella abortus 2308 and is an essential virulence determinant in mice, Matthew Johnsrude

*GP60* Poxvirus Virulence Proteins A35 and O1L as Host Immunoregulators, Alexandra Hayes

*GP61* Ozone exposure increases gene expression of inflammatory markers in the urethral mucosa of mice bladders, Laura White

*GP62* Loss of Function in Dopamine Receptor-3 (D3R) Alters Left Ventricular Cardiac Fibroblast Migration in Response to Wound and Proliferation In Vitro, Andrew Kidding

*Co-Presenter* *Co-Presenter*
Graduate Poster Presentations

**Ballroom | Biomedical Sciences**

**1:30 PM - 3:30 PM**

**GP73** Metabolomic Profiling of Downstream Nutritional Effects from Methadone Exposure In Utero Using Umbilical Cords, Kadesha McIntyre

**GP74** Small molecule and antibody inhibitors of serine proteases within the C1 complex of the classical complement pathway, Denise Rohlik

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**Ballroom | Biomedical Sciences**

**1:30 PM - 3:30 PM**

**GP73** The role of neuropilin-1 in cell-to-cell infection of T-cells by human T-cell leukemia virus type 1, Wesley Kendle

**GP74** Glucose Transporter 6 (GLUT6) Protein Levels Increase in Response to Metabolic Stress in Mouse Skeletal Muscle, Parker Evans

**GP75** Electrochemical detection of mutated DNA from Brca1-KO mice, Elizabeth LaFave

**GP76** Unipolar Polysaccharide Production in Brucella abortus, Dario Hopersberger

**GP77** Using Two Sets of MRI Images to Create CT Images, Samuel Leu

**GP78** A Low-Efficacy Tolerogenic Fusion Protein Elicits Stable Outgrowth of FOXP3+ Regulatory T cells In Vitro and In Vivo, Kayla DeOca

**GP79** PUF-8 and GLD-2 can either promote or inhibit the differentiation of spermagenic germ cells, depending on gene dosage in the Caenorhabditis elegans, Youngyong Park

**Ballroom | Biomedical Sciences**

**1:30 PM - 3:30 PM**

**GP92** Effects of Mettl3 Knockouts in MCF10 Breast Cancer Cell Line, Mohammed Dorgham

**GP93** Uric acid decreases mitochondrial bioenergetic efficiency in liver mitochondria and HepG2 cells, Katherine Buddo

**GP94** WITHDRAWN

**GP95** Investigating the Role of Hyluronan in Cortical Brain Development, Emily Wilson

**GP96** Metabolic and Cardiac Responses to Monocrotaline-Induced Pulmonary Hypertension in Sprague-Dawley Rats, Musaad Alshahy

**GP97** PPP1R2 Plays a Key Role in Regulation of Centrosome Function and Cell Division, Alan-Michael Bresch

**GP98** Elucidating the Role of Trehalose in Acinetobacter baumannii's Stress Response, Samantha Palethorpe

**Ballroom | Biomedical Sciences**

**1:30 PM - 3:30 PM**

**GP99** Castration Induced Erectile Dysfunction and Internal Pudendal Artery Damage is Reversed by Testosterone Supplementation, Michael Odom

**GP90** Identifying the Ideal Marker Placement for Lung Tumors, Wesley Belcher

**GP91** The Role of MAGL in a Mini Brain Model of ASD, Alexis Papariello

**GP92** AMP Deaminase 3 overexpression in C2C12 myotubes increases lactate production and alters the cellular metabolome, Spencer Miller

**GP93** Structure-function studies of Borrelia turicatae fibronectin binding proteins, Charles Booth Jr

**GP94** Coordinated Regulation of the Chkb and Cpt1b Genes in a Unitary Epigenetic Domain, Bhavin Patel

**Co-Presenter**

**Co-Presenter**
**Graduate Online Presentations**

<table>
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<th>Online Presentations</th>
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<tbody>
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<td>GON1</td>
<td>Peer Support and Mnemonic Vocabulary , Rachel Lowery</td>
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<td>GON2</td>
<td>Assessment of Insecticide Resistance to Organophosphates and Pyrethroids in Aedes aegypti, Natalie Cataldo</td>
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<td>GON3</td>
<td>Preconceptions in Newton’s Laws of Motion for 7th Grade Students, Brian Maccarelli</td>
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<tr>
<td>GON4</td>
<td>Science Recommendations for URM Students at Ravenscroft School, Zoe Welsh</td>
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<tr>
<td>GON5</td>
<td>Social Influence and Online Health Community Participation: Impact on Self-Efficacy and Health Outcome Expectations, Leslie Ives</td>
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**Postdoctoral Poster Presentations**

**Ballroom | General**

**1:30 PM - 3:30 PM**

| PD1 | The two-component response regulator BfmR is required for the survival of Acinetobacter baumannii on dry surfaces, John Farrow |
| PD2 | Small molecule screening reveals novel inhibitors of the classical pathway of the complement system, Blake Rushing |
| PD3 | The Human T-cell Leukemia Virus type I basic leucine zipper factor upregulates the expression of the antioxidant Heme Oxygenase I, Amanda Rushing |
| PD4 | Overexpression of AMP Deaminase 3 decreases mitochondrial protein synthesis in C2C12 myotubes, Paul Hafen |
Undergraduate Oral Presentations

MSC 125 | Social Sciences 8:45 AM - 11:45 AM

UO1 8:45-9:00 Google Helps Students Adapt to the Rapidly Growing World of E-Commerce, Kristen McKool

UO2 9:00-9:15 Increasing Nutrition Literacy Among Cancer Patients and Their Caregivers, Chelsea Thompson

UO3 9:15-9:30 Athletic Lifestyle: Is It Here to Stay?, Alexa Petrellese

UO4 9:30-9:45 LAST Study: Leisure Activity Step Tracking Study, Sarah Kautz

UO5 9:45-10:00 The Influence of Depression on Medication Adherence Among Cancer Survivors, Scarlett Anthony

UO6 10:00-10:15 Environmental Risks for High Intensity Drinking Among Young Adults: A Qualitative Study, Madison Garrigues

UO7 10:15-10:30 BREAK

UO8 10:30-10:45 A Lesson Learned the Hard Way: USA Gymnastics Larry Nassar Sexual Abuse Crisis, Kaitlyn Graden

UO9 10:45-11:00 Familial Impacts on Childhood Cancer Abstract: A Literature Review, Caroline Morton

UO10 11:00-11:15 A Critical Analysis of United Airlines' Response Strategies for Its Multiple Crisis Series, Matthew Campbell

UO11 11:15-11:30 The Role of Gender in the Association Between Symptoms of Depression, Substance Use, and Experiential Avoidance, Hunter Marie Davis

UO12 11:30-11:45 A Case Study in Social Media Management and Non-Profit Sport

MSC 125 | Engineering/Technology 1:15 PM - 3:00 PM

UO12 1:15-1:30 Renewable Energy: Market Substitution and Potential Challenges, Owen VanRiper

UO13 1:30-1:45 Moving Toward Zero-Waste for a Sustainable Future in Textiles, Ashley Miller

UO14 1:45-2:00 Automated Impact Device for Generating the Impulse Response of a Complex Coupled System, Samson Goodrich

UO15 2:00-2:15 Vehicle Routing Simulation for Greenville, NC, Emma Kloth

UO16 2:15-2:30 Comparison of Geometry-Based and Measured Coupling Ratios in Arrays of Cantilever Beams, Mariah Mook

UO17 2:30-2:45 City of Mebane Improvement Plan, Reid Butler

*Co-Presenter *Co-Presenter

LUNCH

Undergraduate Oral Presentations

MSC 249 | Human Health 8:30 AM - 10:00 AM

UO18 8:30-8:45 Clean Up Your Health Intervention - Healthy Housekeepers Initiative Phase Two Social Media Intervention, Christina Larkins

UO19 8:45-9:00 Bridging the Gap of Uncertainty and Doubt Between the Latino Immigrant Community and the Healthcare System, Becky Leon

UO20 9:00-9:15 microRNA Regulation of TLR4 Pathogen Receptor Expression and Cytokine Response in Macrophages, Erin Lucci

UO21 9:15-9:30 Newborn Drug Screening: Methadone and EDDP Quantitation Using LC/MS, Samantha Poppenfuse

UO22 9:30-9:45 Simulation of Patient Caregiver Counseling in Speech-Language Pathology, Leigh Harper

UO23 9:45-10:00 Environmental Assessment of On-Premise Drinking Establishments in Uptown Greenville, NC, Meredith Moskowiak

UO24 10:00-10:15 BREAK

MSC 249 | Biomedical Sciences 10:15 AM - 11:45 AM

UO25 10:15-10:30 Method Development for Nicotine Metabolite Ratio in Saliva for Comparison Between Mental Illness and General Populations, Jay Tikekar

UO26 10:30-10:45 A Role For Interleukin-6 Trans-Signaling Following Vascular Injury, Troy Dennis

UO27 10:45-11:00 Regional Architecture of Beta-Catenin and p120-Catenin Interactions Examined by Stochastic Optical Reconstruction Microscopy (N-STORM), William Guiler

UO28 11:00-11:15 Trace Metal Elements in Extracted and Exfoliated Teeth - The ECU Tooth Fairy Project, Mohammad Sarsour

UO29 11:15-11:30 Systematic Quantitation of Benzoic Acid Derived Preservatives in Beverages, Austin Allen

UO30 11:30-11:45 Claudin-7 Regulates the Inflammatory Signaling in Intestinal Epithelial Cells, Lesley Benderman

LUNCH
### Undergraduate Oral Presentations

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<td>Argument-Driven Inquiry: Tracking Progress Through General Chemistry, Meghan Lower</td>
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**MSC 253 | Natural Sciences**

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
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<tbody>
<tr>
<td>8:30-9:45</td>
<td>A Computational Analysis of the Hydrolysis of Aldazines in the Presence of a Wilkinson’s Catalyst, Alison Moller</td>
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<tr>
<td>9:45-10:15</td>
<td>Platinum Catalyzed Synthesis of Gamma-Keto Esters via C-H Bond Functionalization, Dylan Hardee</td>
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<tr>
<td>9:30-9:45</td>
<td>Where Do They Goby?: The Study of Gobiosoma bosc Behavior in Response to Visual Implant Elastomer Tags, Corey Winkler</td>
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<tr>
<td>10:15-10:30</td>
<td>Settling Differences: Factors Affecting Nest Size Variation in the Eastern Bluebird Sialis Sialis, Angelica Reed</td>
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<tr>
<td>10:45-11:15</td>
<td>Investigating What Effect Flow Has on Fibrin Properties using Microfluidics, Miranda Lee</td>
</tr>
<tr>
<td>11:00-11:30</td>
<td>Expression and Characterization of an Immobilized Tobacco Etch Virus (TEV) Protease: Streptavidin Fusion Protein, Jessica Norris</td>
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<tr>
<td>11:30-12:00</td>
<td>Characterizing the Binding of Ca(II) and Cd(II) to Wild Type and Mutant C35A and C84A h/TnC by ICP-OES and Isothermal Titration Calorimetry, Caitlin Palmer</td>
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<tr>
<td>12:00-12:30</td>
<td>Mechanics Regulating the Dissolution of Fibrin in Blood Clots, Sean Cone</td>
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<tr>
<td>12:15-1:00</td>
<td>Applying Data Science to Study High-Resolution Precipitation Delivery in Rural Jamaica: 2014-2015, Calie Hemgen</td>
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**Great Room 3 | Human Health**

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<tr>
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<tbody>
<tr>
<td>11:45-1:15</td>
<td>LUNCH</td>
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<tr>
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<tbody>
<tr>
<td>1:15-2:00</td>
<td>The Anger and Anxieties of the Asian and African Diaspora as Explored Through Poetry Film and Textile Arts, Andrew Li</td>
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<tr>
<td>2:00-2:15</td>
<td>Human: An Exploration of the Subjective and Objective Factors that Influence Our Understanding of What It Means to Be Human, Megan Piggott</td>
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<tr>
<td>2:15-2:30</td>
<td>Art: The Grand Illusion, Alexander Stoehr</td>
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<tr>
<td>2:30-2:45</td>
<td>Unlikely Hero, Carrie Thompson</td>
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<tr>
<td>3:00-3:15</td>
<td>Documenting a Return to Historical Jazz through Musical Research and Creation, Thomas Weybrecht</td>
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<tr>
<td>3:15-3:30</td>
<td>Increasing Cultural Awareness through my Passion for the Arts, Bina Amin</td>
</tr>
</tbody>
</table>
Undergraduate Poster Presentations

**Ballroom | Human Health**

**8:00 AM - 10:00 AM**

**UP1** Knowledge and Perception of the Prevalence and Treatment of Type II Diabetes among Students at East Carolina University, Kelly Kimble

**UP2** Vowel identification in regional dialects of African American English in North Carolina, Carmen Love

**UP3** Developing and Testing the Functionality and Usability of a Bereavement Support Web-Based Link for Bereaved Parents, Jacqueline Tyson

**UP4** Marshmallow-Bagel Upper Gastrointestinal Study in Paraesophageal Hernia Patients, Coleman Hayes

**UP5** Using Heart Rate Variability to Assess Resident Stress During Central Venous Catheter Simulation, Adelaide Robbins

**UP6** The Effect of Enhanced Preparation on Students’ Performance in Simulation, Eliza Davis

**UP7** Comparison of Levator Veli Palatini Muscle Contraction in Sustained Phonation Versus Connected Speech, Katherine Coleman

**Ballroom | Human Health**

**10:00 AM - 12:00 PM**

**UP8** The Influence of Maternal Exercise and Nutrition on Health Disparities and Birth Outcomes, Madigan Raper

**UP9** The Effects of Aerobic Exercise Intensities on Central Blood Pressure in Overweight and Obese African Americans, Ethan Holland

**UP10** Word identification: The influence of sex, race and regional dialect, Morgan Widdowson

**UP11** Current State of Research in Velopharyngeal Ratios to Determine Velopharyngeal Competence: A Review of the Literature, Brianna Swain, Abigail Schwan

**UP12** The Relationship between Patient Portals, Engagement, and Outcomes: Is Health Literacy an Important Link?, Drew Corpening

**UP13** HPV Health Literacy and Vaccination Recommendation Practices of North Carolina Physicians, Kristen Barnes

**UP14** Parental Support, Efficacy, and Objectively Measured Physical Activity Among Preschool-Aged Children, Dominique Bellardini

**UP15** INQUIRY: Health Information Outreach, Avery Bryan

**UP16** The Impacts of Age on the Communication Between the Cranial Base Angle and Cervical Vertebrae, Shana McCusker

**UP17** Contribution of the Palatoglossus Muscle to Speech Production: A Systematic Review of the Literature, Imani Gilbert

**UP18** Racial Identification of African American and White Female Speakers, Monica Beingolea

**UP19** Let’s Talk About Sex!, Samantha Foster

**UP20** Parenting Styles and Their Relationship to the Physical Activity Levels of Preschool-aged Children, Hannah Cooper

**UP21** An Examination of Sugar Sweetened Beverage Consumption among Pre-school Age Children in Eastern North Carolina, Gabby Rudiak

**UP22** Tense and Lax Vowel Identification Errors in Regional Dialects of English, Megan Jackson

**UP23** Understanding What Factors Influence Mammography Follow Up Times, Kristin Coleman

**UP24** Health related consequences of musculoskeletal injuries in adolescents and adults: a comprehensive literature review, Abigail Donahue, Margaret Marshall

**UP25** Participant’s Experience with Biofeedback: A Phenomenological Study, Regent Perez

**UP26** Examining Depression Scores and Cardiovascular Risk in a Community Sample, Alexandra Stephens

**UP27** South Asian Cancer Cross-Sectional Study, Kirtan Amin

**UP28** Use of Ecological Momentary Assessment to Assess Sedentary Behavior among Children ages 2-5 years, Ashlyn Hyde

**UP29** A Content Analysis of Facebook Groups on Chronic Obstructive Pulmonary Disease (COPD), Avery Apperson
# Undergraduate Poster Presentations

## Ballroom | Social Sciences

| UP31 | U.S.-Russian Foreign Relations: Strategic Nuclear Forces and Arms Control Agreements, Christa Gordon |
| UP32 | Future Faculty Role Intent of North Carolina Associate Degree Nursing Students, Casey Powell |
| UP33 | Understanding Sexual Assault Victimization Among College Men: A Mixed Methods Approach, Emily Downs |
| UP34 | Developing and Testing the Functionality and Usability of a Bereavement Support Web-based Link for Bereaved Parents, Laura Whittington |
| UP35 | Prehistoric Artifact Classification at Raven Rock State Park, Timothy Boykin |
| UP36 | The Effects of Motivational Primes on Exercise Performance, Kaleb Davis |

## Ballroom | Social Sciences

| UP37 | Romantic Breakup: Difficult Loss for Some but Not for Others, Kerry Carter |
| UP38 | Examining Cardiovascular Risks in a Community Sample, Katlin Guard |
| UP39 | Humanitarian Aid and its Effect on Conflicts with Multiple Rebel Factions, Madeline Fleshman |
| UP41 | Association between HRV and Social Anxiety in a College Population, Eliza Varju |
| UP42 | The "Good Death": An ethnographic case study of rezadoras in Guatemala, Graziella Dominado |
| UP43 | Objective Measurement of Physical Activity Over Time in Older Adults with Heart Failure, Catherine Taylor |

## Ballroom | Natural Sciences

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## Ballroom | Natural Sciences

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## Ballroom | Natural Sciences

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<td>UP55</td>
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</table>
| UP57 | Time for Tea: Consequences of long-term fertilization on wetland microbial community structure and decomposition, Megan Kocza 
| UP58 | Effects of Hurricane Florence on marine carbon cycle processes, Sara Roobehi |
| UP59 | Examining the Role of Microorganisms in Underwater Carbon Cycling, Matthew Woodlief |

## Ballroom | Natural Sciences

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<td>UP60</td>
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Undergraduate Poster Presentations

WEDNESDAY 4.3.19

Geographically distinct but non-monophyletic morphs: Reexamining the evolution of color in Florida burying beetles (Coleoptera: Geotrupidae: Peltotrupes), Emily Scott

Androgen and progesterone receptor knockouts in zebrafish affect aggression and social dominance, Julia Brown

Use of HPLC Column Retention Probes to Predict Pharmaceutical Method Development Direction, Caleb Collins

Development of novel tryptophan analogues to study and expand protein function, Kristin Tyson

Ballroom | Natural Sciences 10:00 AM - 12:00 PM

All About the Reads: Sequencing Environmental Microbial Genome with Nano-pore Technology and Comparing Its Quality to Other Sequencing Methods, Kelvin Macklin

Social Regulation of the Escape and Swim Motor Circuits in Dopamine Receptor Type 1 Mutant Zebrafish (Danio rerio), Joseph Ward

Parasites as Indicators of Biodiversity in Coastal Shoreline Habitats, Emily Edmonds

Measuring Soil Sulfate Reactions Rates And Redox Potential Under Nutrient Manipulations In A Pocosin Wetland, Brent Williamson, Christopher Rogers

Characterizing the binding of a 33-mer EF-hand peptide to Ca(II) and Cd(II) using Isothermal Titration Calorimetry (ITC) and Circular Dichroism (CD) Spectroscopy, Kijay Byers

Fluorescent Protein Cell Sorting as a Method to Isolate a Stable Cell Line, Elizabeth Viverette

Describing Collaborative Exams Using Random Graphs, Aaron Bain

Ballroom | Education 1:30 PM - 3:30 PM

Tackling Student Debt, Bradley Atkinson

Building QI Nurse Leaders: Validating a MSN – Nurse Leader “Stand-alone” Quality Improvement Course (QI) Based on Student Learning Outcomes, Madison McCauley

The Need and Impact of Peer Education in the Field of Mental Health || PsydeKick, Danielle St. Onge, Sara Poston, Molly Moseley, Nicholas Mork

Using Dialogic Reading to Foster a Growth Mindset in Early Elementary Students, Jenna Murdoch


The Impact of Experiencing Immersive Simulation in Teaching, Carley VanHoy

Improving Student Understanding of Mitochondrial Bioenergetics with Teaching Tool, Jessica Brush, Patricia Malcolm, Basel Abdel fattah, William Blake, William Guptill

And the Band Played On: A Case in the Consequences of Student Activism, Amber Sturdivant, Chloe Pearson, Jayla Cofield

Ballroom | Humanities 1:30 PM - 3:30 PM

I Made It Up: Maps, Essays, and Other Guides for the Queer Black Girl, Glenesha Berryman

Linking Tsiolkovsky’s Rocket Science to the Humanities, Chase Neese

Chekhov and Shakespeare on the Modern Stage: Two Plays in One Show, Katie Collins

The H&M Racist Scandal: Diversity Deficits in an Era of Global Public Relations, Ava Crucittiello

Ballroom | Biomedical Sciences 8:00 AM - 10:00 AM

Role of Dopamine-3 Receptors in left ventricular cardiac fibroblasts proliferation, Deepthy Melit Thomas

Expression of Human IFN-β Protein by Chinese Hamster Ovarian Cells, Todd Hylton

Development of a Manual Documenting Pre-Clinical Application of Songbirds as a Model to Assess Drug Efficacy to Improve Vocal Learning, Carly Judd, Rachel Hodges

Impacts of an Organophosphate and a Pyrethroid on Insecticide Resistance in Culex quinquefasciatus (Diptera: Culicidae), Deryn Smith

Age-dependent study of pathological progression of Alzheimer's disease in hippocampal and cortical tissue of human and an AD mouse model, Taylor Leposa

Characterization of predicted microtubule-associated proteins in sensory hair cells of zebrafish (Danio rerio), William Biggers

Molecular chaperone Tetra-trico-peptide repeat protein 2 (Tpr2) is essential for germline stem cell self-renewal and timely cyst divisions in Drosophila melanogaster oogenesis, Morgan Phillips

Ballroom | Humanities 1:30 PM - 3:30 PM

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## Undergraduate Poster Presentations

### Ballroom | Biomedical Sciences  
10:00 AM - 12:00 PM

**UP95** 
An Examination of Potential Neurobiological Differences in Exercisers and Non-Exercisers, Rachel Grantham

**UP96** 
The Effect of Downstream Resistance in a CABG, Anup Sanghvi

**UP97** 
Targeting Enzymes of Sphingolipid Metabolism in Treatment of Colorectal Cancer, Conor Pumphrey

**UP98** 
Influence of Modified Starches on Mental Performance and Physical Endurance Following Exhaustive Exercise, Callie Herman

**UP99** 
SCI-Induced Morphine Tolerance is Associated with Dopamine Pathway Expression, Ryan Patton

**UP100** 
The role of N6-methyladenosine (m6A) mRNA modification in regulating tumor cell progression, Kristin Chesnutt

**UP101** 
Do Prenatal Supplements Protect the Placenta from Environmental Contaminates, Ariel Fricke

**UP102** 
Factors Leading to DKA Readmissions: A Qualitative Content Analysis Study, Mattie Parrott

### Ballroom | Biomedical Sciences  
8:00 AM - 10:00 AM

**UP103** 
Decellularizing Murine Hearts for Electrospinning 3D Microenvironments, Patricia Malcolm

**UP104** 
The Role of PGRMC1 in Hormone Metabolism in Zebrafish, Pujan Patel

**UP105** 
Negative Cumulative Impact of Low Testosterone and Cavernous Nerve Injury on Pelvic Nerve Integrity, Jennifer McMains

**UP106** 
The Relationship Between Speech Recognition in Noise and Reading Abilities, Hannah Moore

**UP107** 
Platinum Catalyzed Synthesis of Alpha-Keto Esters via C-H Bond Functionalization, Christopher Rogers

**UP108** 
The voltage-gated Ca2+ channel Cav1.3 regulates gene expression in zebrafish, Cameron Smith

**UP109** 
Influence of Intrinsic Aerobic Running Capacity on Cardiac Adaptive Responses to Stress, Alexander Clark

**UP110** 
High fat diet impairs detrusor mitochondrial fatty acid oxidation in male but not female mice, Hanna Kosnik

**UP111** 
Quantitation of Benzoate Preservatives in Drinks Commonly Consumed by NC’s Pediatric Population, Nolan Davis

**UP112** 
Beneficial Neurocognitive Effects of Chronic Naltrexone Treatment in Rats Poisoned with the Sarin Analog Disopropylfluorophosphate, Justin Martin

**UP113** 
An ECG analysis determining the impact of mother’s metabolic equivalent value in pregnancy on infant heart rate variability, Alexandra Williams

**UP114** 
Effect of the extracellular matrix on macrophage remodeling responses, Felicia Jaimes

**UP115** 
Prostatic radiation increases cholinergic gene expression leading to enhanced nerve-mediated contractions, Alexander Turner

**UP116** 
Brain iron deficiency alters sleep performance in a mouse model of Restless Legs Syndrome, Joseph Basco

**UP117** 
Design, Expression, and Characterization of a Bifunctional Protein Chimera for Applications in Molecular Biology, William Taylor

**UP118** 
Physiological Effects of the Melancortin-1 Receptor Gene in Poison Dart Frogs, Matthew Pahl

### Ballroom | Biomedical Sciences  
8:00 AM - 10:00 AM

**UP119** 
Conserved residues of the periplasmic iron transporter from Brucella spp., play important roles in the native structure of the FtrA protein: A calorimetric study, Mina Chanakira

**UP120** 
Electrospinning Synthetic Extracellular Matrix, Anup Sanghvi

**UP121** 
The effect of different optic flow speeds on cognitive performance in sitting and standing, BinKai Hsu

**UP122** 
Investigating the Impact of Mettl16 Cellular Localization on RNA Binding Preferences, Daniel Nance

**UP123** 
Understanding conformational dynamics of Transglutaminase 2 (TG2) using denaturant-induced unfolding studies, Alexander Hondros

**UP124** 
The Antifungal Properties of Berberine Chloride on Candida spp., Danish Hasan, *Ketan Joglekar

**UP125** 
Garlic bioactives influence macrophage associated matrix remodeling enzyme expression in vitro, Thais Oliveir

**UP126** 
Biomechanical Alterations in the Snatch during a Bout of 30 Repetitions, Hannah Black

*Co-Presenter  *Co-Presenter
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<tr>
<th>Ballroom</th>
<th>Biomedical Sciences</th>
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<tbody>
<tr>
<td>UP127</td>
<td>Effective Recruitment Strategies for Community-Based Health Initiatives in At-Risk Communities, Michael Denning</td>
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<tr>
<td>UP129</td>
<td>Creating a Club to Increase Sexual Assault Awareness and Prevention on ECU’s Campus, Danielle Adams, *Phoenix Little</td>
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<tr>
<td>UP130</td>
<td>Factors Influencing Community Collaboration in Public Health Initiatives in Developing Countries, Claudia Woznichak</td>
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<tr>
<td>UP131</td>
<td>Sustainable Success: Motives &amp; Charity Sport Events, Bailey Cooper</td>
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<tr>
<td>UP132</td>
<td>Quiz of Student Interest (QSI), Stephanie Goodman, *Madison Dalgreen, Elizabeth Majette, Abigail Squares</td>
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<th>Community Engagement</th>
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<tr>
<td>UP133</td>
<td>Health4PINE: Our Health Our Responsibility Course Effectiveness, Pranaya Pakala</td>
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<td>UP134</td>
<td>Beaufort County Regional Park Site, Samuel Hunter</td>
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<td>UP136</td>
<td>Ending Drunk Driving at East Carolina University, Michael Crumpler</td>
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<td>UP138</td>
<td>Not Broken: Improving Disability Sport, Sarah Horrell</td>
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<tbody>
<tr>
<td>UP139</td>
<td>Hog Slat Process Improvement Capstone, Houston Beasley, *Dylan Scheck</td>
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<tr>
<td>UP140</td>
<td>Gregory Poole Abstract, Jarrett DePizzol</td>
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<td>UP141</td>
<td>Development of a second generation novel air puff system prototype for use in medical, cosmetic, and food industry, Keith Williams, *Antonia Dingeman, *Grace Krell</td>
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<td>UP142</td>
<td>Characterizing Pulmonary Artery Hemodynamics in End-Stage Renal Disease Patients, Daniel Pearce</td>
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<td>UP144</td>
<td>Crown Equipment Corporation, Cole Brunet</td>
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<td>UP145</td>
<td>DSM Dyneema Process Improvement Project, Andrew Thomas, *William Jackson</td>
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<th>Engineering</th>
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<tbody>
<tr>
<td>UP146</td>
<td>Modeling of human insulin-glucose response mechanism for diabetes analysis, Natalie Bell</td>
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<td>UP147</td>
<td>Design of a Patient Orientation Monitoring System, Christopher Satterley, *Christopher Satterley, *James Barros</td>
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<td>UP148</td>
<td>Pressure Evaluation of Tracheal Suction Catheters to Reduce Damage to Respiratory Airways, Marcus Moody</td>
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<td>UP149</td>
<td>The Future of Advanced Manufacturing in High Bay, Eric Clark, *Avery Jeffers</td>
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<td>UP150</td>
<td>3D Printing Patient-Specific Images for Diagnostics and Perioperative Planning, Joshua Butler</td>
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<td>UP151</td>
<td>The Future of Engineering Education, Jeremiah Johnson, *David Harr</td>
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<td>UP152</td>
<td>Detection of the Freshness of Fish Using A Novel Air Puff Device, Antonia Dingeman</td>
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<tr>
<td>UP155</td>
<td>Capstone Project for IENG 4900, Patrick Thompson, *Nicholas Clarke</td>
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<td>UP156</td>
<td>Winterville Metal Works, Cody Blackburn</td>
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<tr>
<td>UP157</td>
<td>Detection of the Freshness of Fish Using A Novel Air Puff Device, Grace Krell</td>
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<td>UP158</td>
<td>Weyerhauser Capstone, Gregory DeDecker</td>
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<td>UP159</td>
<td>Analytical Model of Ocean Energy: Determining Peak Energy Level Potential, Angela Krebs</td>
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<tr>
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<tr>
<td>UP160</td>
<td>Size Inclusivity, Ronicka Evans</td>
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<td>UP161</td>
<td>How Does Interactivity With App Affect Customer's Continuance Retention?, Richard Fisher</td>
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<td>UP162</td>
<td>Investigation of Effects of Social Factors of Apps on Customer Continuance Intention, Katherine May</td>
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<td>UP163</td>
<td>The Failure of Lehman Brothers: What went wrong?, Victoria Bishop</td>
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<td>UP164</td>
<td>Preparing the Future Accounting Professional for a Rapidly Changing World, Marianna Shurina</td>
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<td>UP165</td>
<td>Utilizing the Lean Launchpad Method to Determine Feasibility of Creating Interactive Digital Media as a Health Education Tool for Phosphorus Management in Chronic Kidney Disease Patients, Priya Patel</td>
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*Co-Presenter
Undergraduate Poster Presentations

Ballroom | Technology and Computer Sciences

1:30 PM - 3:30 PM

UP166 Ameratrail Boat Trailers, Campbell Locke

UP167 Enhancement of operational sustainability of a nationally-renowned park through the use of renewable energy and energy-efficient technology, Matthew Yaeger

UP168 HMF Express Process Improvement Project, Theotokis Mavroidis

UP169 Real-time Augmented Reality Data Visualization Based On External Sensors, Dean Murray

UP170 Spirit Aero Capstone Abstract, Everett Sawyer

UP171 Big Data Analytics for Historical Document Processing, James Philips

UP172 In Pursuit of Green Office Certification, Leanna Pond, *Jason Loria


*Co-Presenter
Impact of a course-based physical activity program on college students’ mental health

Anna Wilder Gold
Mentor: Dr. Bhibha Das
Assistant Study Coordinator - Sue-L Cohen

Mental health issues are significant in the college health population and may impact college students’ overall quality of life and wellbeing. The American College Health Association found 52.7% of students reported feeling hopeless and 39.1% reported having an intense feeling of depression during that past 12 months. Physical activity has been demonstrated to improve mental health in a variety of populations, including college students. The purpose of this study is to examine the impact of a course-based physical activity program on college students’ mental health. The intervention will take place over a 16-week academic term. Pre and post-intervention measurements will examine physical activity levels, physical activity enjoyment, physical activity self-efficacy, anxiety, depression, resiliency, and grit. Subjective physical activity levels will be examined by a 7-Day IPAQ Recall Form. We will utilize a physical activity enjoyment and feeling scale to assess students’ overall feelings toward physical activity. The students will complete an exercise self-efficacy questionnaire to examine confidence in participating in physical activity. The Hospital Depression & Anxiety scale and Keyes’ Mental Health Continuum short form will address a students’ levels of anxiety and depression. The Brief Resilience Scale will assess one’s level of resiliency and a short 8-item grit scale will assess each student’s grit levels. We hypothesize that a 16-week physical activity course will improve college students’ mental health, physical activity enjoyment, resiliency, grit and self-efficacy. With the resources being offered by this program, students may develop an understanding of how their mental health and quality of life are impacted through physical activity.
each of the measures of physical, mental and occupational health. CONCLUSION: The stressors that come along with the nature of job demands for law enforcement officers and firefighters can have a negative effect on their physical, mental and occupational health. Due to these stressors, it is critical to examine solutions to help lower the risk of stress and improve measures of health in both populations.

GO6
A Candidate Gene Study: Finding Associations Between Recurrent Stroke and Genetic Variants of the Five Folate-Mediated One Carbon Metabolism Pathway Genes
Nicole R Mitchell
In the United States, someone has a stroke approximately every 40 seconds, accounting for about 795,000 people suffering from a stroke annually. A stroke is a cerebrovascular event that results from a lack of oxygen supply because of either a blockage or rupture of a blood vessel leading to the brain. Genetic data from individuals enrolled in a clinical trial were used to investigate the association between candidate genes and stroke-related phenotypes, i.e. elevated homocysteine levels, which have been significantly associated with stroke and recurrent stroke risk. The candidate genes included in the investigation are MTHFR, MTR, GNMT, CBS, and TCN2 because of their roles in the Folate-Mediated One Carbon Metabolism Pathway in which they work together to regulate the level of homocysteine in the blood. Single-nucleotide polymorphisms, or SNPs, in these gene regions have been associated with stroke-related phenotypes in previous studies. DNA sequencing of a subset of the genetic data was used to identify the SNPs in these gene regions. These SNPs were then genotyped in the collective genetic dataset to find associations between the individuals' genotypes and stroke-related phenotypes. Statistical analyses revealed significant associations for both individual SNPs and the gene regions as a whole for a number of recurrent stroke-related phenotypes. A metabolomics approach to understanding stroke recurrence in VISP
Kelsey Janae Spragley
Stroke is a significant health burden, being the number one cause of serious, long term disability in the United States. Of the 795,000 stroke incidences each year 185,000 are recurrent. This is significant due to recurrent strokes being more deadly and disabling than singular strokes. Interestingly, there are ethnic disparities in stroke as African-Americans are twice as likely to die from a stroke and die at a younger age when compared to their European-American counterparts. Metabolomics is a large-scale study of small molecules or metabolites and their chemical processes. Studying the metabolome allows for not only a more complete picture of these small molecules, but also a more precise measure of biochemical activity. With samples from the Vitamin Intervention for Stroke Prevention (VISP) clinical trial we hope to determine the differences in metabolite profiles of African-American recurrent vs. non-recurrent individuals, to ascertain whether there are alterations in metabolism between the groups. Following metabolomic analyses, methylation and genomic data will be used in order to further determine potential biomarkers for stroke recurrence based on their relationship with metabolomic profiles. Preliminary analysis has shown metabolites associated with smoking and related phenotypes such as current smoking exhibit significant differences between groups. Other points of interest lie in the relationship between aforementioned nicotine metabolites and sulfates, as well as the role of selective serotonin reuptake inhibitors and ACE inhibitors on stroke recurrence. Other points of significance lie in tryptophan and gut microbiome derivatives being elevated in the recurrent group. In the absence of dietary changes, said trends could suggest the recurrent group harbors a different gut microbiome. Lastly, sphingomyelins and ceramides also showed significant and trending decreases in the recurrent group. This data along with its potential correlations to thrombomodulin suggest a relationship between cereamides and thrombomodulin in maintaining endothelial cell function. These data together suggest that there is mild segregation between groups, with the recurrent and non-recurrent groups displaying slightly different biochemical signatures. Further analyses involving both genomic data and methylation data will further ascertain potential biomarkers for stroke recurrence which can be used in precision medicine efforts for more personalized treatment.

GO7
The Effects of High Perceived Exertion on Joint Kinematics during the Power Clean
Morrison, Theodore; Silberg, Ryan; Nzelek Stuart, Rider Patrick
High intensity training protocols incorporating Olympic lifts have become increasingly popular in the recreationally active population. Studies have found there to be an elevated injury rate in recreationally active populations using Olympic lifts in their training sessions. Previous studies have also found that while performing Olympic lifts such as the power clean while experiencing high perceived exertion, an altered barbell path has been observed. No research has been done investigating if these barbell path alterations result in altered joint kinematic or if these changes have a relationship with exercise or perceived exertion. No research has been done investigating if these barbell path alterations result in altered joint kinematics or if these changes have a relationship with high perceived exertion. The purpose of this study is to examine the effects of high perceived exertion on joint kinematics during the power clean.
All participants in this study had at least six months of experience with the power clean and were otherwise free from injury. Participant's height and weight (176 ± 13.4, 76.7 ± 14.1 kg) were taken after signing the university approved informed consent and then each participant was fitted with reflective markers to track relevant joints and segments using 3D motion capture and 2 force platforms. The participants completed a high intensity weightlifting protocol that consisted of 15 power cleans at 60% of self-estimated 1-RM with 30 seconds of jump squats after repetition 5 and repetition 10. Participant's rating of perceived exertion (RPE 0-10) collected after each bout of jumps squats. Bilateral hip, knee, ankle, elbow and shoulder joint angles and velocities were calculated. Results indicated greater knee flexion, greater trunk flexion and a lower barbell height at the onset of the catch phase as RPE increased. Findings indicated that as RPE increases, mechanics in the power clean are altered in a manner that might put the weightlifter at an increased risk of injury especially in the low back and knees. Understanding how mechanics change during power cleans and how they are related to a lifter's perceived exertion may be able to guide coaches to incorporate new weightlifting cues, especially when a participant is approaching maximal exertion.

GO8
Hazard Perception Training for Adolescents with Autism Spectrum Disorder: Using Eye Tracking and Driving Simulation
Tara J Baran
Currently, the CDC estimates 1 in 59 children are diagnosed with autism spectrum disorder (ASD), which is typically characterized by impaired social interaction, repetitive behavior, and difficulty communicating both verbally and non-verbally. However, while individuals with high functioning ASD (HFAAD) tend to have high cognitive skills, language skills, often succeed in higher education, live independently, secure full-time work, and develop relationships, they still need assistance with everyday living skills such as independent driving and community mobility. Driver's license rates of teens with ASD are lower compared to the general population, likely due to ASD characteristics: problems with executive functioning, motor coordination, attention, anxiety, and understanding non-verbal communication. Teens need to learn when to scan the environment and react to hazards to drive and research has found eye gaze, visual attention, visual scanning, and hazard perception differences between adolescents with ASD and their typically developing peers.

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high school science students’ weekly writing assignment will reduce the number of errors and improve the thoroughness of answers. The following is a guide given by their teacher. Twenty North Carolina public high school Earth and Environmental Science students, ranging in age, gender, and ethnicity will participate. Data will be gathered qualitatively and quantitatively, and graphed to show any changes in the number of mistakes and questions answered, as well as if answered thoroughly and correctly. Over a five-week period, students will independently read and find a current science article relating to the topic. Feedback will be left on all student papers for review and consideration, in anticipation that improvements are made from week to week. The number of student errors, amount of questions omitted and answered incorrectly, and the accuracy of answers are expected to decline during the study. At the end of the five weeks, students will show a marked improvement of how well they answer questions of the assignment and error reduction, showing that teacher feedback does improve high school science students’ writing performance.

Assessing Pre-Service Early Childhood Teachers’ Perceived Preparedness on Early Childhood Social-Emotional Competencies and Resources Needed
Tyla Ricks¹
Department of Human Development and Family Science, East Carolina University²

Mental health challenges of children have been a growing concern, but an even greater matter is the awareness and preparedness of pre-service teachers to identify and accurately respond to these challenges. North Carolina’s Infant/Young Child Mental Health Association (2016) has taken steps to address this concern. To reduce the number of errors and improve the thoroughness of answers, the following is a guide given by their teacher. Twenty North Carolina public high school Earth and Environmental Science students, ranging in age, gender, and ethnicity will participate. Data will be gathered qualitatively and quantitatively, and graphed to show any changes in the number of mistakes and questions answered, as well as if answered thoroughly and correctly. Over a five-week period, students will independently read and find a current science article relating to the topic. Feedback will be left on all student papers for review and consideration, in anticipation that improvements are made from week to week. The number of student errors, amount of questions omitted and answered incorrectly, and the accuracy of answers are expected to decline during the study. At the end of the five weeks, students will show a marked improvement of how well they answer questions of the assignment and error reduction, showing that teacher feedback does improve high school science students’ writing performance.

Evolutionary changes in visual perception following a dietary shift in manakins (Pipridae)

Robert Driver, Chris Balakrishnan

Manakins (family Pipridae) are a group of Neotropical birds consisting of about 60 species. Male manakins have acrobatic sexual displays that involve rapid movements, including the fastest vertebrate limb muscles found in nature. Some manakin species exhibit complex coordinated or rapid displays, while others have simple displays that consist of no more than flicking their wings up and down. Species with complex displays have an increasingly frugivorous diet, compared to species with basic displays that feed primarily on insects. To understand the evolutionary changes associated with complex displays and frugivory, I investigated evolutionary changes in sensory perception that may enable manakins to better detect fruit. Specifically, I compared changes in the sequences of manakin visual opsins to understand rates of evolutionary change in genes associated with visual perception, as well as specific nucleotide changes in this gene family that may enhance fruit detection.

Parasites as Long-term Indicators of Biodiversity in Restored Coastal Habitats

Christopher Scott Moore, April Monica-Houghton Blakeslee
Department of Biology, East Carolina University

Trophically-transmitted parasites require multiple hosts to complete their life cycle, and parasites and host abundance are often tightly correlated. Previous studies have shown that parasite prevalence in more easily sampled intermediate hosts (e.g. mollusks, crustaceans, and small fish) has good predictive power for the community diversity of other taxa required for the parasite to complete its life cycle (e.g. birds, fish, terrapins). In collaboration with North Carolina Sea Grant and the National Estuarine Research Reserve, we are using parasite diversity as a proxy for overall community diversity to evaluate the success of different coastal habitat restoration techniques within North Carolina’s Rachel Carson Estuarine Reserve. Portions of the Reserve were restored using a block design incorporating three replicates of three different treatments: control (no restoration), shell bags, and oyster catcher material. Pre-restoration sampling was conducted monthly to better detect any changes in biodiversity. Monitoring continued until restoration effects were observed and parasite diversity was measured. Finally, parasite diversity was compared among the three treatments using ANOVA and graphical techniques to determine if differences were statistically significant and whether restoration treatments had a positive effect on parasite diversity.
Towards an improved classification of robber flies (Asilidae) using ultrconserved elements

Chris Cohen, Katherine Noble, Jeff Cole & Michael Brewer

The most recent classification organizes robber flies (Asilidae) into 14 subfamilies. Not all workers accept this arrangement, however, and many genera remain unplaced. Previous phylogenetic studies utilising morphology or traditional molecular markers have struggled to provide strong support for many clades, lending further uncertainty to these subfamily relationships. A dataset consisting of hundreds of UCE loci was therefore leveraged to infer the best supported comprehensive phylogeny of Asilidae to date.

Comparative venom gland transcriptomics of the U.S Ctenidae (Order: Araneae)

T. Jeffrey Cole & Michael S. Brewer

Wandering spiders of the family Ctenidae comprise over 500 species mostly distributed across neotropical habitats and have a venomous bite. The Representations of Child Narrators in French Avant-Garde Literature

Rachel Morgan Griffith

This research project examines the child narrator in post-World War II experimental French literature. This is a relevant topic in academic discourses today, as the recent issue Critical Review of Contemporary French Fixiondemonstrates with its issue dedicated to children’s voices in contemporary French literature. This project will address cultural and aesthetic questions about childhood, gender, and identity. Its emphasis on Avant-Garde literature and the bildungsroman genre informs our understanding of how France’s most innovative authors shaped the discourse on post-war aesthetics and constructed a new vision of growing up in a rapidly urbanizing post-war French society. Focusing on the eponymous female narrator in Raymond Queneau’s Zazie dans le Métro (1959) and the unnamed male narrator of Joyce Mansour’s Le Cancer, this paper addresses topics of childhood and identity, and will also explore questions related to childhood innocence and resistance to the sometimes jarring and violent world of adults. Questions addressed will include:

- How do these authors employ humor, satire, and comedy to promote their vision of coming of age in modern society?
- What is the relationship between children and innocence, between youth and naïve, between adulthood and authority and how does this inform understandings of amorous relationships, family relations, and more generally the modern occidental child?
- How do first-person child narrators construct themes of urbanism and domesticity, and what do these visions say about the world’s ultimate message?

Archaeological Investigations of an Early American Farmstead: The Wiley Smith Site

Kelsey A. Schmitz

While farmsteads are relatively abundant in the historic and archaeological record, there are many issues with the current practices used to identify, evaluate, record, and study them. However, farmsteads represent a way of life that was once customary to much of the American population, and therefore deserve adequate archaeological attention. The research project suggested in this proposal aims to study a late colonial/early federal period farmstead located in the Uwharrie National Forest and Montgomery County, North Carolina. This site was once owned by the sheriff of Montgomery County; Wiley Smith. Goals of this project include identification of the size, nature, and structural components of this farmstead, which will be done by utilizing a two-stage excavation approach. Additionally, further analysis of excavated artifacts and associated historical documentation will be used to test whether or not this farmstead operated as a truly subsistence-based unit, or whether the Smith household was instead a part of the ever-growing consumerist population of the early nineteenth century.

GO17

Investigating the αc Connector for Roles in Fibrin Extensibility and Polymerrization

T. C. Dement, N. E. Hudson

A primary constituent of blood clots are fibrin nets that exhibit remarkable mechanical properties such as a large capacity to stretch without damage and sub-millisecond recoil. It is believed that these properties contribute to cardiovascular diseases (CVDs) since patients with CVDs present fibrin network phenotypes of altered rigidity, thickness, and lysis times. However, the exact link is poorly defined largely because the origins of fibrin’s mechanical attributes remain unknown. This research aims to provide evidence that the αc connector, a region on one of three peptide chains that make up the fibrin building block, is responsible, in part, for fibrin polymeryrization and its ability to stretch. Some evidence that the αc connector has such an effect emerged when one study showed a correlation between the length of this region and fiber extensibility using chicken, mouse, and human fibrin. However, cross species factors could have influenced these results. Human fibrin αc connectors contain ten, 13-amino-acid repeats in its primary sequence; the number of repeats varies by species of mammal and does not exist in non-mammals. Separately, emerging studies have shown that molecular force may be associated with various pathological states. Since fibrin operates under the constantly changing strain of vasculature, it is possible that cardiovascular health is affected by acute differences in how fibrin responds to molecular strain. To achieve the aims of this research, recombinant protein technology will be used to create variant human αc connector regions that fall into two groups: truncation variants, which delete some or all of the repeating amino-acid sequence, and tension sensor variants, which will enable molecular force measurement. Fibrin truncation variants will be compared to wild type using florescent microscopy to determine differences in morphology and capacity to stretch. Tension sensor variants utilize a pair of fluorophores that undergo fluorescence resonance energy transfer (FRET) and will be used to measure the tension within the αc connector during polymerization and fiber stretching. Efforts to create a stable cell line expressing these protein variants and preliminary results will be discussed. It is vital to discover the origins of fibrin’s mechanical properties to understand its role in clotting and thus CVDs that affect people worldwide.

GO20

The Representations of Child Narrators in French Avant-Garde Literature

Rachel Morgan Griffith

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motion of the speckles was tracked between the epicardium and endocardium for 3 consecutive cardiac cycles. Perpendicular lines were generated connecting these contours. Displacement of these lines will be calculated from the starting location to end location to calculate SN. The LV was divided into 12 equal segments. The peak SN values across the region of interest will be averaged for the 12 segments. To measure SR, the shift in the displacement will be divided by the time between frames. The novel strain analysis will be compared to the VevoStrain software data to validate the results. Thus far, the contours of the defined region of interest have been traced using the novel processing code, with perpendicular lines connecting these contours. The speckle tracking is currently being developed. This method could optimize the treatment process by determining the location being treated and extent of treatment to the infarct and remote regions of the heart.

GO25
Tags-Aware Recommender Systems: A Systematic Review
Babak Maleki Shoja
Recommender systems are a branch of information filtering systems that tries to predict user’s preferences for an item and provide suggestions based on this analysis for a particular user. During the past decade, social tagging has become more and more popular categorize, describe or search for contents in online resources. There is an increasing trend on employing this approach to various areas including music, book, and products. However, there are several problems regarding tags and different methodologies and techniques are proposed in the literature to tackle these issues and make a better use of associated tags. Similar to conventional recommender systems, there are two ways of producing recommendation lists including collaborative filtering and content-based filtering. In addition, hybrid approaches proposed which take the advantages of both mentioned methods. This research article is systematically reviewed recent methodologies and approaches in developing tag-aware recommender systems and explores new techniques to address these issues.

GO26
Using mechanically robust hydrogels as a base for cartilage tissue engineering
Jacob Matthew Ludwick
In the United States alone, 22.7% of the population is affected by osteoarthritis (Barbour KE et al 2017). This is caused by a degradation of the cartilage between two sections of bone and is most commonly found in the major joints of the body such as the knees and hips. Cartilage is an important tissue but lacks the ability to repair itself. This is due to the lack of vascularity that brings nutrients to the injury site allowing for remodeling of the tissue. Articular cartilage is comprised of three main components: water, collagen, and proteoglycans. With high strength and water content, about 80% water, cartilage is difficult to mimic (Mow VC et al 2005). Previous studies have identified hydrogels as a suitable base to build a composite material from. A swelling test was conducted to determine the mass swelling ratio of common hydrogel beads. The mass and volume of the hydrogel beads was tracked over time. The average mass swelling of the beads was 21500%. Hydrogels are ideal material due to their high-water content that closely resembles the conditions found in vivo (Strange DGT et al 2014, Tonsomboon K et al 2017). Hydrogels, however, are brittle by nature due to pore pressure and require additional components to increase their strength. Gelatin fibers have been shown to improve the fracture toughness of the material which increase the composites tensile strength (Tonsomboon K et al 2017). The addition of poylcarboxylic acid to the hydrogel and the repeated cross-linking of the composite creates charged molecules and leads to additional compressive strength (Strange DGT et al 2014). Both the gelatin-hydrogel composite and activated hydrogel improve the mechanical properties but still fail to reach the needed level for articular cartilage. The proposed use of a composite that has all three components to simulate the water, collagen, and proteoglycan matrix in collagen to improve the mechanical properties and produce a scaffold that is more resilient.

GO27
Personality Prediction from Online Social Network data and digital footprint
Shahin Taghikhani
The global prevalence of social media encouraged people to upload and share a vast and recurrent amount of information about themselves. Social media facilitates dialogue and information sharing among people through various mediums of communication such as text, pictures, audio, and video in various formats such as pictures, text, audio, and videos on different platforms— the most popular being Facebook, Twitter, and Instagram to name a few. These modes of communication, also known as posts, are embedded with people’s interests, emotions, values and personality that can be collected as data. The more people engage with social media platforms, the more data can be collected, and those that do engage consistently with social media have allowed for a considerable amount of personal data to be collected based on their interests, values, etc. Prediction refers to the task of extracting models that can classify unknown data or forecast trends. When its goal is to predict specific categorical values, it is referred to as classification, but when the objective is to model values or continuous functions, it is referred to as estimation (Han Kamber, 2011). With the rise of Machine learning and Deep learning from Artificial Intelligence, predictions based on linguistic and graphic content have become faster and more straightforward. Using Machine learning and Deep learning to predict people’s personality based on their online presence has grown in interest among psychologists and computer scientists. My research focuses on the specific topic of analysis and the prediction of a user’s personality based on their social media data and digital footprint through data collected from their social media, such as their profile pictures, online behavior, posts, comments, tagged, liked and shared photos and videos. Different approaches to this problem have been applied, different type of personality model, machine learning algorithms, deep learning architecture in each approach. The goal of my research is by reviewing previous approaches I will be able to outline a new model architecture that will introduce a high level of accuracy in the prediction.
many benefits to all users. However, advancements in this area are hindered by several challenges such as the void between user queries and the knowledge base, query mismatches, and range of domain knowledge in users. In this research, we explore existing methodologies as well as look into existing real-life applications that are used in the medical field today. We also look into specific challenges and techniques that can be used to overcome these barriers, specifically related to cognitive computing in the medical domain. Future information retrieval (IR) models that can be tailored specifically for medically intensive applications which can handle large amounts of data are explored as well. The purpose of this work is to give the reader an in_depth understanding of artificial intelligence being used in the medical field today, as well as future possibilities in the domain. The models and techniques designed and discussed in this research can help provide a framework, or starting point for those interested in effectively developing, maintaining, and using these models to help improve the quality of health-care. Furthermore, we explore the development process of such a model and discuss the steps including data collection, processing, model creation, and also improvement.

GO30
Revenue Prediction, A systematic review
Kasra Khademorezaei
Revenue prediction is important in making strategic decision in production, marketing and finance. Availability of data makes it possible to predict revenue by using different information collected from the customers, including location, income and preferences. Data can be interpreted by a variety of mathematical and data-driven approaches that do not necessarily agree with each other. We reviewed articles focused on revenue prediction and categorized them by their methodology and featured them used to predict the revenue to find possible avenues of research. We found that using geological data combine by machine learning can produce promising results in terms of accuracy.

GO31
Experimental Assessment of a Subordinate Oscillator Array
Jules Alejad Zapanta
Teresa Ryan, PhD
Acoustics and Vibrations Lab, Dept. of Engineering, East Carolina University, Greenville NC
Mass detection using mechanical cantilevers as the sensing elements has been previously studied. Physical arrangements of these mass sensors as well as mass sensing mechanisms can vary. For instance, single cantilever beam can either use frequency shift or static deflection as the mass sensing mechanism. Potential applications of these mass sensors include the detection of target chemical and biological analytes or other biomarkers as well as target airborne substances. The structures used in this work are similar to the design of a double-sided hair comb, consisting of a rectangular primary mass with an array of substantially smaller cantilevers protruding off it. The array of cantilevers, known as a subordinate oscillator array (SOA), is used to detect system mass changes. Each cantilever beam of the SOA has unique physical dimensions. When an impulse, such as a hammer strike, is applied to the primary mass, energy propagates from the primary mass to the cantilevers. The cantilevers vibrate in response. At the initial impulse application, the cantilevers demonstrate synchronous movement. However, due to the differences in the physical dimensions, the primary cantilevers vibrate at varying natural frequencies, losing synchronicity. After an amount of time, the cantilevers resynchronize their movement. This synchronous behavior occurs at a specific time known as coherence time. At coherence time, energy returns to the primary mass, known as a return pulse energy. Mass addition to alternate cantilevers in the system results in a shift in return pulse energy located at half the coherence time. The mass identification technique used in this work observes the change in return pulse energy at half of the coherence time due to mass addition. Experimental assessment of three available, fabricated SOAs in the macroscale regime using the mass detection technique is the primary aim of this work. The secondary aim of this work is to develop a LabVIEW program which automatically captures the motion of the primary mass upon impulse application. The LabVIEW program aims to simplify and streamline the data collection process. The third aim of this work is to determine a metric for measuring the shift in relative pulse energy due to mass changes in the fabricated SOAs.

GO32
Using Environmental DNA to Detect Secretive Marsh Birds
Amberly Anne Nece
DNA extracted from environmental samples (eDNA) such as soil and water can be a powerful tool for monitoring an organism's presence in an area. This technique has been used successfully to determine the presence of aquatic species of concern. Wetland loss has led to declines in marsh_dwelling birds in recent years. Population declines of the King Rail (Rallus longirostris) and the Black Rail (Laterallus jamaicensis) are most alarming, making an efficient and timely detection method for these birds especially urgent. Their visually concealing habitat and rarity make them difficult to detect visually. Auditory callback surveys are the standard detection method for marsh rails, but these are only effective during certain parts of the breeding season and are personnel-intensive and time-consuming. A potential solution could be making use of environmental DNA. My project will develop a non-invasive method to detect the presence of these secretive, globally Near Threatened species (Birdlife International 2013). I developed a molecular diagnostic test for each species by designing species-specific primers targeting a unique region of the Cytochrome Oxidase Subunit I gene. To validate that the tests work, I conducted standardized marsh bird callback surveys at coastal marshes in North Carolina and collected water and/or soil samples as positive controls at sites of detection. Additional samples from sites of auditory or visual detections of Black Rails were sent from collaborators. These environmental samples were concentrated, and DNA extracted and purified for PCR amplification to provide proof of concept. Using eDNA has the potential to be more cost effective than traditional auditory detections, and can be performed by non_biological resources, eDNA could provide much needed data on range and occupancy for species and help inform conservation decisions as well as potentially be minimally modified for use with other species of concern.

GO33
The Puzzle of Global Warming
Cloning and Characterization of Classical Maize Mutant, Polytypic1
Anastasia Amoroglu, Beth Thompson
Polytypic1 (Pt1) is a semi-dominant mutant that affects maize inflorescence development. To understand how Pt1 functions in development, we examined the phenotype of Pt1 mutants in multiple inbred backgrounds. Pt1 defects are restricted to the inflorescence, but the severity of the phenotype is background dependent. In B73, Pt1/+ mutants have severe floral defects; floral meristems initiate ectopic floral organs and Pt1/+ ears are female sterile. Pt1/+ tassels have similar defects as the ear, but are less severe. Pt1/+ tassels contain fewer spikelets than their normal siblings, and florets often produce extra floral organs. Because Pt1/+ ears are sterile in B73, we could not examine the Pt1 homozygous phenotype. In A19, however, the Pt1 phenotype is mild and Pt1/+ are female fertile. In A19, both ears and tassels from Pt1 homoygotes are pin-like with severe reduction in lateral primordia, indicating Pt1 has broader roles in inflorescence development.

To identify the gene responsible for the Pt1 mutant phenotype, we pursued a positional cloning approach coupled with RNA-seq. We mapped Pt1 to a 6.8Mb interval (~5Mb) on chromosome 6 and performed RNA-seq to identify RNAs with changes in expression levels or sequence. The Pt1-containing interval contains 111 genes that are expressed in ear primordia, nine of which are differentially expressed (FDR < 0.05). However, none of these genes are striking candidates. We are currently analyzing our RNA-seq data to determine how Pt1 affects gene expression. Notably, 13 MADs-box transcription factors, which are known floral regulators, are dramatically downregulated in Pt1 mutants. The characterization of Pt1 mutants will give insight into the mechanisms that underlie normal inflorescence development and technological advances to help our plant.

GO34
Centrifuge Force Fluorescence Microscope
Sean Edward Cavenaugh
Massively parallel single molecule manipulation is a technique invented to overcome the high cost of equipment and labor of the mechanical manipulation of one molecule at a time. The centrifuge force fluorescence microscope (CFM) implements this strategy by placing a sample into an orbiting centrifuge bucket, so that the entire sample is subjected to a uniform force field while it is being observed. The observations of microscope to nanoscopic motions during centrifugal operation are made by a miniaturized microscope system and camera in orbit with the sample and provide data for the quantifiable characterizations of physical properties of a subject.

Fluorescence is the absorption and nearly simultaneous emission of light by a substance. Fluorescence microscopy excites the fluorescent specimens within a sample with a desired wavelength band and filters the known emitted fluorescence spectrum for imaging. The advantages of fluorescence microscopy include labeling features of interest in a sample for real-time tracking of processes, high sensitivity and selectivity, and multicolor fluorescence to track separately distinct specimens, among others.

The fluorescence upgrade designed for a CFM incorporates the traditional optical components needed for fluorescence microscopy, namely excitation and emission filters and a dichroic mirror. The limitations of design stemmed from the need to integrate the fluorescence components into the light path of the CFM, which itself was designed to operate within the spatial constraints of a centrifuge bucket and to possess the durability to withstand centrifugal forces from centrifuge operation at hundreds of revolutions per minute. The complete upgrade to a CFM system will enhance the capabilities of the CFM with intention for use in mechanics experiments and other biophysical applications, specifically those that would benefit from a system that can apply and mechanical force onto a sample.
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and quantify it.

GO35
Characterizing the Microbially Communities on Pappy’s Lane Shipwreck

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Previous studies show that there are differences in microbial communities that colonize and corrode steel surfaces. These studies suggest iron-oxidizing bacteria (FeOB) prime the environment for sulfate-reducing bacteria (SRB) to ultimately influence corrosion. To-date there are no studies verifying the existence of FeOB on shipwrecks, but we hypothesize they are present and colonizing the steel surface. By confirming the presence and estimating the amount of FeOB in the community, the microbial contribution to corrosion and degradation of shallow water shipwrecks can begin to be understood. Samples were collected from 7 locations across Pappy’s Lane shipwreck in Rodanthe, NC. 8 samples were selected based on color differences, which are hypothesized to be indicative of the microbial community types present. The presence of FeOB was determined through Most Probable Number (MPN) growth studies. Results suggest that FeOB are widespread across the shipwreck as FeOB were found in all samples. Positive MPN growth results suggest FeOB were present in greater relative abundance on the samples that contained orange iron oxides. The greatest cell numbers were on the O-1 orange sample with 1511 cells/cm2 compared to 4 cells/cm² on the non-shipwreck control samples. A pure culture of Mariprofundus sp. O-1 was isolated from the O-1 MPNs and the whole genome was sequenced. The O-1 isolate genome and other isolates found within OTU1 have been identified to contain nitrogenase genes which suggests they may be specialized to carry out nitrogen fixation. The microbial contribution to corrosion and degradation of shallow water shipwrecks can begin to be understood. Samples were collected from 7 locations across Pappy’s Lane shipwreck in Rodanthe, NC. 8 samples were selected based on color differences, which are hypothesized to be indicative of the microbial community types present. The presence of FeOB was determined through Most Probable Number (MPN) growth studies. Results suggest that FeOB are widespread across the shipwreck as FeOB were found in all samples. Positive MPN growth results suggest FeOB were present in greater relative abundance on the samples that contained orange iron oxides. The greatest cell numbers were on the O-1 orange sample with 1511 cells/cm² compared to 4 cells/cm² on the non-shipwreck control samples. A pure culture of Mariprofundus sp. O-1 was isolated from the O-1 MPNs and the whole genome was sequenced. The O-1 isolate genome and other isolates found within OTU1 have been identified to contain nitrogenase genes which suggests they may be specialized to carry out nitrogen fixation.

GO36
Glucose transporter 1 (GLUT1) is not necessary for basal or overload-induced glucose uptake in mouse skeletal muscle


Glucose transporter 1 (GLUT1) is traditionally thought to solely regulate basal/resting state skeletal muscle glucose uptake. However, exciting new data from our lab now demonstrates that functional overload, a model of resistance exercise training in mice, increases muscle GLUT1 protein levels (~300%) and cell surface GLUT1 transport activity (~66%), but does not increase glucose uptake. Intriguingly, GLUT1 expression is not necessary for overload-induced glucose uptake in mouse skeletal muscle. GLUT1 is expressed in skeletal muscle and upregulated in response to stressors. These data suggest GLUT1 transport activity is not necessary for glucose uptake, but that GLUT1 may also be necessary for glucose uptake in other tissues. GLUT1 KO mice were bred to skeletal muscle specific Urea-Cre recombinase mice to generate muscle-specific GLUT1 knockout (mGLUT1KO) mice; and for these studies only age matched littermates were used as controls. mGLUT1KO mice were viable and exhibited no alterations in body weight, body composition, whole body O2 consumption, CO2 production, or energy expenditure. To assess the loss of muscle GLUT1 in systemic glucose homeostasis, mice were fasted and blood glucose levels were measured before and during a glucose tolerance test. Surprisingly, mGLUT1KO mice did not exhibit impairments in fasting blood glucose or glucose tolerance. To assess the role of GLUT1 in basal and overload-stimulated muscle glucose uptake, overload was induced in plantaris muscles via unilateral synergist ablation of the distal two-thirds of the gastrocnemius. Oxidative phosphorylation rates were measured in the overload-induced muscle biopsies. The expression of GLUT1 and other transporters were measured by RT-PCR. The metabolic rates of the overloads were measured by indirect calorimetry. The results demonstrate that GLUT1 is not necessary for basal or overload-induced glucose uptake, but that GLUT1 may be necessary for other glucose transporters in skeletal muscle. GLUT1 KO mice were bred to skeletal muscle specific Urea-Cre recombinase mice to generate muscle-specific GLUT1 knockout (mGLUT1KO) mice; and for these studies only age matched littermates were used as controls. mGLUT1KO mice were viable and exhibited no alterations in body weight, body composition, whole body O2 consumption, CO2 production, or energy expenditure. To assess the loss of muscle GLUT1 in systemic glucose homeostasis, mice were fasted and blood glucose levels were measured before and during a glucose tolerance test. Surprisingly, mGLUT1KO mice did not exhibit impairments in fasting blood glucose or glucose tolerance. To assess the role of GLUT1 in basal and overload-stimulated muscle glucose uptake, overload was induced in plantaris muscles via unilateral synergist ablation of the distal two-thirds of the gastrocnemius. Oxidative phosphorylation rates were measured in the overload-induced muscle biopsies. The expression of GLUT1 and other transporters were measured by RT-PCR. The metabolic rates of the overloads were measured by indirect calorimetry. The results demonstrate that GLUT1 is not necessary for basal or overload-induced glucose uptake, but that GLUT1 may be necessary for other glucose transporters in skeletal muscle.

GO37
Demystifying the Role of Matrix Metalloproteinase-12 in Sarcoidosis

Nicole Naadei Neequeay, A Malur, W Kudnuson, A Mohan, MJ Thomsassen

Background: Sarcoidosis is a chronic inflammatory disease characterized by granuloma formation primarily in the lungs. Matrix Metalloproteinase-12 (MMP-12) is an enzyme that degrades elastin in the extracellular matrix and enables infiltration of the immune cells responsible for inflammation and granuloma formation. Little is known about the exact role of MMP-12 in granulomatous diseases, but previous studies have shown increased gene and protein expression in sarcoidosis patients as well as an association between MMP-12 expression and disease severity. Our murine model using multwell carbon nanotubes (MWCNT) mimics the characteristics observed in sarcoidosis patients including elevated MMP12 gene and protein expression. Based on these observations we hypothesized that MMP12 is critical to granuloma pathogenesis. We utilized MMP12 KO mice to address this hypothesis.

Methods: CST (bilateral) and MMP-12 KO mice were instilled with PBS (control) and MWCNT. The bronchoalveolar lavage (BAL) cells were evaluated by immunofluorescence, RT-PCR, and RNA Seq. The lungs were harvested for histology. Results: Histological analyses revealed marked attenuation of granuloma formation in MMP12 KO mice compared to wild type. CCL2, a monocyte chemoattractant thought to play a role in granuloma formation was significantly (p<0.007) reduced in MMP12 KO MWCNT instilled mice (19 fold) compared to wild type (85.5 fold). Conclusions: The striking reduction in granuloma formation in the MMP-12 KO mice compared to wildtype supports a critical role for MMP12 in granuloma formation. Furthermore, the reduced expression of CCL2 in MMP12KO mice in response to MWCNT suggests a possible mechanism.

GO38
Neutron Production in Passive Scattering Proton Therapy

Dillon A Ellis

In the field of radiation oncology, proton therapy is an exciting new modality that provides more absolute dose distributions of different energies. The “Aperture” and “Compensator” are the components closest to the patient and are used to shape the dose distribution inside the target volumes. Preliminary data suggests that the majority of neutron production occurs within the aperture and compensator volumes.

GO39
Centrally Circulating a-Klotho Functions as a Novel Hypothalamic Factor Regulating NPY/AgRP Neuron Activity, Energy Balance, and Glucose Homeostasis in Mice

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Methods: Central administration of a-klotho was performed by using intracerebroventricular (ICV) injection for seven days in diet-induced obesity (DIO) and streptozotocin injected (STZ) mice. In NPY-GFP reporter mice were utilized for electrophysiology and immunofluorescent staining experiments to investigate the effects of a-klotho on NPY/AgRP neurons. To determine the mechanisms of hypothalamic a-klotho, we used GT1-7 immortal hypothalamic cells in vitro along with ICV administration of fibroblast growth factor receptor 1 (FGFR1) antagonist in vivo.

Results: Central a-klotho administration decreased food intake

200 MeV. Due to their higher energy range and the types of collisions with the nuclei of materials they pass through, there is a higher probability for neutron production in proton therapy than in traditional photon therapy. These reactions generate a neutron spectrum up to the maximum energy of the proton beam, and cause a secondary dose that is not accounted for in most treatment planning systems.
and improved glucose profiles in DIO and STZ mice. Liver lipid content and glucagonogen gene expression were also reduced. Electrophysiology and immunofluorescent staining revealed NPY/AgRP neurons exhibit hyperpolarization and reduced firing rate in response to α-klotho treatment. These effects are, at least partially, due to increased magnitude of mIPSCs. In vitro, α-klotho blunted serum-stimulation-induced AgRP gene expression and increased phosphorylation of ERK44/42, AKTser473, and Foxo1ser256. These downstream effects were abolished by pretreatment with inhibitors of either FGFFR1 or P38 kinase. Furthermore, a-kothlo-mediated suppression of food intake, but not glucose levels, was blunted in response to inhibition of FGFRR1 signaling.

Conclusion: These results indicate a prominent role of hypothalamic α-klotho-FFGFR1-P38, signaling in regulation of NPY/AgRP neuron activity, energy balance, and glucose homeostasis, thus providing new insight into the pathophysiology of metabolic disease.

GO40

Outbreaks of the Measles - New Prospects for a 1000 Year Old Virus

Bartosz Lisowsk, Steven Yuvan, Martin Ier

The measles is a highly contagious virus which has been relatively successfully eradicated in many developed countries over the past thirty years. However, recent social trends and political instability have left that status in peril. The circumstances of the Dutch Bible record have left that status in peril. The circumstances of the Dutch Bible record

Landry1,2,3, Hu Huang1,2,3,4

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Background: While much is known about the role of NPY/AgRP and POMC neurons to regulate energy homeostasis, less is known about how forced energy expenditure modulates these neurons and how this relates to energy intake. Therefore, we investigated the effects of acute exercise on neuronal activity in the arcuate nucleus of the hypothalamus.

Methods: NPY-GFP reporter mice were utilized to measure neuronal activity. Exercise was performed by introducing the mice to a treadmill and running at a speed of 13.0 m/min for an hour and compared to a sedentary control group (N=6). Mice were sacrificed by cervical dislocation at the end of exercise. Brains were pressured and sections of the hypothalamus were analyzed with immunohistochemistry. Immunofluorescence analysis was performed to quantify the number of c-FOS positive neurons in each group.

Results: While we observed no difference in c-FOS in POMC neurons, immediately after exercise, c-FOS in arcuate NPY/AgRP neurons are significantly increased compared to the control group. This result was further confirmed by a significant increase in firing rate in NPY/AgRP neurons by electrophysiology recording. Food intake was significantly increased immediately after an acute bout of exercise. This exercise induced food intake was abolished while the NPY/AgRP neuron activation was inhibited.

Conclusion: We demonstrated significantly greater acute NPY/AgRP activation immediately after exercise compared to sedentary control, while POMC neurons remained unaffected. Notably, this exercise induced energy deficit also causes a significant increase in food intake post-exercise. Inhibition of AgRP neuron significantly negates this increase in food intake, suggesting that NPY/AgRP activation is critical for acute exercise induced food intake in un-trained mice.

GO43

Influence of Muscle Phenotype on Ischemic Contractile Function and Capillary Perfusion.

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Chronic limb ischemia, as occurs with peripheral arterial disease, results in progressive and debilitating skeletal muscle functional declines. To overcome this myopathy, the ischemic muscle is reliant upon the recovery of capillary perfusion and myofiber structure. Whether or not muscle phenotype (i.e. postural soleus - Sol, locomotor extensor digitorum longus - ELD) affects a muscles response to or recovery from ischemia, however, is not well understood. In this study, we measured the timing of acute contractile dysfunction in an ex vivo model of ischemia and examined the timeline of recovery using an in vivo model of ischemia in Sol and ELD muscles. Time-resolved measurements of isolated muscle mechanical performance revealed that Sol muscles are functionally more resilient (12 contractions/120 minutes to mechanical failure, Force capacity=38N/s/cm2) than ELD muscles (8 contractions/80 mins to mechanical failure; Force capacity=27N/s/cm2) during acute ischemia. Morphological and functional measurements after 14-days of hindlimb ischemia (HLI) in both the Sol and ELD revealed dispersed capillary networks, reduced capillary perfusion (perfused lectin+ area/ cross-sectional fiber area) and severe myopathy, indicated by loss of isometric force production and dystrophic immunoreactivity. After 56 days of HLI, both muscles had restored their capillary networks and recovered their perfusion to control values (Ctrl. Sol: 0.056 ± 0.02, Isch. Sol: 0.062 ± 0.011, Ctrl. ELD: 0.039 ± 0.005, Isch. ELD: 0.0305 ± 0.005, lectin+area/cm2). Myofiber CSA (μm2) and isometric force production, however, remained reduced compared with control contralateral controls. Our results reveal that Sol muscles are functionally more resilient to acute ischemia. During chronic ischemia, however, Sol and ELD muscles share a similar timeline of perfusion recovery and suffer from sustained myopathy beyond the restoration of tissue perfusion.
The purpose: To accurately estimate the radiation dose to the fetus and assess the uncertainty of fetus position and rotation for a pregnant patient who is undergoing radiation therapy or diagnostic treatment using a series of realistic fetus computational model sets.

Methods: Three computational phantom models were obtained using de-identified good quality MRI and CT imaging data for each fetus model as a starting point to construct a complete anatomically accurate fetus, gravid uterus, and placenta. All Radiological images in DICOM sets were obtained from Vidant Medical Center archive to conduct this study. The method started with outlines most of the fetus organs from radiological images via Velocity Treatment Planning System (TPS) and exported in the DICOM-STRUCTURE set which then was imported to Rhinoceros software, 3D model software for further reconstruction of fetus phantom model sets. All fetuses, volume organs were adjusted to match ICRP-89 data records. Since radiotherapy is not allowed during the first trimester of pregnancy, our fetus model series ages start from 20, 31, and 35 weeks of pregnancy. An adult ICRP female is used to construct the pregnant computational models. Researchers have created a couple of computational fetus phantoms, but most of them have either been scaled to match certain weeks or lack of representing realistic models. However, no research has been done to show how the fetus angle and location may lead to uncertainty in dose calculations.

Conclusion: This approach is demonstrating that pregnant computational phantom sets are applicable to estimate the initial fetal organ doses and compare them with what was obtained from using the TG-36 recommendations, i.e., the current clinical practice. In addition, newly developed pregnant patient models provide realistic anatomical details that can be useful in treatment planning and ultimately risk assessment for the radiotherapy pregnant patients whose three-dimensional radiological images are not available.

The answers to these questions reflect the culture in which the participants of art are embedded. In recent decades, increasing numbers of artists, theorists, and historians have been engaging with the cultural embeddedness of art. This discursive approach to the subject provides a lens that reveals the socio-economic relations of artistic practice. This cultural context—that has conventionally been overlooked—or, by the dominant narratives of art histories—has the potential to radically alter the way we answer questions about the significance, participants, and values represented in art.
remembered with more gratitude. I sifted through the thousands of images of my children and chose a select few. In these I have removed the black and replaced it with Cyanotype blue. The blue is developed by exposure to the sun. Blue is the color of darkness made light.

GO50

Images I Haven’t Made Yet
Dana Smessaert

Recently thinking about my creative practice I have begun to see connections through all my pieces, that of the dualities. I have begun to rethink my work I am making here in the South as a outsider from the Midwest and how these regional cultural signifiers merge. Leading to questions I am now addressing, how do these merge, should they merge? Beginning my exploration in understanding the Southern Sense of Place has been crucial to moving forward in my creative practice. Using this new understanding of ‘place’ I am using the image to talk about the relationships between the occupant and how this historical sense of place shapes their lives.

GO51

Truth, Honor and Inspiration; Printing from the Photographs of Shah Marai
Peter Borsay

As a printmaker I constantly look for inspiration and a narrative that I can use in my work. That search has led me to look at past experiences and how those are manifested in my compositions. While researching information about my past I found the images created by the Agence France Presse, Kabul chief photographer Shah Marai. These images captured the essence of Afghanistan’s people and places that I had only ever read about. I have discovered that Marai’s work and feel a connection between my experience and certain elements of his photographs. I contacted Marai in 2018 to start a dialogue that I hoped would lead to collaboration. Although his photographs were owned by the Agence France Presse, I thought it would still be possible to make prints using his images and collaborate on future projects. Tragically, Marai was killed in Kabul on 30 April, 2018 and I was left with trying to find ways to honor him in my work while not infringing on copyright.

What are the moral, ethical and legal ramifications of an artist using a photographer’s images in their own work? Furthermore, how does one solve the internal dilemma of ‘appropriation’ when the author of the images is recently deceased? These are a few of the questions that I continue to seek answers with my current printmaking projects.

GO52

Design Methodology in Natural Material
Junghoon Han

Growing up in the metropolitan area of Seoul, one of the largest cities in the world has had significant influence on my perspective on the modern labor infrastructure and its environments. I use South Korea as the country that is a barometer and threshold for measuring negative impacts of corporatocracy. During my childhood in South Korea, I was constantly surrounded by men and women in their office attire whom I used to call, “metro zombies.” What was truly memorable about them was the lifeless feeling they gave off with their blank stare and complete lack of individuality. This has led me to be aware of the problem of inferior working condition of workers of today.

This research will focus on design history of mass-produced office supplies of today and how to improve office working environments through new design methodology that incorporates elements of natural and industrial visual language and material. This research will examine connection between natural material and human psychology, unique material language of wood, and how it can be used to redesign and replace the mass-produced office supplies to provide a better working environment for workers.

GO53

Unswept
Marin Gwyn Nannor

In my research, I have been studying how language is used to demean people, especially women. In particular, when a woman is put down using demeaning language to identify her, such as sweetie, honey, and baby etc. I have been continuing my research by exploring further what initiates this action, what the possible reactions are, and how omitting these terms from our vocabulary can change the outcome of certain situations. My work continues to explore this power dynamic by going deeper and discovering the root of the issue.

GO54

Metempsychosis
Yichen Kerry Guan

Past lives and their connection to present life has interested me since I was a kid.

Flowers won’t look pretty all the time, they will wither somehow and after a season they come back again. So, where do they go between the moment when they wither and come back? Do human beings repeat their path from previous lives and into their current moment?

My research explores the topic of “metempsychosis,” the transmigration at death of the soul of a human being or animal into a new body. I create enamel and sculptural objects that represent my own life cycles. Shapes, piercings, and spherical forms convey a sense of repeated lives and different moments throughout our lifetimes.

GO55

Cosmetics Under Fire and Fused
Lauren Nicole Purcell

Enameling is the process of fusing glass to metal. Glass beads, glass threads, and lusters can also be added, but what about makeup? Yes, makeup, what you wear on your face! This research presentation will explore the ingredients that go into makeup and how they are similar to ingredients used in enameling. By combining two seemingly different materials, cosmetics and enamels, this presentation will question the commonality, material safety, and more experimental possibilities of both.

GO56

Archetypes and Explorations of the Unconscious
Amy Noelle Peetry Gunn

Archetypes and archetypal imagery have been created and shared throughout history in the narrative form of folklore and myths to modern and contemporary literature, film and art. These stories share common themes, symbols, and characters found across cultures. Carl Jung explains this commonality of occurrence with his idea of the collective unconscious, a consciousness that is shared amongst all people. My current work explores and seeks to express an unfolding drama of personal archetypal characters, ideas and imagery by using the surrealist methods such as automatic drawing and painting, and also video taping myself as these characters act out their dramas. My research will explore the strategies, motivations and means by which artists have attempted to explore, or draw out ideas that are preverbal, or unconscious as well as the relationship of my personal characters to Jungian archetypal characters.

GO57

Learning to Fail
Epiphanny Sandra Knedler

Over the past year, I have been exploring the trend of gentrification using images of Greenville, North Carolina as a case study. Through photography, research, and community engagement, my understanding of the topic has become more complex and convoluted. As economies evolve, cities experience periods of economic restructuring; each community has its own approach to this restructuring. Through a series of experiments of image-making, I understand that this project is a failure. I am coming to terms with the idea of failure. What does it mean for a project to fail? How can failure influence our artistic practice? I am exploring the ways in which my project failed and how it can better my practice and future projects.

GO58

Victim Intimidation and Intimate Partner Violence
Ellen Elizabeth Madams
Heidi Bonner

Victim intimidation within intimate partner relationships is a common, and often overlooked, issue. In a study of witness intimidation, it was found that domestic and intimate partner violence account for 40-45% of all victim and witness intimidation incidents (Birdsey, 2013). Victim intimidation is the act of threatening harm or otherwise coercing the victim of a crime in an attempt to prevent the victim from reporting the crime or testifying in trial (Chen, 2009). Victim intimidation is not always obvious, and can occur in the guise of offering the victim promises, promises, or other incentives (Birdsey, 2013).

With the Supreme Court decision of Crawford v. Washington (2004), victim intimidation became even more prevalent as the decision required victims to appear at trial and testify if the act of threatening harm or otherwise coercing the victim of a crime or testifying in trial (Chen, 2009). Victim intimidation is not always obvious, and can occur in the guise of offering the victim promises, promises, or other incentives (Birdsey, 2013).

With the Supreme Court decision of Crawford v. Washington (2004), victim intimidation became even more prevalent as the decision required victims to appear at trial and testify if the victim was a witness to the crime or testifying in trial (Chen, 2009). Victim intimidation is not always obvious, and can occur in the guise of offering the victim promises, promises, or other incentives (Birdsey, 2013).
Data analysis is ongoing; however, preliminary results indicate that cannabis use does have a positive effect on sexual satisfaction and functioning. Implications for this study indicate that using cannabis before sex has possibilities for social change by closing the orgasm inequality gap as previous research indicates beneficial sexual implications, especially for females (Sun & Eisenberg, 2017).

GO60
"God is a Keeper". A Qualitative Exploration of Religious Coping for African Americans
Jasmine L. Garland McKinney1, Jane Avent Harris, PhD1
Department of Interdisciplinary Professions, Counselor Education Program, East Carolina University

African Americans utilize mental health resources at a rate lower than their white counterparts due to factors including health disparities and stigma (Fripp & Carlson, 2017). Although the counseling profession has increased the amount of research addressing such disparities, research into religion as a means to cope with mental health issues is limited. Therefore, we wish to present a qualitative, phenomenological study at the Research and Creative Achievement Week that contributes to the gap in literature pertaining to religious coping within the counseling field. The significance of the Black church as a source of solace during notable times in Black history such as slavery and the civil rights movement rationalizes the importance of studies like this (Hays, 2015). In addition, the underutilization of mental health resources combined with data suggesting that Black Americans are more likely to identify as Christians than any other Americans (Pew Research Center, 2018) further justifies the importance of the research that will be presented. Furthermore, this study examined the length to which participants identified with both positive and negative items, as seen in the Brief Religious Coping (RCOPE) Scale (Pargament, 2011). Themes that emerged throughout the present study include: (1) God is a Keeper: Getting through the "Valley", (2) Negative Religious Coping, (3) Positive Religious Coping, (4) Spiritual Development, (5) "Godly Counsel" and "Sound Doctrine", and (6) "Black People Don't go to Therapy". Finally, through expounding on the qualitative data collected throughout this study, a presentation at the Research and Creative Achievement Week will provide insight into further implications for the counseling profession.
Given this information, this study seeks to identify the prevalence of college students leave fewer options for healthcare decisions about how to mitigate or address these known biases to ultimately increase understanding and addressing biases of patients toward physician. Understanding and addressing biases of patients toward providers on the basis of factors such as gender, race, physical characteristics, will help inform healthcare decisions about how to mitigate or address these known biases to ultimately increase patient comfortability, engagement and adherence to achieve better healthcare outcomes.

GO64 Food Insecurity Among Undergraduate Students at East Carolina University Willa Grace Midgett1, Sharon Paynter2 1Department of Anthropology, East Carolina University 2Office of Research, Economic Development and Engagement Hungry is a serious issue for over 40 million people nationwide, translating to food insecurity for 1 in 8 Americans (“Understanding Hunger”). The USDA defines food insecurity as, “having limited or uncertain access to adequate food” (“Definitions of Food Security”). College students, although an often-overlooked group in food insecurity research, tend to experience rates of food insecurity that are higher than the national average (Cady et al. 2016). In addition, college food insecurity has been shown to contribute to ill effects on academic performance and overall wellbeing (Cady et al. 2016, Frensenberg et al. 2011). Stigma associated with an inability to afford basic eating to digitally-altered images of models in the media. I then propose an evidence-based federal policy placing limits on body manipulation in photographs of models in the media. My proposed policy states that: 1) any commercial photo that has been manipulated must be labeled as such; 2) no more than fifty percent of total images a company produces each year may have manipulated models; and 3) companies in violation of this law will face fines that increase with each subsequent violation. Within my communication campaign, I offer a series of communication strategies and messages targeting my primary audience (lawmakers) and those secondary audiences who can influence the primary audience to pass the proposed legislation. In addition, I will leverage my campus as a laboratory to study how to persuade primary and secondary audiences with visual evidence of precisely how different original and manipulated images are.

GO66 Crossroads on Campus: Quantifying Community in Major Student Buildings Hannah Noel Wiser This project will investigate users of the library and the new student center and attempt to quantify the “community utility” these spaces offer. This study will stress the demand for multi-use public spaces by valuing their benefit to the university and workplace experience. The implications of this study will reveal underlying preferences for communal features and how current infrastructure contributes to user welfare with emphasis on the component of community. The library and new student center function like coworking spaces, with a matrix of accommodations for different needs including places to do work, event rooms, food options, and more. Although these spaces are targeted to the individual, they also support localized culture and relationships as a communal setting.

The study will begin with natural observation and interviewing, which will inform the content of a survey designed for empirical analysis. I will then use quantitative data and qualitative data to generate in-depth information about how undergraduate students make decisions about food. GO65 Combating Body Dissatisfaction: A Health Advocacy Campaign to Enact a Federal Photo Manipulation Law Caroline M Alexander When media content is not a true reflection of reality, it can have significant adverse health effects on viewers. Digitally-altered images with “flawless” models may lead people to believe that this is the standard for beauty, and they too can achieve the same “flawlessness.” According to the Eating Disorders Coalition, approximately thirty million people suffer from an eating disorder in the United States, and this population has the highest mortality rate of any mental illness. Because exposure to manipulated images may lead to negative health consequences, I am proposing a federal law to limit these images, and national communication campaign to advocate for this policy.

The first part of my work consists of a literature review connecting the problem of body dissatisfaction/disordered eating to digitally-altered images of models in the media. I then propose an evidence-based federal policy placing limits on body manipulation in photographs of models in the media. My proposed policy states that: 1) any commercial photo that has been manipulated must be labeled as such; 2) no more than fifty percent of total images a company produces each year may have manipulated models; and 3) companies in violation of this law will face fines that increase with each subsequent violation. Within my communication campaign, I offer a series of communication strategies and messages targeting my primary audience (lawmakers) and those secondary audiences who can influence the primary audience to pass the proposed legislation. In addition, I will leverage my campus as a laboratory to study how to persuade primary and secondary audiences with visual evidence of precisely how different original and manipulated images are.

GO67 Colors of primate pelage: The independent evolution of sexual dichromatism in the primate order Thomas C Wilson James E Loudon There is a significant body of research describing the evolutionary importance of plumage coloration among avian species. However, these datasets are lacking for mammalian pelage. Furthermore, very little research has examined the variations of nonhuman primates (NHP) pelage coloration and patterning. Primatologists have noted conspicuous differences in coloration and patterning among NHPs, including neo-natal coats and sexual dichromatism. Sexual dichromatism refers to the differences in pelage coloration between the sexes of a single species. Sexual dichromatism is rare, but found among some species of lemurs, New World monkeys, and lesser apes. To illuminate the mechanism of NHP sexual dichromatism, we examined published amino acid sequences for the MC1R and OCA2 genes of nine NHP species across multiple genera. This dataset incorporated sexually dichromatic NHPs including white-cheeked gibbons (Nomascus leucogenys), Lar gibbons (Hylobates lar), and black howler monkeys (Alouatta caraya). We also examined closely allied monochromatic NHPs including brown lemurs (Eulemur fulvus), white-tailed macaques (Macaca fascicularis), black snub-nosed monkeys (Rhinopithecus bieti), Mueller’s gibbon (Hylobates muelleri), mantled howler monkeys (A. palliata), and chimpanzees (Pan troglodytes). Comparisons across these species suggest the MC1R gene does not play a significant role in pelage coloration. Instead, the amino acid sequence of OCA2, differed by ~12% for N. leucogenys, suggesting that this gene may regulate dichromatic pelage. To expand these genetic datasets, we analyzed sociocultural variables among these species and found that smaller home range sizes and dispersal of both sexes may have played a role in the evolution of dichromatic pelage in NHPs.

The Value of Exposure: The Connection Between International Contact, Ethnocentrism, and Intercultural Sensitivity Erin Reade Taylor Sachyio Shearman For higher education institutions, globalization has become increasingly important for producing highly qualified professionals (Balyuk, 2016). In order to be successful in a globalized world, students must possess cultural awareness and the skills to navigate diverse situations. Two factors that are imperative to the success of globalization and cultural diversity in education is ethnocentrism and intercultural sensitivity. Hales and Edmonds (2018) describe ethnocentrism as “a positive orientation toward those sharing the same ethnicity and a negative one towards others” (p 1), which often times results in a combative, “us vs. them” mentality. The ability to recognize and understand cultural differences and the readiness to respectfully alter one’s behavior to adjust to cultural interactions makes up the basis of intercultural sensitivity (Wang & Zhao, 2016). Gordon Allport’s (1954) Contact Theory, predicts that exposure to the out-group members is associated with less prejudicial views and more positive attitude toward the outgroup members. This theory is furthered by Pettigrew and Tropp (2011) who found a “secondary transfer effect” showing that positive attitudes gained through contact with a specific out-group can transfer to other out-groups. This study examines associations between intercultural contact and contact, ethnocentrism and intercultural sensitivity. The online survey is currently being conducted to understand the impact international contact has on students’ intercultural sensitivity. This study utilizes McCroskey and Neulép’s (1997) generalized ethnocentrism scale (GENE) as well as Chen and Startosta’s (2000) Intercultural Sensitivity Scale (ISS). Students classified as seniors at East Carolina University are being surveyed about their experiences with intercultural contact through programs such as Global Understanding courses, the First Friends program, language acquisition, study abroad, and cultural clubs.
on campus. The targeted participants are not yet reached but projected to be between 300 and 400. Preliminary research suggests that increased contact with international cultures are associated with reduced levels of ethnocentrism and increased awareness of intercultural sensitivity. The finding of the current research informs us about the importance of providing the opportunities for intercultural encounters for the college students to prepare them to be an effective individual in a globalized society.

Expression of AR itself was lower in species that diverged prior to the development of rapid wing movements, and expression was similarly low in the manakin species with a loss of rapid wing movements. Identifying enriched GO categories and differentially expressed transcripts provides initial information for future investigations about the molecular mechanisms that underlie the evolutionary development of rapid muscle movement. Future studies will be able to target specific genes of interest from our candidate list for possible hormonal, knockdown, or overexpression assays to experimentally determine the role of such genes in enabling the phenomenal displays observed in manakins.
Changes their family functioning. The research question guiding inventory how ALS impacts the biological, psychological, social, and tangible aid), which were associated with approach coping reactions (blaming, silencing, infantilizing, and stigmatizing) which were related to PTSD symptoms and avoidance coping. There were three types of helpful reactions (empathic, validating, and tangible aid), which were associated with approach coping and social support. Together, these subscales provide a brief measure with good psychometric properties and convergent validity, in comparison to the original version of the SRQ. Implications of the findings on assessment of social reactions, as well as perceptions of social reactions and post-assault recovery, are discussed.

GP2
Family members of patients with ALS: Their BPSS health and overall family functioning
Rachel Elizabeth Williams, Olivia Riser, Jennifer Hodgson
Amyotrophic Lateral Sclerosis (ALS) is a progressive neurodegenerative disease that robs a patient's ability to command over their body and impacts the family as the caregiving demands mount and the family is forced to reorganize. To date, no one has systematically reviewed the literature to inventory how ALS impacts the biological, psychological, social, and spiritual (BPS-S) health of the patient's family and how it changes their family functioning. The research question guiding the systematic review is: "How does ALS impact the immediate family members' health and interactional patterns?" The inclusion criteria were: (a) articles that include at least one immediate family member of a patient with ALS, (b) at least one BPS-S component of health studied, (c) qualitative and quantitative peer-reviewed journal articles, and (d) published in English. The exclusion criteria were: (a) cellular and genetic studies about ALS, (b) ALS intervention studies, and (c) non-peer-reviewed grey literature (i.e., reports, policy documents), editorials and opinion writings, and conceptual articles. Two investigators identified relevant articles through PubMed, PsychInfo, and CINAHL. Plus with Full Text using identified MeSH and keywords. 3,557 articles were initially identified and screened, with 48 meeting review criteria. Key findings are that the majority of family members' physical well-being decreased throughout the course of the disease, with almost all family caregivers reporting levels of anxiety and reporting a decrease in quality of life over time. Family members also reported feeling isolated with fewer social contacts. However, researchers in 7 studies found religion and spirituality were associated with higher quality of life. Although each individual BPS-S component was captured throughout the 48 articles, none of the articles focused on all 4 components of health simultaneously and very few articles focused on spiritual health outcomes. Similarly, only two of the 48 articles studied family functioning subsequent to an ALS diagnosis. Suggestions for future research include studying the BPS-S health outcomes of family members comprehensively and determining the role family functioning plays in their ability to successfully manage this disease individually and collectively. This would allow for better screening protocols to address the systemic health of the family and patient, and design family interventions that improve family member BPS-S health outcomes.

GP3
Efficacy of a brief self-compassion intervention for women with Internalized Weight Bias. A review of project progress and preliminary findings
Erin Halye, Erin McCullen, Christyn Dolbier
Internalization of weight bias occurs when one believes negative weight-related stereotypes to be true of themselves (i.e., believing that one is deserving of disrespect or unworthy of partnership on the basis of their weight) (Duros & Latner, 2008). Higher levels of internalized weight bias (IWB) are strongly associated with a range of negative consequences, such as lower health-related quality of life (Jeter, Barzle, Dursi, & O'Brien, 2014), maladaptive eating patterns, lower self-esteem, body image concerns, and greater psychopathology (i.e., stress, anxiety, and depressive symptoms) (Duros & Latner, 2008). Further, IWB has been shown to uniquely contribute to harmful outcomes, above and beyond that of body mass index (BMI) (Duros & Latner, 2008). Women who are overweight may be at greater risk for harmful consequences due to additional sociocultural factors (Frederickson & Roberts, 1997; Moradi & Huang, 2008). Although the importance of reducing IWB has been well documented for improving the well-being of overweight individuals (e.g., Tybelski et al., 2018), effective interventions for reducing IWB and associated consequences are limited. Further, self-compassion (SC) may be a valuable psychological resource that holds promise for protecting against the impacts of weight bias, particularly for women (Hilbert et al., 2015; Webb & Hardin, 2016). However, SC as it relates to IWB is also an area of research that is currently underexplored.

Therefore, the present study seeks to address the gap in current literature by evaluating the efficacy of a brief, 3-week SC intervention for overweight women with IWB. I will examine whether participants experience meaningful gains in SC, and whether increases in SC are associated with changes in relevant outcomes, such as reductions in IWB, psychological distress, body shame, and maladaptive eating behaviors (i.e., binge eating and emotional eating), and relate to increases in positive body image and adaptive eating behavior (i.e., intuitive eating). We plan to present on study progress at Research and Creative Achievement Week with regard to intervention implementation, such as recruitment, retention, and completion data. Preliminary findings may also be discussed.

GP4
Benchmarking Integration of Environmental Assessments as Part of Best Practice Heritage Site Management Strategies
Tara Rae Van Niekerk
The study presents a literature gap analysis of the range of tools, technologies and strategies utilized by cultural resource managers, such as state, federal and private sector underwater archaeologists, to measure and analyse the impacts of environmental processes on the stability of underwater cultural shipwrecks sites. The method used for this research is a meta-analysis of a literature data set including refereed academic journal articles, agency site reports and management plans. The variables quantified and assessed include 1) categories of environmental information the practitioners collected such as geological, ecological, oceanographic and meteorological data sets 2) instruments utilized and sampling strategies 3) analytical techniques, 4) and implementation of results to inform management strategies. Analysis of the literature aims to benchmark underwater cultural resource managers and their efforts to incorporate environmental assessments into their management strategies based on their publication record. This study will serve to highlight neglected areas or gaps in attention to certain environmental data sets pertaining to submerged historic shipwreck sites. The results will be followed up with qualitative surveys to establish pertinence to practitioners research questions, management mission, budget, training proficiencies, or other disciplinary or agency challenges to including environmental assessments as part of heritage management best practices.

GP5
Microbiologically Influenced Corrosion of Aluminum Aircraft Wrecks in the Pacific
Dominic William Bush
Aircraft were a major component of the Allied forces’ victory in the Pacific Theatre of World War II, and today, numerous examples can still be found throughout the waters of the western Pacific. Due to the historical, social, and economic importance of these largely aluminum wrecks to modern stakeholders, understanding the corrosive forces and decay trajectories has become an important issue in the realm of conservation archaeology and cultural heritage management. This study proposes to investigate the effects of microbiologically influenced corrosion (MIC) on both aluminum alloys in experimental settings and several wrecks located off the coast of Saipan, in a collaborative effort to evaluate the preservation state of the wrecks. While the microbiome of steel wrecks has been investigated in recent years, far less attention has been paid to the effect of colonizing microorganisms, namely sulfate-reducing bacteria (SRB) and their role in modifying predominantly aluminum wrecks. In order to properly predict the future status of aluminum warplanes if any intervention strategies are necessary, it is imperative that researchers understand the morphology and structure of the microbial community on the aluminum surfaces. This study aims to achieve this by examining aluminum alloy coupons exposed to seawater and corrosion byproducts collected in the field using a combination of electron microscopy (e.g. SEM or TEM) and DNA sequencing (e.g. 16S rRNA) in order to identify the microorganisms present and measure the extent of MIC. The results are expected to elucidate the differences in localized corrosion of aluminum alloys 2024 and 7075 (formerly known as 245 and 755), with the former being used for the majority of the 300,000 planes made by the U.S. and the latter being introduced in the construction of the B-29 Superfortress towards the end of the war. By combining the microbiology component with information on the effects of chemical, meteorological, and anthropogenic disturbances, researchers will be better equipped to assist the Pacific island communities in preserving these valuable wrecks.
Sleep Across the Ages: Investigating the Validity of the Adolescent Sleep Wake Scale in a National Sample of Emerging Adults
Nichelle Huber1, Alexandra Nicoleota1, Jordan Ellis1, & D. Erik Everhart1
1Department of Psychology
The negative health outcomes associated with poor sleep are well known across the lifespan. The adolescence to young adulthood developmental period (AYA; ages 12-25 years) reflects a unique period of transition (e.g., neurocognitive development, changes to environments, shifts in social and academic expectations, and increasing levels of independence). Thus, it is important for researchers to study sleep behaviors across the entire AYA developmental period in a consistent manner. The Adolescent Sleep Wake Scale (ASWS) is a 28-item measure of overall subjective sleep quality, including five sleep behavior domains (difficulty going to bed, falling asleep, maintaining sleep, reinitiating sleep, and returning to wakefulness), and has been validated to assess overall sleep quality and insomnia symptoms in adolescents (12-18 years). The current study aimed to further examine whether the ASWS could be used to assess sleep across the AYA developmental period. The primary aim was to investigate the convergent and discriminant validity of the ASWS, total and subscale scores, within an emerging adult population (ages 19-25) using validated adult sleep assessments. A national sample recruited through Amazon’s MTurk (N = 332; Mean age = 23.37 (SD = 1.55); 53.8% female; 51.4% White) completed the ASWS online. The ASWS total score was also strongly correlated with both subjective sleep quality, including five sleep behavior domains, and technology use. The present study is the first psychometric evaluation of the PANT survey and involves a large sample of MATCH participants from across North Carolina who responded to the instrument online (N = 2,283). Using both exploratory and confirmatory factor analysis, my results show that the PANT is comprised of two factors measuring physical activity and healthy choices, respectively. I then examine the criterion-related validity of the instrument relative to body mass index, and healthy choices, respectively. I then examine the criterion-related validity of the instrument relative to body mass index, and healthy choices, respectively. I then examine the criterion-related validity of the instrument relative to body mass index, and healthy choices, respectively.

SleepWakeScaleinNationalSampleofEmergingAdults

Along with other risk factors such as dietary and lifestyle choices, hypertension is also hereditary (Benjamin et al., 2018). Research has shown disparities in hypertension among males and females in the 20s with females being less likely to be hypertensive (Everett & Zazouacca, 2015). We used a noninvasive, nonpharmacological, biobehavioral intervention using a paced breathing program to see the effects on blood pressure.

Purpose: The purpose of this pilot study was to determine if there is a difference in Heart Rate Variability (HRV) among male and female participants using paced breathing with a family history of cardiovascular disease.

Method/Procedure: Baseline HRV and blood pressure were obtained using a biofeedback ear clip and a noninvasive continuous blood pressure system. The initial visit consisted of a baseline HRV session followed by a paced breathing instruction using a set frequency of 5.5 breaths per minute. The participants returned for continued intervention and evaluation of blood pressure and HRV using paced breathing. Statistical analysis was performed using SPSS v 24.

Results: Participants (N = 20) were 21.15 ± 2.48 years, 65% female, 75% white. The differences in HRV for male and female groups were found to be statistically significant (p = 0.001) for the low-frequency and high-frequency band ratio (LF/HF) after a paced breathing exercise.

Conclusion: The results indicated a significant difference in LF/HF between males and females. The LF/HF is thought to be an estimation of the ratio between the sympathetic and parasympathetic nervous system activity. Although LF/HF has had some controversy as of late about the sympathetic and parasympathetic balance, this pilot found differences between males and females. Further exploration of HRV differences in at-risk populations, specifically between males and females is needed.

Adverse Childhood Experiences and Psychological Symptomology: Moderating and Mediating Roles of Mindfulness and Self-Compassion
Lauren Hope Conder, William Guiler, Erin Haley, & Christyn Dolber
Introduction: Research consistently documents a relationship between adverse childhood experiences (ACEs), stressful or traumatic events through age 18 falling under three categories: abuse, neglect, and household dysfunction) and later mental health problems. Mindfulness (non-judgmental awareness of the present moment cultivated through meditation) and self-compassion (responding to oneself and challenges with kindness, and a sense of common humanity) are consistently associated with beneficial psychological functioning and buffering negative effects of adversity. Limited research has investigated mindfulness and self-compassion as moderators or mediators of the relationship between ACEs and mental health problems. Method: Students (N=560, 85% freshmen, 69% female, 71% white) in Introductory Psychology courses at a southeastern university received research credit for completing an online survey including: Five Facet Mindfulness Questionnaire (FFMQ), Self-Compassion Scale (SCS), ACEs Questionnaire, Patient Health Questionnaire 9, Social Interaction Anxiety Scale (SIAS), Generalized Anxiety Disorder 7 scale (GAD-7), Eating Disorder Examination Questionnaire, and Posttraumatic Stress Disorder Checklist for DSM-5.

Results: Pearson correlations established positive relationships between ACEs and all symptom measures (p < .01). Moderator and mediator analyses were conducted for mindfulness and self-compassion between ACEs and symptom measures (controlling for gender and race/ethnicity). Significant moderation: model testing FFMQ moderation of ACEs-GAD-7 relationship, F(5,553)
GP11

NORMATIVE PERCEPTIONS OF SMOKING AND SMOKING BEHAVIORS AMONG COLLEGE-AGED AFRICAN AMERICAN WOMEN

Shelly A. Thornton, MA

Reducing cigarette smoking within African American Women (AAW) is important because AAW are at greater risk for smoking-related disease development, disease mortality, and poorer disease quality of life (CDC, 2013; USDHHS, 2014). Given these risks, it is important to understand factors that contribute to and protect against smoking within this population. Research has established associations between normative perceptions of smoking and smoking behavior, therefore normative perceptions of smoking for gender and race may influence smoking behaviors for AAW. The purpose of this study was to (1) examine normative perceptions of smoking for women and African Americans, (2) examine normative perceptions of smoking for female friends and African American friends as more specific reference groups, and (3) determine whether normative perceptions of smoking for gender and racial reference groups predict smoking behavior among college-aged AAW.

Participates were recruited through an online research participation incentive program for a brief online survey with items to assess gender and race-based smoking norms, and smoking behavior. In a sample of undergraduate AAW (N = 157), ages ranged from 18 to 22 (M = 18.55, SD = 0.87), and 8.3% self-identified as current smokers. Logistic regression analyses were used to predict smoking status (smoker vs non-smoker) from normative perceptions of smoking for gender and race while controlling for demographic covariates.

Results indicated that participants, on average, perceived that smoking was less normative for women and African Americans in their immediate social circles, more normative for African Americans more broadly, and neither normative nor non-normative for women more broadly. Gender Friend Smoking Norms (GFSN), Racial Smoking Norms (RSN), and Racial Friend Smoking Norms (RFSN) accounted for a significant proportion of variance in smoking status. With each standard deviation increase in GFSN, RSN, and RFSN, AAW were 5.3, 3.2, and 4.2 times more likely to be smokers, respectively.

This study found that perceived gender and racial smoking norms contribute to the prediction of smoking status within a sample of undergraduate AAW. In the development of future smoking interventions for AAW there may need to be considerations for normative perceptions as social and cultural influences on smoking status and motivation for cessation.

GP12

Work Hard, Play Hard… Or Not: A Look at the Relationship between Workaholism and Work-Leisure Conflict

Emily Marie Meier
Dr. Shahnaz Azz

The current study sought to examine the relationship between workaholism, work-leisure conflict, and work stress. Workaholism is an addiction to work characterized by working both compulsively and excessively and is related to many negative outcomes to both the employee and the organization. It is vital, then, to examine these outcomes in order to find ways to reduce potential harm. As such, the current study utilized self-report measures to study whether work leisure conflict would strengthen the relationship between workaholism and work stress. The sample consisted of working adults from various occupations and backgrounds. The results indicated that workaholism was positively correlated with work stress, supporting previous research. Work leisure conflict was found to be positively correlated with both workaholism and work stress. Results did not indicate a moderation effect for work leisure conflict on workaholism and work stress. Organizational implications, limitations, and future directions are discussed.

GP13

Childhood trauma and RPS: How do bad things affect good people?

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Adverse childhood experiences (ACEs) are harmful, toxic interpersonal experiences in childhood that often lead to lifelong, systemic, and maladaptive adjustment. ACEs include childhood experiences of direct exposure to physical, psychological, and sexual abuse, neglect, and violence, as well as parental mental health, substance abuse, incarceration, divorce, and intimate partner violence. Evidence suggests there are biological changes (i.e., disrupted neurodevelopment; Felitti, 2000) in people who experience ACEs, which is believed to help explain why they experience cognitive and socioemotional impairments (Gilbert et al., 2018), engage in health risk behaviors (e.g., smoking; Anda et al., 1999) and are at increased risk for disease, disability, chronic health conditions (e.g., metabolic syndrome; Lee, Tsenkova, & Carr, 2014), and early death (CDC, 2016). Yet, treating the biological effects of trauma is not a common response to the numerous harmful outcomes that are linked with ACEs (e.g., discipline problems, inattention, impulsivity, coronary heart disease, stroke; Gilbert et al., 2010). One reason, could be that there is still a scientific gap in our understanding about the role of disrupted neurodevelopment (SAMHSA). Thus, the purpose of this research is to present empirical research that examines whether disrupted neurodevelopment helps indirectly explain the relationships between ACEs, physical health, socioemotional impairment, and social problems in foster youth.

Using longitudinal data from the Chafee Independent Living Project (Courtney, Stagner, & Perhamit, 2013), a test of indirect effects showed that disrupted neurodevelopment (i.e., PTSD symptoms) help explain the relationship between ACEs (i.e., victimization) and the physical health and socioemotional problems (i.e., delinquency and externalizing behaviors) in adolescent foster youth. The results provide support for using trauma-focused treatments that are known to positively influence the disrupted neurodevelopment of people who have experienced ACEs rather than focus on treating outcomes (poor health, socioemotional problems). Clinicians can use these results to inform biopsychosocial assessments and interventions. Future research can enhance these results by examining disrupted neurodevelopment through physiological measurement and by exploring if disrupted neurodevelopment influences other effects of trauma (e.g., health conditions or cognitive impairment).
Data from 6,068 undergraduates who completed a 100 item survey revealed via correlational analysis that Blacks, heterosexuals, and having married parents were more religious than whites, non-heterosexuals and having divorced parents. Similarly, students scoring high on religiosity were more likely to believe in one true love and were more committed to staying married if they had fallen out of love or if their partner cheated on them than students scoring low on religiosity. High religiosity was also associated with disapproval of homosexuality, not being involved in a “friends with benefits” relationship, not intending to cohabit, avoiding hooking up, not having cheated on a partner, being against abortion, and not having used the Internet to find a partner. Regression analysis suggested a differential influence of religion based on race and sexual identity on some associations.

Structural functionalism provided the theoretical framework for interpreting the findings.

Key words: religiosity, love attitudes, relationship values, sexual values

GP16 Impacts of Preschool Media Use on Behavioral Inhibition
Kelli Long
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Media use in children has expanded far beyond watching television and movies. Preschool-aged children are now using computers, iPads, tablets, smartphones and gaming consoles to watch television, stream content, and play games. Parents have varying limits in place regarding media use, though many parents feel that media benefits children’s learning and creativity (Ridout, 2017). Additionally, many parents feel that their child’s media use has no impact on their child’s social skills, ability to focus, or behavior (Ridout, 2017). In their most recent guidelines, the American Academy of Pediatrics (AAP) recommends that children exposed to fast-paced programming such as Spongebob, performed significantly worse on the EF measures than did children who watched slow-paced programming or colored for nine minutes. Executive function skills are those that allow individuals to control their attention and behaviors to reach a goal. The three components of EF are inhibitory control, working memory, and cognitive flexibility. The present study aims to study the impact of preschool-aged children’s media use on their inhibitory control by way of an iPad-based Go/No-Go Task from the Early Years Toolbox (Howard & Melhuish, 2017). It is hypothesized that the number of minutes a child spends using media will be positively correlated with the percentage of false alarms, or failure to exhibit inhibitory control, on the Go/No-Go Task. It is also hypothesized that reaction time will be inversely correlated to the percent of false alarms. Lastly, the present study attempts to prove that children who meet AAP guidelines will perform better on the Go/No-Go Task than children who exceed AAP guidelines, thus exhibiting better inhibitory control mechanisms. Families are being recruited from area preschool centers. The Go/No-Go data will be collected in the centers, while parents will complete an online media use survey.

GP17 Development of a Sustainable Bleacher Garden: Applications of Sustainability in the Carolina Outdoor Education Center’s Expedition Program
Boris Dario Escalona Berbety

This case study describes a project undertaken by the Carolina Outdoor Education Center’s Challenge Course and Expedition Programs, under the umbrella of Campus Recreation, that work together at the University of North Carolina (UNC) at Chapel Hill to provide outdoor activities to the members of the university community. During the past two years, the Expedition program has been operating with limited resources of income to provide food products to their clients during their personalized trips. To improve cost effectiveness, the Expedition program opted to build a sustainable bleacher garden that would provide a continuous form of fruits and vegetables during the year. The success of the garden led the program to reach out beyond the university community, parks, and businesses, which were suggested to exist in the historical record, has been found archaeologically, further research questions can be explored surrounding aspects of the African American experience in this region during and directly after the end of slavery.

GP21 Metabolic Disease in Juveniles from Ottoman-Era Jordan
Emily A. Edwards
Megan A. Perry

The site of Tell Hisban in Jordan was seasonally occupied by nomadic agropastoral tribes for over a thousand years. In the 1870s, the Ottoman Empire instituted the Tanzimat, a series of reforms intended to solidify control over the region, including a new system of individual land ownership. While some individuals from the tribes were able to purchase their traditional lands, many adopted a more sedentary lifestyle, working for the new agrarian landowners. During this period, at least 62 individuals were interred in the remains of an earlier structure at Tell Hisban. Because subadults are more susceptible to nutritional stress, the remains of the 34 subadults were analyzed for indicators of metabolic disease such as scurvy and rickets, to understand how these political changes could impact nutritional health. The remains of the 34 subadults were analyzed for indicators of metabolic disease such as scurvy and rickets, to understand how these political changes could impact nutritional health.
GP22
Prevalence of Recreational Activities and Perceived Stress in Emergency Medical Service Personnel: A Cross-Sectional Study
Allison Bradley Barrett

According to the American Psychological Association (APA), stress is prevalent across generations, races, and regions of the United States (APA, 2012). Baum (1990) defines stress as "a negative experience that is associated with threat, harm, or demand" (p. 660). Stress is necessary in daily life to keep individuals functioning at the optimal level; however, too much stress can cause a decrease in functioning and poor performance (Donovan, Doody, & Lyons, 2013). Emergency medical service personnel experience stress at a magnified level during a work shift. Due to the high levels of stress, emergency medical personnel experience high rates of burnout and turn to negative coping techniques such as alcohol and drug use (Grigsby & Knew, 1988). The current study seeks to explore the prevalence of recreational opportunities within emergency medical service stations across North Carolina and note any differences in levels of perceived stress among personnel working in stations with recreation opportunities versus those personnel working in stations without recreation opportunities.

GP23
Mental Wellness Programs in Law Enforcement
Cheyenne K. Franks

Mental wellness, in this particular study, is defined as any type of resource or program that assists law enforcement officers in coping when they are stressed with individual or job-related challenges. The literature on mental wellness resources are limited due to the lack of empirical research in the area. The existing research suggests that officers in the field of law enforcement come across a variety of challenges in regard to their job programs and can benefit from programs that address these concerns. Working as a law enforcement officer is an extremely demanding job with an amplified risk for emerging issues such as PTSD, substance use, family struggle, and mental illness largely stemming from the exposure to trauma, crisis, violence, and/or crime. The current study examines the nature of mental wellness resources within law enforcement agencies across the country. The purpose is to provide basic knowledge about the resources that are currently available, and what additional mental health resources agencies support. To determine this information, a stratified random sample of 2,348 law enforcement agencies (police and sheriff) throughout the United States were surveyed.

GP24
Bioarchaeological Analysis of a Historic North Carolina Family Cemetery
Madison Long
Megan A. Perry

The Gazebo Cemetery at Seaside, located in Sunset Beach, North Carolina, purportedly contains members of a wealthy and influential planter family, the Gazebo’s, who died during the late 18th and early 19th centuries. In 2017, a Gazebo descendant requested excavation of the cemetery by East Carolina University as part of an extensive genealogical project that will culminate in the reburial of the human skeletal remains. During the first season of excavation, three adult individuals were recovered from the cemetery; and excavation in 2018 uncovered five additional graves containing seven individuals. Six out of the seven individuals recovered in 2018 are subadults, one 6-8 years of age, one 7-8 years of age, another 1.5 years old, and three term infants. All individuals at the site display skeletal evidence of childhood non-specific stress indicators, such as linear enamel hypoplasias in the adults and children, and/or periostitis or porotic hyperostosis in the children. This evidence, along with the simultaneous burial of two of the newborns and the 6-8 year old child in the same grave possibly due to a disease epidemic based on historical evidence, suggests that even "elite" 18th and 19th century landowning families experienced childhood frailty in North Carolina.

GP25
“THIS IS HOW I LIKE IT”: Feminist Attitudes and Decreased Orgasm Faking
Taylor Elizabeth Hilliard, East Carolina University
Rachael Breznik, University of Albany, SUNY
David Knox, East Carolina University

To what degree do feminist attitudes impact sexual satisfaction via expressing one’s sexual needs? Six-hundred and fifty-two undergraduates completed the Liberal Feminist Attitude and Ideology Scale (LFAIS), as well as items on sexual assertiveness (“I feel comfortable telling my partner what I prefer in regard to our sexual activities”) and faking an orgasm (“I fake having an orgasm”) on a Likert-scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Women, sexual minorities, and people of color reported greater feminist attitudes than men, heterosexual individuals, and white people, respectively (p<.001). Feminist attitudes were also positively correlated with year in school (r = .13, p < .01).

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Conditional process modeling via Hayes’ process in SPSS was used to examine whether feminist attitudes increased openness in expressing one’s sexual needs, which, in turn decreased the tendency to fake orgasms. Sex of respondent, sexual orientation, race, and year in school were included as covariates. Results revealed that feminist attitudes were significantly linked to greater comfort expressing sexual needs (a = .16), which in turn was linked to a lower tendency to fake orgasms (b = -.36). Bias-bootstrap 95% confidence intervals indicated a significant and negative indirect effect of feminist attitudes on orgasm faking through sexual communication (ab = -.06, 95% CI [-.02, -.10]). In other words, results suggested that feminist attitudes decreased faking an orgasm through increased comfort in expressing one’s sexual needs.

GP26
Simply the Best for Our Students: Connecting Latino Parents and the Public School System
Sarah E Daughtridge

Purpose and Rationale: The recent increase in the number of Latino population as well as students enrolled in the United States public schools is creating challenges for K-12 educators/ school professionals. The purpose of this study is to explore the experiences of Latino parent’s involvement in their children’s education and to identify culturally appropriate strategies to foster parent’s participation. The study also examined perspectives of students and public school administrators on bridging the gap between public schools and Latino parents involvement.

Methodology: The study employed ethnographic focus group and an interview research approach. Participants included 32 Latino parents with children (students) enrolled six public schools—elementary, middle, and high schools. Data was transcribed and entered into NVivo (version 12) for formal coding. There were over 90% agreement across all codes and any individual codes with less than 80% agreement were discussed and coded by consent (Creswell, 2009; Creswell & Miller, 2000). The theoretical framework of parental involvement (Epstein, 2001) guided the study.

Findings: Six themes emerged from the parents focus groups on barriers that limit parents effective involvement in children education. These include cultural, educational language, economic, social, and communication. Similar to the challenges disclosed by parents, the public-school staff and students recounted their struggles to involve parents in their education. Themes that emerged from those interviews and focus groups include communication/translational, cultural education, education enforcement within the home, understanding, and unwelcoming environment.

Conclusion and Implications: Factors such as language and culture prevent parents from gaining access to relevant information, and children’s education. For the school administration, lack of resources such as interpreters, translators, and cultural understanding make it difficult to connect with Latino parents. Bilingual school staff and or teachers may encourage parents participation for the reason that they will have someone to communicate with. Schools working together with parents to promote cultural awareness will create a welcoming environment for parents to be more involved in their children education.

GP27
Exploring Community-Based Keyboarding Instruction for At-Risk Youth
Rose Condon1, Cecelia Rabili, Kelly Semon1, Meredith Stancill1, Denise Donica1
1Department of Occupational Therapy, East Carolina University

Keyboarding skills are significant in students’ ability to compose assignments, access information online, and complete computer-based testing requirements. Students must have a solid foundation in keyboarding before they can be successful in these higher-order skills. Despite its importance, keyboarding is rarely taught in classrooms, partly due to a lack of knowledge on best practices for keyboarding instruction. Additionally, socioeconomic status is an important determinant in a student’s access to and understanding of technology outside the classroom. Occupational therapists could potentially address this disparity. This study adapted an established keyboarding program (Keyboarding Without Tears) for use as a community outreach within the summer programming at a local Boys & Girls Club serving the low-income, at-risk youth in Ayden, NC.

Students offered participation in this project included rising first through fifth graders at the selected club. Students were assigned to one of two groups. The experimental group (n=21) participated in programming at the club, the control group (n=14) had access to the program at home. Experimental students were offered programming on site which included two components: (1) structured keyboarding instruction program and (2) small group computer-related activities. These activities occurred four times per week for 6 weeks for all enrolled participants who were at the club the day of the session. The structured keyboarding instruction curriculum is game-based and self-directed. We used
students are incorporating the Scratch program into their curriculum will be evaluated for environmental asthma triggers, with 100% having tested for an environmental home assessment. Due to cases being lost to follow up, interviews and environmental measurements are collected using 1) an Amprobe THWD-3 air quality meter to assess indoor air quality, 2) an AirWatchers 2.5 air quality meter to assess indoor air quality, 3) a TruBlaze indoor environmental monitor to assess indoor air quality, and 4) a SleepSense sleep monitor to assess sleep patterns. Environmental measurements help to identify asthma triggers present in the indoor environment and, along with social determinants of health, provide a comprehensive assessment of health screening to help improve the health of low-income, Eastern North Carolina Families with Children with Asthma. Noelys Montilla, Jordan Snow, Elizabeth Camden, Jordan Carttette

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GP29

Culturally Responsive Curricular Collaborations: A Course- Spaced Exploration of Undergraduate Research
Davis Martin, Emilee Manning, Elizabeth Hawley, Aaryn Shawley, Noelys Montilla, Jordan Snow, Elizabeth Camden, Jordan Carttette

The purpose of this case study was to explore how second graders and undergraduate music education majors work together to redesign lessons from the Silver Burdett (2008) Making Music second grade curriculum to make content more relevant and engaging by incorporating Scratch into a 6th grade science curriculum and evaluating the benefits of incorporating a computer coding program into an interdisciplinary curriculum. Students will also complete pre- and post-assessments on the topic of how to solve a class of problems. This research will seek to determine if this will result in more engaged learners and greater academic growth. Research conducted has indicated that coding programs generally provide stimulating challenges to students, academically and socially. Preliminary analysis of the number of correct words per minute shows a difference between the experimental (M = 1.95) and control (M = 0.64) groups from pre-test to post-test. This poster will include the structure of this unique community-based program as well as its outcomes. This information will inform viewers about the efficacy of this specific keyboarding program with regards to improving speed, accuracy and technique of elementary keyboarders in this population.

GP28

An Algorithm for Student Motivation and Achievement
Victoria Gemelli

Despite all the tools and research available, it seems we are no closer to finding an ideal format to attain student engagement and achievement. An algorithm is an unambiguous specification of how to solve a class of problems. This research will seek to determine if this will result in more engaged learners and greater academic growth. Research conducted has indicated that coding programs generally provide stimulating challenges to students, academically and socially. Preliminary analysis of the number of correct words per minute shows a difference between the experimental (M = 1.95) and control (M = 0.64) groups from pre-test to post-test. This poster will include the structure of this unique community-based program as well as its outcomes. This information will inform viewers about the efficacy of this specific keyboarding program with regards to improving speed, accuracy and technique of elementary keyboarders in this population.

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GP30

The Effect of Modeling Instruction on Student Understanding of Evolution and Natural Selection
Colin Wilson

The topic of evolution and natural selection is central to a comprehensive education in biology, yet it remains difficult to teach due to cognitive and cultural barriers. This study attempts to improve eighth grade student understanding of evolution and natural selection through the use of an active learning pedagogy, Modeling Instruction. Four eighth grade classrooms will be divided into approximately equal population sizes. The student body is made up of predominantly white middle to upper middle class students with high levels of familial educational experience. Two classrooms will receive direct instruction while the experimental group, made up of the additional two classrooms, will take part in the modeling learning cycle, characteristic of Modeling Instruction. Each consenting student will take the Natural Selection Concept Inventory before and after instruction. Student gain scores will be analyzed for significance using an independent-measure t test. It is expected that those in the experimental group will have statistically significant greater gain scores for the Natural Selection Concept Inventory. This outcome will be in line with research trends in Modeling Instruction and active learning pedagogies. This study will add to the support of Modeling Instruction as an effective active learning pedagogy and extend the evidence to include middle grade students.

GP31

Effects of Teacher Shortages and Low Retention Rates on Science Achievement
Christopher Miles Stafford

Turnover and retention rates within high school science departments have become an ongoing issue across the nation, most notably in high poverty schools. The number of science teachers coming out of a four year college has also decreased over the years influencing the number of “highly qualified” teachers entering the school systems. The purpose of this study is to find a correlation between student’s testing performance on the state mandated Biology EOC and the shortage of science teachers and low retention rates for Edgecombe County Public Schools. The research will look at teacher vacancies and the number of years teaching for current and past teachers over a 10 year period. It will also take note of lateral entry teachers who did not earn a secondary education degree. A neighboring school to my own institution has had very little turnover with many of the teachers about to reach retirement. Within the past few years, there has been about a 30% difference in biology proficiency scores and I believe this has something to do with constant turnover of teachers within my own department. I intend to collect data on long term substitutes and teachers who were employed one year or less from human resources and data managers from the three high schools. I will compare the trends of each high school to find a correlation. This study will be strictly quantitative and no identifiers will be used during the study.

GP32

Combining Environmental Assessments and Social Determinants of Health Screening to Help Improve the Health of Low-Income, Eastern North Carolina Families with Children with Asthma
Gabriel Beattie-Sergio, MPH/MSEH(c), Schweitzer Fellow Greg Kearney DrPH, MPH, Associate Professor

Background: Asthma is a serious chronic respiratory condition that causes swelling and constriction of the airways. In the United States, asthma is the leading chronic disease among children under 18 years of age. In North Carolina, the prevalence of children reporting having asthma is 2% higher than the national average. Geographically, the burden of asthma is disproportional in N.C., with eastern counties having the poorest and highest percent black, non-Hispanic population along with the highest prevalence of asthma and asthma-related ED visit rates in the state. Poor housing conditions can create environments for allergy triggers including exposure to furry pets, dust mites, ETS, mold, cockroaches and mice. Other factors such as access to healthcare, and having enough food to eat can create social stress that can add additional burdens to a family with limited resources. Objectives: The objectives for this project are to; 1) identify some of the major social determinants of health (SDOH) among eastern North Carolina families with children with asthma; and 2) evaluate indoor, environmental health triggers associated with asthma. Methods: In our project, we use a home-based intervention approach that includes a combination of tools, including an environmental visual assessment checklist to identify asthma triggers present in the indoor environment and, a SDOH screening tool. Through home assessments and interviews with families, it is possible to determine asthma triggers related to asthma symptoms and attacks. Environmental measurements in the home are collected using 1) an Amprobe THWD-3 temperature and relative humidity device, and 2) Extech meter to measure moisture in home building materials. A SDOH screening tool is used in conjunction with the SDOH screening tool to assess the social economic and wellbeing of family needs. Thus far, there have been 74 families screened using the SDOH tool. 30 families identified the need for an environmental home assessment. Due to cases being lost to follow up, or other unforeseen reasons, 18 homes have been evaluated for environmental asthma triggers, with 100% having
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Interventions the participants will experience an improvement in (1) trauma response factors, (2) behavioral and psychosocial factors, and (3) perception of the Pitt County Sheriff’s Department. Data collection is still in progress.

GP34
Balance Assessment of Athletes vs. Non-Athletes Utilizing Virtual Reality Controlled by Force Plate Center of Pressure Information

Andrew Jung, Patrick Rider
Introduction: Balance is a key attribute which is needed for progression of many athletic movements. The ability to maintain balance is also needed to prevent falls in clinical populations. Literature has shown that the use of center of pressure data is effective to assess one’s ability to maintain balance. Parameters such as COP area, average radial area, and average velocity have been used to identify differences in one’s balance ability. COP parameters have also been used to identify differences in balance ability across populations. Different populations range from athletes to clinical populations. The development of different technologies has played a crucial role in the assessment and rehabilitation of patient’s balance. The Equinet machine is a popular device and is capable of measuring balance only in the sagittal plane and is very expensive. This has identified a need for further development of more effective and cheaper systems. The use of virtual reality immerses a subject in an environment where objects are fixed relative to reality. The implementation of VR in balance assessment and rehabilitation has proven useful due to its standardization, reproducibility, and stimuli control. VR systems which have been developed to assess balance range in the technologies used from large screens with stereoscopic vision, to whole rooms used to immerse the subject. This study utilizes a head mounted display and input from a force platform to control the virtual environment. The purpose of this study is to use a virtual reality system which takes input from a force platform to assess differences in athletes vs. non-athletes.

Methods: Twenty NCAA college athletes (18-22 years old), and twenty non-athletes (18-22 years old) will be recruited. Subjects will perform three 30 second trials while immersed in the virtual environment. The VR environment will be a maze which must be navigated by the subject by moving his/her COP. Using 3D motion capture, information will be collected to identify differences in the kinematic patterns utilized to control COP. Analysis of COP parameters will also identify differences in balance ability. Significance will be determined using a p value < 0.05.

GP35
Racial Identification

Autumn Kristyn Scales and Yolanda F. Holt, PhD
Previous research has evaluated dialect variation between southern White American English (WAE) and southern African American English (AAE) speakers (Holt, Jacewicz and Fox 2015) to evaluate similarity and difference within and between regional and socio-ethnic dialects. This research observed both alignment and difference for AAE and WAE as spoken in eastern and western NC. Minimal research however has evaluated a listener’s ability to evaluate the relationship between regional dialect variation and socio-ethnic racial categorization of AAE and WAE speech. This study attempted to evaluate this relationship. The study asked, “Is there a difference in a listener’s ability to accurately categorize AAE or WAE when produced by male speakers from eastern and western NC dialect regions?” A total of 24 Black and White listeners from central and eastern NC listened to the speech tokens. Results indicate the listeners were able to categorize the tokens produced by eastern NC male speakers (familiar group) into the correct categories with greater accuracy than the western NC male speakers. Results will be discussed in relation to theories of speech perception, pattern recognition, and categorization.

GP36
Dynamic and Thermodynamic Mechanisms for the Onset of the Biochemical Differences Between Athletes and Non-athletes After ACL Reconstruction

Kelsey Reeves, Patrick Rider
Introduction: Anterior cruciate ligament (ACL) injury is one of the most common injuries to occur in athletes. Many prevention and treatment programs have been implemented to reduce the high incidence rate of ACL injuries in young athletes. However, athletes are not the only population who encounter ACL tears. Many non-athletes experience ACL injuries and tend to be improperly treated as compared to athletes. Therefore, lower extremity mechanical differences may exist between athletes and non-athletes after ACL reconstruction.

Objective: The purpose of this study is to investigate the lower extremity mechanical differences between athletes and non-athletes after ACL reconstruction.

Methods: A 3D motion capture system and two force plates were used to collect data for 12 (6 athletes, 6 non-athletes) participants who have undergone ACL reconstruction. 33 reflective markers were placed on the subject’s body so that the cameras could record their movements. The participants performed three trials of a double leg squat, three trials of a single leg squat on the uninjured limb and three trials of a single leg squat on the involved limb. In addition, a single leg broad jump and a timed single leg hop over 6 meters was performed on each leg. Peak vertical ground reaction forces (GRFs) were measured in each leg. Peak hip extension and velocity, peak knee flexion and velocity, and peak ankle plantar flexion and velocity were measured in each leg. Significance was set at 0.05.

Results: Non-athletes demonstrated a significant increase in peak vertical GRF in the uninjured limb as compared to the uninjured limb in athletes (514.37±33.6 vs. 439.12±70.99). There was no significant difference between athletes and non-athletes in the involved limb during the timed single leg hop over 6 meters. Athletes demonstrated a significant decrease in jump distance on the involved limb during the single leg broad jump as compared to the involved limb in non-athletes (1.38 vs. 1.19). Further kinematic analyses has yet to be conducted on joint angles and velocities.

Conclusions: The results indicate that non-athletes increase vertical GRF under the uninjured limb compared to athletes which suggests that non-athletes compensate towards the healthy limb during functional knee performance. These results may be utilized by physicians and physical therapists to help develop exercises that can reduce the compensation in lower extremity functional performance in non-athletes.

GP37
AMP Degradation as a Regulator of Maximal Uncoupled Mitochondrial Respiration

Catherine B. Springer, Jeffrey J. Braut
Atripheid skeletal muscle is more fatigable due, at least in part, to a reduction of mitochondria content. Since mitochondria biogenesis is regulated by the transcriptional coactivator PGC-1α, which in turn is activated by AMP-activated protein kinase (AMPK), lower levels of AMP might be expected to lower mitochondrial content. Perturbations in AMP homeostasis have also been shown to be involved for exercise endurance, as low AMP can inhibit mitochondrial biogenesis, and increase fatigability. Furthermore, AMP can also affect mitochondrial function, such as ATP synthesis and ATP turnover. This study examined the effects of AMP on mitochondrial respiration.

Methods: Mitochondrial respiration was determined in isolated rat skeletal muscle mitochondria in the presence of AMP. The mitochondrial respiration rate was determined in the presence of 100μM of ADP, which is known to be inhibitory for AMP degradation.

Results: The AMP degradation assay (GP37) revealed that AMP degradation rate is significantly lower in the presence of ADP compared to the AMP degradation rate in the absence of ADP (p < 0.05). This finding suggests that AMP degradation is inhibited when AMP is present in the mitochondria, which may be a mechanism to prevent excess AMP accumulation.
days. An adenosine encoding for GFP was used as the negative control. Oxygen consumption rate (OCR) was assessed in the presence of 2 mM pyruvate and 0.5 mM glutamine. These XFe24 Analyzer and the Cell Mito Stress Test from Agilent. Oligomycin, FCCP, and a mix of antimycin A and rotenone were injected to measure the maximal respiration rate, maximal respiration, and proton leak, respectively. RESULTS: Maximal uncoupled (FCCP-induced) respiration rates were normalized to GFP as the value 1. A one-way ANOVA assessing the variance of the groups yielded a P-value of 0.0214 (alpha set to 0.05). Today's post hoc test found significantly (P < 0.05) lower maximal respiration in AMPD3 (-22.3 ± 7.7%) and SNT (-22.1 ± 6.0%) compared to GFP. DISCUSSION: AMPD3 and SNT were effective long-term treatments of mitochondrial respiration perhaps due to downregulation of mitochondrial biogenesis. However, AMPD1 was not able to decrease respiration, suggesting while AMP degradation plays a role in mediating mitochondrial respiration, it may not be the sole mechanism. NIH R01AR070200

GP38

THE ACUTE EFFECTS OF COMMON PHYSICAL THERAPY INTERVENTIONS ON PASSIVE HAMSTRING STIFFNESS: A BLINDED RANDOMIZED CONTROLLED TRIAL

Durland, A.1; Thorp, J.1; Johnson, S.1; Wilcock, J.1; Baker, K1 Norris, N.1; Hall, A.1 1. East Carolina University

Purpose/Hypothesis: The purpose of this study was to compare the effects of common physical therapy techniques on acute hamstring passive stiffness. The hypothesis is that dry needling, stretching, and foam rolling will improve hamstring passive stiffness, and that eccentric exercise may have the reverse effect of increasing passive muscle stiffness. Number of Subjects: 100 subjects Materials/Methods: Subjects who met inclusion criteria had their initial passive hamstring length of the right leg measured using the “90-90 test” and a bubble inclinometer. The measurement was not able to decrease respiration, suggesting while AMP degradation plays a role in mediating mitochondrial respiration, it may not be the sole mechanism. NIH R01AR070200

Case Description: Prior to the season, team members were screened for participation warm-up, and to involve all members that have a role in developing this program to be most effective in preventing injury. Without a screen, preseason training and the warm up routine may not be as specific to result in beneficial outcomes. Additionally, a screen without implementation of corrective exercise and neuromuscular retraining is of no benefit. It is our goal to continue implementing the screen and comparing injury/lost time rates to prior seasons.

GP40

The Effects of Hurricane Florence on Wastewater Treatment in Eastern North Carolina

Danielle Dillane Carter Dr. Charles Humphrey Guy Iverson Caitlin Skubiel

Onsite wastewater systems (OWS) are a common means of wastewater treatment and dispersal in rural regions of North Carolina. Attenuation of pollutants in wastewater is influenced by the environmental conditions (e.g., soil type, vadose zone thickness) beneath the drainfield trenches of the OWS. Raw wastewater contains many different pathogens including viruses, bacteria, protozoan, and helminths that will pose public and environmental health threats if they are not effectively treated. While some pathogens are removed in the septic tank, most wastewater treatment occurs in the soil beneath the drainfield trenches. Prior research has shown that when the separation distance between groundwater and OWS is reduced, bacteria treatment is also reduced. Therefore, groundwater hydrology influences wastewater treatment by OWS. Eastern North Carolina is prone to extreme weather events such as hurricanes, which can deliver significant rainfall over a short period, causing fluctuations in groundwater levels and treatment of wastewater. Some climate models suggest extreme weather may become more common. The goal of this project is to characterize the groundwater hydrology beneath 3 large OWS in Eastern NC during an extreme weather event (Hurricane Florence). Groundwater dynamics including water level, hydraulic gradient, and flow direction were monitored for each system to provide insight into system functionality during intense hydrologic events. We hypothesized that during the hurricane, the separation distance requirements (trench to groundwater) would be temporally violated due to extreme groundwater recharge.

GP41

Prevalence of Asthma Among Hispanic Child Farmworkers in North Carolina

David Wainaina Wambui Gregory Kearney Dale1 1. Department of Public Health, Brody School of Medicine

The United States (US) labor laws do not prohibit children from working in agricultural farms operated by their parents. This "agricultural exceptionalism" in law has contributed to continued exposure to chemicals among young as young as 10 years who work in these farms. Absence of enough data to call for policy and other regulatory mechanisms has potentially failed to protect these children from environmental exposure that cause adverse health outcomes. This paper explores the respiratory health effects that Hispanic children who are the majority for children farmworkers in North Carolina. Among the data that were collected were measures of lung functions (Forced vital capacity, FVC and Forced expiratory volume, FEV1) and sociodemographic data. In addition, Asthma screening questions were administered to determine presence or absence or cases of previous asthma. Triangulated measured lung function with self-reported asthma data would help strengthen the findings of this study.

Analysis of data will focus in determining prevalence, trends and/or associations between impaired lung functions and/or self-reported asthma and exposure to harmful environmental chemicals or conditions found in the agricultural farms where the children work. Additionally, further analysis will seek to determine ecosinniphal inflammation in the airways indicated by the amount of fractional exhaled nitric oxide (FeNO). This analysis will be indicative of the presence of asthma among young farmworkers.

GP42

Combining Augmented & Virtual Reality into a Superior Display System

Joan Vinh Le Hueh Rui Wu Zhen Zhu

Augmented Reality (AR) systems, such as Microsoft Hololens, have the capability of displaying 3D models in a real-world environment. As an embedded system, Hololens has more constraints in computation power than a normal PC. As a result, it may be challenging to implement advanced functionality, such as object detection and localization, in real time software. In
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contrast to AR, Virtual Reality (VR) systems, such as the HTC Vive, utilizes two lighthouses that can track the user headset. The user headsets and controllers can be located in a relative play space. Therefore, it is able to detect a user’s location accurately and efficiently. However, VR lacks the capability of displaying models in the real world. We propose a new method to combine and integrate both systems (AR & VR) in this work.

Our goal is to display 3D models of human organs in an AR system based on the perception of space and target in VR. Our hypothesis is that the space and localization of object perceived in the space can be transformed seamless between AR and VR devices. In this work, the target object is an external human organ, such as a limb. The location will be estimated in the VR coordinate system using infrared sensors and other devices. It will be transformed into the AR coordinate system, based on which a 3D hologram of the limb can be collocated and displayed. The transformation can be performed in real-time. The main contributions of this paper are the implementation of this integration approach and the demonstration of the feasibility visible in both sensors. This concept will inspire more research into the integration of AR/VR systems with external sensors.

GP43
Modeling and Prediction of Cryptocurrency Prices
Alireza Ashayer1
Mentor: Dr. Naseeh Tahirzi1
1Department of Computer Science
Since the introduction of Bitcoin in 2008 as the first practical decentralized cryptocurrency, the interest in cryptocurrencies and their underlying technology, Blockchain, has skyrocketed. Security, anonymity, and lack of a central controlling authority make them ideal for users who are privacy minded. Academic research on machine learning, Blockchain technology, and their intersection have increased significantly in recent years.

One of the focus areas of the academic research in this area is the feasibility of applying machine learning techniques on data obtained from the Blockchain. This research reports on the performance and accuracy of modeling cryptocurrency prices using five different machine learning techniques. These techniques are Linear Regression, Exponential Smoothing, Auto-regressive Integrated Moving Average, Feed-forward Neural Network, and Long-Short Term Memory based Recurrent neural network. In this research, we have modeled the future prices of five different cryptocurrencies and compared the performance and accuracy of each technique for one cryptocurrency. The results obtained from this research can help researchers and cryptocurrency users to gain a better understanding of the performance of machine learning techniques when applied to the Blockchain technology.

GP44
Scripting an Automated Score and Message Board, Cyber Security Competitive Labs as a Service (CLaAS)
Nicholas Joseph Hempenius
There is a growing skills gap in the cybersecurity industry, to compound the skills gap, there is also a growing manpower gap. Every year the need for skilled cybersecurity professionals grows and every year the skills deemed important change. This has created a dire situation for academic and organizational training. The situation has sparked a wealth of research and development in Serious Cyber Security games based learning systems. However, significant research of design in game-based learning systems is independent of actual curriculum or does not see a common problem for which systems and designs should follow. This research will present a game that offers cybersecurity training for students and academic professionals. The design will present a balance of fun and learning, combining these common features visible in both sensors. This concept will inspire more research into the integration of AR/VR systems with external sensors.

GP45
Intrusion Detection Techniques
Author: Deepthi Hassan Lakshminarayana (MSCS)
Mentor: Dr. Naseeh Tahirz, Graduate Program Director Comp. Sci Dept.

With the growing rate of cyber-attacks there is a huge requirement for intrusion detection systems (IDS) in network. As the invasion gets complicated and challenging to detect better techniques are employed to retain the trust and security in the network. Over the last decade lot of methodologies have been designed to provide users with reliability, privacy and information security. This research paper reviews mainly three intrusion detection techniques such as blockchain technology, machine learning and deep learning. The goals of this survey are to compare the performance of various machine learning and deep learning algorithms and discuss the different block-chain methods used for intrusion detection. Also, the applications, drawbacks and challenges of these techniques are discussed. We have also provided an insight into future trends in these areas.

GP46
Design of a MeV Range particle accelerator beamline for the purpose of Optimically Stimulated Luminescence
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Optically Stimulated Luminescence (OSL) is a method which allows us to determine the dose deposition to a crystal structure. One potential method of delivering such a radiation dose would be using a particle accelerator. This presentation describes the design of a particle accelerator beam line that enables controlled irradiation of a variety of different samples. Post irradiation, luminescence measurements allow us to determine dose and other characteristics. There are many components that are crucial for the construction of an OSL beamline. Drift tube guides the radiation from the particle accelerator to the chamber while at vacuum. A vacuum tight chamber houses several samples at a time and an actuating arm extends individual samples into the path of radiation. Multiple turbo and rough pumps evacuate the line down to the required pressure, which is monitored by an ion gauge. A light tight structure will have to be built around the portion of the beamline which is accessible to samples to prevent the samples from being tarnished by light post-irradiation.

GP47
Projections of Changes in the Distribution of Nassau Grouper Spawning Habitat Using an Ensemble of Earth System Models
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Nassau Grouper (Epinephelus striatus) is an endangered, iconic Caribbean reef fish whose spawning and larval success may be threatened by climate change. These fish spawn within aggregations on coral reefs from December to April. Climate change threatens to reduce spawning habitat and connectivity of populations due to thermal stresses and changing currents. Previous research projects a reduction of up to 80% of spawning habitat using a single earth system model. This research aims to identify thermal refuges of E. striatus using a multi-model approach and better quantify model uncertainty. The GFDL, IPSL, and MPI climate models were used to compare sea surface temperature (SST), seasonal SST gradients, and north/south geostrophic currents from historical (1981-2000) and future (2081-2100) periods under a business as usual climate change scenario. These variables were selected as they were determined in prior research to impact probability of spawning. Under the future period, SST exceeded the thermal tolerance of E. striatus (24-27.5° Celsius) across much of the Caribbean among all three models, with the largest increases in SST seen in the IPSL climate model. However, all three models suggest there may be some locations with thermal refugia. SST gradients and north/south geostrophic currents are not projected to change drastically under future conditions and nor are they projected to exceed the tolerance limits of E. striatus. Since SST may exceed the thermal limits of spawning habitats, these findings may have major impacts on the fishery of an iconic species by potentially reducing their reproductive output. This suggests that management practices,
Microbial metabolisms have shaped the earth for long before the age of humanity, oxygenating the atmosphere and carrying out the cycling of important elements such as carbon and iron. In this way microorganisms have proven to be very successful ecosystem architects, building a whole planet suitable for sustaining a variety of life. Yet, our understanding of microbial community dynamics within niches in their environments is often limited and can be further muddled by anthropogenic contaminants. To study the relationship between environmental conditions and microbial communities we have targeted a unique environment constructed by iron-oxidizing bacteria (FeOB): the iron mat. FeOB produce iron-oxidonitrates that form conglomerates in freshwater creeks known as iron mats. Thus, these ecosystem architects build an environment suitable to other microbial guilds including sulfate-reducing, iron-reducing, and nitrate-reducing bacteria. This study is conducted at Town Creek, Greenville, NC where humans are also impacting the environment, by way of underground oil contamination. With the addition of a selection pressure will the microbial functions be maintained by its environment, while also resolving the influence microbial community has in maintaining environmental conditions (e.g. through the bioremediation of contaminants). Through the analysis of microbial community and function (i.e. metagenomics) we can observe how the microbial community downstream microbial communities. Concentrations of total iron mats. Thus, these ecosystem architects build an environment suitable to other microbial guilds including sulfate-reducing, iron-reducing, and nitratereducing bacteria. This study is conducted at Town Creek, Greenville, NC where humans are also impacting the environment, by way of underground oil contamination. With the addition of a selection pressure will the microbial function be maintained by its environment, while also resolving the influence microbial community has in maintaining environmental conditions (e.g. through the bioremediation of contaminants). With the addition of a selection pressure will the microbial function be maintained by its environment, while also resolving the influence microbial community has in maintaining environmental conditions (e.g. through the bioremediation of contaminants).
Santo virus (ESV). In this study, we explore the effects of ESV infection on replication of DENV in mosquito cells and live mosquitoes. We assessed the effects of ESV coinfection on DENV protein expression and localization and genome replication and show that ESV inhibits DENV replication in mosquito cells. We also measured ESV effects on DENV in three different populations of a major DENV vector, Aedes aegypti (wild-type, high dissemination and low dissemination colonies). Findings show ESV reduced DENV body titers in the wild-type population from $1.7 \pm 0.4$ PFU/eq DENV-2/ml to $0.8 \pm 0.2 \log_{10}$ PFU/eq DENV-2/ml, and decreased leg titer from $3.0 \pm 0.3 \log_{10}$ PFU/eq DENV-2/ ml to $0.8 \pm 0.2 \log_{10}$ PFU/eq DENV-2/ ml in mosquitoes exposed to ESV. No DENV was detected in saliva from mosquitoes exposed to ESV. Hence, ESV may suppress DENV transmission.

GP55

Improve the Estimate of Energy Density in Relativistic Heavy Ion Collisions

Todd Mendenhall1, Dr. Zi-Wei Lin1
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During relativistic heavy ion collisions (RHIC), extremely high temperatures and densities are created. These conditions allow for the phase of matter known as quark-gluon plasma (QGP) to exist for early times for expected finite \( \tau_F \) values. Our solution [2] for late times and is also quantitatively comparable to the divergence as \( \tau_F \to 0 \), our \( \varepsilon(t) \) agrees with the recent triangular solutions for more complicated cases. We find that, apart from the recent formula still diverges as \( \tau_F \to 0 \). In this study, we extend the \( \varepsilon(t) \) for early times for expected finite \( \tau_F \) values.


GP56

Differential gene expression in the upper and lower floret of maize

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Flowers are essential for plant reproduction and also produce seeds and fruits that are consumed as food. In maize, male and female flowers are produced respectively on the tassel and in the ear. The lower floret aborts, resulting in mature ear spikes with a single female floret. Maize florets contain the grass-specific organs, lemma, palea, and lodicules, in addition to stamens and carpels. Sex determination occurs through pistil abort in the tassel and stamens arrest in the ear.

To understand the gene regulatory networks that function in floral development, we used laser capture microdissection coupled with RNA-seq to identify genes specifically expressed in the upper and lower floral meristems. We used RNA in situ hybridization to examine the expression of five DE genes, all of which have distinct expression patterns in the floral meristem; three of these genes appear to be differentially expressed (DE) between the upper and lower florets (FC≥2; q<0.05) and are enriched for genes involved in transcriptional regulation, development and hormone metabolism. We used clustering or datasets to examine the expression of five DE genes, all of which have distinct expression patterns in the floral meristem; three of these genes appear to be differentially expressed (DE) between the upper and lower floral meristems. These analyses have the potential to uncover new genes and regulatory networks that function in maize floral development.

GP57

Documenting Responses in Ecological Communities to Environmental Changes and Time Using Benthic Foraminifera

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Ecological observations of community dynamics in modern communities are restricted to a small glimpse of geologic time and environmental influences. However, fossil records of well-studied organisms such as foraminifera lack these restrictions as observations of fossil communities can be made over long spans of geologic time and over varying environmental conditions. Microevolution benthic foraminiferal assemblages from Shattuck Zones 10-18 of the Calvert Cliffs, Maryland, are being studied to examine the changes in marine community structure over a period of 10 million years. In conjunction with grain size analysis, foraminiferal assemblages are being used to 1) define each zone, 2) investigate intra- and inter-zone community change in response to multiple transgressive and regressive events, and 3) characterize a transition from a warmer period of the Middle Miocene Climatic Optimum recorded in the Calvert Formation (Zones 10-16A) to a colder period recorded in the overlying Choptank Formation (Zones 16B-18).

Understanding paleocommunity change over a 10 million year period when global temperatures were ~6°C higher and sea level was ~48 m higher than today advances our understanding of the influence of global climate on shelf environments, and benthic foraminiferal communities allowing detailed observations of changes in the composition of these communities. 

GP58

Modeling Cognitive Network Structure to Study Novice and Intermediate Physics Thinking

Timothy Malcolm Sault

Students express their ideas, both correct and incorrect, based on the responses they give to exam questions. We utilize the analytical framework of network analysis to analyze common student ideas. Cognitive networks are made of multiple choice exam responses (nodes) that are connected by the joint selection frequency (edges). These networks are useful in identifying student logical connections between physics ideas. By developing a model to describe these cognitive networks, we study their structure as well as structural differences between novice and intermediate physics students. When specifically examining the network structure of incorrect responses, we can identify whether students are making ‘smarter’ mistakes based on logic, or simply guessing. We believe these response methods will be associated with more defined network structure, and more random network structure, respectively.

GP59

Differentiation of Interpolation Techniques for Estimating the Spatial Distribution of Average Rainfall in Bangladesh

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It is projected that heat-trapping gases in the atmosphere will change global precipitation patterns to become more extreme making dry seasons more dry and wet seasons more wet. In Bangladesh, the dry and wet seasons are getting longer. This affects roughly 80 percent of the total population in Bangladesh, which is directly or indirectly engaged in agricultural activities. In this study, four interpolation techniques (Empirical Bayesian Kriging, Global Polynomial Interpolation, Inverse Distance Weighted, and Radial Basis Function) were compared for estimating the spatial distribution of rainfall in Bangladesh. Rainfall values recorded from 34 weather stations were averaged from 2003-2013 to help remove any anomalies. 12 stations were randomly chosen and set aside for an independent validation, and the remaining 22 stations were used to calibrate each model. Cross validation using the Root Mean Square Error (RMSE) was used to determine the optimal parameters for four interpolation techniques. Empirical Bayesian Kriging achieved the best results where the Mean Bias Error (MBE) is -0.61 and RMSE is 3.32. Besides, spatial distribution, temporal distribution of rainfall also important for regional climate change impact studies. Therefore, the analysis of temporal distribution of rainfall is destined for future studies.

GP60

Climate change impacts on spawning habitat suitability of Cubera snapper

Isha Gokturk, Brad Erisman, Will Heyman, Rebecca Asch

Climate change has altered environmental conditions on a global scale and already prompted changes in latitudinal distribution, depth range and phenology of fish species in marine environments. Impacts on tropical fish species are of particular concern as warming temperatures may result in conditions that have not been experienced by fishes anywhere in the world. This study is focusing on modelling the effects of climate change on the distribution and phenology of spawning aggregations of reef fishes in the Caribbean and Indo-Pacific regions, beginning with the impacts on Cubera snapper (Lutjanus cyanopterus). Cubera snapper inhabit coastal waters near rocky bottoms and reef structures and spawn during March through August off the
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coast of Florida, the Gulf of Mexico, and the Caribbean. A series of ecological niche models will be developed to project how the distribution of fish spawning aggregation sites will change under different climate change scenarios. The Non-Parametric Probabilistic Ecological Niches Model (NPPEN) will be used to model data extracted from an expertly validated global database of fish spawning aggregations that has been linked with information on environmental conditions from satellite data. While prototype models are first being developed for Cubera snapper and Nassau grouper (Epinephelus striatus), this work will eventually be expanded by looking at 12 species with varying thermal tolerances and life history characteristics. The goal is to examine how habitat preferences and phenological events may shift with species that experience more narrow thermal tolerance ranges during spawning events. Species with lower thermal tolerances will likely be more sensitive to climate change, therefore they are expected to experience a greater extent to changing environmental conditions than species that are able to withstand greater temperature changes. Modelling shifts in fish spawning aggregation locations and climate change impacts can be a useful tool for managing fisheries and marine protected areas across the globe.

GP61

Determination of River Herring eDNA Shedding and Decay Rates Via Two Fish Hatchery Experiments

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River Herring, a term used to describe both the Blueback Herring (Allosa aestivais) and the Alewife (A. pseudoharengus), were once abundant in North Carolina waters and were an economically important fishery however, these species are in decline due to a number of anthropogenic problems such as the degradation of their habitat, overfishing and the construction of dams. A method of quantifying the spawning populations of these fish is needed because North Carolina’s turbid waters and the large area of its coastal river systems make traditional means of sampling difficult. Environmental DNA (eDNA) sampling could be used to determine the location of a sound producing fish through methods of spatial filtering.

The procedure begins with superimposing a grid of approximate sound source locations over the spatial region of interest. From the position of the grid points and the sound speed in water, time difference of arrival (TDOA) between hydrophone pairs are calculated for a hypothetical sound source located at the grid point. The audio tracks from each channel are combined using these delay times – a virtual signal issuing from that location experiences constructive interference, while other signals and noise are suppressed through destructive interference. The average power of the signal is evaluated on the grid of possible source locations. Implementing this algorithm on audio excerpts from the array and determining the grid point that yields the maximum average power locates the fish that produced the sound.

GP63

Particle Induced X-ray Emission: Calibration of GUPiX Software for Elemental Analysis

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A newly calibrated material analysis system has been developed in ECU’s Physics Department Accelerator Laboratory. The system uses Particle-Induced X-ray Emission (PIXE) analysis to provide trace element composition of a wide range of sample types. PIXE analysis can provide sensitivities to the parts-per-million (ppm) level or better for many elements. In this method, a sample is irradiated with protons in the energy range of 1 – 3 MeV from the 2-million-volt tandem particle accelerator. Characteristic x-rays emitted from the sample are detected with an x-ray spectrometer, a new, state-of-the-art Silicon Drift Detector (SDD). The emission spectrum data is imported into a software program called GUPiX. With certain parameters, the data is then fit using a database of known spectral line energies to determine elemental composition of the sample. Details of the PIXE beamline and GUPiX software, including the multiple-sample analysis capabilities of the system, will be presented, and proposed multidisciplinary applications for biology, archeology, and medicine will be discussed.

GP64

Novel genetic mutant renders lateral line non-functional, causing survivability and behavioral deficiencies in zebrafish.

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The lateral line is a sensory system used by aquatic vertebrates to sense hydrodynamic disturbance caused by water flow and nearby predators or prey. The sensory units of the lateral line organ are the neuromasts, which are clusters of sensory hair cells distributed across the body. Killing the hair cells with ototoxic compounds or severing the lateral line nerves have demonstrated that the lateral line is profoundly important for swimming coordination, schooling, rheotaxis, and predator/prey detection. However, all of these previous studies have used acute treatments to temporally disrupt lateral line function. The reason for this acute-ablation strategy is the lack of a genetic mutant where only the lateral line system is disrupted, and all other sensory systems remain intact. In this study, we describe the first genetic model which allows us to study fish where the lateral line has been non-functional from birth. Lpoma HMIGC fusion partner-like 5 (lhp5) is a gene required for sensory hair cell function in humans, mice, and zebrafish. Here, we show that teleost fishes possess duplicate lhp5 genes, lhp5a and lhp5b, likely originating with the teleost-specific whole-genome duplication event. In zebrafish, these homologs are expressed in discrete populations of hair cells: lhp5a expression is restricted to auditory and vestibular hair cells, while lhp5b expression is specific to hair cells of the lateral line neuromasts. Consequently, lhp5a mutants exhibit defects in auditory and vestibular function, and subsequent larval death. However, the disruption of lhp5b affects hair cells of the lateral line only, making this mutant unique in that they are born with lateral line deficiencies. The lhp5b mutants do not exhibit complete mortality; though survival and growth are negatively affected in comparison to wild type siblings. This is especially apparent in scenarios where resources are limited. In summary, this work demonstrates the subfunctionalization of zebrafish lhp5a and lhp5b orthologs through cis-regulatory divergence. Furthermore, it is the first description of a genetic mutant which specifically affects the lateral line, providing a unique opportunity to study the contribution of this sensory system to fish development and behavior.

GP65

Applying the Optically Stimulated Luminescence Property of Tooth Enamel to Radiation Exposure Triage

Aaron D Lee

Fabric N Momo

Over the past few decades, scientists have been attempting to assess absorbed dose to workers or the public who may be exposed to radiological accidents. Up until now, EPR has been used as a qualitative approach in triage to separate individuals into high and low risk categories. However, EPR has been associated with a substantial amount of error in its usage, thus necessitating the development of a more accurate bio-dosimeter. It has been shown that teeth exhibit OSL properties which can be used to precisely quantify absorbed dose to an exposed individual. The crystalline structure of teeth allows for electrons to gain energy and become trapped in molecular defects after an exposure to ionizing radiation. These electrons can then be liberated, causing them to release energy as they return to their ground state. The total energy released from the teeth is proportional to the dose received. Therefore, triage categories can be refined to include more levels of risk.
As anthropogenic changes to environments have come to the forefront of public and scientific focus, the impacts of invasive species are beginning to be realized. Though invasive species are often most recognized when they are larger and easily identified, smaller cryptic biota, can also be highly impactful. Along the shores of the western Atlantic, a common mud crab (Rhopanopaeus harrisi) is being negatively affected by a recently introduced and impactful parasite (Loxothylacus panopaei). This invasion has novel selective pressures on Atlantic coast R. harrisi populations. In addition, recent research has shown that microbes can play a role in a macroorganism’s evolutionary dynamics, with examples coming from Hymenopteran insects. This is partially due to their rapid mutation rates and the ability to horizontally transfer genes, providing them with the capacity for potentially influencing the outcome of the coevolutionary arms races between hosts and parasites. To test the microbial impact two hypothesis will be tested. (1) Determine the microbial communities associated with host and parasite, and (2) perform experiments assessing the impact of disruption of microbial communities associated with the host and/or parasite. For (1), infected and uninfected crabs will be collected along the shores of NC. Crabs from this area will be dissected and the parasite will be identified and characterized. From the samples collected, the parasites will be characterized and the microbial communities will be sequenced. From the microbial sequences, the functional domains of the microbial communities will be assessed using Chlorophenol, a broad-spectrum antibiotic. A 5X concentration of the antibiotic will be used, which, based on preliminary data, is enough to disrupt microbial communities. Parasites will be given a 6 week experimental period to infect the crabs, after which infection rate across communities will be assessed. While the interactions between microbes and macroorganisms in marine parasitology is a relatively new field, this research can assist in understanding what role microbes play in the coevolutionary dynamics of hosts and parasites.
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Caretakers. Any of the circulating pox zoonoses could mutate into a new pox super pathogen causing a pandemic. Current preventative measures include the smallpox vaccine made with a related virus, live vaccinia virus (VACV), as well as a new treatment option for smallpox called TPOXX which was FDA approved in 2018. TPOXX has a poor safety record (especially for those who are immunocompromised, pregnant, or have eczema) and is not available to the general public. Our lab has identified two vaccinia virus genes/proteins that play an important role in virulence, A35 and O1L, and we are assessing their effects on host immune responses. Sera and spleen cells were collected from mice infected with the A35 deletion mutant (A35 ΔDl), O1L deletion mutant (O1L ΔDl), or wild type (WT) each week for 4 weeks post infection, and sera were analyzed for anti-viral antibody production using ELISA. T lymphocytes isolated from spleen cells were used in antigen presentation assays to determine the effects of A35 and O1L on cytokine production. We found that A35 protein inhibits anti-viral antibody production and cytokine responses by T lymphocytes. However, we have not found an effect of O1L on antibody or T cell responses, so we also measured O1L effects on viral replication, cell killing and protein expression. Our lab has shown that both of these viral mutants make safer vaccine alternatives against poxviruses. Understanding how poxviruses turn off immune responses will aid in anti-viral drug design, improve vaccines, and may allow us to mimic poxvirus immunosuppression to control autoimmune diseases.

Ozone exposure increases gene expression of inflammatory markers in the urothelium of mouse bladders. Laura White, Elena Pak, Myles Hodge, Sky Reece, Elizabeth Browder, Kymberly Gowdy, and Johanna Hannan

Introduction: Ozone (O3) is a pollutant present in the atmosphere that can be harmful to human health. Studies have shown an increased pulmonary and systemic inflammatory response following inhalation of O3. However, whether O3 influences inflammation and smooth muscle function in the bladder is unknown. We hypothesize that O3 exposure will cause an inflammatory response in the urothelium of the bladder. Methods: Female and male C57BL/6 mice (8-12 weeks old) were exposed to filtered air (EA) or O3 (1 ppm) for 3 hours. Mice were humanely euthanized at 6 or 24 hours post exposure. Bladders were excised and separated into the detrusor and urothelium. RNA was isolated from the urothelium and qPCR was performed to measure the expression of the following genes: IL-6, TNF-α, CXC1L1, CXC1L2, IL8, CC2L, and IL-1β. Results: O3 exposure increased inflammatory markers in the urothelium of female mice, however, there was no change in the males sampled in this study. IL-6 (inflammatory cytokine recruitment), and CXCL2 (polymorphonuclear neutrophil recruitment) were all elevated 6-hours post-O3 in females. TNF-α (activated by macrophages) and IL8 (receptor initiating immune response) were elevated at 24-hours post-O3 in females. There was no increase in expression of CCL2 (recruitment of monocytes/T cells) or IL-1β (activated by macrophages) in males or females. Conclusion: O3 causes a significantly increased inflammatory response in the bladder urothelium in females 6 hours following O3 exposure. Many of these markers are indicative of activation of an innate immune response while markers of the adaptive immune response were much lower. Our next steps are 1) to assess inflammatory markers in male urothelium 6-hours post-O3 and 2) histologically examine bladder cross-sections to determine if O3 leads to immune cell infiltration in the bladder.

GP72

Loss of Function in Dopamine Receptor-3 (D3R) Alters Ventricular Cardiac Fibroblast Migration in Response to Wound and Proliferation Into Vitro

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Dopamine is a neurotransmitter heavily involved in neural pathways regulating the reward response, body movement, mood, and cognitive function. As such, much of the research on dopamine and its five receptor subtypes has been conducted to observe the in vivo function of each receptor subtype in neurological disorders. However, recent studies by colleagues from our institution have suggested that D3Rs may play a role in cardiac-related aging, as 2-month-old D3 receptor knock-out (D3KO) mice show age-related changes in cardiac function similar to 2-year old wild-type (WT) mice. Thus, it would be interesting to understand the role of D3R expression in LV cardiac fibroblasts and cell culture experiments were performed to examine possible changes in cardiac fibroblasts from the left ventricles (LV) of WT (23-week old) and D3KO (5-week-old) mice. Immunohistochemistry was performed to determine the expression of D3R in LV cardiac fibroblasts, and cell culture experiments were performed to examine possible changes in cardiac fibroblasts. Proliferation was measured via total cell count over time points of 6, 12, 24, and 36 hours, while migration in response to a scratch wound was examined as change in distance (µm) at 3, 6, 12, 24 hours, and every 12 hours thereafter up to 86 hours. Staining with antibodies for D3R successfully showed expression of this receptor in WT cardiac fibroblasts, while cell culture experiments showed a time-dependent shift in proliferation and attenuation of migration in D3KO fibroblasts in the first 36 hours as compared to WT. Additionally, upon isolation of LV cardiac fibroblasts from 5-week-old D3KO and 23-week-old WT mice, cell volume from D3KO fibroblast isolation was markedly reduced compared to WT isolation under identical conditions (5-fold and 18-fold decrease in 5-week D3KO, respectively). This data suggests D3Rs may play a role in LV cardiac fibroblast migration and proliferation and correlate with previous observations of age-related changes in cardiac function of D3KO mice.

GP73

Metabolic Profiling of Downstream Nutritional Effects from Methadone Exposure In Utero Using Umbilical Cords

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Neonatal Abstinence Syndrome (NAS) is an array of symptoms experienced by an infant after the sudden discontinuation of an intrauterine supply of opioids or substance. Due to the steady rise of opioid abuse in the United States, incidence of NAS has increased. Hence, it is imperative to understand the effects of opioid exposure on infant nutrient status. As a part of this research study, we conducted metabolomics analysis using liquid chromatography-mass spectrometry (LCMS) on 52 (26 control and 26 admitted drug users) umbilical cords. All cords were homogenized in water with 0.1% formic acid and select internal standards were added. Metabolites were extracted using methanol and centrifugation. The results found eight tested positive for methadone and EDDP, nine tested positive for cotinine, two for fentanyl, two for norbuprenorphine, and nine for THC-COOH glucuronide. Metabolomics analysis identified 985 metabolite features, of which 75 had statistically significant differences between the control and methadone exposed cords. Further pathway analysis demonstrated that methadone exposure led to significant depletions of key nutrients in the arginine and ornithine, tryptophan, histidine, vitamin B6, lysine, and folate biosynthesis pathways. Given the public importance of these findings, our future steps are to determine the association between opioid levels, newborn nutrient levels and NAS symptoms.

GP74

Small molecule and antibody inhibitors of serine proteases within the C1 complex of the classical complement pathway

Denise Rohlik, Brandon Garcia, Blake Bashing

Complement is a proteolytic cascade that upon activation plays a key effector role in the innate immune system and acts to prime the adaptive immune response. During normal homeostatic events, complement is tightly regulated for its roles in immune complex clearance, lysis of target cells, opsonization, and the development of inflammatory responses. Several endogenous regulators are responsible for the control of complement activation; however, when dysregulation does occur, aberrant complement activation has been linked to autoimmune and neurodegenerative diseases in humans. Inhibition of the classical complement component C1 may ameliorate hallmark features of autoimmune and inflammatory disease. Two serine proteases within the C1 complex, C1r and C1s, are promising therapeutic targets for small molecule-based drug development. Using a surface plasmon resonance-based fragment drug discovery approach, we analyzed the binding affinities of over 2,000 small molecule compounds and identified compounds that bind directly to C1r. To visualize and definitively determine the binding site of our compounds, we co-crystalize leading compounds in complex with the serine protease domain of C1r. In vitro assays of complement function were utilized to quantify protease activity and, subsequently, the efficacy of our inhibitory compounds of interest. In a parallel approach we are investigating the activity of a series of small molecule compounds identified in a large scale in silico screen and which are predicted to bind directly to the catalytic site of the C1s protease. In a third approach we are developing anti-C1r monoclonal antibodies that specifically target the serine protease domain of C1r to determine whether our antibody will halt C1r activation and therefore downstream complement activity.
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**GP75**
The role of neuropilin-1 in cell-to-cell infection of T-cells by human T-cell leukemia virus type 1

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Human T-cell leukemia virus type 1 (HTLV-1) is a complex retrovirus and the etiologic agent of a fatal malignancy known as adult T-cell leukemia (ATL) and HTLV-1-associated myelopathy/tropical spastic paraparesis (HAM/TSP), a progressive neurodegenerative disorder. Approximately 3-10 million people worldwide are infected with HTLV-1. Transmission of HTLV-1 occurs through breastfeeding, sexual contact, or transfusion with cellular blood products. Infection occurs almost exclusively by cell-to-cell contact between CD4+ T-cells. For infection to occur, virions are transferred from an infected cell to the target cell through a virological synapse or through a cellular conduit, or by the transfer of extracellular matrix components. Following transfer of a virion, the HTLV-1 envelope (Env) interacts with the heparan sulfate proteoglycan (HSPG) neuropilin-1 (NRP-1) and glucose transporter 1 (GLUT1) tri-receptor complex. Following provirus integration into the host genome, HTLV-1 basic leucine zipper factor (HBZ) is expressed and localizes to the nucleus, where it effects a variety of cellular processes. In the nucleus, HBZ affects expression of multiples genes through interactions with transcription regulators.

Microarray analyses indicate that HBZ increases NRIP1 gene expression. NRP1 encodes neuropilin-1, which is a multi-use co-receptor and one of the receptors recognized by the HTLV-1 envelope protein. In this study, we performed a western blot analysis to verify that NRP-1 levels were increased in Jurkat clones containing HBZ. Additionally, using a single cycle infection/ luciferase assay, we determined that HBZ increases infectivity of Jurkat clones transfected with viral DNA. Using a short hairpin RNA (shRNA), we were able to reduce the level of NRP1 mRNA as assessed by qRT-PCR. Using the single cycle infection/ luciferase assay, we found that knock-down of NRP-1 in donor cells results in a decrease in infection efficiency. Because HTLV-1 infection requires cell-to-cell contact, we hypothesize that NRP-1 helps to retain viral particles at the cell surface to facilitate the infection process. Future directions will focus on addressing this hypothesis.

**GP76**
Glucose Transporter 6 (GLUT6) Protein Levels Increase in Response to Metabolic Stress in Mouse Skeletal Muscle

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Skeletal muscle is the main tissue responsible for blood glucose uptake, and importantly metabolic stressors induce adaptations in muscle that can both impair and enhance muscle glucose uptake. Glucose transporters (GLUTs) are critical for skeletal muscle glucose uptake, yet surprisingly to date not all of the glucose transported into skeletal muscle is available for cellular use. Additionally, it is unknown whether they play a role in how muscle adapts to metabolic stress. Thus, the goal of this study was to determine whether glucose transporter 6 (GLUT6) protein levels change in skeletal muscle in response to metabolic stressors such as insulin resistance and the stress caused by cell-to-cell contact between C2C12 satellite cells and murine macrophages. We will also conduct experiments using HeLa cells and murine macrophages to determine whether B. abortus upregulates or downregulates the expression of these transporters. These results could have implications for how muscle adapts to metabolic stress and how muscle uptake of glucose is modulated by insulin resistance.

**GP77**
Electrochemical detection of mutated DNA from Brcal-KO mice

Elizabeth R. LaFave, Michael D. Tarpey, Nicholas P. Balestrieri, Espen E. Spangeburg, Eli G. Hrvatskovs

Breast cancer 1, early onset gene codes for the DNA repair enzyme, breast cancer 1 susceptibility protein (Brcal). Brcal is prone to DNA mutations, predisposing humans to the development of cancer and additionally impacting skeletal muscle function. Skeletal muscle specific Brcal homoyzgote (Brcal1KO) mice were generated to show loss of muscle quality was associated with loss of Brcal. This was demonstrated through many phenotypic assays, notably, electron microscopy to visualize the appearance of swollen mitochondria coupled with qPCR, both individually and in combination. Additionally, histochemistry was used both to measure mRNA (mDNA) mutation frequency in KO vs. age-matched wildtype (WT) mice. An electrochemical method has been developed to rapidly provide information on DNA structure/sequence extracted from a model organism. DNA can be immobilized on a pyrolytic graphite (PG) electrode using layer-by-layer (LbL) protocols and asayed using square wave voltammetry (SWV). An electrocatalytic cycle arises by oxidation of ruthenium trisbipyridine (Ru(bpy)32+) to Ru(bpy)333+ at the electrode followed by regeneration of the reduced form through oxidation of DNA bases, primarily guanines. Differences in DNA structure/sequence manifest in the oxidative currents as the ruthenium is oxidized and interacts with the DNA. If altered (i.e. damage or mutation), this results in changes in the generated oxidative peak currents, providing insight into the genetic processes associated with an organism. Here, mDNA from the Brcal1KO and WT mice was assayed and compared with a goal of supporting previous qPCR and phenotypic assays. Peak currents upon electrochemical oxidation were shown to significantly (p < 0.05) decrease in Brcal1KO mDNA as compared to WT, indicating the accumulation of DNA mutations in the KO samples. Signal decreases were likely related to the loss of guanine content upon oxidative damage, mispairing, and eventual transfer to thymine upon replication processes. These results mirrored the accumulation of mitochondrial mutations indicated in beforementioned assays. Analysis of nuclear DNA showed that oxidative peak currents significantly increased (p < 0.05) in Brcal1KO mice compared to WT, indicating an accumulation of DNA damage, likely the formation of 8-oxoguanine. Continued work includes exploring means to validate suspected guanine depletion in Brcal1KO mDNA, as well as both validate and quantify the appearance of suspected DNA damage using liquid chromatography-mass spectrometry.

**GP78**
Unipolar Polysaccharide Production in Brucella abortus.

Dariel Anne Hopersberger, Richard H. Hooper

Brucella abortus is an intracellular pathogen that is the causative agent of spontaneous abortion in cattle and undulant fever in humans. To facilitate evasion of the host immune system, B. abortus colonizes macrophages and replicates within these cells; thus, the capability of B. abortus to survive within the host relies on its ability to successfully infect macrophages. As a member of the alpha proteobacteria, B. abortus is closely related to the bacterial species Caulobacter crescentus and Agrobacterium tumefaciens, which have been demonstrated to produce a highly polarized polysaccharide (UPP), respectively. In both cases, a polysaccharide is generated at one pole of the cells and aids in attachment to the bacteria to a solid surface. While B. abortus is also known to produce exopolysaccharides (EPS), the function of these EPS in B. abortus largely remains undetermined. Homologous genes have been identified in B. abortus for all but one of the UPP genes found in A. tumefaciens, and unipolar polysaccharide production of unknown composition has been observed using the fluorescently labeled lectin wheat germ agglutinin (WGA), the same lectin that binds to the UPP observed in A. tumefaciens.

Our lab has constructed a B. abortus mutant that lacks the homologs of the two most essential genes for UPP production and has observed that the upp mutant strain is attenuated in mice by about 100 fold, as determined by measuring colony forming units in the spleen, indicating that these genes contribute to virulence in B. abortus. We will use fluorescently labeled lectins and laser scanning confocal microscopy to determine whether B. abortus produces an authentic UPP at one pole in response to solid surface contact. We will also conduct experiments using HeLa cells and murine macrophages to determine whether the UPP genes aid in attachment to these cells.
In this project, we have developed a method that generates the pCT image using two sets of MRI data. The method is first trained with the CT data and two different sets of MRI data of multiple training patients. We segment anatomical structures in the images into several regions and then use a regression analysis to determine a two-variable high-degree polynomial function for each region to relate a voxel’s two MRI intensity values to its CT number. The polynomial functions are then applied to a target patient to convert the MRI data into pCT images.

The accuracy of this method is evaluated by finding the mean absolute error (MAE) between the pCT and the reference CT images. Our voxel-based method gives an average MAE of 40.3 ± 3.0 HU, which is comparable to a previous study based on the more complicated atlas-based method and better than other studies.

**GP90**

A Low-Efficacy Tolerogenic Fusion Protein Elects Stable Outgrowth of FOXP3+ Regulatory T cells In Vitro and In Vivo

Kayla DeOsa
Dr. Mark Mamie

Interleukin-2 (IL-2) is a potent T cell growth factor that interacts with a high affinity heterotrimetric receptor consisting of alpha (CD25), beta (CD122), and common gamma (CD132) chains. IL-2 independently binds to the alpha chain with low affinity and binds to the beta and gamma complex with intermediate affinity. IL-2 is the critical growth factor for an immunosuppressive subset of T cells known as FOXP3+ regulatory T (Treg) cells, which are absolutely required for immunological tolerance self. IL-2 enables FOXP3+ CD25high Tregs to suppress pathogenic conventional T (Tcon) and thereby prevent autoimmune disease, allergic disease, transplant rejection, inflammation, and immunopathogenesis. IL-2 has preferential action on Tregs because this receptor constellation expresses high levels of CD25 whereas Tcons express low to intermediate levels of CD25. Due to their IL-2 dependent immunosuppressive activity, Tregs hold immense promise for immunotherapy. However, Tregs exhibit phenotypic instability, and dominance of the CD25+ FOXP3+ Tregs coupled with the diminution of the Tcon subset. This study provides mechanistic insight into Treg physiology and provides a superior strategy for selective expansion of immunosuppressive Tregs.

**GP91**

PUF-8 and GLD-2 can either promote or inhibit the differentiation of spermatogenic germ cells, depending on gene dosage in the Caenorhabditis elegans

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PUMILIO/FBF (PFB) proteins have a conserved function in stem cell regulation. The nematode C. elegans has multiple PUF proteins. Among them, PUF-8 has a specialized role – it can promote both germline proliferation and differentiation, depending on the genetic context. PUF-8 protein inhibits the translation of target mRNAs by interacting with PUF binding element (PBE) in the 3’ untranslated region (3’ UTR). In this work, an in silico analysis has identified 765 potential PUF-8 target genes that have at least one PBE in their 3’UTRs. Of those, we focused on GLD-2 cytoplasmic poly(A) polymerase due to its known function in germline differentiation. Biochemical and reporter analyses showed that PUF-8 specifically binds to a PBE in gld-2 3’ UTR and represses a GFP reporter gene carrying gld-2 3’ UTR in the C. elegans proliferative mitotic germ cells. Genetic analyses also demonstrated that GLD-2 can either promote or inhibit the differentiation of spermatogenic germ cells through GLD-1 (a KH RNA-binding protein) and MPK-1 (an ERK/MPK homolog), depending on dosage in the absence of PUF-8. Specifically, heterozygotes for gld-1 and gld-2 genes [gld-1/+; gld-2/+]] inhibit the mitotic division of spermatocytes and instead promote their regression to proliferative mitotic cells by activating MPK-1 in the absence of PUF-8. Since these regulators are broadly conserved, we therefore suggest that similar molecular mechanism may control stem cell differentiation and tumorigenesis in other organisms, including humans.

Keywords: PUF-8, GLD-2, GLD-1, MPK-1, C. elegans, Germline, Tumors

**GP92**

Effects of Mettl3 Knockouts in MCF10 Breast Cancer Cell Line
Mohammed G Dorgham

Despite intense study, metastatic breast cancer is still the 2nd leading cause of female death from cancer in the US. While many genetic lesions and environmental factors have been implicated in breast cancer progression, effective treatments are still lacking, suggesting that we are missing part of the puzzle. In recent years, it has become clear that posttranscriptional regulation plays a key role in the aberrant gene expression underlying malignancy and metastasis. For example, the mRNA modification N6-methyladenosine (m6A) is involved in many post-transcriptional regulation processes including mRNA stability, alternative splicing, and translational efficiency and has been reported to be involved in many different cancer types, including breast cancer. For this study, we characterized the effects of decreasing mRNA m6A levels by knocking out Mettl3 in a genetically defined model of breast cancer with regards to proliferation, migration, and invasion. The goal of this study was to determine if these effects differed based on the stage of disease progression. Experiments were conducted with the MCF10 breast cancer progression model to allow for studying the effects of Mettl3 knockout in different stages of progression. To begin, we knocked out Mettl3 via Crisp-Cas9 and subsequently used Fluorescence Activated Cell Sorting (FACS) in three cell lines, MCF10A, MCF10AT1 and MCF10CA1H, to generate stable cell lines. Protein expression analysis by Western Blotting confirmed that cell lines from MCF10 breast cancer model did indeed undergo knockout of Mettl3. To identify changes in phenotype we preformed proliferation and migration assays as well as invasion assays. Once characterization of phenotypic changes are complete, our future studies will investigate the impact of the m6A changes on the posttranscriptional regulation of target mRNAs related to Epithelial to Mesenchymal transition (EMT) and eventually relate gene expression changes in the mRNA messages to the observed phenotypes. Ultimately, by understanding how changes in m6A lead to phenotypic changes in cancer cells it may be possible to manipulate this mRNA modification as a novel breast cancer treatment.

**GP93**

Uric acid decreases mitochondrial bioenergetic efficiency in liver mitochondria and HepG2 cells
Katherine Ann Buddo, Maria J. Torres, and P. Darrell Neufer
East Carolina Diabetes and Obesity Institute, Department of Physiology, East Carolina University, Greenville, NC

High fructose ingestion increases the risk of obesity, metabolic syndrome and type 2 diabetes by a mechanism distinct from its caloric content. Acute exposure to fructose in mice induces a rapid (within minutes) decrease in liver [ATP] and [P] and increase in [ADP] and [Pi] and results in a decline in bioenergetic function. Inhibition of xanthine oxidase, which catalyzes the last reaction in the catabolism of AMP to UA, prevents the pathology induced by fructose, suggesting that either of the terminal reaction products, UA and/or O2?•/H2O2, mediate the decline in bioenergetic function. Consistent with this hypothesis, HepG2 cells exposed for 15 min showed a marked increase in extracellular acidification rate (ECAR) with no change oxygen consumption rate (OCR). After 18h of UA exposure, both basal and maximal OCR were reduced. Exposure to 10 mM UA for 18 h resulted in a complete loss of OCR and cell death. Force-flow measurements demonstrated that OCR is decreased, concomitant with an increase in the FO2 – ΔGATP slope in the presence of UA (1 mM), whereas UA was found to rapidly and dose-dependently depolarize mitochondrial membrane potential in cultured cells. These findings collectively suggest that UA reduces the efficiency of mitochondrial energy transfer. In isolated liver mitochondria, simultaneous measurement of mitochondrial [O2] and [ATP] at three different rates of respiratory demand revealed a 50-80% decrease in the P/O ratio in the presence of UA. Uric acid is a weak acid, which tend to accumulate and ionize in alkaline compartments (e.g., mitochondrial matrix). These findings therefore provide evidence that uric acid decreases the free energy available to support OXPHOS, reducing the bioenergetic efficiency and capacity of hepatocytes.

**GP94**

Production of Monomeric Fibrin in the absence of Polymerization
Alexander Molyneaux Pinaire
Dr. Nathan Hudson

A crucial part of understanding the behavior of blood clots is ascertaining key molecular differences between fibrinogen and monomeric fibrin. Better structural and biophysical knowledge of fibrinogen and fibrin would promote better therapeutic outcomes for clot-related ailments. During fibrin polymerization, “knobs” (A & B) on one fibrin monomer fit into “holes” (a & b) on adjacent monomers. The objective of this proposal is to produce a fibrinogen mutant lacking both A and B knobs capable of forming polymer, yielding purified monomeric fibrin. Vector Cloning will be done with Gibson Assembly and recombinant protein will be expressed with Expi293F HEK cells. The production of a new fibrin variant that does not polymerize would be an important step forward in the search for structural differences between fibrinogen and fibrin. If successful, this project has future
removal or enhancement of extracellular HA in 3D human brain affecting synaptic development. We will test this hypothesis by actin cytoskeleton, through RhoGTPase signaling, ultimately transduction. RhoGTPases control the morphology of the synapse neurodevelopment, particularly synapse formation and signal transduction. Many events relating to HA occur via (ECM) during neurodevelopment may alter formation of the alterations in spacing between neural cells and synapses and little about how the E/I ratio is regulated. It is thought that

Background and rationale: Pulmonary arterial hypertension is a progressive, complex, and serious disorder in which endothelial dysfunction and vascular remodeling impedes small pulmonary arteries, resulting in increased pulmonary vascular resistance and pulmonary pressures. The right ventricle (RV) is the major determinant of functional state and prognosis in pulmonary arterial hypertension (PAH). RV hypertrophy (RVH) triggered by pressure overload can compensate for the increased afterload and maintain cardiac output. RVH also increases the energy demand, which, when coupled with increased cardiomyocyte size (diffusion distances) and decreased capillary density, leads to diminished oxygen supply, relative ischemia, and progressive RV heart failure. Monocrotaline (MCT) has been shown to cause pulmonary hypertension in rodent models, leading to structural and functional changes of right ventricle. In the first 3-4 weeks, a compensated hemodynamic state is observed, but by 10-12 weeks, heart failure and spontaneous mortality is reported. While much is known about the structural characteristics of RVH remodeling, little is understood about the characteristics of metabolic remodeling. We developed these experiments to investigate whether mitochondrial dysfunction was present in early remodeling, potentially contributing to functional deterioration.

Methods: Sprague-Dawley rats received a single MCT (60 mg/kg of body weight) subcutaneous injection and cardiac performance was assessed through respirometry studies.

Results: Treatment with MCT caused increase in RV wall thickness as well as RV diameter during the first week after MCT treatment. This increasing continued significantly until 21st day. Our results show that the mitochondrial respiration were not different between RV and LV in control rats. However, rats treated with MCT showed that RV is significantly lower than LV in glutamate/malate stimulated respiration, suggesting lower state I oxygen consumption in the RV.

Abstracts | Graduate Poster Presentations
Castration Induced Erectile Dysfunction and Internal Pudendal Artery Damage is Reversed by Testosterone Supplementation

Michael R Odom, Shelby A Powers, Elena S Pak, Johanna L Hannan

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Introduction/Objectives: Androgen deprivation therapy (ADT) is used to manage prostate cancer; however, erectile dysfunction (ED) and cardiovascular disease are common side effects. The internal pudendal arteries (IPA) supply blood to the penis and vascular injury to these vessels can cause ED. This study will determine if castration impairs vascular function in systemic (aorta and mesenteric arteries) and penile vasculature (IPA), and if testosterone (T) supplementation can restore erectile and vascular function. We hypothesize IPA will develop impaired relaxation prior to systemic arteries following castration, and T therapy will recover both vascular and erectile function.

Methods: Male Sprague Dawley rats were divided into 3 groups (12 wks, n=6/group): control (CON), CAST (6 wks castration), and CAST+T (6 wks castration + T (1.5 mg/kg) last 2 wks). Serum testosterone levels were measured via ELISA. Erections were assessed via cavernous nerve stimulation and measurement of intracavernous to mean arterial pressures (ICP/MAP). Aortas, mesenteric arteries, and IPA (2 mm segments) were mounted into tissue baths. Contractility to potassium solution (KCl), electrical field stimulation (EFS), phenylephrine (PE) and endothelin-1 (ET-1) were measured. IPA androgen receptor protein expression was measured.

Results: CAST impaired erectile function and IPA ACh relaxation (CON: 60%, 60%; p<0.05), PEP (62%, 62%) and pyruvate (47%, 47%) compared to CON. CAST+T improved IPA ACh relaxation (65%, 65%) and IPA reactivity to hypertension (T: 64%; p<0.05). T did not impact IPA contractions and had no effect on aortic or mesenteric vasoactivity. Conclusion: CAST leads to ED and impaired vasodilation in the IPA without evidence of systemic vascular dysfunction. T therapy markedly recovered erections and improved IPA relaxation to greater levels than CON. T therapy to restore erectile function in prostate cancer survivors is warranted.

Abstracts | Graduate Poster Presentations

Identification of the Ideal Marker Placement for Lung Tumors

Wesley Andrew Belcher

Mentors: Jae Won Jung (EUC Physics) and Andrew Ju (Brody School of Medicine)

Purpose: The CyberKnife Synchrony system is used to track tumor motion throughout the breathing process. This is done by using gold fiducial markers and two orthogonal x-rays. The synchrony system tracks the gold fiducial markers, which are bracketing the tumor, and relates their centroid to the tumor location. This study is looking to identify the ideal location for gold fiducial marker placement to ensure the tumor is tracked properly.

Methods: Patients receiving CyberKnife treatment for lung tumors undergo 4D CT imaging. These 4D CT scans are broken into ten different phases. These phases are labeled phase 0 to phase 90. Phase 0 represents max exhale. Phase 50 represents max inhale. The tumors Gross Tumor Volume (GTV) was contoured as well as each fiducial. Once contoured, the center of mass was found for each fiducial marker and the GTV. These centers of masses were used to determine the distances between each fiducial and the GTV. The distance between every fiducial was also calculated. Deformation fields were generated for the different phases.

Results: From the preliminary data it is seen that not all fiducials accurately move with the tumor. This has been seen from both methods in the experimentation.

Conclusions: Better placement is necessary to ensure proper tracking and thus proper dose distribution.

Abstracts | Graduate Poster Presentations

Aortic and Mesenteric Vasoreactivity and Androgen Supplementation

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Introduction/Objectives: Androgen deprivation therapy (ADT) is used to manage prostate cancer; however, erectile dysfunction (ED) and cardiovascular disease are common side effects. The internal pudendal arteries (IPA) supply blood to the penis and vascular injury to these vessels can cause ED. This study will determine if castration impairs vascular function in systemic (aorta and mesenteric arteries) and penile vasculature (IPA), and if testosterone (T) supplementation can restore erectile and vascular function. We hypothesize IPA will develop impaired relaxation prior to systemic arteries following castration, and T therapy will recover both vascular and erectile function.

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Investigation of the Effect of Androgen Supplementation on aortic and Mesenteric Vasoreactivity

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GP94

Coordinated Regulation of the Chkb and Cpt1b Genes in a Unitary Epigenetic Domain

Bhavin V. Patel
Brian M. Shewchuk

The regulation of lipid degradation and biosynthesis is crucial for maintaining homeostasis. In skeletal muscle, a major site of lipid metabolism, carnitine palmitoyltransferase 1B (CPT1B) is a rate limiting enzyme in mitochondrial lipid oxidation, and activation of the CPT1B gene in response to lipids is crucial in preventing a net accumulation of lipids and the associated detrimental physiological effects. This mechanism is defective in obese individuals, exacerbating the effects of excess systemic lipids. The biosynthesis, specific with lipids, such as membrane phospholipids, is also crucial for proper cellular function, including mitochondrial oxidative processes. In this context, Choline Kinase Beta (CHKB) is required for the biosynthesis of phosphatidyl choline, a major component of healthy biological membranes, and defects in this gene which cause phosphatidyl choline deficiency ultimately result in skeletal muscle dystrophy. Interestingly, the CPT1B and CHKB genes are located in very close proximity in the mammalian genome, and initial analysis indicates that the expression of these genes changes in parallel to stimulatory and repressive agents. This observation raises the possibility that these two genes, both essential for skeletal muscle mitochondrial function in oxidative metabolism, are coordinate regulated by a common transcriptional and epigenetic mechanism that links mitochondrial biogenesis with lipid oxidative capacity. While limited published data exist for related CHKB/ genetic regulation in metabolic control, the full regulatory mechanism remains unclear. In addition, while allele associations with human disease in both skeletal muscle and neural function have been identified, nothing is known about the regulation of CHKB, including its connection to CPT1B regulation. Thus, the proposed research will address the coordinated regulation of CPT1B and CHKB. The experiments in progress will advance the characterization of the transcriptional and epigenetic regulatory mechanism of the unitary CHKB/CPT1B gene locus, and its modulation by aspects of an obesogenic environment.

GON1

Peer Support and Mnemonic Vocabulary

Rachel Lowery

The purpose of the study is to determine the impact of peer support used along with mnemonic vocabulary strategies on academic performance of students with special needs in a project-based classroom. Students with special needs are being outperformed by general education students in the inquiry-based and problem-based science classroom. Students with special needs, specifically other health impairment (OHI), and specific learning disability (SLD), struggle to retain key vocabulary and explain science phenomenon and concepts. Due to the cooperative learning environment in a project-based science classroom, students with special needs rely heavily on their peers for academic and emotional support. Research suggests that peer support and mnemonic vocabulary strategy for key terms can be implemented as interventions in the general education classroom to improve learning outcomes for students with special needs. General education students will receive teacher-delivered training on how to provide peer support in the use of mnemonic vocabulary devices to students with special needs. The study will take place in a mixed-ability 6th grade science classroom. Students will receive peer mediation for fifteen minutes for five days for each set of twelve key vocabulary terms. Including mnemonic keyword devices for key vocabulary and implementing peer supports to review key science vocabulary will improve students with special needs scores on weekly vocabulary assessments. With this intervention in place, it is expected that both tutors and tutees will be able to correctly match key terms to definitions with 100% accuracy. Training general education students purposefully to provide specific peer supports to students with special needs will positively impact student learning outcomes in relation to conceptual science knowledge and student understanding.

GON2

Assessment of Insecticide Resistance to Organophosphates and Pyrethroids in Aedes aegypti

Natalie Pauline Marie Catado MSEE/MPH candidate
Dr. Stephanie Richards, MSEE, PhD

Aedes aegypti is the primary vector of pathogens such as Zika, dengue, yellow fever and chikungunya viruses, making mosquito control a vital part of protecting public health. A mosquitoes may contact insecticides from residential, agricultural and/or commercial use. Repeated sublethal exposure to insecticides may result in insecticide-resistant mosquitoes. Integrated pest management programs should incorporate insecticide resistance testing to ensure that the product they are using is effective. Active ingredients (AIs) may be formulated with other compounds, such as synergists, to increase effectiveness by downregulating anti-insecticide enzymes in mosquitoes. The current study examined the susceptibility or resistance to AIs (permethrin [pyrethroid], chlorpyrifos [organophosphate]) and formulated products (Mosquitomist,â“¢ [contains chlorpyrifos], Biomistâ“¢ [contains permethrin]) in insecticide-susceptible and pyrethroid-resistant Aedes aegypti. The hypothesis that synergists (piperonyl butoxide, diethyl maleate, s-s-s-tributyl phosphorothioate) increase the efficacy of AIs was also tested. Mosquitomistâ“¢ was the only insecticide to which the pyrethroid-resistant population was susceptible. The addition of synergists to AIs does not necessarily increase mortality rates when compared to AI alone. This finding may be due to resistance mechanisms acting against both AIs and synergists. The implications of the findings are discussed.

GON3

Preconceptions in Newton's Laws of Motion for 7th Grade Students

Brian David Maccarelli

All students have preconceptions that they bring to bear when learning a new concept in science (West & Fensham, 1974). These preconceptions can influence how and what the students learn and whether new concepts will be accepted or ultimately rejected (Reinfried & Tempelmann, 2013). The purpose of this action research study is to identify the preconceptions that 7th grade students hold related to Newton's Laws of Motion. In this qualitative descriptive study, participating students will be given a preassessment to ask students to choose statements related to Newton's Laws that they feel are correct statements. Students are then asked to explain in writing why they chose those statements as true. Student responses will be coded and analyzed so that common preconceptions can be identified and categorized. It is expected that student preconceptions as uncovered in their writing responses will fall into a handful of common categories that will be useful to teachers within a school district, as knowing what preconceptions students hold better arms the teacher to plan and implement instruction, ultimately improving students’ achievement (Sadler, 2016).

GON4

Science Recommendations for URM Students at Ravenscroft School

Zoe Mullin Welsh

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The purpose of this study is to determine if there has been inequity in the science recommendations of underrepresented minorities (URMs) at Ravenscroft School. The research questions are: Which populations are most frequently recommended for honors/AP-level sciences and will these statistics change after teacher interventions? Data from the past three school years will be analyzed and these results will be shared with science teachers, who are the ones that make the course recommendations. Science teachers will then participate in a number of interventions and data from the 2019 recommendations will be compared with previous years. A mixed-method approach will be used. Quantitative data will include the recommendation analysis and comparison between pre and post study teacher surveys. Qualitative data will be collected via audiotaped individual interviews with each science teacher. It is expected that the percentage of URMs students recommended for honors and AP-level sciences will increase after the teacher interventions.

GONS
Social Influence and Online Health Community Participation: Impact on Self-Efficacy and Health Outcome Expectations
Leslie Holmes Ives
With the rise of social networking and the development of meaningful online connections, health topics are becoming more frequently discussed online. Particularly among those with chronic diseases and rare conditions, social media and online health networks (OHC) are commonplace avenues for support and advice on disease treatment and quality of life concerns. Most online health communities revolve around peer to peer discussion and are void of healthcare provider expertise; peer feedback is instantly accessible and more in-depth than what a treating physician can offer in a medical office visit. Further research is needed to determine how online health communities help validate and encourage patients to take better control of their health journeys. This study examines patient responses to various OHC messages and how these responses shape enhanced health attitudes and to positive self-efficacy with a basis in social cognitive theory.

Patient interactions from four rare disease OHC discussion boards are examined and categorized using defined measures of outcome expectations and self-efficacy. The findings suggest that OHC discussions contribute empowered patients with high self-efficacy and optimistic health outcome expectations. Adversely, patients were more likely to pursue holistic methods of healthcare rather than re-engage their physician in their disease-specific needs. Further research in self-efficacy and outcome expectations could be expanded to include actual health outcomes, and patient surveys could give greater insight into how self-efficacy and outcome expectations influence their relationships with treating physicians.

Keywords: Online health communities, health communication, social cognitive theory, self-efficacy

The complement system is a component of innate immunity and is composed of a network of blood serum proteases which aid in foreign defense and clearance of damaged tissues. However, malfunctioning of this system has been shown to be implicated in several diseases including neurological disorders, organ rejection, kidney disease, sepsis, and others. In many of these cases, the complement system is overactivated leading to a heightened inflammatory environment which drives the pathology of many diseases. For this reason, we have developed a strategy for developing a novel inhibitor targeting C1r – the initial protease in the classical pathway (CP). We used a fragment-based drug discovery approach in which 2,000 small molecule compounds were screen for their ability to bind to C1r using surface plasmon resonance (SPR). Of these, 91 compounds were selected as positive for C1r binding ability. Using a pathway specific ELISA assay, these compounds were then screened for their ability to inhibit C1. This led to the identification of two CP inhibitors named PP214 and PP216. Using SPR, PP214 and PP216 were found to bind to the CCP2-SP domain of C1r in a dose dependent manner. Further analysis showed that PP216 could directly inhibit CP. This led to the identification of two CP inhibitors named PP214 and PP216. These data indicate that PP214 and PP216 are promising molecular scaffolds which can be built upon to synthesize a more optimal C1r inhibitor.

PD3
The Human T-cell Leukemia Virus type I basic leucine zipper factor upregulates the expression of the antioxidant Heme Oxygenase I
Amanda W. Rushing1, Blake Rushing1, Kimson Hoang1, Jean-Michel Pélissonère Jr1, Nicholas Polakowski1, and Isabelle Lemasson1
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Adult T-cell leukemia/lymphoma (ATLL) is a resilient lymphoproliferative disease of CD4+ T cells infected by the Human T-cell Leukemia Virus type I (HTLV-1), for which there are no effective treatments. Mounting evidence supports that the overexpression of antioxidants contributes to drug resistance in many types of cancer. One such antioxidant is the iron recycling enzyme Heme Oxygenase I (HMOX-1), which has been shown to enhance cancer cell survival upon exposure to stress-inducing...
agents. HMOX-1 expression is regulated by the small Maf AP1 proteins, which control transcription from promoter antioxidant response elements (AREs). A previous report, confirmed by our laboratory, shows that the HTLV-1 antisense-encoded basic leucine zipper factor, HBZ, interacts with small MafS for recruitment to AREs in vitro. We questioned whether HBZ and small MafS regulate the expression of antioxidants like HMOX-1 as a pro-survival strategy in ATLL cells. Our results show that HMOX-1 is overexpressed in ATLL cells in a manner dependent upon both HBZ and the small MafS. These proteins were found to be present at an ARE in the promoter of HMOX-1 in vivo, and HBZ expression was observed to promote ARE transactivation in a small Maf-dependent manner. HMOX-1 is thought to be the main mediator of iron metabolism and functions in a cytoprotective capacity during oxidative stress. We observed that ATLL cells, as well as HBZ-expressing cells, exhibited resistance to iron-induced cytotoxicity, which was attenuated upon inhibition of HMOX-1 enzyme activity. Furthermore, HBZ expression was found to be important for maintaining ATLL cell redox state, as well as for maintaining cell viability in response to iron exposure. These findings support the possibility that HBZ and small MafS may upregulate transcription at AREs to positively regulate some antioxidant response genes in ATLL cells, wherein these gene products may have cytoprotective effects in response to oxidative stress and may contribute to anti-cancer drug resistance.

**PD4**

Overexpression of AMP Deaminase 3 decreases mitochondrial protein synthesis in C2C12 myotubes

Paul Samuel Hafen1, Spencer G. Miller2, Jeffrey J. Brault3

1Human Performance Lab
2East Carolina Diabetes and Obesity Institute
3Department of Kinesiology

Atrophic skeletal muscles display decreased PGC-1α expression and mitochondrial content among different atrophic conditions (e.g. cachexia, disuse, sarcopenia). A possible contributor to the reduced mitochondrial content is the enzyme AMP Deaminase 3 (AMPD3), which is increased in all atrophying skeletal muscle. A specific type of health literacy, has emerged as key component in the prevention and maintenance of healthy dietary practices. NL has been defined as the capacity to obtain, process, and understand written and verbal cancer information. Nutrition literacy (NL), a specific type of health literacy, has emerged as key component in the promotion and maintenance of healthy dietary practices. NL has been defined as the capacity to obtain, process, and understand written cancer information and skills needed to make appropriate nutrition decisions. With the use of infographics education materials and a hands-on workshop, the goal of this study is to increase NL and skills among cancer patients/survivors and their caretakers.

**PD5**

Increasing Nutrition Literacy among Cancer Patient and their caregivers

Chelsea Morgan Thompson, Alice Richman, MPH, PhD, Essie Torres, MPH, PhD, Catherine Njeri Njuguna MS, RDN, LDN, CDE, Kathryn Bennett-Chamblish, MS, RDN, LDN, Julie Hann, MS, RDN, LDN

Health literacy is an overlooked problem in the prevention and treatment of cancer, and individuals with limited health literacy are unable to find, process, and understand both written and verbal cancer information. Nutrition literacy (NL), a specific type of health literacy, has emerged as key component in the promotion and maintenance of healthy dietary practices. NL has been defined as the capacity to obtain, process, and understand written cancer information and skills needed to make appropriate nutrition decisions. With the use of infographics education materials and a hands-on workshop, the goal of this study is to increase NL and skills among cancer patients/survivors and their caretakers.

This study will provide a NL educational intervention to 40 cancer patients and caregivers who are currently undergoing treatment at Vidant Cancer Care. We will assess whether the intervention impacts knowledge and intention to change nutrition behavior. Specifically, the research team which is comprised of ECU students, faculty, and Vidant nutritionists, will develop a nutrition education booklet and short educational training session aimed at increasing participants knowledge about proteins, fats, and carbon and calories of a food label, identifying healthy fats, and identifying alternative protein sources. The booklet and training session will be piloted and evaluated using a pre- and post- survey to assess nutritional knowledge, nutritional literacy, and intention to change nutrition behavior among cancer patients and/or caretakers.

Many cancer patients and caretakers experience challenges with nutritional literacy. Our study will potentially increase the participants basic nutritional literacy and increase their skills, so they can make healthy nutritional decisions during and after treatment.

**UO2**

Athletic Lifestyle: Is It Here to Stay?

Alexa Petrellese
Dr. Marina Alexander

The athleisure wear industry increased “17% to $9.6 billion
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in sales in the past year.” (Cheng, 2018) The sales of athleisure merchandise have been on an upward trend for the past several years. Trefis Team (2016) reports that apparel sales as a whole has only increased 2% in 2015, the rise in active wear sales was 16%. The popularity of this trend has resulted in this term to be included in the Merriam-Webster dictionary. The Merriam-Webster dictionary defines it as “casual clothing designed to be worn both for exercising and for general use.” Athleisure merchandise consists of leggings, shorts, and joggers which is now a $1 billion industry alone (Cheng, 2018). In tandem, with the rise in the athleisure apparel, Americans are increasingly trying to be fit by joining gyms, watching their caloric intake, going on juice cleanses, and tracking exercise through the latest technological advances in watches. Are these trends indicating a shift in Americans lifestyle? Is there a correlation between Americans wearing athleisure clothing and working out? With these research questions in mind, students (n=87) in two fashion merchandising classes were asked to answer a voluntary seven question questionnaire. A little over 73 % (64 of 87) of the students who were wearing athleisure clothes completed the questionnaire. Participants ages ranged from 18 to 22, there were five males and fifty-nine females. Less than half (46.9%) of the students who were wearing athleisure were planning to go to the gym or work out that day. About 53% of the students who were wearing athleisure clothes has no plans of going to the gym or working out. Top three reasons students provided for wearing athleisure were: comfort (90.6%), convenience (15.6%), and the ability to stay trendy (14%). Based on the results of the sample, it seems this trend is here to stay as it relates to the core American values of: being active, staying healthy and fit, and looking youthful. This trend is gaining popularity in a time where 70% of Americans are considered overweight or obese, as well as, one in five Americans are living with a mental illness. Is there a relationship between the importance placed on overall wellness and clothing choices of people in a society? Further studies on a bigger sample size are needed to explore the relationship between different variables and this trend.

UO4 LAST Study: Leisure Activity Step Tracking Study
Sarah E Kautz
Type 2 Diabetes (T2DM) is currently the 7th leading cause of death and by 2025 1 in 5 will be living with T2DM. Since a risk factor for T2DM is physical inactivity, interventions to increase physical activity (PA) should be examined. In November 2018, the U.S Department of health established updated guidelines for PA, removing the hour length requirement stated in previous guidelines. This modification demonstrates that any PA is better than none and every bit counts. For better T2DM management, increasing participation in leisure-time PA is critical. This pilot study will aim to promote leisure-time PA that is feasible and effective and can be performed in short sessions outside of a gym. Leisure time PA includes parking further from the store, taking the stairs, cleaning the house, and gardening. Participants (N=20) will be between 46-65 years of age, inactive (classified as <150 minutes of moderate intensity physical activity per week), diagnosed with T2DM, and able to meet for 1-hour meetings once a week for 6 weeks. This study will include a 6-week active intervention through in-person group meetings and social media posts. Each week a new step goal will be set: 10% increase from the previous week’s average while also discussing topics related to behavior modification, PA, and T2DM. This will then be followed by 6-weeks of no active intervention. Participants will be asked to wear a Fitbit to track their steps each day for all 12 weeks. Data will be collected 3 times throughout the study: baseline, midpoint, and endpoint. Measurements will include a hip-to-waist ratio assessment, recording of average daily steps, motivation barriers to adherence, awareness of PA level, and additional physical and mental constraints.

We hypothesize individuals who go through the 12-week technology-assisted intervention will improve their step count through setting weekly step goals to decrease their risk factors associated with T2DM.

Findings from this study could result in a more feasible way for those diagnosed with T2DM to become more active. Increasing the feasibility for PA as a component of T2DM disease management could serve as a way to combat the climbing trend of those affected by T2DM.

UO5 The Influence of Depression on Medication Adherence Among Cancer Survivors
Scarlett Leigh Anthony
Marissa Carraway, Ph.D.
Julian Stalls, M.A.
Lisa Campbell, Ph.D.
Cancer survivorship is defined as “any person living with, through, and beyond cancer” which encompasses over 15.5 million Americans. Although rates of cancer survivorship have increased, cancer survivor adherence rates are still not optimal. Adherence in cancer survivors includes engaging in a healthy lifestyle, attending regular surveillance appointments, and adhering to prescribed medications. Previous research has identified many factors that impact adherence in cancer survivors in cultural, biological, social, and psychological domains. Within the psychological domain, depression has been shown by previous research to impact adherence rates within many populations. The purpose of the present study is to examine the impact of depression on adherence rates among cancer survivors. Specifically, the current study will compare self-reported medication adherence rates of those who screen positively for depression with medication adherence rates of those who screen negatively for depression. Adult cancer survivors will be recruited through a family medicine outpatient center and pediatric oncology late-effects clinic. Participants will complete the Adherence to Refills and Medications Scale (ARMS) to assess medication adherence and the Patient Health Questionnaire (PHQ-2) to screen for depression. Descriptive statistics will be used to define the rates of adherence and depression. A t-test will be used to compare adherence rates of those who screen positive for depression versus those who do not. The results of this study will support a larger study to build a biopsychosocial-spiritual model for predicting adherence among cancer survivors. Determining whether or not depression influences medication adherence among cancer survivors will help providers seek early intervention in patients to prevent future decreased adherence and promote improved well-being for cancer survivors.

Environmental Risks for High Intensity Drinking Among Young Adults: A Qualitative Study
Madison Garrigues, Melissa Cox, PhD, MPH
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Background: Excessive alcohol use has been recognized as a worldwide concern for young adults ages 18 to 24. Rates of high intensity drinking (HID), broadly defined as consuming twice the standard binge drinking amount of five or more drinks in a 2-hour period, have increased rapidly in recent years. Research shows that 35% of college students report high intensity drinking in the past 7 days, and the acute consequences of HID are significant including alcohol poisoning, blackouts, physical injury and sexual assault. To reduce the prevalence and burden associated with this exceptionally risky form of drinking, we must understand the environments that place an individual at highest risk for this behavior.

The current case study investigates the public relations crisis involving Larry Nassar and the sexual abuse he inflicted on more than 265 known victims such as gymnasts from United States Gymnastics (USAG) and athletes from Michigan State University (MSU). This case study addresses how the organizational stakeholders changed their communication and actions as Nassar’s crimes were uncovered to public. This crisis case reveals the consequences of putting an organization’s reputation before the wellbeing of its members and gives a valuable lesson that victory is not a strategy and excellence of athletic performance should not be all about reputation in sports PR

Sexual Abuse Crisis
Kathryn Graden, Olivia Peraza, Olivia Hewitt, Leah Andrews and Lucy King
The current case study investigates the public relations crisis involving Larry Nassar and the sexual abuse he inflicted on more than 265 known victims such as gymnasts from United States Gymnastics (USAG) and athletes from Michigan State University (MSU). This case study addresses how the organizational stakeholders changed their communication and actions as Nassar’s crimes were uncovered to public. This crisis case reveals the consequences of putting an organization’s reputation before the wellbeing of its members and gives a valuable lesson that victory is not a strategy and excellence of athletic performance should not be all about reputation in sports PR

UO7 A lesson learned the hard way: USA Gymnastics Larry Nassar Sexual Abuse Crisis
Caroline Elizabeth Morton
The prevalence of childhood cancer is becoming more prominent in the United States. While the number of children diagnosed with cancer continues to increase, the impacts of family members need to be considered. The purpose of this study was to review literatures to gain more insight on the impact of childhood cancer survivors in cultural, biological, social, and psychological domains. Within the psychological domain, depression has been shown by previous research to impact adherence rates within many populations. The purpose of the present study is to examine the impact of depression on adherence rates among cancer survivors. Specifically, the current study will compare self-reported medication adherence rates of those who screen positively for depression with medication adherence rates of those who screen negatively for depression. Adult cancer survivors will be recruited through a family medicine outpatient center and pediatric oncology late-effects clinic. Participants will complete the Adherence to Refills and Medications Scale (ARMS) to assess medication adherence and the Patient Health Questionnaire (PHQ-2) to screen for depression. Descriptive statistics will be used to define the rates of adherence and depression. A t-test will be used to compare adherence rates of those who screen positive for depression versus those who do not. The results of this study will support a larger study to build a biopsychosocial-spiritual model for predicting adherence among cancer survivors. Determining whether or not depression influences medication adherence among cancer survivors will help providers seek early intervention in patients to prevent future decreased adherence and promote improved well-being for cancer survivors.

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Frieshter et al’s (2014) theoretical framework of youth drinking contexts. Data collection continued until we reached saturation. Focus group data was then transcribed verbatim and analyzed using NVivo. Data were coded by two independent coders who met to resolve all disagreements.

Results: Eight environmental factors were identified as factors for high intensity drinking among young adults: activity associated with alcohol, availability, specific events, consumption, location, promotion and others’ drinking. Participants reported that availability of alcohol, specific events such as 21st birthdays and football games, the presence of intoxicated individuals, and social media had the highest influence on young adults’ drinking behaviors.

Conclusions: In conclusion, our results revealed that high intensity drinking among young adults is threatened by specific environmental factors. These results represent modifiable environmental risk factors to be addressed by public health prevention and intervention efforts.
A critical analysis of United Airlines’ Response Strategies for its Multiple Crisis Series

Matthew Taylor Campbell, Carley Elizabeth Cox, Lauren Michelle Turner, Bianca Celine Franco

This case study addresses a series of crises that the United Airline has suffered. The company endured continuous backlash due to constant public relations issues that have plagued its business over the past decade. Having multiple crises in national media is not a great way to attract or retain business. Hence, United Airlines has consistently been the poster child for “how not to handle crises.” A company’s true moral character is revealed in a time of crisis through its actions, no matter what the official mission statement describes. Public statements lose public support when the company’s actions are contradicting their mission statement. In the series of poorly handled crises, United Airlines tarnishes its reputation as a company that is concerned about these gender differences. By better understanding the differences between men and women and how they respond to depression, educators and treatment providers would be better able to identify those at risk and to provide more effective intervention. This study examines the influence of gender on the way in which people respond to depressive symptoms. One response is that of drug use (licit and illicit). Another response is Experiential Avoidance (EA), which consists of strategies to avoid negative emotions and experiences.

Methods: The sample used in this study includes 4,170 (61.1% female, 71.2% Caucasian, 78.0% freshwater East Carolina University undergraduate student volunteers who took a Psychology course from 2016-2018. Symptoms of depression were measured using the Patient Health Questionnaire-9 (PHQ-9), which assesses the severity of symptoms commonly associated with depression. Gender was measured via self-report; some participants self-reported a gender other than male or female (i.e., transgender or other), but the percentages were too small to be looked at independently. Substance use was measured using single-item frequency questions for each main category of drug (licit and illicit), as well as with the Alcohol Use Disorders Identification Test (AUDIT), which assesses the severity of alcohol-use problems. EA was measured using the Multidimensional Experiential Avoidance Questionnaire (MEAQ), which assesses levels of EA experiences. The collected data will be analyzed using PROCESS Macro and SPSS, which will allow us to determine if gender moderates the association between (1) depression and substance use and (2) depression and EA.

Expected Results: Analyses will be completed in Spring 2019. We expect our moderation analyses will reveal that: (1) Men are more likely than women to respond to their depressive symptoms with substance use, and (2) men are more likely than women to respond to depressive symptoms by engaging in EA.

This study will provide more insight into how gender plays a role in the experience of depression, substance use, and EA.

A Case Study in Social Media Management and Non-Profit Sport

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Given the growing attention from researchers and practitioners, this case study addresses a timely problem facing non-profit sport organizations: face social media management. Due to a lack of technical skills and knowledge, many organizations fail to effectively utilize social media to promote their organizations. This case outlines factors surrounding a local Little League Baseball program, Greenville Little Leagues (GLL), and its annual Tournament of State Champions. The case examines the organizational details regarding the operation of GLL, the tournament, GLL’s current social media usage, and the steps organizers have taken to improve social media practices within the organization. The benefits of utilizing social media in a non-profit setting, as well as the challenges an organization may face when implementing a social media strategy, are specifically highlighted. The case demonstrates how GLL organizers applied current research on non-profit social media to create a more successful social media management plan.

Specifically, GLL integrated Cianfrone and Warner’s (2018) six Online Community Building Factors into their social media campaign and used the social media management platform, Hootsuite, to schedule posts. The 2018 Tournament of State Champions planning committee experienced many improvements after implementing these strategies, which were based on the current research. GLL witnessed their page likes and followers on Facebook and Instagram more than double during the month of July and reached over 125,000 hits. During the two tournaments (GLL’s Tournament of State Champions, there was a significant amount of rain causing delays of games. Because of the increased following, social media was a great asset for the GLL staff to communicate to fans about updated schedules and delays. Furthermore, the implementation of Hootsuite for scheduling allowed for volunteers to schedule posts ahead of time, reducing stress and maximizing efficiency. In summation, this case highlights how a non-profit organization can utilize current research to improve its operation via social media. A discussion on cost-effective strategies that can be implemented by a non-profit organization dependent upon volunteers is provided.

Moving Toward Zero-Waste for a Sustainable Future in Textiles

Ashley Nicole Miller

Zero waste refers to dramatically reducing the amount of waste that we as humans generate and emit into our environment with severe negative consequences. To lead a sustainable lifestyle is within our reach now more than ever through innovation and advances in technology. We will explore the following questions: What materials were used to create this product and what waste streams arise during its production? Can the product be recycled and how easily? How long does it take to break down? The critical component is to develop a regenerative and restorative strategy for material utilization. This will help us define where the products we use (and wear!) in our daily life come from, their end of life analysis, and its impact on the environment and human health.
Automated impact device for generating the impulse response of a complex coupled system
Samson Goodrich, Teresa Ryan, PhD
Acoustics and Vibrations Lab, Dept. of Engineering, East Carolina University, Greenville NC

This work aims to improve upon an experimental test apparatus to measure the impulse response of a mechanical system by creating an automated impact device. The mechanical system consists of a single large cantilever beam (the primary mass of the system) with a set of much smaller cantilevers coupled to the single large primary mass. The set of smaller cantilevers can be characterized to bind to, with high specificity, and immobilize a target substance on its surface. Potential target substances include various biomarkers, bacteria, spores, chemicals, or other contaminants. By applying an impulse (hammer strike) at the base of the primary mass and monitoring the response vibration at the tip of the primary mass, changes in the mass of the smaller connected cantilevers can be inferred. Coherence time refers to how long it takes for the vibrations of the smaller cantilevers to synchronize, and when mass is added to any of the smaller cantilevers in the array, the coherence time changes. Changes in coherence time profiles correspond to changes in mass so that the amount of the target substance can be quantified. Previous work used simulations and modelling of the system arrays to demonstrate the amount of mass necessary to detect measurable change in coherence time. The goal of this work is to create a device that automatically strikes the base of the central mass of the system, in a controlled, repeatable fashion, and is designed to rebound off the system immediately after creating an impact to prevent interference with the system’s vibration measurements. An automated impact device ensures highly accurate and precise results for future experimentation performed with this complex coupled system. The interval of impact and amount of force is computer controlled and coupled with a servo motor to control the impact device. An accelerometer is integrated into the impact device as a trigger for the LabVIEW-based data acquisition system, to enable precise measurement of the time that the impact occurred related to the time and vibration data collected from the cantilevers. Device design and preliminary data are presented.

Vehicle Routing Simulation for Greenville, NC
Emma Dava Kloth
Mariah Christina Mook
Jinkan Lee, PhD
Department of Engineering, East Carolina University, Greenville NC

When the network of connected vehicles is partially disrupted by a malfunctioning autonomous vehicle, all the other vehicles have to find alternative routes to avoid the closed road until the malfunctioning unit is restored or removed. If any vehicle that was originally planned to pass through the closed road, stops in the vicinity of the malfunctioned vehicle, it could affect nearby vehicles like a chain reaction and cause a halt of the whole network. In this worst-case scenario, we may not initiate new routing plans with halted vehicles randomly spread in that network. This initial condition may force to recall vehicles one by one from the network to a depot or nearby rest areas to initiate network run again. Isolation and quarantine in disease control is the proven approach that controls the spread of an epidemic disease. In particular, this approach might be effective for the smart and connected vehicles with autonomous vehicles. We hypothesize that the isolation of a malfunctioning vehicle and quarantine of nearby vehicles can prevent the spread of the disorder caused by stopped vehicles, thus minimizing disorder of the whole network. We will build a small size vehicle routing model and test the effect of a randomly closed edge by simulation to understand the behavior of this dynamic system. Then we impose an epidemic disease control approach of isolation and quarantine to further investigate the effect of this control policy on the dynamic network in case of disruption. If successful, we will provide the control policy that determines the effective range, defined by directly connected edges, for the quarantine and will discuss the efficiency and efficacy of the proposed method.

Comparison of Geometry-Based and Measured Coupling Ratios in Arrays of Cantilever Beams
Mariah Christina Mook
Teresa Ryan, PhD.
Acoustics and Vibrations Lab, Dept. of Engineering, East Carolina University, Greenville NC

Small mechanical cantilevers have been used as mass sensors in a number of different sensor designs. When a cantilever bends due to a change in mass, that downward displacement is a repeatable, measurable static response. There are also detection methods that rely on the dynamic response of the cantilevers, in other words how system vibration changes when the mass changes. Research in these sensing mechanisms has pushed the envelope for developing more responsive mass sensors down to atto-, zepto-, and yoctogram sensitivities [1-3]. These ultrasensitive mass sensing methods can also be used to detect specific types of airborne analytes such as chemical vapors, bacteria, or other biomarkers [4]. The mass detection approach relevant to this work uses mechanically coupled arrays of cantilevers. The degree of coupling between sensing elements changes the expected amount of vibration localization, allowing for optimization of the sensor behavior. The degree of coupling is characterized by a quantity called the coupling ratio. The aim of the work is to compare a calculated coupling ratio based only on array geometry to measured results. A set of eight cantilevers are placed to their nearest neighbors by way of a short perpendicular coupling beam. Calculated and measured coupling ratio will be compared over a range of coupling beam positions along the main length of the cantilevers. The coupling ratio is determined by using connected and uncoupled vibration data. Using a coupled resonator-based nanobalance as yoctogram resolution detector, “Zephtogram-Scale Nanomechanical Mass Sensing”, Nano Letters, vol. 6, no. 4, pp. 583–586, Apr. 2006.

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OU18
Evaluation of UAV Atmospheric Sensor Configurations on Signal Acquisition
Julian Quinteros, Teresa Ryan, PhD, Mariah Mook, Zachariah Adams
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Sound propulsion has been studied since the sixth century BC. Aristotle was the first person to discover sound traveled in waves. Like other waves, sound is affected by the medium through which it travels. It is well known that many aspects of the immediate acoustic environment affect the amount of transmission loss in sound. These aspects include humidity, temperature, and local weather parameters such as wind, temperature, and humidity. To understand how sound propagates in different atmospheric settings, atmospheric profiling is necessary. Atmospheric profiling is being used to build a mathematical model that can predict sound propagation due to different environment scenarios. To record atmospheric metrics, a commercially available sensor, the i-Met-XQ, is used to record temperature, pressure, humidity, GPS location and time. To obtain reliable data while retrieving the atmospheric profiles, the devices require to have acquired a significant number of satellites to pair the data points with precise GPS location. The DJI S1000 is a larger model that is more difficult to handle due to its size and weight. The smaller UAV was deemed to be more efficient in regard to its objective. In prior work, a DJI S1000 UAV was used because of its flat deck and payload capacity. For ease of use, a transition to the use of a Phantom Standard is desired, but requires design and testing of fixtures for optimal mounting of the i-Met-XQ sensors. This work will present test flight data evaluating various sensor mounting configurations.

OU19
Clean Up Your Health Intervention - Healthy Housekeepers Initiative Phase Two Social Media Intervention
Christina S. Larkins, Dr. Bhulha M. Das
Twenty ECU housekeepers will be recruited, and they must be at least 18 years old and currently be an ECU housekeeper with internet access. The measures that will be assessed include physical activity, mental and emotional health, and ways to maintain a healthy lifestyle. Specific topics will include diet management, physical activity, mental illnesses and how to handle them and long-term maintenance of all the previous topics.

OU20
Bridging the Gap of Uncertainty and Doubt Between the Latino Immigrant Community and the Healthcare System
Becky Leon
The underprivileged Latino community currently exists as a minority in the United States, yet as their numbers continuously increase, their access to certain services in the health care field requires serious attention and modifications to create a system with reliable, permanent, and accessible resources. The Pew Hispanic Center/Robert Wood Johnson Foundation Latino Health explored the amount of access Hispanics have to healthcare including understanding the type of information received by Hispanics. Approximately 79 percent of Latinos reported receiving health care information through social groups or media (Office of Minority Health). Not only is health care information difficult to find, but the information that is accessible is often viewed as unreliable and untrustworthy. Approximately 79 percent of Latino report receiving health care information through social groups or media outlets such as television which can set back the overall health of this underrepresented community. The results of this study will be used to contribute to the knowledge base on disparities within the Latino community.

OU21
miRNA Regulation of TLR4 Pathogen Receptor Expression and Cytokine Response in Macrophages
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2Interdisciplinary Program in Biomedical Sciences, Brody School of Medicine

Macrophages are complex cells involved in innate immune responses to nonspecific stimuli. Toll-like receptors (TLR) is a major pathogen receptor that recognizes both exogenous pathogens like bacterial or viral products, but can also be stimulated by endogenous stimuli like oxidized LDL and fatty acids. TLR stimulation in macrophages has been associated with aiding disease processes, such as atherosclerosis, type 2 diabetes, and cancer. Macrophages produce pro-inflammatory cytokines and interferons like TNF-alpha, IL-1B, and IL-6 when the TLR4 receptor is stimulated. New evidence suggests that TLR4 might be regulated post-translationally through noncanonical pathways involving pRNA (sRNA) and microRNAs (miRNAs). Noncoding RNAs are regulated in part by a specialized ribonuclease called DICER. TLR4 has been identified as a potential regulatory target of the DICER-Let-7 pathway. To understand how the microRNA Let-7 regulates the phenotype of macrophages we utilized loss of function and gain of function approaches by transfecting RAW 264.7 macrophages with mimetic let-7p, an anti-let-7p, and siRNA to inhibit DICER. Quantitative PCR was used to measure pro-inflammatory cytokine gene expression in the macrophages and flow cytometry was used to assess TLR4 expression. The Let-7 mimetic suppressed TLR4 expression, causing the macrophage to manifest an anti-inflammatory cytokine phenotype. Conversely, let-7p inhibition resulted in an increase in TLR4 expression and an exacerbated pro-inflammatory cytokine response. These data suggest that DICER/Let-7p is a critical regulator of macrophage phenotype and may point to miRNA processing as a therapeutic approach to targeting inflammation.

OU22
Newborn Drug Screening: Methadone and EDDP Quantitation using LC/MS
Samantha Poppenfus1, Kadesha McIntyre2, Ahmad Aboazziz3, Linda May4, Srikanth Ravissanarkar3, Devon Kuehn3, and Kim Kew2
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3Department of Pediatrics, BSOM
4Department of Foundational Sciences and Research, School of Dental Medicine

Background: Methadone is a common alternative for women to replace opioid use and prevent withdrawal symptoms during pregnancy. Methadone is considered a safer alternative to other medication but crosses the placental barrier leading to behavioral deficits and attenuated nervous development of newborns. Current methods for drug screening of newborns is time intensive, however, the umbilical cord is immediately available after delivery and can be processed more rapidly. The purpose of this study was to design and validate a method for quantitatively measuring methadone and the primary metabolite, EDDP, in umbilical cords using liquid chromatography/mass spectrometry (LC/MS).

Method: Fifty-two umbilical cords were collected within one hour of delivery from consenting mothers who reported use (n=26) or no use (n=26) of illicit substance. Cords were cut into 4 cm sections; each section of the umbilical cord was stored at -80°C. Once thawed, cords were suspended in water with 0.1% formic acid and then homogenized. An external calibration curve was prepared using methadone and the primary metabolite EDDP ranging from 0.1-1000 ng/mL. Solid phase extraction (SPE) was performed on calibration standards and samples prior to analysis by LC/MS. Detection was quantified via limit of detection (LOD), limit of quantitation (LOQ), linearity, dynamic range,
Simulation of Patient Caregiver Counseling in Speech-Language Pathology
Leigh Renee Harper, Mrs. Allyson Turnage

Mursion @ ECU, East Carolina University

The endeavor I am undertaking as part of my Signature Honors Research Project is concerned with creating a useful and sustainable simulation experience for students in the Communication Sciences and Disorders Department. More specifically, my project utilizes Murison simulation technology to facilitate an experience between a student, acting as a Speech-Language Pathologist, and an avatar, acting as the parent of a child diagnosed with a language delay. The purpose of this project is to allow students the most realistic environment in which to practice their clinical conferences skills prior to entering the professional world.

There are several steps in my investigation. First, I designed a case history of the “patient” being discussed and subsequently completed a detailed scenario for the Mursion simulation to follow, including proper reactions of the avatar to certain clinician responses. Following this step, I recruited nine participating students to take part in my project, all of whom are seniors in the Speech and Hearing Sciences program at East Carolina University. My mentor and I met with the group of participating students and provided a teaching/training session on best practices related to caregiver counseling.

The next step in my project, which will take place in the following months, is for the participants to take place in the actual simulation experience. Each simulation will be video recorded for the purpose of reflection. These videos will be shared among the group at a debriefing session in order to discuss positive experiences, ways to improve counseling skills, overall learning outcomes, and thoughts regarding how Murison technology may be beneficial on a wider scale for utilization in the Communication Sciences and Disorders Department.

The intention of my work is to provide students with a simulation opportunity that is not currently available to them in the belief that “practice makes perfect.” Conferencing with the parent of a child can be difficult, uncomfortable, and nerve wracking for a graduate student or a new clinician. It is my hope that being given the opportunity to simply practice this skill and work towards honing this ability in a pressure-free environment prior to entering the work force will increase the confidence and professional level of our graduating clinicians.

Expected results and implications: Upon completion of our environmental assessment, we will be able to identify specific environmental factors of on-premise drinking establishments that directly promote high-intensity drinking among youth and young adults. Such factors are modifiable components of the environment that can be incorporated into alcohol prevention and intervention strategies to effectively reduce the prevalence and burden high-intensity alcohol consumption.

Method Development for Nicotine Metabolite Ratio in Saliva for Comparison between Mental Illness and General Populations

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Tobacco use continues to be a major preventable cause of morbidity and mortality globally. It increases the risk of multiple diseases by affecting numerous body systems, killing around 6 million people per year in the world. In the United States, almost half a million adults die prematurely due to tobacco related health burden. There appears to be a significant substantial tobacco use disparity between patients with and without psychiatric mental illness (MI). Furthermore, there is evidence to suggest increased prevalence of tobacco smoking among populations with mental illness. The ratio of trans-3’ hydroxy cotinine (3HC) to cotinine (nicotine metabolite ratio [NMRI]) has recently emerged as a biomarker to measure the rate of nicotine metabolism. Higher NMR has been correlated with increased combustible tobacco use along with lower confidence and success in smoking cessation. NMR has not been validated among populations with MI, however, as psychiatric illness has historically been an exclusion criterion for tobacco cessation research. Due to considerably higher prevalence of smoking among patients with mental illness, we have aimed to examine if persons with psychiatric illness have higher representation of fast nicotine metabolizers. Establishing NMRI as an evidence-based biomarker among patients with mental illness will help clinicians develop treatment algorithms in this population and assist to bypass the usual trial and error practice of pursuing treatments which may not be effective. A method for sample preparation, analysis, and quantitation was developed. Using standards, saliva from non-smokers, and saliva from smokers with and without MI, a protocol for measuring nicotine, cotinine, and 3HC was developed and validated for analysis via liquid chromatography/mass spectrometry (LC/MS).

A Role For Interleukin-6 Trans-Signaling Following Vascular Injury
Troy Jonathan Dennis

Cardiovascular disease (CVD) has historically been the leading cause of morbidity and mortality in the United States, yet in recent years surgical procedures such as percutaneous coronary intervention (PCI) and/or coronary artery bypass grafting (CABG) have been at least partly effective at reducing morbidity associated with CVD. While these interventions have been deemed somewhat successful, they have introduced new iatrogenic complications such as neointimal hyperplasia and/or vascular remodeling that often result in vessel occlusion and restenosis. Interleukin-6 (IL-6) is a multi-functional cytokine with inflammatory and proliferative capacities that has been previously implicated in the pathogenesis of CVD; however, our understanding of its discrete role in the regulation of CVD remains incomplete. Classical IL-6 signaling is mediated directly through its interaction with its membrane receptor (IL-6R) and the ubiquitously expressed glycoprotein 130 (GP-130), which activates the downstream effector STAT3, in turn promoting inflammation and proliferation. Interestingly, vascular smooth muscle (VSM) cells lack the IL-6R, yet IL-6 can still function in cell trafficking an IL-6R through a process known as IL-6 trans-signaling (IL-6TS). In IL-6TS, IL-6 binds to a soluble IL-6 receptor (sIL-6R) which can also be inhibited by a soluble GP-130 (sGP-130). Unfortunately, little is known regarding the role of IL-6 in VSM in various tissues and more specifically in VSM. In the current study we hypothesize that IL-6 via its TS pathway leads to STAT3 activation, in turn promoting aberrant proliferation and subsequent VSM remodeling. To test this hypothesis, we will introduce a transgenic mouse model harboring a cardiac artery of experimental animals and after specified periods of time we will probe injured (and uninjured) arteries for changes in STAT3 protein expression. We will expand the study by investigating the proliferative and migratory effects that treatment with a IL-6/IL-6R complex may have. We expect to see...
upregulation of STAT3 protein expression as well as promotion of migration and proliferation in treated cells, thereby implicating IL-6TS and STAT3 in CVD pathogenesis. From our anticipated findings we hope to elucidate a potential clinically-relevant mechanism behind pathologic vascular remodeling that could shed light on IL-6TS/STAT3 as a beneficial therapeutic target against CVD.

Regional Architecture of β-Catenin and p120-Catenin Interactions Examined by Stochastic Optical Reconstruction Microscopy (N-STORM)

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Introduction: Extensive research has investigated β-catenin and p120-catenin in their respective oncogenic and tumor suppressive functions. Due to technological innovations in the field of super-resolution microscopy, the interactions between the two molecules can be scrutinized to a greater extent than ever before. Previously, the best compound microscopes can resolve two objects that are about 0.2 µm apart. Thus, the conventional microscope would support their direct interactions when producing the images of molecule colocalization. By using Nikon’s N-STORM (Stochastic Optical Reconstruction Microscopy), the present study seeks to address the hypotheses of molecular interactions defined by colocalization at the resolution of 28-30 nm.

Method: Non-cancerous MDCK-II and metastatic prostate cancer PC3 cell lines were obtained from ATCC for imaging. Both cell lines were grown on No 1.5 coverslips, fixed, and stained according to the procedure developed by Nikon. Alexa Fluor 488 and 647 dyes were used from Thermo Fisher Scientific functioned as secondary antibodies to fluorescently illuminate the protein molecules. Multiple images of each cell type (β-catenin N=5; p120-catenin N=5) were taken and evaluated using Nikon’s analytic software. Random β-catenin and p120-catenin randomization colors within a 100 µm proximity to other were measured. The number of colocalizations were also counted.

Results: Across all images of the MDCK-II cells, 282 data points were collected. The mean distance between β-catenin and p120-catenin was found to be 27 nm with a SE of ± 0.36 nm. The amount of protein colocalizations across the MDCK-II cells were known concentration levels as well as comparing with reference bone ash sample, which will be done by spiking our samples with known background information regarding the project, instrumentation, and the process of method validation. Validation will include evaluating percent recovery (accuracy and repeatability) of the sample, which will be done by spiking our samples with known concentration levels as well as comparing with reference bone ash samples. This will be completed over multiple replicates to ensure validity.

Systematic Quantitation of Benzoic Acid Derived Preservatives in Beverages

Austen J Allen, Jack E. Pender, PhD; Natalie Taft, MS; David N. Collier, MD; PhD; Allison S. Danell, PhD

Introduction

Benzoate derivatives (sodium benzoate and potassium benzoate) are frequently added to commercial beverages as a preservative. FDA regulations prohibit benzoate levels from exceeding 1000 mg/L (0.1% w/v) of a beverage, and empirical evidence demonstrates manufacturers seek to follow this mandate. However, there is concern that even at a legal level, consumers may exceed the FAO/WHO Acceptable Daily Intake (ADI) benzoate guideline of 5 mg/kg of body weight/day. Several lines of evidence indicate that such exposure may promote weight gain and maintenance.

Methods

A high performance liquid chromatography (HPLC) method was developed, allowing for accurate and precise detection and quantitation of benzoate in beverages. This HPLC method consists of a 6-minute isocratic analysis utilizing a 0.2% formic acid/15% acetonitrile mobile phase and a 100x3.0 mm, 3.5 µm Agilent Zorbax Eclipse Plus Phenyl-Hexyl column.

Data

Benzoate concentration data was systematically obtained for a variety of drinks categorized using industry/WHO standards. Over 330 beverages have been analyzed, including citrus and orange sodas, reduced-calorie cola colas, pre-packaged teas, and sparkling waters. Subcategories based on packaging, name, and store brand were also created based on survey results from our patient population indicating preferences for the least expensive available beverages. For example, Mountain Dew, Mello Yellow, Sun Drop, Mountain Lion (Food Lion Brand), Mountain Lightning (Walmart-Brand), and Dollar Tree Mountain Stars and Sun Drop, Mountain Lion (Food Lion Brand), Mountain Lightning (Walmart-Brand), and Dollar Tree Mountain Stars and Stripes were all analyzed while studying citrus sodas. This set of beverages featured a range in benzoate concentration of 227 mg/L to 381 mg/L with a mean of 284 mg/L for all analyzed citrus sodas. Several other variables were also examined, including the consistency of benzoate concentration as a function of shelf storage time.

Discussion/Future Work

Concurrent clinical work includes using these data to estimate exposure of adult volunteers in an Institutional Review Board (IRB) approved study to measure related metabolites in urine pre- and post-exposure. Future work will utilize benzoate concentration data described in this report to create a patient-survey which allows patient benzoate exposure at the ECU Pediatric Healthy Weight Research and Treatment Center to be accurately determined. Results obtained through these surveys will provide more data to assess the relationship between benzoate consumption and body weight changes.
opportunities. Knowledge is power, and schools can empower these students are from rural, lower-income, less educated areas the circumstances of many students at South Central, as well for increasing global competency skills for future virtual exchange projects, as South Central recently of the errors. The significance of this study is to improve our ways of addressing these misconceptions in the classroom by creating activities that truly overturn the misinformation learned in childhood and to create a framework for providing young children with media that does not create these misconceptions from the beginning.

The findings from this project will achieve two major goals. The first goal it will achieve is creating partnerships with foreign schools that Ms. Piner and South Central Highschool can utilize for future virtual exchange projects, as South Central recently recently received a grant to implement global learning initiatives. The second goal it will achieve is developing global competency skills among students at South Central Highschoool, and potentially a new classroom if the first one cannot commit to two semesters.

To evaluate the growth in global competency among Ms. Piner’s students we will be using the framework outlined by OECD’s Programme for International Student Evaluation (PISA). The framework includes a survey administered to students before and after the globalization experience. These surveys will indicate if the students developed their skills in global competency, rendering the virtual exchange project effective or not.

UO32
Insects and Persistent Misconceptions
Emma Rae Wester
People begin to learn from a very young age how to catalog the natural world, absorbing criteria for classification through media, social interactions and formal and informal education. In the case of insects, these classifications are often formed with misconceptions gleaned from children’s books that contain erroneous information. We theorize that the earlier a misconception is formed, the harder it is to overturn and thus persist through adulthood even when the adult learns and uses information counter to the misconception. In this case, we are examining how the types of misconceptions children have formed about insects through their interaction with erroneous media persists through adulthood (undergraduates). To analyze adult misconceptions about insects, we tested misconceptions of insects among undergraduates in an entry level biology class, both before and after they are taught the correct criteria for classification. To assess which errors about insects to which children are commonly exposed, we rated trade books, for number and egregiousness of the errors. The significance of this study is to improve our ways of addressing these misconceptions in the classroom by creating activities that truly overturn the misinformation learned in childhood and to create a framework for providing young children with media that does not create these misconceptions from the beginning.

UO33
More PEAS Please: Can Food-Based Learning Improve Preschoolers’ Vegetable Intake?*
Joceyl M Bayles, Sarah Burckholder, Archana Hegde, Stephanie Pitts, Virginia C Stage
The purpose of this study was to examine the effect of a 7-week hands-on food-based nutrition education curriculum, Preschool Edible Activities with Science (PEAS) on Head Start (HS) children’s (aged 3-5) vegetable liking and fruit and vegetable (FV) consumption. Preschool children at a Greenville, NC HS partook in the 7-week PEAS curriculum during fall 2018/spring 2019. Two additional centers in Ayden, NC served as well-matched comparisons. The goal of PEAS is to expose preschool-aged children to healthy eating habits early on, using a more interactive, engaging learning approach. Activities are designed around a model of science inquiry using food to teach health, math, science, art and reading. Every lesson includes the opportunity for children to taste or make one of the 9 target vegetables: broccoli, cauliflower, sweet potato, radish, cucumber, tomato, spinach, snap peas and carrots. All PEAS activities were pre-tested in a local, private preschool center to assess age-appropriateness and identify logistical issues related to content organization. Parent-reported data was collected at baseline: parent/child demographics, child vegetable liking (1=super yummy, 5=super yucky), and level of child neophobia. Baseline and post-intervention data were collected from: pictorial FV liking survey and skin carotenoids (Veggie Meter*). Descriptive and paired/independent t-tests were used to analyze demographics and differences within/ between intervention and comparison groups. Final intervention sample included 43 preschool children (n=43) and control sample included 47 children (n=43). Approximately 70% of children in control group and 59% of children in intervention group were 4 years old with age ranges of 3-4 and 3-5 respectively. Preliminary findings indicate no significant differences for the foods assessed for liking in control group; however, in the intervention group 8 of target foods showed increase in liking including broccoli (M=3.16, SD=1.703), cucumber (M=3.33, SD=1.680), tomato (M=3.16, SD=1.688), carrots (M=3.19, SD=1.680), sweet potato (M=3.19, SD=1.666), pea pods (M=3.07, SD=1.562). A decrease in child liking occurred in target vegetable radish (M=2.67, SD=1.672). At preliminary assessment, children had only been exposed to five target vegetables (broccoli, cauliflower, radish, sweet potato, spinach). Research will continue and more analysis will be available at the time of presentation.

UO34
Argument-Driven Inquiry: Tracking Progress Through General Chemistry
Meghan Lower
This project proposes a two semester study that focuses on the evaluation of an innovative instructional model called Argument-Driven Inquiry (ADI) that is designed to help more and a wider diversity of students become more proficient in science. The focus of this project is to determine if and how the use of this instructional model affects the development of students’ science proficiency over time. The objective of this study is to examine how students enrolled in General Chemistry I and II Labs (CHEM 1151 and 1161) respond to the use of the ADI instructional model over the course of two semesters. Group argumentation sessions from five General Chemistry I investigations and four General Chemistry II investigations were recorded and coded according to the Assessment of Scientific Argumentation in the Classroom (ASAC) observation protocol through the use of NVivo, a qualitative data analysis software. From the data, a positive trend was seen in the total ASAC scores for each of the experiments. An overall increase was seen within each of the three sub-categories of the ASAC observation protocol over the course of the school year, with the cognitive sub-score increase being significant. In conclusion, the data found that repeated exposure to argumentation-based laboratories improves an essential scientific practice.
Carbon-Hydrogen Bond Functionalization is an essential organic transformation that cleaves the Carbon-Hydrogen bond and forms a new Carbon-Heteroatom bond. While these bonds are ubiquitous in nature, they are not considered a functional group as they are very unreactive. To be able to functionalize traditionally unreactive groups, such as hydrocarbons, would open unprecedented pathways in organic synthesis and offer more efficient and cost-effective synthetic precursors commonly used in pharmaceutical drug development, research, and industrial applications.

This study expands the scope of a previously discovered unique oxidant and additive free, platinum-catalyzed, direct C–H acylation of 2-(aryloxy)pyridines with acyl chloride by using ethyl succinyl chloride as the acylating agent to synthesize gamma-keto esters. By extending the ester from the C–H bond activation site with space spacers, it offers the attachment of bulkier groups due to less steric hindrance than the previously synthesized alpha-keto esters as well as further confirmation of the proposed mechanism. An amalgame of 2-(aryloxy)pyridines, differing in their substituents, were reacted under previously established reaction conditions with ethyl succinyl chloride. All reactions were complete in 3 hours or less and monitored via GC analysis, which showed product conversion greater than 70%. Various substituents have been tested to show the reactions tolerance to electron-withdrawing and electron-donating groups, further demonstrating the versatility of the mechanism.

Where Do They Goby?: The Study of Gobiosoma bosc Behavior in Response to Visual Implant Elastomer Tags

Corey Winkler, Chris Moore, Dr. April Blakeslee

The naked goby (Gobiosoma bosc) is a small benthic fish that inhabits western Atlantic estuaries, where it ranges from Texas to Rhode Island. This species is tolerant of changes in salt concentration and can be found across a wide range of salinities. Previous work has found limited gene flow between and among populations, the potential changes to behavior (i.e., differential shelter use or predator susceptibility) in marked and unmarked fish had to be fully evaluated in a lab setting.

Naked gobies were collected from Mallard Creek at Goose Creek State Park (along the Pamlico River near Washington, NC) throughout the summer of 2018 and separated into marked and unmarked treatments. Each replicate contained 10 individuals that were video recorded for several hours with only a 30-minute period being used for analysis. Preliminary results suggest that no significant behavioral changes occur in naked gobies after being marked with VIE tags. In a related ongoing study, I will examine the potential difference in predator susceptibility after the implantation of the VIE tag compared to untagged control fish. Altogether, the results of this work are important because it could further support the viability of VIE tags being utilized for mark and recapture field experiments.

Developing a Basic Concept for a Portable OSL Reader (ODIN)

Nicholas Andrzej Kowalski

Optically Stimulated Luminescence (OSL) is used to measure the radiation dose absorbed by crystalline materials. Minerals that have been exposed to a radiation dose start to glow, i.e., they emit luminescence, when they are stimulated with light. OSL has primarily been used for archaeological and anthropological applications where radiocarbon dating was not possible. The goal of this study is to develop a basic OSL device by investigating the needs of the user base and modifying the instrumentation.

With assistance from the Innovation and Design Lab with ECU and through the I-CORPS @ ECU Program a business model canvas and marketing strategies were developed. The I-CORPS program focuses on customer relationships, revenue streams, key resources, and cost structure. Interviews were conducted and at the conclusion of the program a decision was made on whether future developments are possible.

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UO36
Platinum Catalyzed Synthesis of Gamma-Keto Esters via C–H Bond Functionalization
Dylan Lee Harder, Shouquan Hao

UO37
Where Do They Goby?: The Study of Gobiosoma bosc Behavior in Response to Visual Implant Elastomer Tags
Corey Winkler, Chris Moore, Dr. April Blakeslee

UO38
Developing a Basic Concept for a Portable OSL Reader (ODIN)
Nicholas Andrzej Kowalski

UO39
Setting differences: factors affecting nest size variation in the Eastern Bluebird Sialia sialis
Angelica N. Reed, Susan B. McRae

Department of Biology, East Carolina University

Bird nests provide mechanical protection and insulation, creating a thermal environment suited to incubating the eggs and regulating body heat of altricial young. These functions make crucial differences in offspring survival and parental reproductive fitness. Within population nest size variation reflects differences in parental investment in building behavior. I investigated whether reproductive success or maternal condition were related to nest size in a population of Eastern Bluebirds. Bluebirds readily nest in artificial nest boxes where they are monitored by community members. If post-fledging nest size, as a measure of building effort, is a good predictor of reproductive success or parental condition, then it would be a valuable measure that could be reported non-invasively by citizen scientists. Bluebird nests were monitored at ECU’s West Research Campus, and all nests were collected and weighed following fledging or predation. Using four years of data collected by the McRae lab, I first tested the prediction that nest weight is related to reproductive success (measured as clutch size, hatching success and fledging success). Video observations revealed that nest building was exclusively conducted by mothers. Therefore, I also tested the prediction that nest weight is related to maternal condition (maternal weight divided by wing length). After finding no significant relationships, I investigated alternative factors that may influence nest size. Nests built earlier in the season were larger on average, and those built by immigrant females tended to be larger than those built by females hatched on site. I am now comparing nest weights of philopatric females with their maternal nest weights to test for a ‘natal memory’ of nest size by building females. In addition, to determine whether there are thermal advantages to smaller nests due to additional free space within the box, I related mean daily maximum temperatures in nest boxes recorded with data loggers to nest size. Results of thermal analyses suggest that nest size significantly impacts mean maximum nest temperature during incubation. Going forward, I will determine whether observed phenotypic plasticity in nest size is a response to environmental (location, availability/proportion of pinestraw, degree of shading, ambient temperature) or intrinsic variables (female age, nest attempt number, number of eggs laid that season).

UO40
Standard Practice for Formulating Green Enzymatic Detergent Products through the use of Wash Performance Evaluation, Stability Testing Techniques, and MALDI/MS
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Enzymatic detergents experience unfavorable climate control scenarios once they have left the plant, often varying their shelf-life and stability. Wash performance evaluation and stability testing are used to predict performance; this will be coupled with the use of the MALDI/MS that will indicate degradation of enzymes by oxidation. The wash performance evaluation (WPE) is a mathematical description for how much soil is removed in a wash using a spectrophotometer. The spectrophotometer outputs reflectance values that will be in terms of light (L) and color saturation (a & b) by absorbing the light that bounces off the fabric. The soil removal index (SRI) equation computes the percent soil removal. This technique can be used to test on various fabrics including polyester and cotton. The validity of the wash performance evaluation is supported by a low average percent relative standard deviation of 1.2%. The stability testing techniques are practiced by formulating detergents and placing the detergents through three quality checkpoints. The three test dates will allow for the quality of the product to be evaluated for a detergent sitting on the shelf for six to twelve months. This is done by placing the detergent in an oven at 30°C for 30 days. Within those days, testing will take place on day 1, day 15, and day 30.

This will simulate for 1 day, 6 months, and 12 months on a shelf. In the year 2019, 96 samples will undergo testing to determine the level of stability. Change in qualitative and quantitative values are used including: pH, specific gravity, appearance, color, viscosity, and percent active. These will indicate a failed stability test if a predominant change is noticed from different day testing. Changes that would result in a failed stability test include: ±0.5 pH, ±0.25 cP change in viscosity, ±0.25 cP change in specific gravity, and ±0.5 pH change in viscosity. The MALDI/MS will be used to find the location that experienced oxidation. Through these tests, enzymatic detergents will experience long shelf life through simulation and be capable of evaluating quality of wash. Ensuring a successful enzymatic detergent formulation.
Fibin is an insoluble protein and a major component of blood clots. When a wound occurs the protein, fibrinogen, is converted into fibrin monomers by the enzyme thrombin. These fibrin monomers aggregate to form fibrin polymers that then bundle into thicker fibers to form a network, a process called network polymerization. Previous studies have investigated a variety of factors that influence fiber formation under static conditions, but little has been investigated on what effect flow has on fibrin networks. Patient samples indicate that fibers align in the direction of flow, but it has not been carefully studied to determine if they polymerize this way or if they re-orient after the polymerization process. Furthermore, there is little data regarding how fluid flow deforms already polymerized clots. Understanding fluid-clot interactions is important for developing models to predict strokes, pulmonary emboli, and myocardial infarctions.

To gain understanding on the effect flow has on fibrin structure, fibrin networks will be formed within microfluidic channels. By using this method to form clots, we are able to better replicate what happens in a person’s circulatory system and, therefore, better understand what happens in the body. These chips are custom built to accommodate many potential uses. Each chip design has a different number of inlets and outlets to easily manipulate various flow rates and buffer compositions for fibrinogen and thrombin. In these chips fibrin networks will be formed while under the manipulation of various flow rates. Simultaneously, network formations will be imaged using epifluorescent microscopy where we can observe and record the structural makeup of the fibrin networks as they form under different habitual stimuli. Preliminary results will be presented.

Expression and characterization of an immobilized Tobacco Etch Virus (TEV) protease: Streptavidin fusion protein

Jessica Norris, Tuli Patel, and Robert M. Hughes, Ph.D.*
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Proteases with highly specific activities have applications in the purification and downstream processing of overexpressed proteins, including the cleavage of affinity tags and solubility promoting partners such as GST and MBP. However, proteases can be challenging to express and purify, and commercially sourced proteases such as Tobacco Etch Virus protease (TEV) can be prohibitively costly. Here we describe the production and characterization of a TEV-strep fusion protein which can be immobilized on biotin-coated superparamagnetic nanoparticles for optimal recovery and reuse in protein preparation applications. We demonstrate activity of our fusion protein in the presence of a heterologously expressed protein containing the TEV protease target sequence (ENLYFQK). We also describe the time- and temperature-dependent activity of our fusion protein when bound to superparamagnetic nanoparticles and the resulting shelf stability. We anticipate that the immobilized TEV protease described in this document will be a useful tool for biochemists that can simplify workflows by eliminating downstream protease contamination in protein purification protocols.

Sclerodermia Defiance: A Practical, Educational and Free Guide
Characterizing the Binding of Ca(II) and Cd(II) to Wild Type and Mutant C35A and C84A hTnC by ICP-OES and Isothermal Titration Calorimetry
Caitlin Diana Palmer; Amyia Cunningham, Dr. Anne M. Spiches, Ph.D.*

Many key biological processes rely on the presence of essential metals within a cell; therefore, maintaining the delicate balance of metal ions is paramount to homeostasis. Cadmium in its divalent state, Cd(II), is a toxic heavy metal that can disturb this delicate balance, leading to a disruption in biological function. Cd(II) can disrupt biological pathways through its ability to mimic essential metals such as Ca(II), thus potentially interfering with key metal-protein interactions. The purpose of this study is to understand Cd(II) binding to human cardiac troponin C (hTnC), a native Ca(II) binding protein, at both the thermodynamic and structural levels. In this study we collected equilibrium dialysis data coupled to ITC-OES to determine the number of Ca(II) ions binding to the protein and ITC data to determine the thermodynamic driving force of these interactions. Our work is also supplemented by ITC data for Cd(II) binding to wild type (WT) and mutant C35A and C84A hTnC to pin-point where Cd(II) is binding. Several novel features: the Cd(II) binding includes tighter Cd(II) binding to the C- Domain of hTnC are shown by step-wise binding with large K values, as well as (CdIi) stoichiometric ratios of n=2 and n=3; n=2 and n=2; and n=1 and n=2 for WT, C35A, and C84A hTnC, respectively. These data suggest that Cd(II) binds tighter than native-bound Ca(II) and with varied stoichiometries.

Mechanics Regulating the Dissolution of Fibrin in Blood Clots
Sean J. Cone, Andrew T. Fuquay, Nathan E. Hudson

Fibin is a fibrous protein that serves as an important structural component of blood clots, and proper dissolution during fibrinolysis is crucial to resuming normal blood flow. As little is known about the behavior of individual fibrin fibers, studying their mechanisms during this process provides insight into developing fibrinolytic therapies for resistant blood clots. To study the breakdown of fibrin, fibrinogen is mixed with thrombin to polymerize fibers suspended between ridges 20 µm apart. Polymerized fibers are labeled for fluorescence microscopy. Under the microscope, plasmin is added to small networks of fibrin to initiate degradation, and this process is imaged over time. We determined that individual fibers undergo distinct pathways during degradation; these pathways include lysis (fiber clearance), fiber elongation, the bundling of multiple fibers, and the collapsing of fibers into the ridge. Fibers are placed into separate categories at specific time intervals to analyze how plasmin concentration and network density affects overall fiber lysis.

Results suggest that fibrin lysis is the precursor to all other pathways (i.e. elongation due to structural rearrangements, fibrin bundling, etc.) and the rate of lysis is regulated by network density (measured in fibers/micro2) as well as plasmin concentration. Patterns across both plasmin concentrations are similar, but lysis completes much earlier at 1.0 U/mL than 0.1 U/mL. A higher network density results in a larger percentage of fibers lysed in earlier time intervals while later time intervals are consistent across different densities, suggesting that the initial rate of fiber lysis is greater in denser networks. This influences the number of fibers that bundle, elongate into each other, and collapse into the ridge. Networks at higher densities experience more elongated fibers in mid-lysis, presumably because of greater tension redistribution from lysis. Bundling also appears to be more common in denser networks. Fibers collapse into the ridge less often at higher densities with a plasmin concentration above 0.1 U/mL, this is most likely because of greater bundling that happens in denser networks. Future steps involve determining the effect of fluorescent light on the degradation of fibrin, as well as running trials using plasminogen activated by tissue-plasminogen activator to understand its effects in fibrinolysis.

Applying data science to study high-resolution precipitation delivery in rural Jamaica: 2014-2015
Calie Hemgen, Mathematics BS Intended Major & Scott Curtis, Department of Geography, Planning, and Environment

Future steps involve determining the effect of fluorescent light on the degradation of fibrin, as well as running trials using plasminogen activated by tissue-plasminogen activator to understand its effects in fibrinolysis.

What Factors Maintain the Mixed Mating System of a Local Annual Plant, Triodanis perfolia?
Anna O’Brien1, Carol Goodwillie1
1Department of Biology, East Carolina University

A plant that is able to reproduce by cross- or self-fertilization is known to have a mixed mating system. This system is an evolutionary puzzle to many researchers because the factors that can maintain both outcrossing and selfing are not fully understood. Cleistogamy, a form of mixed mating, describes the production of both open (chasmogamous, CH) flowers that can be cross-pollinated and closed (cleistogamous, CL) flowers that are obligately self-fertilizing. Studies show that inbreeding depresses fitness relative to outcrossing, but the exact mechanism behind this relationship is not clear. In this study, we transplant progeny of self- and cross-pollinated CL and CH flowers to assess if low quantities in CL offspring resulting in slightly reduced fitness relative to CH offspring. The minor fitness benefit of CH offspring cannot negate the advantage of producing low cost
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CL flowers that have guaranteed seed production. This prompts the question: why do plants continue to make costly, larger CH flowers? Heterosis, the increased fitness of offspring of crosses between different species, may be a key factor in maintaining CH flowers. Heterosis can occur when populations are fixed for different mildly deleterious recessive alleles. The offspring of these underappreciated art forms to tell the story of African and Beyoncé Knowles. Embroidery, as a textile art, has long been associated with people of color and their struggles, namely Iranian filmmaker Abbas Kiarostami, Mrigankasekhar Ganguly nor literature could do on its own. Poetry film has long been explored through metaphor, allusion, and performance that neither film nor literature could do on its own. Poetry film has long been an equivalent to the crimes committed against her people. Shala-all express facets of the mindset of oppressed women turn a cheek and accept her fate. He represents the community that produces both CH and CL flowers. In a greenhouse experiment, we hand-pollinated plants of three populations of T. perfoliata to generate offspring from self-fertilized CH flowers, within-population crosses, and between-population crosses with two populations. We also collected seeds from CL flowers to compare CL and selfed CH offspring to determine if the allocation of resources to plants does not fluctuate for each flower type. To quantify lifetime fitness, seedling germination, seedling survivorship and plant biomass were measured. Our results may contribute to the understanding of the maintenance for the mixed mating system, an evolutionary enigma. 

The Anger and Anxieties of the Asian and African Diaspora as Explored Through Poetry Film and Textile Arts
Andrew Tian Li

If one compares literature to film, traditional storytelling is almost identical in both mediums. Protagonist is introduced, gains some companions, goes on a quest, slays the dragon, and saves the princess. And while non-traditional storytelling-namely, poetry and embroidery-is universally accepted and admired within art, its film equivalent has not found the same mainstream respect or recognition. Concurrently, the stories of people of color-who have fought for their hardships, their humanity, their dreams-have only recently been welcomed into the mainstream of storytelling. In my project, I hope to bring together two oft-overlooked topics and marry them into a piece of work that does justice to both mediums. Poetry film, while it may consist of actual readings of poetry or spoken word, is more accurately defined by the synthesis of visual and non-linear cinematic elements like metaphor, allusion, and performance that neither film nor literature could do on its own. Poetry film has long been associated with people of color and their struggles, namely Iranian filmmaker Abbas Kiarostami and Vaagnakharad Ganguly and Beyonce Knowles. Embroidery, as a textile art, has long been associated with women and as such has been deprived of critical and commercial appreciation. This project seeks to reclaim both of these underappreciated art forms to tell the story of African and Asian deities as reflections of dying cultures and their reactions to their destruction by forces of colonization and imperialism.
Increasing Cultural Awareness through my Passion for the Arts

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As we meet more people in our day to day lives, we come to notice that we are more different than we are similar. However, it's these differences that seem to bring us closer to one another. Varying cultures play a large role in these differences and cultural awareness is more needed today than it ever has been before. My passion for dance has allowed me to increase cultural awareness on East Carolina University's campus and continue to educate students and faculty on an important part of my heritage. Raas is a North Indian folk-dance that originates in the state of Gujarat in India. ECU Raas is a dance team that was created on campus in the spring of 2015 by a freshman student who wanted to see more of her own background and heritage on campus through the form of dance. Being a recognized Predominantly White Institution (PWI), East Carolina University's ability to welcome students from different groups, like ECU Raas, and advocate for cultural awareness is absolutely necessary to increase the diversity of our campus. Since the beginning of my freshman year in Fall 2015, I have served as the captain of the team. Through my four years of leading the team, I have seen how my love for Raas has increased cultural awareness not only on campus but also in the dancers and their appreciation for their cultural roots. Each individual on the team has been able to increase their understanding of their rich ethnicity and proudly embrace their culture on campus. The team has strengthened cultural diversity and has encouraged inclusivity since it was established. Since its creation, ECU Raas has competed and placed at multiple national dance competitions. Additionally, the team has given back to our local community through various events. ECU Raas hosts the annual Diwali Nachi Bollywood-Fusion charity dance competition every February, has engaged in multiple "Cultural Cuisine and Chats" through LWWC and has left a lasting impression at our university.

Knowledge and Perception of the Prevalence and Treatment of Type II Diabetes among Students at East Carolina University

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In 2017, the Centers for Disease Control and Prevention (2017) found that 12.2% of adults in the United States were living with diabetes. In North Carolina, about 10.1% of adults were diagnosed with diabetes, but this number is much higher in Eastern North Carolina (Centers for Disease Control and Prevention 2016). In rural North Carolina, about 18.6% of adults were diagnosed with diabetes (United Health Foundation, 2019). With such a high proportion of the population diagnosed with diabetes, it is important to assess the public's understanding of the disease. Previous research has investigated the public's understanding of diabetes in many sample populations but not in Eastern North Carolina. Chinnappan and colleagues (2016) found that diabetes understanding varied between age groups and education levels in Malaysia. Participants who were 12-24 years old and were in college had the best understanding of the causes and treatment of diabetes (Chinnappan et al. 2016). Based on the research by Chinnappan et al., students at East Carolina University should have a basic understanding of diabetes. The present study will investigate the basic understanding of Type II diabetes treatment and prevalence among college students in Eastern North Carolina. The data gathered could promote programs that more effectively educate college students on the treatments of diabetes. A Qualtrics Survey was used to collect participants' data and statistics were used to assess the participant's knowledge of Type II diabetes treatment. The researchers proposed that there would be a considerable lack of understanding regarding diabetes prevalence and treatment among students at East Carolina University. The study found that the majority of college students did not have a thorough understanding of Type II Diabetes treatment. The lack of knowledge persisted across different hometown regions, family history, academic status, and diagnosis status. There was a significant difference between the knowledge of treatment plans between science and math-related majors and literature, language, and social science majors (P< 0.05). There was also a lack of knowledge of the comorbidities of high insulin levels. This study identifies gaps in knowledge among students at East Carolina University and hopes that future programs could be implemented to increase the public's understanding of Type II diabetes.

Vowel identification in regional dialects of African American English in North Carolina

Carmen Elizabeth Love

The speech signal provides information on talker characteristics including socio-ethnic affiliation and racial identity. Regional variation, both similar to and divergent from White American English (WAE), has been described for African American English (AAE) (Eberhardt, 2008; Holt, Jacewicz & Fox, 2015). However, limited studies have evaluated the effect of regional dialect variation on vowel identification (Clopper and Pisoni, 2004) finding the listener's ability to categorize speech may be affected by their perception of the talker's regional dialect. To date no work has attempted to assess the interaction of racial categorization and vowel identification within AAE. This work evaluated the influence of talker's regional dialect on word identification for Black and White listeners (n= 25) from eastern North Carolina and Indiana. Participants heard eastern and western NC AAE and WAE speech (male and female). Listeners identified one of 14 English vowels presented in /V/! form. Listener's categorical perception in the presence of regional and socio-ethnic dialect variation was assessed. Results showed different errors for non-southern (Indiana) listeners and southern (NC) listeners. Results are discussed with respect to speech perception and vowel categorization for familiar and unfamiliar dialects of American English in the presence of regional vowel change.

Developing and Testing the Functionality and Usability of a Bereavement Support Web-Based Link for Bereaved Parents.

Jacqueline E Tyson

Dr. Nancy Dias

Experiencing the death of a child can impact multiple aspects of the parent's overall health, composed of physical, mental, and social health, and can even impact the parent's ability to sleep (Dias et al., 2017). The standard bereavement services offered do not meet the individualized needs of bereaved parents (Dagostino et al., 2008; Jost & Haase, 1998; Neidig & Dalgas-Pelish, 1991).

The purpose of this senior honors project was to test the functionality and usability of an web-based link to target the individual needs of bereaved parents by conducting interviews. This web-based link offers parents access to a bereavement care counselor who will assess the individualized needs of bereaved parents and direct them to appropriate resources. This project will be conducted in eastern North Carolina.
The surgical outcomes following patients who undergo the marshmallow-bagel study in comparison to those who complete the full esophageal manometry is analyzed for significant differences. The null hypothesis is that patients receiving the esophageal manometry and patients receiving the marshmallow and bagel, show no difference in outcomes regarding the ability to swallow, ability to tolerate a regular diet, presence of dysphagia, presence of odynophagia, need for postoperative steroids, and need for postoperative esophageal dilation. Two patient groups are divided by reviewing the charts of patients who underwent preoperative procedures for a paraesophageal hernia repair. The first population is patients who only received the preoperative evaluation of the marshmallow-bagel technique prior to surgical treatment of a hiatal hernia. The second population is patients who only received an esophageal manometry prior to surgical intervention of a hiatal hernia.

**RESULTS**

Sixteen participants were enrolled in the study. Stress as determined by SI, SDNN, and RMS-SD was not significantly different across participants prior to beginning the simulation. Stress as determined by SI, SDNN, and RMS-SD did not change significantly between any one of the 12 individual procedural steps. Within each of the individual 12 procedural steps, stress did not statistically decrease over time as determined by SI, SDNN, and RMS-SD.

3 of the 16 (18%) participants appeared to have increased stress during the final examination portion, with an average stress index of 51.9 (range 31.4-58.5) at baseline compared to an average of 280 (range 160-360) during the final exam.

**CONCLUSION:**

This study suggests that stress, as measured by HRV, during simulated CVC training did not change throughout any procedural step, and did not decrease over time. Further studies examining HRV during real life CVC placement is warranted.

**UP6**

The Effect of Enhanced Preparation on Students' Performance in Simulation

Elsa Leontine Davis

Background: Simulation is an artificial representation of a real-world process to achieve educational goals. More specifically, health care simulation has been defined as a strategy or technique to replicate clinical situations in an interactive fashion (Gaba, 2004). Simulation is a frequently used tool for assessment of clinical skills and judgment in the College of Nursing. It is important for students to use the simulation environment for active learning to better their nursing skills. Simulation has been shown to increase student comfort in hospital settings and help with retention of knowledge (Lasater, 2007). However, little is known about preparatory methods for simulation within nursing education. The purpose of the study was to compare outcomes of two different methods of simulation preparation.

**METHODS:**

This was a prospective cohort study with a convenience sample of 16 participants (n=16) with retention of knowledge (Lasater, 2007). However, little is known about preparatory methods for simulation within nursing education. The purpose of the study was to compare outcomes of two different methods of simulation preparation.

**METHODS:**

This was a prospective cohort study with a convenience sample of 16 participants (n=16) with retention of knowledge (Lasater, 2007). However, little is known about preparatory methods for simulation within nursing education. The purpose of the study was to compare outcomes of two different methods of simulation preparation.
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were measured were patient age, race, and insurance type. STATA was used to run correlations between the different variables and follow up time. The variables were put into multiple regression models to understand their impact on follow up time. Age was the only variable that was statistically significant within the model (R2=0.07, P=0.00). Women ages 40-49 took less time to complete follow up testing with an average time of 24 days. Phase two included black women from phase one that completed surveys and had abnormal results. Perceived barriers to mammography, as measured by the Champion Attitudes towards Mammography and Breast Cancer Scale, were placed into multiple regression models to determine if the perceived barriers influenced follow up time. None of the models were statistically significant. Age was the only variable that influenced follow up time after receiving an abnormal mammogram result. There were no racial differences in follow up times. We believe that physical mobility, time, and other health related priorities may explain why older women had longer follow up times.

UP8
The Influence of Maternal Exercise and Nutrition on Health Disparities and Birth Outcomes

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Background: Health inequities are defined as any apparent disparity in the health of different individuals due to a preventable cause. Some determinants seen in the United States are race, socioeconomic status, and education level. In pregnancy, these determinants can contribute to adverse maternal and neonatal birth outcomes. For example, African American (AA) women are at a higher risk for preterm birth, or delivery before 37 weeks gestation, than Caucasian women. Current research expresses the benefits of maternal exercise on birth outcomes but fails to investigate the influence of maternal exercise on attenuating adverse birth outcomes in AA women. Further research is required to understand this influence on other birth outcomes. Supported in part by the American Heart Association.

UP9
The Effects of Aerobic Exercise Intensities on Central Blood Pressure in Overweight and Obese African Americans

Ethann Vann Holland

African Americans are at an increased risk of cardiovascular disease and type 2 diabetes compared to their Caucasian counterparts. According to the 2018 American Heart Association report, nearly half of all African American adults (46.6% of males & 47.7% of females) show prevalence of cardiovascular disease. From these health disparities, studies have found that African American adults have a significantly higher prevalence of risk factors for cardiovascular disease and mortality including: hypertension, obesity, inactivity, and smoking. The American College of Sports Medicine guidelines recommend that adults participate in 150 minutes of moderate intensity aerobic activity each week or 75 minutes of vigorous intensity aerobic activity each week for improvement of health-related risk factors. Most studies assessing the benefits of exercise at different intensity levels were performed in mostly Caucasian populations.

Hypertension is one of the most prominent risk factors for cardiovascular disease and mortality. Brachial blood pressure is the typical method for assessing hypertension, however, recent studies suggest that aortic blood pressure may be a better

indicator of future cardiovascular events. Many studies have shown that aerobic exercise can reduce mean systolic and diastolic brachial blood pressure. Additionally, research assessing aortic blood pressure have found a reducing effect of aerobic exercise on systolic and diastolic pressure; however, the majority of these studies consisted of primarily Caucasian adults. Considering the increased risk of cardiovascular disease and type 2 diabetes among African American adults, more research assessing the effects of moderate and high intensity aerobic exercise on specific risk factors in African American Adults is clinically important.

It is possible that high intensity exercise training may result in a greater reduction in central blood pressure compared to moderate intensity exercise due to the greater shear stress on the vasculature. The purpose of this study is to evaluate the effect of exercise training intensity on central blood pressure in overweight and obese African Americans. Participants (n=60) will complete 6 months relating to aerobic exercise training at either moderate (45-55% VO2max) or high (70-80% VO2max) intensity. Central blood pressure will be assessed at baseline and follow up using the AtCor SphygmoCor Xcel.

UP10
Word identification: The influence of sex, race and regional dialect

Morgan Nicole Widdowson

The speech signal provides information on talker characteristics including socio-ethnic affiliation and racial identity. Regional variation, both similar and divergent from White American English, has been described in African American English. However, it is unknown if such regional dialect variation influences listeners’ racial categorization or word identification accuracy. This work evaluated the influence of listeners’ sex, race, and regional dialect on word identification for Black and White talkers from two dialect regions within North Carolina. Black and White listeners (n = 23) from eastern and central North Carolina participated. In the word identification task, the listeners matched the speech tokens from the same talkers to one of fourteen / h/k/ words. Results showed an effect of listener sex on word identification accuracy such that female listeners were more accurate than male listeners. No effect of listener race or regional dialect was observed for either task. Follow-up analyses will investigate the interaction between listener and talker sex, race, and regional dialect.

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UP11
Current State of Research in Velopharyngeal Ratios to Determine Velopharyngeal Competence: A Review of the Literature

Brianna A. Swain
Abigail K. Schwan
Abigail E. Haenssler
Jamie L. Perry

The velopharyngeal (VP) mechanism functions to form a closure between the oral and nasal cavities through posterior movement of the velum and lateral movement of the pharyngeal wall. Velopharyngeal closure is important for various functions including speech production and swallowing. Individuals with incomplete closure of VP structures may experience velopharyngeal inadequacy (VPI), resulting in hypernasality and poor speech intelligibility (Woo, 2012). A functional VP mechanism involves multiple velopharyngeal variables including the length of the velum and pharyngeal depth. A VP ratio, calculated by dividing the total velar length by the pharyngeal depth, is typically calculated to assess for VP function. The entire velar length is used to calculate the ratio, but this does not represent the part of the velum that is used in VP closure. The effective part of the velum, the distance from the posterior nasal spine to the velar knie, is the area of the velum that contributes to VP closure. An effective VP ratio is calculated by dividing the effective velum length by the pharyngeal depth which provides a more accurate representation of the VP mechanism performance during speech (Tian et al., 2009).

A review of the literature was conducted to analyze current research evaluating the effectiveness of VP ratio measurements to determine VP competence. Studies that measure total VP ratios and effective VP ratios to assess VP competency were considered. Further research on effective VP ratios can aid in identification of direct causes of VPI and measure VP competency in cleft and non-cleft individuals.

UP12
The Relationship between Patient Portals, Engagement, and Outcomes: Is Health Literacy an Important Link?

Drew Elizabeth Coprenguin

The use of technology to enhance the health care experience was emphasized through the HITECH Act of 2009 and was reinforced by the Center for Medicare and Medicaid Services in stipulating meaningful use requirements. An important element of these requirements is the engagement of patients and families in their care. In response, healthcare facilities have taken steps to
to create an enhanced curriculum for Brody Medical students practices of NC physicians. This study is part of a larger study knowledge, confidence, and HPV vaccine recommendation (CDC, 2016). Physician recommendation is the single best understanding of information in portals vary. There does seem literacy is a vital piece in improving patient engagement. One study stated that health literacy was a missing factor in a patient’s ability to understand information in patient portals. Lack of prior health literacy could negatively impact health outcomes. The usefulness of patient portals is apparent across the existing literature, but the factors that influence successful delivery and understanding of information in portals vary. There seem to be a relationship between education through patient portals, increased engagement, and patient outcomes. Further research is needed to gain a clearer understanding of the role health literacy plays in this relationship.

Methods

HPV Health Literacy and Vaccination Recommendation Practices of North Carolina Physicians

Kristen Barnes

Human Papillomavirus (HPV) is the most common sexually transmitted infection (STI) in the US (NIH, 2018). Most HPV clears up on its own, but can result in cancers of the cervix, vulva, vagina, penis, anus, rectum and oropharynx if left untreated (CDC, 2019). HPV vaccination is the best prevention for cervical cancer (Choe, 2018). In 2018, HPV was the 2nd leading cause of death for cervical cancer in the United States. The goal of this study was to assess the knowledge, confidence, and HPV vaccine recommendation practices of NC physicians. This study is part of a larger study to create an enhanced curriculum for Brody Medical students to increase HPV health literacy, self-efficacy, and intention to provide HPV prevention to patients. A 25-question online survey was distributed in the NC Pediatric Society’s Listserv the NC Family Medicine July and August 2018 e-newsletter and emailed to all pediatric and medicine physicians who are practicing physicians in NC, of which 673 completed the survey. It included questions on HPV knowledge, vaccination policy and intention to recommend HPV vaccination. The results of the survey highlighted key areas of strength such as comfort in doctor-patient communication and key areas of improvement in HPV knowledge, recommended dosing schedule and vaccination policy. Almost all physicians (94%) reported to be comfortable or very comfortable talking with adolescents about sexuality transmitted infections and recommending the HPV vaccine for patients (98%). However, only half (50%) of physicians knew that most HPV infections clear up within 2 years, and that HPV-related oropharyngeal cancer is highest among men (51%). Almost two-thirds of physicians (64%) did not know the correct HPV vaccine dosing schedule for an 11-12-year-old. Over half of practices (58%) did not have an HPV vaccination policy. Roughly half (51%) of participants would be interested in a brief training on the newest HPV vaccine guidelines, with over half (55%) of respondents favoring an online training for continuing education credit. Notably, 73% of physicians were not using the Advisory Committee on Immunization Practices (ACIP) preferred recommendation method of informing the parent their child is due for the HPV vaccine, providing information, and offering the vaccine unless the parent objects. These results show the need for improvement in HPV knowledge, recommendation practice, and vaccination policy among NC physicians.

Parental Support, Efficacy, and Objectively Measured Physical Activity Among Preschool-Aged Children

Dominique L. Bellardini, Katrina D. DuBoise, PhD, Derrde M. (Oguloglu, PhD), Hannah E. Cooper

Introduction

Less than half of children ages 3 to 5 years meet the physical activity (PA) guidelines of moderate-to-vigorous PA (MVPA) which can lead to adverse health effects throughout life. Parental efficacy and parental support for promoting PA are associated with higher child PA levels. The purposes of this study are as follows (a) examine relationships between parental MVPA and parental efficacy for promoting child PA; (b) examine relationships among child PA levels with parental efficacy and PA support; (c) compare parental support and parental efficacy between fathers and mothers.

Methods

Nine parent-child triads, with children ages 2 to 5 years, participated in data collection. Anthropometric measurements were obtained for all triad participants, then parents individually completed a demographic information and the Support for Physical Activity Questionnaire and the Parental Self-Efficacy for Health Promotion and Physical Activity Behaviors in Preschoolers Scale. PA participation for all participants was objectively measured using accelerometers for 7 days and then time spent in moderate-to-vigorous PA (MVPA) was calculated.

Results

The mean age of the children was 3.9±1.0 years. Two-thirds of the children were male. There were positive relationships between both maternal and paternal MVPA and parental efficacy for promoting child PA in situations facilitating activity (r=.487 and r=.285, respectively). There were also weak positive relationships between maternal and paternal PA and parental efficacy for promoting child PA in situations inhibiting activity (e.g., weather) (r=.1772 and r=.234, respectively). There were non-significant negative correlations between child MVPA and maternal efficacy for promoting PA under both circumstances-facilitation (r=-.180) and inhibition (r=-.110). Strong negative correlations were found between child MVPA and paternal efficacy for promoting PA under both circumstances-facilitation (r=-.805) and inhibition (r=-.497). Maternal and parental efficacy were similar for facilitating and inhibiting circumstances and parental support for child PA (p=.05).

Conclusions

In conclusion, parents who were more physically active reported themselves to be more efficacious in promoting child PA. Paternal, but not maternal efficacy was associated with lower MVPA among children. Maternal and parental efficacy and support were similar, which could indicate shared beliefs regarding the importance of child PA.

INQUIRY: Health Information Outreach

Avery McKenzie Bryan
Dr. Melissa Cox
Leah Cordova

Background and objectives: In rural eastern North Carolina, many students and their families are unaware of how to find and utilize high-quality health information resources. Residents of these eastern counties are more likely to be afflicted with poorer overall health than their counterparts in other areas of the state. The goal of this project was to develop a curriculum for rural youth to improve students’ skills for locating and evaluating high-quality health information online. Given media specialists’ role in delivering NC curriculum standards on this topic and their unique skills in library and information science, media specialists are critical partners in delivering widespread health information literacy training to youth in Eastern NC.

Methods and results: This study is composed of two components. First, we conducted a survey of middle and high school media specialists (N=165) across NC regarding health information training in their school. Using descriptive statistics we found that 65% of media specialists were not aware of NC curriculum standards for health literacy, only 5% believed most students in their school can apply skills to evaluate health websites, and 52% believed competing curriculum demands were a barrier to implementation. Second, we developed INQUIRY, a one hour instructional curriculum using current best practices for evidence-based health information literacy for middle and high school students that is tailored to the specific needs and resources of youth in rural areas. We piloted INQUIRY with local high school students (N=15) to assess feasibility and acceptability of the curriculum. INQUIRY will be distributed to all media specialists in public middle and high schools across eastern NC.

Summary: This study sought to increase the knowledge and utilization of high-quality health information among youth and their families in rural Eastern North Carolina by implementing the INQUIRY curriculum and materials through media specialists. Through our efforts, these media specialists will also have an increased capacity to deliver trainings to local youth and have increased awareness of National Library of Medicine resources to support information literacy and equity.

The Impacts of Age on the Communication Between the Cranial Base Angle and Cervical Vertebrae

Shana K. McCusker, Abigail E. Haenssler, MS, Jamie L. Perry, PhD

Background: Craniofacial morphology, specifically the cranial base, is dependent upon the dimensions and structure of the first cervical vertebra (C1) (Sonneson, Pederson, & Kjær, 2007). The occipital condyles are the main landmarks for determining the structural integrity and stability of C1, and thus, the occipitoatlantal junction (Boon et al, 2018). Dependence upon the positioning of C1, an acute or obtuse cranial base angle can be formed (Mason, 1991). The nasion, sella turcica, and basion, components of the cranial base angle, have been found to change position as facial growth occurs (Arat, 2010). To the best of our knowledge, no studies have examined the impact age has on the communication between the cranial base and cervical vertebrae. Given that the cranial base changes position with age, and the cranial base is dependent upon the dimensions of C1, it is likely that age impacts their communication. The purpose of the study...
The palatoglossus muscle has also been shown to be active during oral state, especially during the production of nasal sounds. The velum is not elevated for the production of nasal sounds. Proceeding this review, several studies have documented that the palatoglossus functions during speech and swallowing. However, more research is needed regarding the specific contributions of the palatoglossus to speech production.

UP18
Racial Identification of African American and White Female Speakers
Monica Marie Bengeola
Previous research has observed both regional similarity and difference between African American English (AAE) and White American English (WAE) spoken in the same geographic region (Childs & Mallinson, 2004; Holt, Jacewicz, Fox, 2015). Variation in speech acoustics such as vocal production (Chopper & Pisoni, 2004) and intonation (Thomas & Reaser, 2004) and familiarity with the dialect (Baker, Eddington, and Nay, 2009; Wolfram, 2001) are believed to influence the listener’s ability to categorize Black and White female speakers from eastern and western NC. Twenty-four Black and White male and female listeners (aged 18-25) from eastern and central North Carolina listened to AAE (4) and WAE (4) female speakers from the western and the eastern NC dialectic regions. Listener’s demonstrated greater difficulty identifying western NC AAE female speakers compared to all other groups. Results are discussed with respect to listener evaluation of acoustic cue weighting and speaker alignment to regional and socio-ethnic aspects of speech production.


relationship between maternal MVPA and parenting style was found for the permissive style (r=.68), whereas no relationship was observed between maternal MVPA and authoritarian (r=.08). For fathers, strong to weak relationships were found between paternal MVPA and the different parenting styles: authoritarian (r=.40), authoritative (r=.50), and permissive (r=.28). Child MVPA was most highly correlated to having a permissive mother (r=.62).

The relationship between paternal parenting style and child MVPA was negative across all three parenting styles: authoritarian (r=.11), authoritative (r=.26), and permissive (r=.70).

Conclusions:
Mothers and fathers within the same triad exhibited similar levels of all three parenting styles: authoritative, authoritarian, and permissive. A maternal permissive parenting style was related to more time in MVPA for the mother and child. In contrast, all three paternal parenting styles were related to lower child MVPA. These results may suggest that a maternal permissive parenting style may be more efficient at promoting child MVPA than the other maternal parenting styles as well as the paternal styles.

UP21
An Examination of Sugar Sweetened Beverage Consumption Among Pre-school Age Children in Eastern North Carolina
Gabby Elizabeth Rudia

The prevalence of obesity and dental caries is associated with an early consumption of sugar sweetened beverages (Creske et al., 2013; Ordway et al., 2018). Therefore, practicing healthy eating habits early in childhood is critical. Major health disparities exist between children in rural and urban areas, especially among ethnic minority populations. The purpose of this study was to determine the extent of sugar-sweetened beverage and water consumption in young children living in rural eastern North Carolina.

This project was conducted in the WIC program of a rural health department in eastern North Carolina, in collaboration with a Public Health Nurse and bilingual WIC nutritionist. Preliminary data has been collected from 10 mothers (White (2); Hispanic (6), and African American (2), with children ranging in age from 1 to 3 years. The data collected included information on the number of times per day the child drank the sugar sweetened beverages, the serving size, and the type of beverage consumed. The data was analyzed using descriptive statistics. The results indicate that the majority of the children consumed sugar sweetened beverages daily, and the serving sizes were larger than recommended.

As the largest health profession in the workforce, nurses should consider how the social determinants of health affect the health-promoting or health-damaging choices made by mothers in the consumption of sugar-sweetened beverages (Eckardt et al., 2017). This research may identify the ways to tailor health information messages specific to this rural population.

UP22
Tense and Lax Vowel Identification Errors in Regional Dialects of English
Alex Jackson

Speech perception is a listener’s ability to correctly identify a speech target as intended. In American English there are three tense/lax vowel pairs as presented in the words heed/heed, head/hood. These pairs are differentiated in part by the vowels duration and by the relative tongue height. In western NC, the Southern Vowel Shift (Labov, Ash, Boberg 2006) the production of lax vowels with greater tongue height and tension and tense vowels with less, is well documented for southern White American English. For African American English (AAE) there is some evidence of its presence (Holt, 2018). Because listener’s tend to categorize both personal and vocal characteristics in speech perception tasks this research sought to determine if the regional dialect of the speaker had any effect on the listener’s ability to accurately categorize the members of the tense lax vowel pairs as intended. Twenty-five listeners from central and eastern NC listened to 672 vowel tokens including the pairs listed above from AAE and WAE male and female speakers from eastern and western NC. Results revealing an unexpected error pattern are discussed with respect to cue weighting and dialect variation in speech perception.

UP23
Understanding What Factors Influence Mammography Follow Up Times
Kristin Coleman, BS(c’11); Deononna Farr, DrPH, MPH, CHES1; M. Brandt, PhD, CHES2; Daniela B. Friedman, PhD2; Cheryl A. Armstead, MS(R), PhD3; Swann A. Adams, PhD3; MS4,5; Jeanette Fulton, MD6, Douglas Bull, MD6

A critical gap in the literature is the understanding of what factors influence the decision to follow up after receiving an abnormal mammogram result. Perceived barriers to mammography, as measured by the Champion Attitudes towards Mammography and Breast Cancer Scale, were placed into multiple regression models to determine if the perceived barriers influenced follow up time. None of the models were statistically significant. Age was the only variable that was statistically significant within the model (R2=.07, P=.00). Women ages 40-49 took less time to complete follow up testing with an average time of 24 days. Phase two included black women from phase one that completed surveys and had abnormal results. Perceived barriers to mammography, as measured by the Champion Attitudes towards Mammography and Breast Cancer Scale, were placed into multiple regression models to determine if the perceived barriers influenced follow up time. None of the models were statistically significant. Age was the only variable that influenced follow up time after receiving an abnormal mammogram result. There were no racial differences in follow up times. We believe that physical mobility, time, and other health related priorities may explain why older women had longer follow up times.

UP24
Health related consequences of musculoskeletal injuries in adolescents and adults: a comprehensive literature review
Abigail Donahue1, Margaret Marshall2, John Willson PT, PHD2, Stacey Meardon PT, PHD2

Background:
As the largest health profession in the workforce, nurses should be aware of health-related consequences following musculoskeletal injury. Youth, who are experiencing musculoskeletal injury and breakdown during a time that is considered a window of opportunity for enhancing long-term bone and joint health. Moreover, musculoskeletal injury in active populations has been reported to profoundly affect quality of life and activity participation, with 25-30% of individuals permanently stopping their exercise program after injury. In order to fully appreciate the impact of musculoskeletal injury on young active populations, a thorough understanding of both short-term and long-term health related consequences is needed. However, a comprehensive review of the health-related consequences secondary to musculoskeletal injury in young active populations is lacking.

To address this gap in the literature, we will conduct a critical review and comprehensive search (i.e. a systematic search and review) to provide a best evidence synthesis of the literature. Specifically, we will identify what is known and what remains uncertain in the literature about quality of life and participation following youth musculoskeletal injury. Limits of the methodology will be discussed. A narrative summary will be provided with tabular accompaniment and the results will be presented in the framework of the International Classification of Functioning, Disability, and Health.

UP25
Participant’s Experience with Biofeedback: A Phenomenological Study
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Hypertension is the common factor in the leading cause of death in the United States known as cardiovascular disease (CVD). Although there are a plethora of studies that approach the prevention of CVD by physical activity, containment by pharmacological therapy, damage control or repair by surgery, there is some evidence of its presence.
Depression is a comorbid condition that is related to myocardial infarction (MI) risk, is prevalent post MI, and is associated with CVD. Although research suggests the benefits of biofeedback on CVD. Although research suggests the benefits of biofeedback in treating HTN is important, it is also important to understand the ability of biofeedback to treat HTN.

The mental health survey will discuss anxiety, depression and each component of health. If there is a strong relationship this could lead to more studies and interventions looking at minorities and ways to help them during cancer treatment and more importantly post cancer treatment. Data collected may inform an intervention examining the impact of a lifestyle-based intervention for South Asian women who are post-cancer treatment.

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A Content Analysis of Facebook Groups on Chronic Obstructive Pulmonary Disease (COPD)

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Chronic Obstructive Pulmonary Disease (COPD), a chronic lung condition causing progressive airflow obstruction and difficulty breathing, is a leading cause of morbidity and mortality in the United States. People living with chronic diseases, such as COPD, are increasingly using social networks to obtain health information that can be used to more effectively self-manage their disease. Facebook “Groups” provide unique spaces on social media for friends and strangers to share common interests in a designated community platform. To date, no studies have explored the content included within existing Facebook Groups related to COPD. Therefore, the purpose of this study is to conduct a social media content analysis that will describe the purpose, educational content, user activity, and member engagement levels of COPD Facebook Groups. The following research questions are being explored: 1) What are the purposes of Facebook Groups related to COPD? 2) What educational content areas are addressed in COPD-related Facebook Group wall posts? 3) Do reach and engagement metrics of COPD Facebook Group wall posts vary based on the purpose and types of educational content posted on the Group Walls?

Method: Youn children (ages 2-5 years) and one of their parents wore an Actigraph accelerometer for 3 days total, with at least one day falling on a weekend. Also, during this 3-day time period, an ecological momentary assessment (EMA) survey regarding the child’s sedentary activity was completed by the parent. The survey was sent out directly to the parent’s smartphone 8 times at random between 7:00 AM until 8:30 PM each day, for 3 days total. The survey prompted the parent to provide information about the types of sedentary activities the child has participated in over the past 30 minutes. In addition to the types of activities, the survey also asked about the duration of the sedentary activities and who these were being performed with. At the initial visit, the height and weight of the parent and child were measured. Further, background information gathered about each parent and child dyad. There have been 18 out of 40 dyads where data collection has occurred. Future data analysis will include calculations of time spent in sedentary, light, moderate and vigorous physical activity for the child. We will also report the main types of sedentary activities that the children engaged in during the 3-day period along with average duration. Finally, the frequency of participating in sedentary activities alone or with another family member will be determined.

Method: Young children (ages 2-5 years) and one of their parents wore an Actigraph accelerometer for 3 days total, with at least one day falling on a weekend. Also, during this 3-day time period, an ecological momentary assessment (EMA) survey regarding the child’s sedentary activity was completed by the parent. The survey was sent out directly to the parent’s smartphone 8 times at random between 7:00 AM until 8:30 PM each day, for 3 days total. The survey prompted the parent to provide information about the types of sedentary activities the child has participated in over the past 30 minutes. In addition to the types of activities, the survey also asked about the duration of the sedentary activities and who these were being performed with. At the initial visit, the height and weight of the parent and child were measured. Further, background information gathered about each parent and child dyad. There have been 18 out of 40 dyads where data collection has occurred. Future data analysis will include calculations of time spent in sedentary, light, moderate and vigorous physical activity for the child. We will also report the main types of sedentary activities that the children engaged in during the 3-day period along with average duration. Finally, the frequency of participating in sedentary activities alone or with another family member will be determined.

This quantitative study will utilize a cross-sectional descriptive design to address the following research question: Is there a difference in depression in community dwelling adults without heart disease compared to an age-matched sample of adults who have had an MI in the last three to seven years? Participants (N=40) were recruited using convenience and snowball sampling and met the following inclusion criteria: community dwelling adults age 21 and older who have not had a previous MI or heart surgery. All participants completed a demographic health form and the Center for Epidemiological Studies Depression Scale (CES-D). All data were obtained via interview and recorded on paper forms. Age matched controls were randomly selected from an established data base of adults who were 3 to 7 years post MI and who completed the Reoccurrence of Myocardial Infarction (ROMI) study. Data will be entered into SPSS and analyzed using descriptive statistics and chi-square and t-tests.

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Behavior among Children ages 2-5 years

Kirtan Prashant Amin

In the last forty years, there has been an increase in cancer prevalence. Specifically, in the southern Asian community, there has been a notable increase in cancer in the past fifteen years. It has also been noted that there are significant physical, mental, social and occupational health issues as a result of cancer treatment and diagnosis. In healthy individuals, physical activity and nutrition is correlated with positive physical, mental, social and occupational outcomes. The purpose of our research study is to examine the relationship between physical activity and physical, mental, social, and occupational health outcomes in South Asian women who had cancer treatment. We hypothesize that Southern Asian cancer patients who are active will have better health outcomes post cancer treatment compared to their inactive counterparts. The cross - sectional study will have surveys for each category and will look at specific aspects determining their physical, mental, social and occupational health. The physical category the survey will ask questions regarding physical activity, nutrition, and body mass index (BMI). The mental health survey will discuss anxiety, depression and other types of mental health symptoms through the survey. The social and occupational health survey will examine their social and family life and any ways this might detriment their health. The data will be analyzed by looking at the relationship between physical activity and each component of health. If there is a strong relationship this could lead to more studies and interventions looking at minorities and ways to help them during cancer treatment and more importantly post cancer treatment.
Increasingly, tourism effects are relying on the marketing of food and beverages from locally-owned restaurants and taverns. The prospect of local foods is attractive to many tourists, and often linked to the local and cultural desirability of a destination (Chang & Yuan, 2011). Furthermore, consumption of food accounts for approximately one-third of tourists’ expenditures (Chen, 2016; Hall & Sharpley, 2003). For these reasons, food is a key component of destination marketing, including food consumption motives. These include aims to seek sensory and contextual pleasure, price/value assurance, novelty and variety, symbolic ideas (authenticity and prestige), and familiarity with the type of food (Fields, 2002; Mak, Lumber & Eves, 2012). The current investigation served as a pilot study to understand efforts to market food, events and cultural opportunities. The purpose of this study was to examine the relationships between specific demographic factors and motives for food consumption. This investigation also sought to understand the extent to which tourists reported specific motives, and the relationship between frequency and duration of visits to specific motives. Data was collected over a two-week period during the summer of 2018. Tourists attending local events during this period were randomly intercepted. Study participants were excluded if they were under the age of 18. Eighty-seven participants took part in the study.

Motives were measured on five-point Likert scales containing three items to measure each type of motive. Mean scores for motives were highest for novelty and variety (M=4.50,SD=2.24) followed by symbolic ideas (M=4.25,SD=1.93), pleasure (M=4.00,SD=1.76), familiarity (M=3.67,SD=1.88), and price/value assurance (M=3.00,SD=1.83). When examining the tourists, age was negatively related to length of stay (r = -.504, p<.001) and number of people in party (r = -.300, p<.005). Length of stay in the downtown area was negatively related to motives of familiarity (r = -.201, p<.021), but also positively related to number in party (r = .278, p=.009) and frequency of visits (r = .268, p=.012). Males were more likely to report tourism based on symbolic ideas when compared to females (Mdiff= -.36, p<.015). Motives for symbolic ideas were also negatively related to party size (r = -.213, p=.049). The discussion focuses on how destination marketing can appeal to specific motive types and offers recommendations for future research.
The current follow-up practices that some physicians provide to bereaved parents include mailing cards, making phone calls, attending funerals and visitations, and meeting with the family (Granek et al., 2015, pg. 1627). Despite some of these health care providers best efforts, communication is lacking, and there is a gap between parents and health care providers regarding the pain they are believed to have in bereaved parents’ lives (Meert et al., 2011). Providers should implement the interventions requested by parents on a case-by-case basis. This easily-accessible web-based link can provide the opportunity to bridge the gap between professionals and parents during bereavement. The link will address the difference in expectations by allowing parents to report what they expect from the physicians.

The purpose of this descriptive qualitative study is to understand the health care providers perspectives of the functionality and the usability of a web-based link for bereaved parents. Data collection involves focus group and individual interviews with the following groups: 1. Pediatric Physicians/Pediatricians 2. Nurses 3. Other Health Care Providers involved in pediatric care (quality of life team members, bereavement counselors, child life specialists, pastors, social workers, IT professionals, etc.). The interviews will follow a semi-structured interview guide. The parents who have lost a child aged 0-18 in the last 2 years will be interviewed.

After gaining information through the interviews, we will revise and further develop the web-based link to deliver targeted and individualized interventions for parents. Bereavement care interventions that are generalized are not sufficient in providing individualized interventions for parents. Bereavement care practices targeted towards improving bereaved parents’ health outcomes.

UP35
Prehistoric Artifact Classification at Raven Rock State Park
Timothy O’Quinn Boykin, Department of Anthropology, East Carolina University
Dr. J. Randolph Daniel Jr., Department of Anthropology, East Carolina University

This project classifies approximately 2800 prehistoric artifacts donated by a local landowner to Raven Rock State Park in Harnett County, NC. Project methods will include classifying the artifacts by type (associated culture and time period), raw material (stone type), and the location of recovery. The information concerning the locations where the artifacts were recovered will be obtained from interviews with the landowner who originally found them.

I will then prepare a report with an inventory of all the artifacts that includes all the above information. A second part of the report will include completion of state archaeological site forms to complete documentation of the collection. This project is significant in several ways. First, I will receive archaeological training in classification and report preparation, giving me some experience for a future career in archaeology. Second, completion of this project is a vital step necessary to prepare the collection for public display that will help inform the public about the rich Native American heritage of the region, documenting over 10,000 years of prehistoric occupation in Harnett County.

UP36
The Effects of Motivational Primes on Exercise Performance
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This research aimed to investigate how exercise performance is affected by exposure to messages that are designed to prime mating or health motives. This study used a between-subjects design and contains one manipulated independent variable with three discrete levels: the mating benefit prime, the health benefit prime, and the control condition (no prime). A sample of adults aged 18 and up participated in this study. The participants were approached in East Carolina University’s student recreation center and were randomly assigned to one of the three messages (health, mating, or control). The researchers measured the participants’ exercise motives using the Exercise Motivation Inventory (EMI-2, Markland & Inglewood, 1997) before being exposed to one of the three motivational primes. Once participants finished completing the EMI-2, they exercised on an elliptical machine or cycle trainer of their choice while viewing the assigned message. After exercising, participants completed the Brief Mood Introspection Scale and the Fundamental Social Motives Inventory to measure arousal level and fundamental social motives (BMIS, Mayer & Gaschke, 1988, FSMI, Neel, Kenrick, White & Neuberg, 2016).

Preliminary findings indicate that exposure to the health benefit prime increased participant exercise duration. Furthermore, men exposed to the mating benefit prime exercised at higher speeds than men who viewed the health or control messages.

UP37
Romantic Breakup: Difficult Loss for Some but Not for Others
Kerry Ranier Carter
David Knox

A 32 item survey (completed by 286 undergraduates) identified factors associated with positive (feeling happy, less anxious, sense of relief, freedom) and negative (sadness, jealousy, loss of self esteem, anxiety) outcomes following a romantic breakup. Analysis revealed complex associations but, in general, being female, black, initiator of the breakup and heterosexual were more likely to be associated with experiencing positive outcomes. Multivariate analyses suggested that being the initiator of the breakup was a key predictor of more favorable breakup outcomes. Symbolic interaction theory provided the theoretical framework for interpreting the findings.

UP38
Examining Cardiovascular Risks in a Community Sample
Kaitlin Gray Guard

Fatigue affects the ability to participate in physical activity at levels for cardiovascular benefit. Fatigue is a common symptom experienced after a myocardial infarction (MI) with up to 70% of persons reporting fatigue that is different than fatigue prior to their MI. More importantly, fatigue has been associated with poor clinical outcomes. What is not understood is how fatigue after an MI differs from fatigue in those adults without heart disease. Thus, the purposes of this study were to describe fatigue in a community sample of adults and to compare this fatigue to reported fatigue in a post-MI, age-matched adult sample.

This cross sectional descriptive study addressed the following research questions: (1) What is the average fatigue scores of adults without heart disease residing in the community?; and (2) Is there a difference in fatigue in a community sample of adults without heart disease compared to an age matched sample who has experienced an MI in the last 3 to 7 years? A convenience sample of community dwelling adults (N = 40), ages 21 and older, who have not had an MI or heart surgery completed a demographic health form, and the Revised Piper Fatigue Scale (range 1-220). All data were obtained via interview and recorded on paper forms. Age matched controls were randomly selected from an established data base of adults who were 3 to 7 years post MI and who completed the Recurrence of Myocardial Infarction (ROMI) study. Data will be entered into SPSS and analyzed using descriptive statistics and chi square and t-tests.

Preliminary results note that current participant (n = 21) ages ranged from 50-83. Most were women (60%) and White (70%). No further data are available at the time of abstract submission. Because fatigue is the number one complaint in primary care, understanding if fatigue after MI differs from fatigue experienced by community dwelling adults without heart disease will assist in designing strategies to minimize fatigue and increase participation in physical activity at levels to prevent heart disease.

UP39
Humanitarian Aid and its Effect on Conflicts with Multiple Rebel Factions
Madeline Faye Fleshman, Dr. Marie Olson Lounsbury

Humanitarian aid, protected under the Geneva Convention, is designed to protect four basic measures of human rights, including the right to life, food, basic healthcare, and physical well-being (Abriskeita 2001). To meet a basic standard of human rights, humanitarian aid is guided through the principles of neutrality to parties in conflict, equal proportionality of assistance to victims, and independence from a political agenda (Abriskeita 2001). While the principles of aid are seemingly straightforward, the difficulties of conflict create outcomes that are only beginning to be fully understood. The research suggests that the introduction of aid lengths conflict duration through substitution, stealing, disproportionate delivery, and safe zones (Narang 2011; MacFarlane 1999; Lischer 2003; 2005). The present study looks to add to this research by looking into the factors that create the environment in which aid lengthens and intensifies conflict. There are two main questions to be answered: does humanitarian aid lengthen and intensify conflict and does the presence of multiple rebel groups increase the likelihood that aid will worsen conflict. The main hypothesis to be presented at RCAW will be that the more rebel groups involved in a civil conflict the higher likelihood humanitarian aid could worsen the conflict. Using the Armed Conflict Database and humanitarian aid data from the Organization for Economic Cooperation and Development I will run the Cox proportional hazard model as well as ordinary regressions to determine if the influx of aid in conflicts with multiple rebel groups has worsened conflict outcomes in duration and intensity. This original research should add the literature about aid as well as civil conflicts, while informing policymakers about the effects of aid in certain conflict conditions.
Obesity is a worldwide epidemic and its prevalence continues to rise (Kost & Panagiotakos, 2006, Lobstein, Baur, & Uauy, 2004). Obesity has both short-term and long-term physical health consequences, affecting multiple levels of an individual’s biopsychosocial experiences (AHA, 2011). Obesity, and particularly obesity in children, is linked to asthma (CDC, 2009), sleep apnea (Flegal et al, 2005), type 2 diabetes (Danieli et al., 2009), hypertension, cardiovascular health risks (Lave, Milan, & Ventura, 2009, AHA, 2011, Lobstein et al., 2004, Whitlock et al., 2005), and leads to higher and earlier mortality rates (Stamatakis, Hamer, & Dunstan, 2011). Concerned about its ramifications, researchers have explored possible explanations and ways to intervene. One line of research explores the relationship between eating habits, obesity, and attachment positing that a lack of emotional awareness may cause individuals to eat more because they are not able to distinguish between hunger and stress cues (van Strien & Ouwens, 2003). Eating can be comforting, rewarding, and distracting during stressful events, but eating to regulate emotion can be problematic since most people prefer unhealthy food as comfort food (Wansink & Payne, 2007), which often leads to unhealthy eating habits and obesity. Eating together as a family, however, tends to not only improve family functioning but it also improves eating behaviors, usually resulting in smaller portions and healthier food. (Berge, 2009). While each of these relationships have been explored independently, few studies have looked at the connection between family attachment, eating habits together and obesity. Theory suggests that those families who eat together less often experience more stress and report less connection. This lack of connection could lead to children experiencing higher levels of insecure attachments which has been consistently linked with poor eating behaviors and higher levels of obesity. Using triadic data (father, mother, and child) this study explored the link between family meal times, attachment styles, and eating behaviors. Findings supported this connection. Families who ate fewer family meals have children who report higher levels of insecure attachment and poorer eating behaviors. This data will make a family meals have children who report higher levels of insecure attachments which has less connection. This lack of connection could lead to children experiencing more stress and report very little about the work of the researcher. In 2018, an ethnographic case study was conducted to learn about the role and work of the researcher in two villages near Antigua, Guatemala. The primary investigator had worked in these villages for the past 11 years. Key informants in the villages referred two researchers to participate in the study. The participants were Spanish-speaking, married, adult women between 65 and 70 years of age. The interviews were audiorecorded and transcribed into English by a bilingual, bicultural honor student. Transcripts were validated by a bilingual nurse researcher experienced in ethnographic methods. Field notes and observations informed the interviews. Inductive content analysis was used to identify similarities and differences within and between cases. Preliminary data revealed core similarities among the researchers. Their primary role in the community was to convey peace and forgiveness during the dying process and death through prayer and song, ultimately relieving pain and suffering. This was described as a “good death.” All researchers recited the Rosary during the novena (9 days of mourning) and described a “license” to work or a “calling” by God. Conversely, several differences existed among the researchers. First, one researcher visited the sick alone, while other made visits in pairs or groups. Also, locations of their service differed; one described visiting the sick in their homes, whereas others made visits to hospitals, churches, and homes. A final difference was that one researcher visited only sick people, while researchers working in tandem visited persons going through other major life events, such as baptism and communion. All researchers had a relationship with the Catholic Church in the village which ranged from formal (organized) to informal. Implications for practice suggest assessing the U.S. Guatemalan community to identify practicing rezadoras and to incorporate their work in palliative care services. Further research to discover how rezadoras impart their knowledge to the next generation is warranted.
In the southeast United States, precipitation is a phenomenon that is present year-round. While precipitation occurs during each part of the year, the driving mechanisms behind the precipitation vary seasonally. Over 70% of total winter precipitation comes from extratropical cyclones (ET), while about 80% of that comes from well-organized Mesoscale Precipitation Features (MPF) (Nieto-Ferreira et al. 2013). MPFs tend to remain present for the spring and summer seasons but are not the primary mode of precipitation. Instead, isolated precipitation features (IPF) take over as the primary precipitation mode of the southeast United States. Previous studies have shown that the transition from the MPF-based winter precipitation regime to the IPF-based summer precipitation regime is abrupt (Rickenbach et al. 2015). The creation and observation of radar imagery will allow for the characteristics of this abrupt seasonal change to become clearer.

For this study, a new high-resolution NEXRAD precipitation dataset has been obtained from the National Oceanic and Atmospheric Administration (NOAA) National Center for Environmental Information (NCEI). The acquired NCEI data covers a ten-year period ranging from 2002-2011. For each of the ten years, the data covers the months of March-August, with each data file consisting of one hour of precipitation. The scripting language of the Grid Analysis and Display System (GrADS) will allow for the creation of hourly radar imagery covering the southeast United States using the acquired NEXRAD data. From this imagery, movies of hourly radar imagery for the ten-year period were created to examine when the abrupt seasonal change tends to occur. In addition, the frequency distribution of rain rate for all pixels in the domain is determined for each month. We will determine whether the evolution of the convective season is associated with changes in the frequency of rain rate. This will advance understanding of the mechanisms controlling the convective season onset.
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at East Carolina University's West Research Campus has revealed distinct changes in both plant and soil community composition after 17 years of fertilization. We found that nutrient enrichment directly alters plant and microbial growth and abundance. However, the indirect effects of long-term nutrient enrichment, such as changes to plant-microbe associations, are less well understood. To determine how fertilization-induced microbial community change influenced plant productivity, we grew plants in 0.35% aragonate amended with Hoagland’s nutrient solution in the presence of soil microbes from fertilized and unfertilized plots. We measured plant height and biomass and collected an agarose sample for microbial community genomic analysis. Prior to genomic sequencing, it is essential to recover the highest quality and concentration of microbial DNA from the agarose samples. The objective of this study was to determine which DNA extraction kit yielded the highest DNA quality and concentration from agarose samples. We compared microbial DNA quality and concentration using the following nucleic acid extraction kits: DNAeasy Powerlyzer Powersoil, QIAquick Gel Extraction, and Qiagen Ultraclean DNA isolation and a combination of the Ultraclean and then Gel Extraction Kit. Each individual kit resulted in a significant amount of contamination due to the amount of agarose left in the sample. Therefore, the combination of the UltraClean and then Gel Extraction kit yielded the best results based on the 260/280 and 260/230 ratios, which determine whether the sample is contaminated, and concentration of the DNA from each extraction procedure. The 260/280 was 1.76 ng/μl, the 260/230 was 0.05 ng/μl, and the nucleic acid concentration was 27.2 ng/μl from the combined kits. From this study, we developed a protocol for obtaining high-quality DNA from microbial cells in agarose, which is important for successful downstream genomic analyses. The DNA extracted using this protocol will be amplified by polymerase chain reaction, and the microbial community will be sequenced using targeted amplicon sequencing.

UP50

Codon Usage Bias of Genes Expressed in Venom Glands
Khaleb Levon Enoch, Timothy Jeffrey Cole
Venom is a toxic substance that is produced by some animals to assist in capturing prey or self-defense. Due to venom being vital for their survival, these animals must produce a large amount of venom proteins. Since venom glands have genes that are expressed in high quantities in other body tissues, we hypothesized that highly expressed genes in venom glands would show more codon optimization than other body tissues. To test this, RNA sequences of five different species' venom glands were obtained from the NCBI short read archive, assembled into transcripts, and their complete coding sequences were extracted. After calculating the codon usage frequencies from the samples, it was tested to see if they were significantly different from a uniform distribution. After using chi squared test, it was shown that all codons showed significantly different usage compared to what was expected.

UP51

Submerged Aquatic Vegetation (SAV) loss in North Carolina Estuaries
Noah Scott Gwynn, Dr. Joseph Luzkovich
The State of North Carolina is concerned about the loss of submerged aquatic vegetation (SAV), which comprises significant fish and wildlife assemblages in low-salinity estuaries. We made rapid assessments of SAV occurring along shore-parallel transects in 1-m deep water using single-beam SONAR and underwater video in the Albemarle Sound (AS), the Pamlico River (PR), and the Neuse River (NR) estuaries. In the AS, transects totaled 527 km, with SAV on 94 km or 17.8% of the linear extent (LE) along shore. Compared with historical estimates (from NOAA and the State of NC), there had been 135 km (25.6% LE) of SAV occurring on the same transects, indicating a loss of 41 km (7.8% LE). In the PR, transects totaled 431 km with 6 km having SAV (1.4% LE). Historical SAV along the transects in the PR totaled 29 km (9.7% LE), indicating a 5.4% LE loss of SAV. Finally, the NR transects totaled 240 km with SAV found on 29.7 km (12.4% LE), compared with 13 km (5% LE) historically. Overall, there was a decline in SAV LE from 14.6% to 9.9%, a 4.7% loss. We conclude that the linear extent of SAV habitat has declined and gained in different estuaries.

UP52

Elucidation of 15-Lipoxygenase-2 and PERP1 Interactions Implicated in Acute Renal Failure
Katherine Anne Ray
15-Lipoxygenase-2 (15-LOX-2) is one of six lipoxygenase enzymes that catalyze the peroxidation of fatty acids and are involved in many different cell signaling pathways related to development, homeostasis and even disease. 15-LOX-2 has recently been implicated in ferroptosis pathways, or iron dependent programmed cell death, that is linked to acute renal failure. It is hypothesized that this occurs when phosphatidylethanolamine binding protein 1 (PERP1) binds to 15-LOX-2 and the complex binds to the cell membrane in the presence of calcium. This alters 15-LOX-2's affinity from free fatty acids to membrane phospholipids, resulting in the generation of hp-ETE-PEs that feed into ferropotosis pathways when they are not adequately reduced. Interactions between 15-LOX-2, PERP1, and the cell membrane have been observed using 10 nm nanodiscs as a model of the phospholipid bilayer. Fast protein liquid chromatography (FPLC) has been used to show binding of the 15-LOX-2 to the nanodiscs and this has been confirmed using SDS-PAGE. This interaction will be optimized by creating nanodiscs with 1:1 ratios of POPE with POPE and POPS respectively and assessing binding using FPLC.

UP53

Mitochondrial DNA variation in the pitcher plant fly Sarcophaga sarraceniae: Exploring possible influences of host specificity and geographic structuring
Joshua David Parker, Dr. Trip Lamb, Dr. Michael Brewer
North American pitcher plants (Sarracenia) are a recently evolved (~3 my) assemblage of 11 carnivorous species. Sarracenia pitchers also provide resources (food, shelter) for certain arthropods, including two fly genera—Fletcherimyia, and a second, single species of Sarcophaga (S. sarracieniae)—whose larvae develop within pitchers. Sarcophaga sarraceniae inhabits the entire geographic range of Sarracenia and appears to deposit larvae indiscriminately whereas Fletcherimyia occupies smaller species ranges and shows pitcher host specificity. S. sarraceniae truly a pitcher generalist? To address this question, we examined mitochondrial DNA (mtDNA) variation in S. sarraceniae to test two hypotheses: 1) co-evolution—where observed mtDNA variation should be attributable to plant host fidelity, and 2) geography—where mtDNA variation should exhibit phylogeographic structure. To test the co-evolution hypothesis, we will compare phylogenies for flies and Sarracenia to assess host-related congruence. To test the geographic hypothesis, we will determine whether genetic variation is congruent with established biogeographic barriers.

UP54

Determining the Energy Landscape of the Integrin-iC3b Bond Under Dynamic Force
Justin Mikel Linofsky
The Integrin-iC3b bond is of fundamental importance in the adaptive immune response to foreign antigens. When a pathogen is present iC3b is covalently attached to the foreign intruder to tag it for phagocytosis. Leukocytes (white blood cells), express integrin α-ν-ιβ2 on their surface, which directly binds to iC3b, thereby initiating the phagocytic process. In this project, we will measure the bond strength between iC3b and α-ν-ιβ2 to further the understanding of this very important immunological response. Previous studies focused on iC3b—α-ν-ιβ2 binding under static conditions, and showed, based on allosteric inhibitors, that iC3b may present multiple binding sites for a-ν-ιβ2. Being that immune cells in vivo aren't stagnant, measuring the affinity of the bonds under dynamic force is imperative for a more in depth understanding of relation to the body's immune response. To investigate the force dependent binding between the iC3b and the α-ν-ιβ2 we are going to measure their adhesion strength using centrifuge force microscopy (CFM). With the capabilities of CFM, energy landscapes of the integrin-iC3b bond can be found. Given that this method of testing bonds has high sample throughput, vast amounts of data on simultaneous rupture events can be collected and studied, thus, the certainty of a bond profile can be greater.

So far we have developed statistical models using Monte Carlo estimations on bond cleavage to anticipate and further help hypothesize about the future data. Furthermore, a methodology for preparing the DNA has already been devised. Dr. Sila at the University of Houston will be providing the iC3b and the a-ι domain (bonding portion of a-ν-ιβ2). In the chamber the DNA will attach to the centrifuge on one end and attach to a bead on the other. The a-ι domain and iC3b will be bound to the middle portion of the DNA (using a disulfide bond and amine chemistry, respectively), causing looping of the DNA when they bind. The bead, pulling with centripetal force, will break the Integrin-iC3b at known strain given the angular velocity of the system. We hypothesize, given knowledge of iC3b having many binding sites, the exact affinity of each location can be acquired using CFM. With this technology CFM should give rise to plots that indicate different affinity based on bond location to the iC3b.

UP55

Working hard or hardly working? Life as a non-dominant iron oxidizing bacteria
Sophia M. Pearce, Chequita N. Brooks, Erin K. Field
Department of Biology, East Carolina University
Life can be hard, other students cut in front of you in line at Chick-fil-A, hiking trails are overcrowded, you will “never” be forced to eat lunch? Competition for energy resources is a common theme throughout any ecological community, including microbes. A microbe having flexible energy sources allows competition to be reduced in its community and allows it to eat either “breakfast” or “lunch” happily. Freshwater iron-oxidizing
bacteria (FeOB) are microbes that use Fe(II) to grow, but Fe(II) as an energy source has its limitations since it oxidizes quickly leaving FeOB with no energy source to eat. Once again, having flexibility with energy sources instead of only using Fe (II) could prove to be beneficial for FeOB.

Town Creek, Greenville, NC harbors FeOB, predominantly Leptothrix ochracea, based on 16S rRNA sequencing and microscopy. However, when using culturing techniques, the non-dominant FeOB grows instead of the dominant Leptothrix sp. Which raises the question, how is the non-dominant FeOB surviving within the microbial community? Is the non-dominant genus working harder to oxidize iron to make ATP? Or is the genus using another energy source to survive? To start researching energy sources with the non-dominant FeOB from Town Creek cultures were isolated using serial dilution techniques. Once FeOB sulfate isolated they were exposed to a varying energy sources (e.g. sulfur) in the absence of Fe(II).

Growth of the FeOB was measured using cell counts. If Fe (III) is the only source of energy being used by the non-dominant FeOB, then it is indeed in competition with the microbial community for Fe (II). The research done in this experiment (e.g. competition for and flexibility of the non-dominant microbe’s energy sources) can be applied to other communities, not just microbes. This can help explain how non-dominant organisms have been able to survive within their communities when competing for resources is applied.

UP56

The Synthesis of Salicylaldehyde Derivatives
Adam Patrick Burch

There exists a class of compounds known as salicylaldehydes. It is desirable to be able to prepare salicylaldehydes starting from a simpler class of compounds known as phenols. Currently the known methods of synthesizing these salicylaldehydes starting from phenols either produces low yields or requires extremely dry reaction conditions. Experimentally, avoiding moisture can be very difficult, therefore the goal of this research is to improve the methods for the synthesis of salicylaldehyde compounds from phenols by finding new high yielding reactions. Efforts directed toward this goal will be discussed.

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Effects of Hurricane Florence on marine carbon cycle processes
Sara Roobehi, Cody E. Garrison, Erin K. Field
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Rainfall from hurricanes Florence and Michael have washed large amounts of freshwater, organic carbon, and microbes through the Outer Banks inlet and into the Atlantic Ocean. The goals of this project are to determine if major hurricanes, similar in size to Florence and Michael, can alter the normal carbon cycle in the Atlantic Ocean due to the large influx of organic carbon and the stimulation of sediment microbes which can utilize this organic carbon in fermentation processes. Microbial communities between terrestrial and marine environments vary widely due to salinity preferences. We collected 21 water samples and sediment samples from coastal North Carolina to examine the microbial communities and determine if there has been a shift in community members due to the hurricanes. The water samples are then filtered through a polyethersulfone (PES) filter, trapping microbial DNA/RNA. These samples will be extracted to see which microbial DNA/RNA is present. Sediment samples will also be collected at some stations for RNA analyses. The 16S RNA gene V4-V5 region of the DNA will be sequenced and through Mothur, an open source program, microbial communities present will be identified.

We are analyzing the microbial communities and identifying community member taxa in order to determine if they originated from different environments or determined by an influx of microbes from terrestrial sources. Ultimately these results will help us understand how hurricanes affect the global carbon cycle and what role microorganisms play.

UP59

Examining the Role of Microorganisms in Underwater Carbon Cycling
Matthew D. Woodlief, Erin K. Field

Microbes capable of metabolizing naturally occurring carbon complexes play a crucial part in carbon cycling in the ocean. One example important example of carbon cycling in the ocean involves methane. Methane seeps leak methane and other hydrocarbon compounds into the environment of the ocean floor. However, unlike traditional hydrothermal vents, methane seeps are more stable over time and do not significantly increase the temperature of the surrounding water. The longevity of this unique environment can allow for selection to take place, which could result in a population of organisms suited for a low oxygen, low light, and methane-rich environment. Microbes are organisms capable of rapid evolution and sustaining life in environments with limited nutrients or other extreme conditions. Amongst the many microorganisms are methanotrophs, which are bacteria capable of utilizing methane as their sole source of carbon and energy. In March of 2016, ocean sediment samples were collected at two sites in the Atlantic. The goals of this study are to characterize the bacterial and archaeal community composition with depth at these two locations, determine what relationship sediment depth has on the community composition, identify key microbial processes involved with occupying this environment, and establishing what relationships may exist between the community members and the carbon source of emphasis on methane cycling. DNA was isolated from 31 samples and the bacterial and archaeal populations were sequenced using Illumina MiSeq sequencing platform. The 16S rRNA is currently being analyzed in Mothur to determine the community composition. The data will be used to construct community compositions at varying intervals of sediment depth and the community composition will be analyzed to determine if depth plays a role microbial succession. Ongoing PCR amplification is being used to identify the presence genes responsible for metabolizing methane. A combination of microbial community data and targeted PCR will be used to pose hypotheses regarding the relationships between the microbial communities at differing sediment depths as well as their role in metabolizing methane from the underwater seeps. The data gathered over the course of this study will expand upon our understanding of the role microbes play in the carbon cycle within the ocean.

Elucidation of allosteric behavior and enzyme-effector complexes of human 15-lipoxygenase-2 through hydrogen-deuterium exchange mass spectrometry
Amy Elizabeth Musgrave

The activity of human 15-lipoxygenase-2 (15-LOX-2) has been implicated in human inflammatory diseases such as atherosclerotic cardiovascular disease. 15-LOX-2 is one of six human lipoxygenase genes that catalyzes the cyclooxygenation of fatty acids to produce both pro- and anti-inflammatory cellular signaling molecules. Despite its importance, current anti-inflammatory available on the market do not target lipoxygenase derived inflammation. Understanding the allosteric activity of 15-LOX-2 will enable us to develop selective molecular tools to assess its biological function and potential role in cardiovascular disease. There are three types of regulation of 15-LOX-2 activity: small allosteric regulators, selective inhibitors, and protein-protein/membrane interactions. Hydrogen-deuterium exchange mass spectrometry is being used to identify the presence of genes responsible for metabolizing methane. A combination of microbial community data and targeted PCR will be used to pose hypotheses regarding the relationships between the microbial communities at differing sediment depths as well as their role in metabolizing methane from the underwater seeps. The data gathered over the course of this study will expand upon our understanding of the role microbes play in the carbon cycle within the ocean.
exchange mass spectrometry (HDX-MS) allows for structural analysis of the complex formed with small allosteric regulators and selective inhibitors of 15-LOX-2. The exact location of the allosteric effector, oleyl sulfate (OS) interaction with the enzyme is still unknown. HDX-MS is an incisive tool that can be utilized to locate the effector binding site and determine how it structurally/ 
dynamically impacts active site chemistry. This insight could help with future structure-activity relationship guided drug design.

UP61

Determination of Butyphenol A in Vervet Monkey, Chlorocebus app., Hair Using Liquid-Chromatography/Mass Spectrometry and Liquid-Chromatography/Ultraviolet-Visible Spectroscopy

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A review of current literature showed that there are no 
quantitative chemical/analytical methods which can reliably
determine the level of anthropogenic disturbance experienced 
by populations of non-human primates (NHPs). This study 
proposes a metric for estimating anthropogenic disturbance by 
measuring levels of butyphenol A (BPA) in hair samples of NHPs. 
Hair samples were collected from wild populations of vervet 
monkeys (Chlorocebus app.) from S. Kims and South Africa. BPA 
was chosen for analysis because of its synthetic nature, prevalence 
on these landscapes, and its presence in many plastic products, 
including food and beverage containers. The presence of BPA 
in these hair samples can potentially demonstrate the degree to which a population is anthropogenically disturbed.

Hair samples were prepared for analysis using a methanol 
extraction. Prepared samples were analyzed using two separate 
methods, liquid-chromatography/mass spectrometry (LC/MS) and 
liquid-chromatography/ultraviolet-visible spectroscopy (LC/UV). 
Initial results have shown that LC/UV is a viable method of 
detection as BPA standards yielded a detectable signal. Further 
trials are being completed using LC/MS as the method of detection.

UP62

Variations in morphometric condition of larval Atlantic Croaker (Micropogonias undulatus) as a function of temperature, zooplankton, and seasonality

Erika Desiderio-Segovia1, Martina Marie Plafcan1, Rebecca G. Asch1

This study aims to analyze the condition of larval Atlantic croaker (Micropogonias undulatus) collected from Beaufort Inlet, NC. The condition of the larval will be determined using morphometric measurements in relation to environmental factors. Temperature and zooplankton abundance are two important environmental factors that influence larval growth. Higher temperatures speed up larvae physiological rates, as well as influence the activity of prey, the zooplankton that larvae feed on. Larvae are expected to be in the best condition when their ingress into the inlet coincides with peak zooplankton abundance. It is hypothesized that larvae will be in better condition when they are in the inlet during warmer periods and/ or higher zooplankton abundance. The larvae, collected from the months January 2017 to October 2017, were measured with Image Pro Premier software using images taken with a Lumenera microscope camera. The zooplankton abundance and temperature data were collected from Beaufort Inlet concurrently during the collection of larval fishes. These data were collected using a 200 mm- mesh plankton net and a YSI EXO water quality sensor. Relationships between larval condition and the independent variables will be determined using a Generalized Additive Model (GAM). With climate change affecting the characteristics of the ocean and marine life, alterations in temperature and zooplankton could cause an unforeseen change in larval condition. Since larvae in better condition are likely a good signal for high recruitment to adult fish populations, declines in larval condition would be a cause for concern for fisheries management. This issue is particularly important to address for Atlantic croaker since they are a commercially valuable species.

UP63

Geographically distinct but non-monophyletic morphs: Reexamining the evolution of color in Florida burying beetles (Coleoptera: Geotrupidae: Peltotrupes)

Emily Maegen Scott

The genus Peltotrupes (Coleoptera: Geotrupidae) is found throughout the sand dune ridges of peninsular Florida. Commonly called Florida Deep Digger Scarab beetles, individuals excavate burrows as deep as 2-3 m and are traditionally 
considered flightless. The recognized diversity within the genus (P. profundus profundus, P. d. dubius, and P. youngi) is based 
on the color of four body regions: the top color of the head, the color of the elytra, the color of the hind wings, and the color of the tergum. Initial results have shown that LC/UV is a viable method of 
detection as BPA standards yielded a detectable signal. Further 
trials are being completed using LC/MS as the method of detection.

UP64

Early Peanut Introduction for High-Risk Infants: A Narrative Review

Sarah Burkholder, Ashley Poindexter and Virginia C. Stage, PhD, RDN, LDN (mentor)

Department of Nutrition Science, College of Allied Health Sciences, East Carolina University

Food allergies, especially peanut allergies, have become more prevalent in the US affecting nearly 2% of children. Recently, the National Institute of Allergy and Infectious Diseases released new guidelines for the prevention of peanut allergies in the US. These guidelines are supported by emerging research that has shown peanut allergies can be prevented among infants categorized as high-risk by being exposed to peanuts before 12 months of age. The purpose of this review was to examine the effects of introducing high-risk infants under two and a half years to peanuts in addition to determine the most effective time to introduce peanuts. Eleven peer-reviewed studies met the search criteria for this review. Inclusion criteria included studies that examined the early introduction of peanuts to test how earlier introduction would affect the prevalence and development of a peanut allergy. Four articles were published with the Learning Early About Peanut (LEAP) research team in which the teams set out to find the most effective method to prevent the development of a peanut allergy in high-risk infants. Five articles discussed the strategies of peanut introduction in infants and its potential effects. Two articles discussed guidelines and recommendations of peanut introduction by health professionals. Research designs among the studies included cross-sectional, cohort, and randomized controlled trials. Five observed studies used a skin prick test to determine peanut sensitivity, while two studies relied on the parents to recall their child’s sensitivity. Four articles concluded that an early introduction of peanuts to infants is effective in decreasing the prevalence of developing a peanut allergy, with one study having a 67% decrease in developing a peanut allergy. They also displayed a delayed divergence between dominant and subordinate attack levels when compared to WT WT. It was found that ARKO-AR KO pairs had less average attacks than WT-WT pairs for the entire pairing period. They also displayed a delayed divergence between dominant and subordinate attack levels when compared to WT-WT. It was found that ARKO- ARKO pairs had significantly shorter interaction times, less overall attacks in a given time, as well as exaggerated social roles seen in heat maps. PGRKO did not display a difference in attack numbers during 
the observational period, however, video analysis revealed significantly longer encounters with more attacks, as well as exaggerated social roles seen in heat maps. Preliminary evidence of other pair types shows that WT males consistently dominate over PGRKO and ARKO males.

This data gives insight to the role of AR and PGR in mediating male aggressive and social behaviors. Further work can be done to determine how underlying neural mechanisms to these behaviors change as a result of receptor knockouts.
High-performance liquid chromatography (HPLC) is a separation technique commonly used in the pharmaceutical industry for monitoring active ingredients and impurities. A separation method must be developed and validated for each new formulation, often requiring several months to complete. The retention characteristics of the HPLC column stationary phase play a major role in the separation process. In recent years HPLC column manufacturers have published information regarding the critical retention mechanisms and appropriate mechanism rankings. Predictions will be made and evaluated based on the hypothesis is that trends observed by chromatographing varying these conditions can take advantage of different retention mechanisms to achieve the desired separation. The hypothesis is that trends observed by chromatographing new compounds at the same conditions as the new compounds of interest will allow insight into the retention mechanisms acting on the new compounds. Knowing the critical retention mechanisms will allow more efficient choice of conditions to improve the separation.

A series of compounds with pharmaceutical relevance will be chosen as the simulated sample for separation. The published chromatographic test compounds and the simulated sample will be chromatographed on HPLC columns with dissimilar retention mechanism rankings. Predictions will be made and evaluated regarding the critical retention mechanisms and appropriate change to improve the separation.

**Development of novel tryptophan analogues to study and expand protein function**

Kristin Janel Tyson

Proton-coupled electron transfer (PCET) reactions play important roles in numerous biological processes, necessary to sustain life including cellular respiration, photosynthesis, and DNA synthesis and repair. PCET is often mediated by amino acids and tightly regulated by conformational changes of the protein, providing a challenge for scientists in determining the mechanistic features that underlie these processes. As a result, the community has turned to developing unnatural amino acids (UAAs) that structurally and/or functionally mimic their canonical counterparts but with altered thermodynamics that can change the rate limiting steps of protein function, by causing a stabilization or ‘trapping’ of organic radicals. While tyrosine has served a central focus for these reactions, accumulating evidence implicate tryptophan residues in PCET. To probe the mechanism for tryptophan in long-range PCET, here, we present the synthesis of new tryptophan derivatives, based upon 5-hydroxytryptophan (5-HOW). We show that these new derivatives have altered acidity constants and reduction potentials lower than either natural tryptophan or tyrosine residues. Finally, we demonstrate that these UAAs can be incorporated site-selectively into a model protein, azurin, with maintained protein stability and structure. These new UAAs will enable us to test the mechanism of tryptophan in facilitating long-range PCET in biological catalysis.

**Social Regulation of the Escape and Swim Motor Circuits in Dopamine Receptor Type 1 Mutant Zebrafish (Danio rerio)**

Joseph Carl Ward, Jack McNally, Dr. Fadi Issa

Dopamine Receptor Type 1 (drd1) in regulating social activity and spinal motor circuits in socially dominant and submissive fish by genetically knocking the drd1 receptor. Our motivation stems out of the fact that in many animal species dopamine plays an important role in regulating aggression, motivation and spinal motor activity. However, it remains poorly understood how social factors can influence dopaminergic signaling and its impact on motor function. We focused out attention on two easily quantifiable behaviors: the startle escape response and swimming behaviors. In wildtype zebrafish, we found that subordinate animals display an elevated startle response sensitivity and reduced swimming activity compared to dominant animals. However, preliminary results show that although the drd1 KO animals display similar status-dependent behavior patterns compared to wildtype pairs, these differences are less distinct. Drd1 KO substraduates continue to display heightened escape response sensitivity and reduced swimming activity compared to dominants, but those differences are less discernable. We aim to verify these results with a larger sample size. If confirmed, our results would suggest that the drd1 receptor potentially plays an important role in regulating motor activity in a socially status-dependent manner.

**Parasites as Indicators of Biodiversity in Coastal Shoreline Habitats**

Emily Amanda Edmonds, Christopher Scott Moore, April Monica-Houghton Blakeslee

Digenetic trematodes (parasitic flatworms) are tropically transmitted parasites, which means that they require multiple hosts to complete their life cycles. Previous research has found that parasite and host diversity are strongly and positively correlated, so if parasites are detected at a site, then the downstream hosts that are required for life cycle completion must also be present in the general area. Therefore, parasites can be used as proxies for the presence of their hosts to obtain an understanding of local biodiversity. Habitats that are more complex, such as those with natural shorelines (as opposed to artificial bulkheads or seawalls), are expected to be associated with greater biodiversity and therefore higher parasite diversity; however, this has never been systematically tested. My research will test this expectation by quantifying parasite diversity in the eastern mudsnail (Tritia obsoleta) – a common host for trophically transmitted parasites in estuaries in coastal North Carolina. Standard field sampling and lab dissection methods will be conducted to haphazardly collect snails at each site from a total of 5 paired (natural or bulkhead) sites along Taylor’s Creek (Beaufort, N.C.), and then dissect them in the lab to determine parasite species richness and prevalence. I hypothesize that parasite diversity in snails will be higher at sites with natural versus hardened shorelines, because natural shorelines have more complex habitat capable of supporting a variety of potential host organisms. Previous sampling trips have resulted in generally fewer snails found at the bulkhead sites versus paired natural sites. This either suggests that bulkhead sites have less suitable habitat or that snail movement is occurring. Thus, a mark-recapture study will be conducted to further our understanding of these questions. Paint pens will be used to mark 100 snails per site, and snails will be released and then recaptured monthly to determine how extensively snails may be moving. I hypothesize that snails will be relatively site-resident, supporting their use as a good focal species to assess local biodiversity with parasites as proxies.
Pocosins are freshwater ombrotrophic wetland bogs with deep peat layers that store substantial amounts of carbon. Peatlands account for less than 3% of the Earth’s surface, but store ~30% of soil carbon and are responsible for ~40% of global methane emissions. These massive carbon storage pools have contributed to global warming over millions of years and if disturbed by global warming or anthropogenic activity, peatland carbon stores pose a substantial risk for large CO2 and CH4 fluxes to the atmosphere and hydrologically connected systems. Recent biogeomorphological studies have revealed the importance of sulfur cycling in peatlands, where dissimilatory sulfate reduction is thermodynamically favored and can account for nearly 50% of anaerobic carbon mineralization, effectively mitigating methane flux. Anthropogenic activities constitute a substantial threat to peatlands as development for agriculture and other uses have significantly altered critical biogeomorphological processes. The present study intends to quantify changes to pocosin soil sulfide biogeochemistry in response to increased availability of phosphorus, the proximal limiting nutrient in pocosins, along a phosphorus fertility gradient. This research was conducted at a pocosin peatland located at East Carolina University’s West Research Campus. This pocosin drains into the Neuse and Tar-Pamlico River Basins, influencing riparian and estuarine water quality by retaining large quantities of nutrients. Groundwater samples were collected from the study site two weeks after the application of phosphorus fertilizer. Spectrophotometric analysis was used to determine the concentration of sulfide species in groundwater samples at each study plot. Measuring soil sulfide changes following nutrient influx could provide insight into the biogeomorphological consequences of anthropogenically-induced peatland degradation and assist in predicting the impact this will have on hydrologically connected systems.

Fibrinogen is one of the largest proteins in humans, and forms into fibers that create blood clots. Fibrinogen is made of three amino acid chains, known as the α, β, and γ chains. Because of its size and complexity, recombinant fibrinogen can only be expressed in mammalian cells. To create a stable cell line, each of the plasmids for the α, β, and γ chains must be individually transfected and selected for. To speed up this slow process, new plasmids will be created for each fibrinogen chain that contains a distinct FP. The three FPs being used, tdTomato, eGFP, and mAmberine, have little to no overlap between their excitation and emission wavelength ranges. The FPs named have been paired with one of the three structural chains of fibrinogen, α and tdTomato, β and eGFP, and γ and mAmberine.

Plasmids containing genes coding for FPs and fibrinogen chains will be constructed using the Gibson Assembly DNA editing method. This is done by creating forward and reverse primers that create fragments of DNA that are connected to other vector fragments using the same compatible primers. The FPs will be attached to a standard vector expressing each of the three chains of fibrinogen after an inserted IRES sequence. This will enable rapid cell sorting, because the Aria Fusion Cell Sorter can independently sort for and isolate cells producing each of the three modified structural chains of fibrinogen expressing the fluorescent markers. These sorted cells can be used to create a stable cell line for the α, β, and γ chains, so that the only cells present in the line produce the desired modified fibrinogen.

CONVERSATION DYNAMICS AND BUILDING CONNECTIONS THROUGH CONVERSATIONS
Marshall Joseph Aikins

Humans are social creatures who learn as a unit in their communities. The goal of this research is to model these interactions and better describe and understand the individual interactions within the community. Through a better understanding of how these interactions take place we can better understand the connection between the cognitive and social domains of learning. Interactions between students taking collaborative exams are quantified using the framework of Network Analysis. Network Analysis has many models that can be used to describe different types of networks. We compare student collaboration networks to these different random Network Analysis models.

TACKLING STUDENT DEBT
Bradley Mark Atkinson
Margaret Katharine Anderson
Alex Milton Bentley

The goal of this project is to reduce the amount of debt that students end their college careers with. We plan to do this by educating incoming college students (especially first time college students and those from low income families or communities) and their families on how to navigate student debt. We are in the process of developing modules that will be integrated into our existing learning assistance, which in the end help the majority of students in these styles of learning. To explore this relationship, behavioral schemes have been identified. These are: socializing, separate work, group discussion, instructor discussion, instructor social and teaching discussion. Next, video will be watched and coded in 15 seconds increments. After this initial coding pass, I will create a conversation map. This map will be constructed by tracking speakers and listeners during each of the conversation modes. All analyses will be carried out in the statistical programming language R, utilizing packages including 'graph' and 'ma' to allow for characterization of the conversation maps. There have been no preliminary results in this context as many different groups must be coded before a conversation map can be made.

Describing Collaborative Exams Using Random Graphs
Aaron M. Bain
Timothy M. Sault
Antoni Aguilar Mogas
Steven F. Wolf
The ongoing part of this project is connecting incoming college students and their families to scholarships available to them. We are in the process of doing that here, working with the Office of Admissions to find ways to present information about available scholarships here at ECU. We want to provide information to students about the scholarships available to them through ECU, first, then talk about other options for scholarships or grants. By the time we are finished presenting, it is our hope that they will be better educated on what opportunities are available to them as they prepare for college.

UP77

Building QI Nurse Leaders: Validating a MSN – Nurse Leader “Stand-alone” Quality Improvement Course (QI) Based on Student Learning Outcomes

Madison Grace McCauley, BSN Senior Student
Donna Marie Lake, PhD, D.N.

Background: Research Study provided academic graduate nursing faculty preliminary evidence, (QI) stand-alone course instruction is beneficial in preparing nurse leaders in QI Science. A literature review yielded there is lacking evidence on graduate curriculum that teaches practicing nurses how to conduct quality improvement change projects.

Significance: Practicing registered nurses are expected to conduct quality improvement change activities, however the literature states there are few opportunities for RNs to learn about QI methods in school or at the workplace (Maxwell, Wright, 2016; Kovner, 2010). Amongst the limited programs, inconsistencies exist among faculty related to achievable teaching methods.

Purpose: Provide (MSN) Leadership Faculty an understanding of students experiential learning outcomes who completed a QI Course based on Dartmouth’s QI Microsystems Framework.

Methods: Descriptive design included a student survey to evaluate successful change project within a health system. The assessment of student knowledge and skills were recorded by analyzing the survey data. Results: The nurse leader students (33% (33 of 99) return rate) found the stand-alone DE QI Course had a positive impact to QI learning skills. Specifically, they had confidence in building QI interprofessional teams (83%), and majority of participants (86%) reported QI change projects improved direct care and patient flow. Particularly noteworthy, 100% were more confident leading QI projects, and 96% could apply QI tools (Fishbones, Flow charting). Lastly, 45% felt they were not confident in participating in root cause analysis work, thus this has been added to the course.

Implications: MSN QI Stand-alone Course/Dartmouth Framework is useful for MSN prepared nurse leaders conducting team-based change projects. Faculty teaching methods of QI principles and tools application can successfully prepare MSN students in leading change projects related to quality care delivery projects.

UP78

PsydeKick- Peer Mental Health Education and Advocacy

The Need and Impact of Peer Education in the Field of Mental Health || PsydeKick

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In efforts to encourage sustainable community development, research was conducted on needs of students of East Carolina University. A large need base was found when looking into mental health of college students. In a 2013 survey by the American College Counseling Association, “95 percent of those directors said they had noticed a greater number of students with severe psychological problems than in previous years.” Need for mental health support for college students is increasing however professionals are backlogged and struggling to meet the needs of students. “The ratio of counselors to students is 1 to 1.527. Smaller schools have better ratios” (Gallagher. P, 2009). With campus professionals struggling to meet student needs research took a new focus of what peers can do to lower the impact of less severe cases on campus counseling centers. While ideas of counseling and apps were proposed solutions to the surmounting needs, we connected our research directly to ECU’s Counseling Center. We began learning statistics impacting our campus while receiving feedback from students being interviewed. With the aid of our campus professionals, PsydeKick was developed. A peer mental health education program in which students could receive training to become peer educators and help students on campus better cope with select mental health struggles as well as connect those with more severe needs to professionals and all free resources available. A program which trains students to effectively communicate with others has the potential to reduce the influx of students seeking counseling because they have not gained the education to effectively cope with and even understand their struggles. This permits professional counselors in the center to be more readily available to those with more severe need. Through two years of research and development the students involved have concluded the validity peer education as a means of aiding in the field of mental health. Not only does peer education impact those struggling with mental health issues but has the potential to create strong character and development in students seeking training to learn more about a topic surrounded by stigma, and use this education to better campus relationships.

UP79

Using Dialogic Reading to Foster a Growth Mindset in Elementary Students

Jenna Marie Murdock

The present study examines the use of dialogic reading strategies during whole class read alouds of picture books specifically chosen for their likelihood of illustrating particular growth mindset concepts. The author describes the concept of growth mindset, gaps in current growth mindset research, benefits of dialogic reading, and development of survey questions for the present study. Case study findings focus on outcomes obtained with a class of 17 first grade students. The read alouds resulted in greater student understandings of growth mindset concepts. Students were able to support their survey question answers with evidence from the lessons using growth mindset phrases. When comparing pre-survey and post-survey data, the growth mindset read alouds resulted in improved self-talk, as well as stronger understandings and support of the notion that “mistakes help me learn.” Study limitations and time constraints are detailed and followed by a description of how this research experience impacted the researcher as a future teacher.

UP80


Jeremy Austin Cox, Jocelyn Bayles, Danielle Adams, Lauren Butler, Dr. Archana Hedge, Dr. Virginia C. Stage

Child food neophobia has been shown to peak between ages 2-5, however these children have also been shown to be open to new food preferences. Repeated taste exposures have proved to be the most effective way to promote intake of novel vegetables. Children consume the majority of daily meals/snacks in preschool centers, making it a prime location for nutrition education (NE) to impact dietary habits in children. The objective of this study was to assess the implementation of a hands-on NE curriculum, Preschool Edible Activities with Science (PEAS), using process evaluation techniques. Preschool Edible Activities with Science (PEAS) is a 7-week hands-on NE curriculum designed to teach preschoolers math, science, art, and literacy using nutrition. Each lesson provides an opportunity for children to taste-test novel vegetables, including broccoli, cauliflower, spinach, sweet potato, radish, cucumber, tomato, snap peas and carrots. Starting in fall 2018, PEAS was pilot tested in October-January at a local Head Start center with 6 classrooms serving 3-5 year old preschool children (n=104). Process evaluation data was collected by the on-site study coordinator who observed the process of implementation. Areas of focus for the process evaluation included: dosed delivered, dosed received, context (i.e barriers/facilitators) and fidelity (i.e extent to which implemented as intended). The final sample included 104 preschool children. Delivered was 7 lessons in a 3 month period. Dose received included 78.4% overall child participation and 89.4% children participation for at least half of the lessons. Children were engaged in the intervention when responding to educators inquiries and when minimally distracted by environmental or peer influences.

Common barriers to implementing PEAS included: policy confusion, distracting learning environments, lack of teacher support/modeling for trying new foods, and child neophobia (“fear of the new”). Common facilitators included: center director support for conflict resolution, peer reinforcement, and children advocating for teacher participation. Fidelity obstacles included teachers’ preference on lesson implementation (e.g. conduct lessons from tables not carpet) and food anomalies (i.e. cucumbers without seeds). Additional research is needed to assess the effect of PEAS and similar integrative educational approaches on preschool children’s vegetable liking and intake.

UP81

The Impact of Experiencing Immersive Simulation in Teaching

Carley Marie VanHoy

The present study examines the use of Murison technology in pre-service science education courses. The author describes the concept of Murison technology, using Virtual Reality in a classroom setting, and benefits of constructivist teaching practices. Case study findings focus on outcomes obtained with...
Improving Student Understanding of Mitochondrial Bioenergetics with Teaching Tool

Jessica N. Brush, Basel A. Abdellatif, Patricia J. Malcolm, William B. Blake, William C. Gupill, Department of Kinesiology, Department of Engineering, Dr. Ronald Cottritt, Dr. Barbara Muller-Borer

Student learning preferences have been summarized into four main areas: visual, auditory, reading, and kinesthetic (VARK). These preferences can be used to teach difficult material as a university setting, such as mitochondrial bioenergetics in the Department of Kinesiology at East Carolina University.

Mitochondrial Bioenergetics refers to the production of adenosine triphosphate (ATP) to power body functions in complex organisms. The production of ATP occurs through the electron transport chain (ETC); this topic is typically taught in the classroom with videos, diagrams, and illustrations. These teaching methods do not accommodate the varying learning styles of all university students. A former Department of Engineering senior capstone design team created a prototype of a teaching tool to demonstrate the electron transport chain through methods of visual learning. Based on the previous team’s and sponsor’s feedback, an improved prototype has been designed. This new design accommodates all learning styles when used with lecture materials. The design also improves the functionality of the teaching tool. To visualize the different production processes of the electron transport chain, various input scenarios will be added to the original prototype. This new prototype will be evaluated with undergraduate university students in a classroom setting. Suggestions and improvements to the design will be implemented upon receiving user feedback. The final product will be comprised of the updated prototype, a user-building manual with accompanying purchasing information, and a laboratory guide that encompasses the different learning styles to simulate mitochondrial bioenergetic scenarios. The user manual will also include suggested learning activities to be used with the model to promote problem-solving skills and higher order thinking.

UP82

Key Words: VARK, mitochondrial bioenergetics, electron transport chain, oxidative phosphorylation.

I Made It Up: Maps, Essays, and Other Guides for the Queer Black Girl

Glenshe D Berryman

Black feminist theorist Christina Sharpe poses a crucial question to Black artists: how do we materially and aesthetically disrupt the specter of Black life? Poet Dionne Brand answers this question with her theory of the ruttier—the notion that Black art can serve as navigational guides, or maps, for surviving the multimodal violence of racism. I transform this theoretical framework into a collection of creative nonfiction essays in “I Made It Up: Maps, Essays, and Other Guides for the Queer Black Girl.” I narrate my coming of age, coming out experience, and mental health diagnosis through traditional, visual, and experiential essays. The seven chapters are based on Lucille Clifton’s poem “won’t you celebrate with me,” with each line constituting its own chapter. Each chapter will be divided by a two-page photo collage featuring Black queer women in Eastern North Carolina. Through visually representing the poem’s meaning, the collage series makes flesh Brand’s belief that Black art is intrinsically linked to Black survival. The goal of this project is to affirm and disrupt the marginality (and the specter of death) haunting Black queer women in the South. In addition to the collage series, essays like “Interviews with a Black Girl Soldier” and “7 Am Coming Out Pocket Manifesto” to “Therapy in Three Acts” and “Notes from a Mental Hospital,” narrate raw experiences with gender, sexuality, blackness, mental health, failure, and the joy of making a path for others.

UP85

Linking Tsiolkovsky’s Rocket Science to the Humanities

Chase Michael Neese

The launch of Sputnik, the Apollo missions, the construction of the International Space Station, and modern rocket technology, all can be traced back to the Russian scientist, philosopher, and innovator, Konstantin Tsiolkovsky (1857–1935), and his famous equation for flight. In many cases, however, the significance of Tsiolkovsky’s impact made not merely on the technological progress, but on the concept of space travel and thus the larger destiny of humanity and universe as a whole, is often overlooked or dismissed entirely. By utilizing knowledge from aerospace studies, cultural studies, and scientific history, I am going to bridge the common divide between science and humanities disciplines by creating a digital humanities website to showcase the effect of Tsiolkovsky’s vision for the future on the science and intellectual thought development from the 1880s to modern day. This interdisciplinary study of Tsiolkovsky’s space exploration legacy is being conducted in relation to the philosophy of Russian Cosmism within the broader intellectual and artistic context of Tsiolkovsky’s time. Digital images of notebooks, drawings, letters, and other documents from the Museum of Cosmonautics (Moscow), and the Tsiolkovsky State Memorial Museum (Kaluga) collected by me in Russia, became the foundational basis for my cross-disciplinary digital project. As a part of my ongoing research, for my current poster presentation I examine primary and secondary sources on Tsiolkovsky’s life and discoveries, along with NASA’s open source data catalog, in order to support my argumentation for highlighting the necessity of studying Tsiolkovsky’s legacy from a multidisciplinary perspective in the 21st century.

UP86

Chekhov and Shakespeare on the Modern Stage: Two Plays in One Show

Kate Beth Collins

It is impossible to find two names more vital to modern theatre than William Shakespeare (1564-1616) and Anton Chekhov (1860-1904). As Shakespearean-Elizabethan drama shaped Classical theatre, Chekhov’s plays defined early 20th century Modernist theatre. Both of these author’s plays shaped the Postmodernist theatre landscape in the late 20th-early 21st centuries, celebrated by modern stage directors and the theatre audiences, due to their exceptional relevance to the problems of human existence and their immense potential for theatrical experimentation within performative aspects of theatre as a medium. However, while these two playwrights are normally presented as canonical figures separately, it is only recently that they are being considered in the same setting, and their messages compared to one another.

My project examines intertextual connections between Chekhov’s “Uncle Vanya” and Shakespeare’s “Romeo and Juliet” through theatrical and literary analysis of these works. I investigate the influence of Shakespearean and Chekhovian legacies upon one another as exemplified by modern performances, and my current close textual analysis is based on the Bedlam Theatre’s recently running production entitled “Uncle Vanya, Romeo and Juliet”, which I attended in New York in October of 2018. This experimental performance mixed two well-known plays together, interrogating the similarities of Shakespearean and Chekhovian characters, and how they can enrich the modern viewers’ understanding of these two texts when presented side by side.

This research paper will allow me to produce a three-part radio presentation for “Showtime!” on WZMB 91.3 for the listening public of Eastern North Carolina.

UP87

The H&M Racist Scandal: Diversity Deficits in an Era of Global Public Relations

Authors: Ava Criscitello, Aalyya Gilles, Kiree Cheek, Cierra Ford, Madalyn Beale

Mentor: Dr. Jin-Ae Kang

The lure of fast fashion through mass production is a familiar story in the retail industry, but what happens when that appeal becomes indiscriminate? In October of 2018, H&M’s in-store brand, Weekday, released a collection of workwear dresses. The outfits were designed for women of all races, and featured a diverse model line-up to promote inclusivity. However, the susceptiveness of the collection’s promotion was swiftly brought into question. The Weekday collection featured a model of color that was perceived to be Black, but who was actually a Black woman with a shaved forehead, to hide her natural hair. This cosmetic decision was met with criticism and condemnation from the Black community, at the same time that H&M was promoting diversity. In a world of fast fashion, and in today’s technological age, theH&M Weekday collection is an example of the disconnection between the ideals of inclusion and representation, and the execution of those ideals in practice. The Weekday dressing should be a statement of diversity. The question remains: did the Weekday collection promote the ideals of inclusion, or did it merely perpetuate the notion of diversity as a numbing, overused marketing tactic?
Role of Dopamine-3 Receptors in left ventricular cardiac fibroblasts proliferation

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Dopamine is a naturally occurring neurotransmitter which plays a vital role in functioning of brain and body movements. Dopamine receptors are a class of G-protein-coupled receptors that are prominent in CNS, but dopamine injection is also used to treat conditions in response to low blood pressure and certain types of heart failure. Most of the studies regarding the role of D3 receptors was based on brain as these neurons were found mostly in the central nervous system. Recent studies from colleagues, have indicated that D3R may play a role in cardiac related aging as it is prominent in CNS, but dopamine injection is also used in various tissues including the heart. To evaluate this hypothesis, we investigated the role of D3R in cardiac fibroblasts proliferation and characterized from LV of WT and D3KO mice. In the WT, the agonist pramipexole and the combination of agonist pramipexole and antagonist SB 277011-A increased proliferation in both time points. In D3KO group the proliferation rate decreased at a constant rate, while the combination of agonist and antagonist increased the proliferation rate of D3KO as compared to WT and D3R plays a role in proliferation.

Expression of Human IFN-β Protein by Chinese Hamster Ovarian Cells

Todd Cameron Hylton, Rebecca Ann Niccle, Mark D. Mannie

Multiple Sclerosis (MS) is an inflammatory demyelinating disease of the central nervous system that affects approximately 400,000 Americans and 3 million individuals in the western world. MS is the leading cause of nontraumatic neurological disability in young adults. The primary disease-modifying therapy for MS is a cytokine known as Interferon-beta (IFN-β), which is the prototypic cytokine of the innate immune system. IFN-β reduces formation of new brain lesions and decreases relapse rates and disease progression. However, mechanisms by which IFN-β inhibits MS is not fully understood. In murine models of MS showed that IFN-β elicits an immunosuppressive subset of FOXP3+ regulatory T cells (Treg), which in turn suppress CNS demyelinating disease in mice. Given that mouse IFN-β elicits Tregs in mice, a central question is whether human IFN-β elicits differentiation of human FOXP3+ Tregs in primary T cell cultures. The purpose of this project is to derive new mammalian plasmid encoded human IFN-β without the C-terminal additions. Both expression vectors encoded the native signal sequence to direct secretion of IFN-β as a glycosylated soluble protein. These plasmids were then transfected into Chinese Hamster Ovary (CHO) cells. Stable transfecants were selected based on resistance to the antibiotic Geneticin, and IFN-β producing cells were selected by flow cytometric sorting of cells that expressed high concentrations of Green Fluorescent Protein (GFP). Expression supernatants from each line exhibited equal amounts of human IFN-β activity in the in vitro TF-1 cytotoxicity assay. These results provided suggestive evidence that the C-terminal affinity tag did not adversely affect the activity of the N-terminal IFN-β cytokine domain. This IFN-β/FoxP3 recombinant protein was purified by Ni-NTA affinity chromatography and shown to have potent cytotoxic activity. This expression system will be used to reveal whether IFN-β elicits differentiation of human FOXP3+ Tregs. This expression system will be instrumental for resolving Treg physiology and for devising new therapeutic options for MS.
Conclusions: Neuroinflammation and aberrant activity of 8-month-old 3xTg-AD female mice, (*p<0.05). Moreover, microglial cells in multiple regions of the hippocampus in AD male mice. Additionally, results indicated hyper-proliferation indicated a heightened proliferation of microglial cells in the CA3 microglial cells in the AD patients was increased, which indicates by microglial overgrowth. This study aims to investigate the role in Alzheimer's disease (AD) pathogenesis. Recent studies have suggested that neuroinflammation may contribute to this degradation by disrupting the amyloid metabolism and by no required to detect physical stimuli such as sound waves or head movements. Most of these “hairs” are actin-filled stereocilia that are linked together by extracellular links to form the characteristic hair bundle. Additionally, hair cells also feature a single microtubule-based projection called the kinocilium. The kinocilium plays several roles, from influencing the development of the hair bundle to assisting in the detection of mechanical stimuli. As such, it is fundamental to our understanding of sensory hair cells to characterize the structural and functional components of the kinocilium.

Vertebrate hair cells express a unique set of gene products, some of which are predicted to contribute to the structure and function of the kinocilium. In some cases, these putative kinocilial genes are candidates for certain types of hearing loss in humans. To characterize these genes, we have turned to the zebrafish vertebrate model system. Zebrafish hair cells are genetically and molecularly similar to mammalian hair cells. This allows us to utilize the genetic tractability of zebrafish to characterize the protein localization and function for these putative human deafness genes. In this work, we show the mRNA expression patterns for two of these candidate deafness genes in zebrafish. Additionally, we have made transgenic fish that express GFP-tagged versions of these proteins, demonstrating their localization to the kinocilium of zebrafish hair cells. Future studies will use gene knockouts to understand the role of these microtubule-associated proteins in the structure and function of the hair cell kinocilium.

Characterization of predicted microtubule-associated proteins in sensory hair cells of zebrafish (Danio rerio).

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Our findings are consistent with the hypothesis that O268Q Hsp90α interacts with Tpr2, DNAJC7, and Hsp72. The role of Hsp72 in this interaction is not well understood. Future studies will explore the potential role of Hsp72 in the pathogenesis of AD.

Methods: To examine the amyloid and microglial activity in the human brain, we acquired brain tissues from clinically diagnosed AD and non-dementia (ND) patients. To examine this activity in the mouse model, we acquired brain tissues from age-matched wild type (WT) and AD affected (3xTg-AD) mice in 4, 6, and 8-month age groups. Immunohistochemical (IHC) analysis was utilized to determine the characteristics of pathological AD hallmarks.

Results: Analysis of the human brain tissue showed an alteration in amyloid precursor protein (APP) in the hippocampus of AD patients as compared to the ND patients. The activation of microglial cells in the AD patients was increased, which indicates neuroinflammation. Results of mouse brain tissue analysis indicated a heightened proliferation of microglial cells in the CA3 region (*p<0.05) of the hippocampus in the 6-month-old 3xTg-AD male mice. Additionally, results indicated hyper-proliferation of microglial cells in multiple regions of the hippocampus in 8-month-old 3xTg-AD female mice, (*p<0.05). Moreover, increased presence of amyloid burdened neurons was observed in both the cortical and amygdala regions of 4, 6, and 8-month age groups of 3xTg-AD mice as compared to their age-matched WT. Conclusions. Neuroinflammation and aberrant activity of microtubule proliferation contribute to the progression of AD.

Future directions of this study aim to further illuminate the regulation of microtubular activation in AD and the potential roles of O268Q Hsp90α activity through quantification and analysis of the age-matched animal brain tissue. The ability to understand, and therefore modulate, neuroinflammation may be a promising approach for prevention of progression in AD.

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Steroid hormones influence cell proliferation and cell fate in developing and injured tissues. Although steroid hormone signaling has been well-studied, the precise mechanisms by which cells specifically receive steroid hormones remains largely uncharacterized. In Drosophila, and many other insects, the primary steroid hormone is ecdysone, which is necessary for reproduction. Ecdysone effects have been well studied in the ovary, for example, ecdysone signaling through the Ecdysone Receptor promotes germ cell proliferation, differentiation, and survival. It is unclear, however, how Ecdysone Receptor expression or signaling is regulated in germ cells. We previously identified the molecular chaperone protein encoded by the gene Tetratricopeptide repeat protein 2 (Tpr2) in a reverse genetic screen as a possible connection between ecdysone signaling and germline stem cell self-renewal. The human homolog of Tpr2, DNAJC7, can form complexes with Hsp90α and Hsp72 in vitro. Tpr2 is thought to function as a recycling cochaperone, aiding protein folding and dimerization of the glucocorticoid and progesterone receptors. Ecdysone signaling is necessary for Drosophila germline stem cell function and cyst divisions. We therefore hypothesized that Tpr2 may promote ecdysone signaling in early germ cells. As an initial test of this hypothesis, we used CRISPR mutagenesis, genetic mosaics, and germline-enhanced RNAs techniques to investigate whether Tpr2 is necessary for germ cell mitotic divisions. In the absence of Tpr2, germline stem cell self-renewal is abrogated, suggesting that Tpr2 is autonomously necessary for germline stem cell activity. Further, germ cell mitotic divisions are delayed in Tpr2 mutants, leading to fewer cysts per germarium. Our preliminary data suggest that Tpr2 mutant germ cells are slow to complete S phase, indicative of an overall slower cell cycle. Taken together, our data suggest that, like Ecdysone Receptor, Tpr2 is essential for cell cycle control in germ cells. Our future directions will test whether Tpr2 promotes ecdysone signaling in germ cells. Our studies help elucidate the molecular mechanisms by which steroid hormones promote cell division.

An Examination of Potential Neurobiological Differences in Exercisers and Non-Exercisers

Rachele Ivy Grantham, Dr. J.C. Muzle, Dr. C. Habebe

Within the United States, obesity rates continually increased from 1999 to 2016. This is particularly concerning due to the fact that the American government has put out abundant amounts of information on these increasing obesity rates and encouraged Americans to change their lifestyles in order to combat this epidemic. Despite these efforts, the rates of obesity have continued to increase. Because obesity is associated with heart disease, type 2 diabetes, and certain types of cancers, the prevalence of obesity is concerning. One of the most influential factors in becoming obese is a lack of physical activity. The American College of Sports Medicine (ACSM) lists risk factors for Cardiovascular Disease and lists physical inactivity as the single most preventable risk factor. This leads to the issue of the general public knowing they should be participating in physical activity on a daily basis yet continue to not meet guidelines set by the Centers for Disease Control or ACSM. It is not known whether there is a neurobiological predisposition that makes exercise adherence or avoidance more likely. This study aims to examine the potential neural differences between physical active and inactive individuals in their perception of their own group and the opposite group. Electroencephalography (EEG) will be used to record patterns of brain activation as active and inactive individuals view images of people engaged in physical activity and sedentary behavior. This brain activity will then be compared across groups in response to the different stimuli. The results of this study may allow for more successful promotion of physical activity.

The Effect of Downstream Resistance in a CABG

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The coronary artery bypass graft, or CABG, is the most common open-heart surgery and is used to treat coronary artery disease in patients with severe blockages in their coronary arteries (Mayfield 2018), yet 10 to 15% of the grafts fail within the first 18 months (Ghiazi 2013). Downstream resistance (due to disease or ischemia) in the left anterior descending artery could affect the hemodynamics of the graft and lead to its potential failure. While previous studies have focused on different factors that could affect the hemodynamics of the graft, the role of downstream resistance, a potential impactor, remains unexplored. From a basic physics viewpoint, resistance in an artery could impact blood flow which would change the hemodynamics in the graft. Obtaining a better understanding of this physiological factor on the hemodynamics of the CABG would change the hemodynamics in the graft. Obtaining a better understanding of this physiological factor on the hemodynamics of the CABG could help physicians make a more informed decision regarding patient care and lead to the improvement in CABG success, a procedure that affects 300,000 patients annually (iDataResearch 2018).

A previous project has resulted in a physical CABG phantom model that includes mechanisms to physically alter the downstream resistance. A noninvasive imaging technology, iCertainty™, has been used to qualitatively assess the flow in...
The human CRC cell lines, LoVo and HT-29, were employed in all investigated using a standard 96-well viability assay. Potency was growth. For this reason, SPHK1 is an area of special interest in 1-phosphate, a mitogenic sphingolipid that enhances cancer cell cells. Importantly, SPHK1 catalyzes formation of sphingosine-glucosylceramide synthase (GCS), acid ceramidase (AC), and the present work we employed pharmacological inhibitors of in cancer cell fate, as it elicits apoptotic-induced cell death. In treatment modalities. Dysfunctional sphingolipid metabolism challenging to manage clinically. This highlights the need for new new phantom model and the CFD models.

Conor Miller Pumphrey
Myles Clayton Cabot

Colorectal cancer (CRC) is aggressive and difficult to treat if not detected early. The typical lack of early signs and symptoms paired with CRC's metastatic propensity make this cancer challenging to manage clinically. This highlights the need for new treatment modalities. Dysfunctional sphingolipid metabolism is known to promote cancer growth as well as contribute to chemotherapy resistance. Thus, targeting the enzymes of sphingolipid metabolism appears an attractive therapeutic strategy. Ceramide is a sphingolipid that plays a crucial role in cancer cell fate, as it affects apoptotic-induced cell death. In the present work we employed pharmacological inhibitors of glucosylceramide synthase (GCS), acid ceramidase (AC), and sphingosine kinase 1 (SPHK1) to determine, respectively, whether blocking cellular ceramide glucosylation, ceramide hydrolysis, or sphingosine phosphorylation would limit the growth of CRC cells. Importantly, SPHK1 catalyzes formation of sphingosine-1-phosphate, a mitogenic sphingolipid that enhances cancer cell growth. For this reason, SPHK1 is an area of special interest in therapeutic strategies for CRC and other cancers. The effects of our pharmacological inhibitors on CRC cell growth were investigated using a standard 96-well viability assay. Potency was gauged by evaluating IC50 values (the half-maximal inhibitory concentration, meaning the dose required to kill 50% of the cells). The human CRC cell lines, LoVo and HT-29, were employed in all experiments. GCS inhibitors used were PPMP and Elgotstat. AC inhibitors included DM-102 and SACLAC, whereas the SPHK1 inhibitors tested were FTY-720 and SKI-1. The most promising results were obtained in experiments using the HT-29 cell line. In HT-29 cells, FTY-720 was the most potent SPHK1 inhibitor, with an IC50 of 7.6 µM. GCS was another enzyme that was effectively suppressed, in this instance by introduction of PMPM (IC50 = 3.5 µM). Finally, of the two AC inhibitors, SACLAC demonstrated the highest potency (IC50 = 9.5 µM). These results indicate promising possibilities for treating CRC with sphingolipid enzyme inhibitors. An area of future study may be testing the impact of poly-therapies using multiple SL enzyme inhibitors for a powerful, more efficacious approach to treatment of CRC.

Caliee Herman, Rachel Dodson, Jaycin Fartior, Azen Shaver, Ryan Silberg, Nate Harris, Gustavo Sandri Heidner, Nicholas Murray
Department of Kinesiology, East Carolina University

Slow-releasing carbohydrates may delay the effects of fatigue after exhaustive exercise. Purpose: Observe the influence that hydrothermally modified starches (HMS) and traditional maltodextrin (MAL) supplements had on physical endurance and mental performance following exhaustive exercise. Methods: Male participants completed a VO2 max and two days of cycling sessions using a Velotron ergometer. Cycling sessions were performed at 70% of the VO2 max workload for 150 minutes. Supplements were consumed 30 minutes prior to cycling and during exercise at the 120-minute mark (1 g CHO/kg body weight). Brain activity was measured using a Neuroscan 64-channel Electroencephalograph (EEG) cap. Go-noGo and N-back tasks were performed before and after cycling bouts. Blood glucose, lactate, ketones, cortisone, and urine specific gravity were measured before, during, and after cycling. Heart rate (HR), VO2, and Rate of Perceived Exertion (RPE) were recorded in 15-minute intervals. Results: Ketones increased significantly more for HMS than MAL from pre to post cycling measurements (p < .05). Glucose spikes occurred for MAL. HR increased time during MAL use. Reaction times for Go-noGo and N-back were faster for HMS post exercise. Event Related Potential (ERP) differences were present in both mental tasks following exhaustive exercise. Conclusion: HMS supplementation decreased the impact of cognitive and physical fatigue post exercise.

UP98
Influence of Modified Starches on Mental Performance and Physical Endurance Following Exhaustive Exercise

Conor Miller Pumphrey
Myles Clayton Cabot

Colorectal cancer (CRC) is aggressive and difficult to treat if not detected early. The typical lack of early signs and symptoms paired with CRC's metastatic propensity make this cancer challenging to manage clinically. This highlights the need for new treatment modalities. Dysfunctional sphingolipid metabolism is known to promote cancer growth as well as contribute to chemotherapy resistance. Thus, targeting the enzymes of sphingolipid metabolism appears an attractive therapeutic strategy. Ceramide is a sphingolipid that plays a crucial role in cancer cell fate, as it affects apoptotic-induced cell death. In the present work we employed pharmacological inhibitors of glucosylceramide synthase (GCS), acid ceramidase (AC), and sphingosine kinase 1 (SPHK1) to determine, respectively, whether blocking cellular ceramide glucosylation, ceramide hydrolysis, or sphingosine phosphorylation would limit the growth of CRC cells. Importantly, SPHK1 catalyzes formation of sphingosine-1-phosphate, a mitogenic sphingolipid that enhances cancer cell growth. For this reason, SPHK1 is an area of special interest in therapeutic strategies for CRC and other cancers. The effects of our pharmacological inhibitors on CRC cell growth were investigated using a standard 96-well viability assay. Potency was gauged by evaluating IC50 values (the half-maximal inhibitory concentration, meaning the dose required to kill 50% of the cells). The human CRC cell lines, LoVo and HT-29, were employed in all experiments. GCS inhibitors used were PPMP and Elgotstat. AC inhibitors included DM-102 and SACLAC, whereas the SPHK1 inhibitors tested were FTY-720 and SKI-1. The most promising results were obtained in experiments using the HT-29 cell line. In HT-29 cells, FTY-720 was the most potent SPHK1 inhibitor, with an IC50 of 7.6 µM. GCS was another enzyme that was effectively suppressed, in this instance by introduction of PMPM (IC50 = 3.5 µM). Finally, of the two AC inhibitors, SACLAC demonstrated the highest potency (IC50 = 9.5 µM). These results indicate promising possibilities for treating CRC with sphingolipid enzyme inhibitors. An area of future study may be testing the impact of poly-therapies using multiple SL enzyme inhibitors for a powerful, more efficacious approach to treatment of CRC.

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factor that upregulates detoxifying and antioxidant enzymes. Fetal vinculin exposure induces histopathological changes in the placental labyrinth, the site of maternal-fetal exchange, and decreases placental weight. My research aims to investigate the protective effects that sulforaphane has on placental growth, development, and function of vinculin-exposed embryos. Specifically, we tested the hypotheses that sulforaphane reduces vinculin-induced placenta malformations, and increases placental proteins associated with detoxification and the blood placenta barrier via Nr2f2. To test this hypothesis, we exposed wild type and mutant (Nr2f2 KO) fetuses (via maternal gavage) to vinculin, vinculin and sulforaphane, sulforaphane alone, or corn oil the solvent control from embryonic day (E) 13.5 to 16.5. On E16.5 we euthanized the dam and embryos and collected placentas. I conducted histology and proteomics on four placentas per treatment. Proper placenta form and function is essential for fetal and adult health. My project takes the first step toward developing a prenatal supplement that can protect the fetus from EDC-induced placental abnormalities and will determine how placental health contributes to protecting the fetus from EDC exposure.

UP103
Decellularizing Murine Hearts for Electrospinning 3D Microenvironments
Patricia Joyce Malcolm, Dr. Muller-Borer

Prior research in the Muller-Borer laboratory has reported minimal stem cell integration when grown on electrospun scaffolds created from blends of synthetic and biological compounds [1]. Current tissue engineering research suggests the importance of tissue-specific extracellular matrix (ECM) in supporting stem cell proliferation for tissue regeneration [2]. The microenvironment of stem cells plays a crucial role in their engraftment, differentiation and survival rate. The focus of this project is to develop a cardiac ECM-based solution to create electrospun nanofiber scaffolds that simulate the cardiac tissue environment. Using a muscle decellularization technique, the initial goal of the study is to determine the number of murine hearts needed to successfully create viable electrospun scaffolds. Published protocols for heart and skeletal muscle decellularization were used to decellularize murine hearts and store the ECM. Current research is focused on characterizing, storing, optimizing the decellularization process and successfully spinning ECM scaffolds. This project is the first phase of creating cardiac ECM scaffolds for tissue engineering applications and developing 3D tissue microenvironments to facilitate in-vitro tissue engineering studies. It is anticipated that this approach to scaffold design will continue to be a part of the study of cell transplantation and regenerative medicine therapies.

References:

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UP104
The Role of PGRMC1 in Hormone Metabolism in Zebrafish
Pujaan Rameshkar Patel1, Zhu, Yong1
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Progestin is not only essential for ovulation in all vertebrates, but is also required for final oocyte maturation in fish and frogs. Abnormal oocyte maturation acceleration can cause premature menopause in humans. Previous studies have suggested that progestin receptor membrane component 1 (Pgrmc1) is widely expressed, and possesses various functions dependent or independent of progestin. For example, Pgrmc1 contains a cytochrome b5 domain, which binds cytochrome P450 proteins and activates steroid-synthesizing P450s. However, the role of Pgrmc1 paralog Pgrmc2 is still largely unclear. To determine physiologic function(s) of Pgrmc2, we generated zebrafish mutant line (pgmr2c-/-). We found reduction in both spawning frequencies and the number of embryos in female pgmr2c-/-/. This subfertility is caused by reduced oocyte maturation (germinal vesicle breakdown, GVBD) in pgmr2c-/- in vivo. Nonetheless, oocytes from pgmr2c-/- had similar sensitivity to progestin as those from wildtype in vitro. So, we hypothesized that oocyte maturation tardiness found in vivo could be due to lack of progestin signaling in pgmr2c-/. As expected, we found significant reduced expression of steroid synthesizing enzymes including cyp11a1 and hsd3b1, which are especially important for syntheses of progestin. In summary, we have provided a plausible molecular mechanism for the physiological functions of Pgrmc2 in the regulation of female fertility, likely via regulation of its role of progestin synthesis of the enzymes in the ovary. That in turn regulates progestin for oocyte maturation in zebrafish.

UP105
Negative Cumulative Impact of Low Testosterone and Cavernous Nerve Injury on Erectile Function Following Robotic Prostatectomy
Elizabeth Sabatelli, Ella Jordan, Ivey Emmert

Objective: The first objective of this study was to investigate the effects of RP-induced cavernous nerve injury in an animal model of low T (castration) on MPG neuron survival and to assess if T supplementation can restore erectile function and health.

Male Sprague-Dawley rats were separated into control (CON), castration (CAST), bilateral cavernous nerve injury (BCNI), CAST+B+T, and CAST+BCNI and T supplementation (3mg/kg; C+B+T). After 4 weeks of CAST, rats underwent BCNI to mimic RP and the C+B+T group started T for 2 weeks. At 18 weeks, erections were measured via stimulation of the cavernous nerves and measurement of intracavernosal to mean arterial pressure (ICP/MAP). Bilateral MPGs were collected, dissolved and counted. Neurons were stained using antibodies to measure neuronal branching and length and then co-stained to identify apopotic neurons. Additional neurons were stained with sympathetic or nitrergic markers.

Overall, CAST, BCNI and C+B decreased ICP/MAP, nerve growth and branching, increased apoptosis, elevated anti-erectile populations, and reduced nitrergic neurons compared to CON (p<0.05). C+B decreased in length by 33%, branching by 50% and doubled apoptosis (p<0.05 vs CON). The population of pro-erectile nitrergic neurons were reduced by 60% in the CAST or BCNI and by 70% in the C+B (p<0.05 vs CON). In contrast, the anti-erectile neurons increased 30% with BCNI and 40% C+B (p<0.05 vs CON). T restored neurite length in C+B but not branching. Apoptosis was reduced 50% in C+B+T; however, it was still elevated above CON (p<0.05). T restored neuronal populations to control levels and erectile function as measured by ICP/MAP in C+B rats (p<0.05).

Nerve injury in a low androgen state (C+B) impaired neurogenesis and caused a decrease in pro-erectile neurons compared to CON, CAST or RP alone. These data indicate that recovery of erectile function following RP-induced nerve damage in a low T state is unlikely and will lead to a higher incidence and severity of ED. T improves both erectile function and neuronal health and should be considered for prostate cancer survivors.
Carbon-Hydrogen bond functionalization is a fundamental organic transformation in which a carbon-hydrogen bond (C-H) is cleaved and replaced by a carbon-X bond, where X can be carbon, oxygen, or nitrogen. Carbon-hydrogen bonds are considered unreactive, but can be activated by the use of a transition metal catalyst. C-H activation chemistry has the potential to impact organic synthetic methods by enabling the conversion of low-cost compounds such as hydrocarbons into functional organic compounds.

We have discovered a unique platinum catalyzed acylation reaction to produce alpha-keto esters through C-H activation. Elyl-chloroacetone, an acylating reagent, was reacted with 1a (R = H) and 10% platinum catalyst in chlorobenzene. The reaction was complete within 2 hours and analysis with gas chromatography indicated no byproducts. Reaction conditions were optimized with respect to catalysts and solvent. To investigate the effect of various substituents on compound 1a, a series of substituted 2-arlyl pyrimidines were synthesized and tested in the reaction. The reaction showed great tolerance to both electron withdrawing and electron donating groups. Isolated yields of the final products were in the range of 75-88%. Experimental results of this unique acylation reaction will be presented and the significance of platinum catalyzed C-H activation to organic synthesis will be discussed.

The voltage-gated Ca2+ channel Cav3.3 regulates gene expression in zebrafish.

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Excitatory-transcriptional (E-T) coupling is a mechanism of gene regulation that involves calcium (Ca2+) entering a cell through an ion channel in response to neural or sensory stimuli. These Ca2+ ions interact with signaling proteins to alter patterns of mRNA expression in target cells. One family of ion channels responsible for E-T coupling are the voltage-gated calcium channels (L-VGCCs). Cav3.3 (Cav3 calcium channel α3 subunit) member of the L-VGCC family that is expressed in the brain and the sensory hair cells of the auditory and vestibular organs. When hair cells are excited by mechanical stimuli such as sound waves, activation of Cav3.3 channels signal the release of neurotransmitter so that sound information can be communicated to the brain. As such, Cav3.3 is required for auditory sensitivity in humans, mice and zebrafish. However, the specific role of Cav3.3 in E-T coupling in hair cells and other neural tissues during development has not been investigated.

To determine whether Cav3.3 channels regulate gene expression in zebrafish, we performed RNA-seq experiments to compare transcript abundance between wild type larvae and those where the Cav3.3 channel was inactivated either genetically (cav3.3mutants) or pharmacologically (L-type channel blocker isradipine). All together, we detected a set of downregulated transcripts which we have begun to confirm by mRNA in situ hybridization on cav3.3a mutant larval zebrafish. Determining which genes are regulated by Cav3.3 channel activity will help us to understand how E-T coupling contributes to the development of vertebrate nervous systems.

UIP109
Influence of Intrinsnic Aerobic Running Capacity on Cardiac Adaptive Responses to Stress
Alexander Samuel Clark
Dalton McGee
Sthefa Amareesh
Musaad Alashly
Dianne Walters
Las Karwa
Robert Lust

The purpose of the conducted experiments were to examine structural changes that occur in heart, related to pulmonary hypertension status and intrinsic aerobic exercise capacity. This will be conducted by having a control group of rats, some with a high capacity for running (HCR) and some with a low capacity for running (LCR), and an experimental group, some HCR rats and some LCR rats that are injected with monocrotaline (MCT). The MCT causes pulmonary hypertension in the rats, and then their hearts are examined by ultrasound weekly for 21 days to observe the progression of the disease. After 21 days, the rats are euthanized and the hearts and lungs are harvested for further analysis. Histologic sections stained with hematoxylin and eosin (H&E) will then be used to evaluate cellular ultrastructure. Right and left ventricular wall thicknesses will be used as internal controls to validate the serial ultrasound measurements. In addition, characteristics of individual myocytes will also be examined. Since we are looking at a remodeling process, picrosirius red staining will also be used to evaluate collagen ultrastructure. Ultimately, the structural remodeling will be evaluated both in the context of function and metabolic alterations. At this point, preliminary measurements show that histology and ultrasound measurements are highly reproducible.
Discussion found to contain acceptable levels of benzoate preservatives. Fruit juice-based drinks were examined samples, carbonated soft drinks (regular, low-calorie beverage. Beverages of certain classes contained similar quantities. Preliminary Data sample peak area with known concentrations of benzoic acid. Separating beverage components through differences in their polarity. Benzoate content was quantified through comparison of acid can facilitate a decrease in leptin, a hormone necessary for co-factors such as L-carnitine or acetyl-CoA. Analyzing bladder metabolic and bioenergetic sex differences will help create more effective treatments for bladder dysfunction.

UP111 Quantification of Benzoate Preservatives in Drinks Commonly Consumed by NC’s Pediatric Population Nolan Michael Davis, Jack E Pender, Natalie Taft, David Collier, Allison S Daniel

Introduction Beverage manufacturers commonly use sodium benzoate (NaC7H5O2) and potassium benzoate, (C7H5K2O2), as preservatives. Guidelines established by the Food and Drug Administration require benzoate levels to be less than 0.1 percent in food or beverage. However, in 2016 the World Health Organization (WHO) encouraged industry to adopt a 75% lower threshold in sports drinks because those beverages may be consumed at a much higher frequency by children. Research in animal models has found high levels of any form of benzoic acid can facilitate a decrease in leptin, a hormone necessary for appetite and portion hunger control.

Methods Beverages labeled as containing benzoate commonly consumed by pediatric populations were purchased. These beverages were analyzed with High Performance Liquid Chromatography by separating beverage components through differences in their polarity. Benzoate content was quantified through comparison of sample peak area with known concentrations of benzoic acid.

Preliminary Data The quantity of benzoic acid and benzoate varied depending on beverage. Beverages of certain classes contained similar quantities. In particular, carbonated form of energy (regular, low-calorie and no-calorie) had an average benzoate level of below 250 mg/ kg. None of the sports drinks sampled (i.e. Gatorade) were found to contain benzoate preservatives. Fruit juice-based drinks were found to contain acceptable levels of benzoate preservatives. Based on current regulations, all samples were found to be in compliance with Food and Drug Administration rules.

Discussion According to the Centers for Disease Control, 12.5% of North Carolina’s adolescents are obese, while a further 15.2% are overweight. Adolescents are not exceeding the recommended daily amount of benzoate through the consumption of one beverage. However, the concern is that pediatric populations are consuming too much benzoate. Children evaluated through healthy weight initiatives conducted at ECU indicate they consume multiple benzoate-containing beverages daily. Currently, physicians and nutritionists have nutrition serving size guides for patients that detail an average amount of sugar and sodium in beverage classes. The quantification of benzoate preservatives in beverages will allow pediatricians across eastern NC to develop a benzoate serving guide. This will allow parents to easily track the amount of benzoate preservatives that their child consumes.

UP112 Beneficial Neurocognitive Effects of Chronic Naltrexone Treatment in Rats Poisoned with the Sarin Analog Diisopropylfluorophosphate Justin Riley Martin - Multidisciplinary Studies in Neuroscience / Department of Psychology Tian Tran - Multidisciplinary Studies in Neuroscience / Department of Psychology Kori Brewer - Department of Emergency Medicine William Meggs - Department of Emergency Medicine

Accidental poisoning with organophosphates utilized for agricultural purposes is commonly seen in rural communities, including many areas of eastern NC. It is documented that chronic nerve damage, including cerebral dysfunction and neuropsychological disabilities, occur in humans after such poisonings. Conversely, organophosphate compounds are also used as nerve agents in chemical warfare and terrorist attacks. Some of the symptoms that persist after exposure include headaches, memory loss, confusion, and fatigue. Studies have shown acute poisonings can induce impairments on performance in neuropsychological tests. While acute physiological manifestations are well managed with atropine and pralidoxime, a large percentage of subjects eventually develop neurocognitive problems that include memory loss, confusion, anxiety disorders and increased aggression. An explanation is that an inflammatory cycle within the CNS may be a common mechanism of many neurological conditions. This suggests that novel, anti-inflammatory drugs may be beneficial in minimizing the impact of inflammatory processes, thus reducing the onset of neuropsychological impairments. Naltrexone is a potent, anti-inflammatory agent that is safe and readily available. Indeed, clinical trials have shown that naltrexone is effective in several inflammation-related diseases, such as neurogenic pain or movement disorders. This study involved a rodent model of acute organophosphate poisoning using diisopropylfluorophosphate (DFP), an irreversible acetylcholinesterase inhibitor, to determine if naltrexone can mitigate the development of neurocognitive problems in the weeks after exposure. Adult rats (n = 12/group) were given acute DFP (50 mg/kg), DFP + naltrexone (5 mg/ kg), or naltrexone; rats were treated chronically with naltrexone for 12 weeks. Afterwards they underwent neurocognitive assessment for associative learning deficits using trace eyeblink classical conditioning (TECC). This task is mediated by an intact hippocampus, which may be vulnerable to DFP. Results indicate that rats poisoned with DFP but treated with naltrexone showed improvements in conditioned responding in TECC. Naltrexone has been shown to be neuroprotective against inflammation-mediated neurodegeneration and is therefore a good candidate in examining the prevention of neurological sequelae from organophosphate poisoning.

UP113 An ECG analysis determining the impact of mother’s metabolic equivalent value in pregnancy on infant heart rate variability

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Discussion Participation in exercise is important throughout life. Moderate exercise during pregnancy has shown to have positive outcomes for the mother as well as the fetus. Previous research has reported that regular maternal aerobic exercise during pregnancy to be associated with lower fetal heart rate (HR) and higher heart rate variability (HRV) at 36 weeks gestation, and this trend continues to be seen in infants at one month of age. HRV is the beat to beat variation in the duration of the R-R interval (RRi) and is a noninvasive tool to assess cardiac autonomic function. In developing fetuses and infants, HRV can demonstrate how well the central and peripheral nervous system are working together. A technique used by exercise experts to measure physical activity for a varied population is Metabolic Equivalent (MET) value. One MET is the amount of oxygen required by the body in a resting state. This study is interested in the effects of maternal MET values on infant HR and HRV at one month of age.

Electrocardiography (ECG) of infants born to exercising and non-exercising pregnant women were recorded using a Hexoskin shirt. A MATLAB code was written to extrapolate the Vivosense generated RRI files, if needed, and to convert the RRI files from MS Excel files into text files, a compatible input file type for Kubios Premium. All RRI signals were processed using Kubios Premium. Only the mean HR reached statistical significance. None of the HRV parameters reached statistical significance, but there was a higher standard deviation of normal-to-normal intervals (SDNN), root mean square of successive differences (RMSDD), high frequency (HF) were seen for infants who were exposed to maternal exercise. No correlation was seen between the maternal MET values and the infant HRV parameters. Limitations of this study included a small sample size, assigning a MET value of 3 to all non-exercising mothers skewed the relationship between maternal MET values and infant HRV parameters, and potential correlations between pre/pregnancy activity/fitness levels, maternal resting HR, maternal age, gestational weight gain, or infant sex were not considered. Overall, infants born to women who participated in regular exercise during pregnancy had lower HR and higher HRV than infants who were not exposed to exercise. This continues to suggest the developing cardiac autonomic nervous system is sensitive to the effects of maternal physical activity and is a target for fetal programming.

UP114 Effect of the extracellular matrix on macrophage remodeling responses Felicia Elena Jamies, Ian N Hines

Background: Liver fibrosis is the accumulation of the extracellular matrix (ECM). It is known that macrophages (Mφ) play a significant role in promoting hepatic collagen production. Intriguingly, the ECM itself may influence Mφ function with evidence that the ECM can signal through integrin linked kinase (ILK) to promote inflammation and further fibrogenesis. Matrix metalloproteinases (MMPs) play a role in matrix remodeling and are critical for resolution of tissue fibrosis in the liver. Recent work has shown that type-1 collagen, the main ECM component in the hepatic stroma, can affect the inflammatory phenotype of Mφ. The purpose of this study is to better understand how the ECM can affect expression of MMPs in Mφ, a potential key regulator of the tissue remodeling process. Hypothesis: Interactions between the ECM, specifically Type 1 collagen, and Mφ will inhibit the expression of MMPs in an ILK dependent manner. Methods: Bone marrow derived Mφ (BMDMs) from WT or ILK knockout (ILK−/−) mice were cultured in the presence and absence of collagen type-1 for 24 hours cells prior to treatment with either treated with either saline or interferon-γ/LPS or IL4 for an additional 4 hours. RNA was then isolated and gene expression for various MMPs and inflammatory factors was assessed by quantitative polymerase chain reaction. Results: WT BMDM showed differential expression of MMPs upon activation with
Prostatic radiation increases cholinergic gene expression leading to enhanced nerve-mediated contractions.

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Introduction: In the US, Prostate Cancer affects 1 in 9 men. Though prostatic radiation therapy (RT) does not directly irradiate the bladder, the nerves supplying the bladder are located on the prostate’s posterolateral surface and often receive a direct dose. Radiation-induced damage to these nerves can cause bladder dysfunctions such as urinary incontinence, and difficult or painful urination. This study is examining the impact of prostatic RT on smooth muscle contractility and bladder innervation.

Methods: Male Sprague-Dawley rats (8 weeks) received a single dose of prostatic radiation (0 or 22 Gy). The bladders were collected 2 and 10 weeks post-RT. The bladder was separated into three sections. Contractile response to electrical field stimulation (EFS) and carbachol were measured. Gene expression was collected 2 and 10 weeks post-RT. The bladder was separated into three sections. Contractile response to electrical field stimulation (EFS) and carbachol were measured. Gene expression was assessed by qPCR for protein gene product 9.5 (PGP9.5; non-specific neuronal marker) and choline acetyltransferase (ChAT; specific cholinergic nerve marker). Bladder sections were stained with Masson’s trichrome for smooth muscle content. Additional sections underwent immunofluorescence staining for neuron-specific class III beta-tubulin (ChAT), a-smooth muscle actin, and 4′,6-diamidino-2-phenylindole (DAPI).

Results: EFS-mediated and carbachol stimulated cholinergic bladder contractions were significantly decreased at 2 weeks post-RT. Following 10 weeks of RT, nerve-mediated contractions were markedly increased while carbachol contractions were unchanged. Bladder smooth muscle content was significantly increased at 2 weeks post-RT and was not different from controls at 10 weeks post-RT. Bladder gene expression of ChAT was increased at 2 weeks and decreased at 10 weeks. In contrast, there was no change in PGP9.5 with radiation. We are currently assessing neuron and ChAT positive nerve populations in the detrusor at 2 and 10-week post-RT.

Conclusions: At early timepoints post-RT, nerve-mediated contractions are decreased which leads to an increase in gene expression of ChAT. EFS bladder contractions become elevated by 10 weeks post-RT. We believe the amplified contraction in the bladder is due to increased cholinergic innervation post-RT which will be confirmed with immunofluorescent staining.

Brain iron deficiency alters sleep performance in a mouse model of Restless Legs Syndrome

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Introduction: Restless Legs Syndrome (RLS) is a sensorimotor disorder that follows a circadian cycle and strongly affects sleep. While the disorder is defined by a patient self-reported “urge to move”, RLS patients often also manifest with periodic limb movements during sleep (PLMS), which are clinically-objective outcome measurements. The cause of RLS remains unknown, and while brain iron deficiency (BID) is associated with RLS and PLMS, there is no date to animal model in which the effect of BID on sleep performance has been evaluated. We here present a new technical approach and the first pilot data that assess the outcome of BID in an inducible animal model.

Methods: Littermate mice (C57BL/6) were separated upon weaning and exposed to control (Ctrl, 48 ppm Fe) of iron-reduced diet (BID, ~5–6 ppm Fe). This approach has been validated in other rodent models and provides a BID conditions without an anemic phenotype. Starting in week 7 (at age ~10 weeks), animals were placed in an modified homecage that was divided into electrically-shielded compartments, each of which fitted with electric field sensors (Plessey Semiconductors Inc.), normal bedding and food and water access for each animal. Animals were kept in this cage for 5 hrs on 2 subsequent days, and sleep and locomotor activities were recorded with the Plessey sensors in epochs of 1 hr each, digitized (~1 kHz), and spectrograms of these activities were analyzed off-line.

Results: Our pilot data show that control and BID animals show markedly different sleep/rest patterns. We regularly observed that control animals coil up in their nest and display a 4-5 Hz frequency band that is associated with breathing, as early as in the 2nd hour of the observation period. The aggregate sleep duration of all 4 control animals on their 2nd day of observation was 230.4 min, while those of the 4 BID summed to only 78.3 min. Similarly, the number of sleep episodes was 39 in control and 18 in BID animals, and the average duration of sleep / episode was 6 min in control and 4.2 min in BID animals.

Conclusion: Our results suggest that BID induces an altered sleep phenotype that, in general, resembles that of RLS patients with PLMS. The inducible BID mouse model may provide a tool to understand the mechanisms that underlie PLMS and altered sleep.

"Move and mole" RLS patients often also manifest with periodic limb movements during sleep (PLMS) and the average duration of sleep / episode was 6 min in control and 4.2 min in BID animals.

Design, Expression, and Characterization of a Bifunctional Protein Chimera for Applications in Molecular Biology

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Department of Chemistry

There are many different methods of protein capture that are used to immobilize proteins on solid supports while still maintaining their overall function. In this study, the binding interaction between streptavidin and biotin, one of the strongest known non-covalent interactions, is used for the immobilization of a protein kinase onto a solid support. This study is focused on the expression and characterization of a protein fusion between streptavidin and the catalytic subunit of cAMP-dependent protein kinase (PKAcs). The protein fusion will be tested for its expression level, solubility, kinase activity and its biotin binding affinity. A series of linkers between PKAcs and streptavidin will enable testing of the relationship between kinase activity, linker length, and linker flexibility. Upon expression of the protein, the PKAcs-streptavidin construct will be immobilized on biotinylated superparamagnetic nanoparticles. Initial efforts focused on the expression of our protein fusion in E. coli. These were hampered by low expression levels of our target protein. Recent work includes attempts to express our protein fusion in a mammalian cell line. The goal of this study is to create reusable nanobeads with specific kinase activity for life science applications.

Conserved residues of the periplasmic iron transporter from Brucella spp. play important roles in the native structure of the FixC protein: A calorimetric study

Mina N. Chanakira, Sambuddha Banerjee, Anne M. Spuches, R. M. Roop. East Carolina University Department of Chemistry and Department of Microbiology and Immunology.

Physiological Effects of the Melanocortin-1 Receptor Gene in Poison Dart Frogs

Matthew J Pahl, Kyle Summers

The Melanocortin-1 Receptor Gene (MC1R) codes for a protein on the surface of melanocytes. Melanocytes are specialized cells that are responsible for producing the pigment melanin and can be found in a variety of mammals, amphibians, and reptiles. A previous study on MC1R in the European common frog Rana temporaria found only five nucleotide substitutions across a 945 base pair coding region, which suggests that variation within the gene has little to no effect on melanism in this species. A different study on MC1R expression in the beach mouse Peromyscus polionotus discovered a fixed single nucleotide polymorphism (SNP) that is responsible for the “light” or “dark” hair color phenotype. These studies provide valuable background information but there has been little research on the effect of MC1R on the more sophisticated color patterns present within poison dart frog Ranitomeya imitator populations.

To determine what effect, if any, MC1R has on the phenotypic expression of color in R. imitator we started by crossing individuals with banded, striped, and Varadero color morphs, and created a pedigree spanning several generations. After measuring color (spectral reflectance) using a spectrometer and taking tissue samples from each individual in the pedigree (96 total), we amplified the DNA present, performed polymerase chain reaction with the relevant primers, and ran the samples through agarose gel electrophoresed to check that amplification worked. We then cleaned the PCR products and sequenced them with an automated sequencer. Sequences were aligned in the program Genious and SNPs were identified. By comparing the color (reflectance) of each individual with its genotype, we will try to identify associations between the MC1R genotype and coloration (reflectance), and determine whether specific mutations are responsible for phenotypic differences among the color morphs.
Tissue Engineering Laboratory has reported minimal stem cell scaffolds for tissue engineering applications. Successful Electrospinning techniques have been used to create nanofibrous residues in producing the native fold of FtrA. The important structural roles played by the four metal-binding Mn2+ using the conserved metal-binding residues with affinities the mutants tested had lower folding stability and altered folding and Mn2+ solutions were titrated in. On the other hand, all of folding domains which get conformational stability when Cu2+ indicate that the wild-type protein contains two independently retained their wild-type Cu2+ affinity. Our DSC experiments did not show binding with Mn2+, however, H65A and E67A stabilities of these proteins respectively. Our ITC data show that well as their roles in protein folding stability were tested and H151A, and E67A.) Each mutant's ability to bind metal as acids are conserved in FtrA. These conserved residues on Brucella FtrA include H65, E67/M111, H118, and H131, which are able to bind Cu2+ as well as E67 and D115 which are able to bind Fe2+.

In this study we mutated four of these residues (H65A, H118A, H131A, and E67A) Each mutant's ability to bind metal and as well as their roles in protein folding stability were tested and compared with similar properties for the wild-type protein using calorimetric techniques. These techniques included Isothermal titration calorimetry (ITC) and differential scanning calorimetry (DSC) which quantified metal binding ability and folding stabilities of these proteins respectively. Our ITC data show that wild-type FtrA can bind both Cu2+ and Mn2+ (an iron mimic) with μM affinities unaffected by pH. The mutant proteins however did not show binding with Mn2+, however, H65A and E67A retained their wild-type Cu2+ affinity. Our DSC experiments indicate that the wild-type protein contains two independently folding domains which get conformational stability when Cu2+ and Mn2+ solutions were titrated in. On the other hand, all of the mutants tested had lower folding stability and altered folding mechanisms.

Thus, our studies confirm that Brucella FtrA uptakes Cu2+ and Mn2+ using the conserved metal-binding residues with affinities unaffected by the pH of the solution in vitro, as well as indicating important structural roles played by the four metal-binding residues in producing the native fold of FtrA.

Electrospinning Synthetic Extracellular Matrix
Anju Pranar Sanghi
Electrospinning techniques have been used to create nanofibrous scaffolds for tissue engineering applications. Successful integration of cells onto scaffolds is critical in developing 3D tissue structures. Previous research in the Cell Based Therapy & Tissue Engineering Laboratory has reported minimal stem cell activity when grown on electrospun scaffolds from blends of synthetic and biologic compounds (Vargas, 2016). Electrospun nanofibers mimic the structure of the extracellular matrix (ECM) laid down by cells but not functional properties (Gao et al., 2017). The purpose of this study is to evaluate human mesenchymal stem cell (hMSC) engraftment and viability when grown on novel electrospun scaffolds in the presence of the extracellular matrix proteins fibronectin. We hypothesize that electrospun scaffolds created with synthetic fibers and ECM components will provide an enhanced microenvironment to increase hMSC proliferation and engraftment. Biodegradable, biocompatible electrospun scaffolds are created from a blend of beta-lactoglobulin (BLG) and poly(ethylene oxide) (PEO). Scaffolds are crosslinked at 100°C and sterilized under UV light. The fiber structure and diameter will be analyzed using scanning electron microscopy. The scaffolds will be treated with a 0.05% fibronectin solution. Fibronectin adsorption and dispersion will be assessed with fluorescence microscopy. After assessing fibronectin adsorption on the scaffolds, hMSC activity will be evaluated. hMSCs will be seeded on control scaffolds and fibronectin treated scaffolds. Scaffolds and hMSCs will be imaged and cell proliferation assays performed at 24, 72, 144 and 192 hours. This research is ongoing to determine the techniques and components to enhance the integration and proliferation of stem cells in the scaffold. The results of this study will advance techniques to improve hMSC viability for tissue engineering applications.

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Impact of different optic flow speeds on cognitive performance in sitting and standing
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During flight, pilots encounter a series of physical and cognitive challenges. One of the more pressing considerations during flight is spatial disorientation. In humans, the vestibular system is a set of sensors that detect angular motion and translation.
This system is responsible for providing a sense of position and motion in three-dimensional space. The spatial disorientation pilots encounter may be due to physiological limitations of the vestibular system. However, little is known about how the human brain can misinterpret sensory information during the integration process. In addition, there is limited information available about how the human brain performs cognitive tasks while concurrently interpreting large amounts of information received during constant vestibular stimulation. The goal of this research project is to investigate how high-speed optic flow affects the processing of additional sensory information. In order to simulate the high-speed optic flow experienced by pilots during flight, a virtual reality (VR) headset was used. A total of three different speeds of optical flow (slow, medium, and fast) were used in this experiment. In addition to wearing VR headset participant were given two push button control devices. During the experiment, two sound frequencies are generated by the computer for the participants to hear. Participants will either stand or sit and press the corresponding button as soon as possible after hearing either the high or low pitch sound. The delays between when the sound is produced and the instant that the button is pressed is recorded for all cases. This data will be analyzed to determine if the optical flow had any effect on cognitive performance or not. It is hypothesized that participants will have longer delays when pressing the button while experiencing higher speed optical flow and that participants will also respond to higher pitch sound more quickly than the low pitch sound. Demographic data will also be collected for each of the participants. Age and health background are two of the main factors expected to affect the results. Overall, the findings from this work are expected to characterize how optical flow contributes as a distraction factor for participants performing in flight tasks.

Investigating the Impact of Mettl6 Cellular Localization on RNA Binding Preferences
Daniel Joel Nance, Emily Satterwhite, Kyle Mansfield
Recently, mRNA modification by N6-methyladenosine (m6A) has been shown to be involved in post-transcriptional regulation processes including mRNA stability, splicing, and promotion of translation. Accordingly, the mRNA methylation complex of Mettl3/14/WTAP has been the subject of intense study. However, the precise manner in which the binding preferences of Mettl3/14/WTAP has been the subject of intense study. However, the precise manner in which the binding preferences of Mettl3/14/WTAP is regulated is not well understood.

We have been successful at overexpressing Mettl6 and identifying additional RNA targets by immunoprecipitation. Interestingly, when overexpressing exogenous Mettl6 we have observed differences from the endogenous protein in both the RNA targets as well as the relative affinity for targets. We hypothesize that this difference may be related to cellular localization as the endogenous protein appears to be mainly cytoplasmic while a significant fraction of the exogenous protein is found in the nucleus. We are currently investigating the impact of Mettl6 cellular localization on its RNA binding preferences using nuclear import and export buffers to direct the endogenous protein to one compartment or the other. Future experiments will explore the physiological importance of Mettl6 localization by investigating the presence of nuclear localization and export signals and their impacts on METTL6's RNA targets.

Understanding conformational dynamics of Transglutaminase 2 (TG2) using denaturant-induced unfolding studies
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The biological relevance of TG2 can be better understood through an investigation of its allosteric mechanisms and conformational dynamics. Transglutaminase 2 (TG2) is a multi-functional enzyme inherently capable of adopting at least two catalytically active, stable conformations. TG2's dependent transamidase activity is presumed to be associated with TG2's "open" state, while its "closed" state confirmation is linked to the enzyme's mutually exclusive GTase activity. The believed allosterically regulated nuclear export/import mechanisms of TG2's conformational changes are caused by the endogenous protein to one compartment or the other. Future experiments will explore the physiological importance of Mettl6 localization by investigating the presence of nuclear localization and export signals and their impacts on METTL6's RNA targets. Through these studies we hope to better understand the biological role of this understudied m6A methyltransferase.

Understanding conformational dynamics of Transglutaminase 2 (TG2) using denaturant-induced unfolding studies
Alexander D. Honдрos1, Anita Desantis1, Tony N. Zeczyck1
1 Department of Biochemistry and Molecular Biology, Brody School of Medicine at East Carolina University
The biological relevance of TG2 can be better understood through an investigation of its allosteric mechanisms and conformational dynamics. Transglutaminase 2 (TG2) is a multi-functional enzyme inherently capable of adopting at least two catalytically active, stable conformations. TG2's dependent transamidase activity is presumed to be associated with TG2's "open" state, while its "closed" state confirmation is linked to the enzyme's mutually exclusive GTase activity. The believed allosterically regulated nuclear export/import mechanisms of TG2's conformational changes are caused by the endogenous protein to one compartment or the other. Future experiments will explore the physiological importance of Mettl6 localization by investigating the presence of nuclear localization and export signals and their impacts on METTL6's RNA targets.
conformations were created via site directed mutagenesis and unfolding properties of these mutants were compared to the WT enzyme. In addition, GTP was included in parallel investigations to determine the ligand-induced stabilization effects on TG2’s unfolding. These studies have revealed valuable insight into both the anatomic and dynamic nature of TG2, leading to a better understanding of how this enzyme functions in biological processes.

UP124

The Antifungal Properties of Berberine Chloride on Candida spp.

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Berberine Chloride will be an effective treatment against C. albicans. Oral Candidiasis is a fungal infection caused primarily by Candida albicans, an opportunistic organism. This affects people with immunodeficiencies and those who are on multiple antibiotics, undergoing chemotherapy, and antiretroviral therapy. The current treatment for Candidiasis consists of fluconazole and amphotericin B however usually the patients will relapse within a few months after being off treatment. Furthermore, because there are so few treatment options available, Candida is becoming more resistant to these drugs. Natural products are being looked at as a solution to this problem. Berberine Chloride is an alkaloid, an effective antimicrobial agent and can hinder the growth of staplylococcus aureus. Recent literature has suggested that it may have some antifungal properties. For Berberine Chloride, the MIC was between 300µM and the MFC was about 3500µM. For time kill, C. albicans (MYA-2876) was incubated for 24 hours in 24-well plates in RPMI plus 10% FBS at 37°C in 5% CO2. Then the wells were treated with various concentrations of the fungal inoculum of 10^6 C. albicans (MYA-2876) cells was prepared 4 hours before counting the CFU. For Biofilms Quantification, Berberine Chloride seemed to be more effective than Fluconazole.

Abstracts | Undergraduate Poster Presentations

UP125

Garlic bioactivities influence macrophage associated matrix remodeling enzyme expression in vitro

Thais Gaiola Oliveira and Briecida Osborne.

For centuries, Garlic (Allium sativum) has been used for both flavoring and medicinal purposes, and its sulfur bioactive compounds are largely responsible for its health benefits including preventing cardiovascular diseases. Among the bioactive compounds present, allicin and its breakdown products including diallyl disulfide (DADS), have been shown to reduce inflammation. Previous URCA funded work in our lab highlighted the ability of DADS to reduce key inflammatory markers (e.g. interleukin 12, IL12, chemokine ligand 2; CCL2, and inducible nitric oxide synthase; (iNOS) in macrophages (M1) in response to lipopolysaccharide (LPS). In addition to promoting inflammation, M1 also play a significant role in tissue remodeling, expressing key matrix remodeling enzymes (e.g. matrix metalloproteases; MMPs) which may influence disease progression. Little is known regarding the effect of garlic bioactives on this component of the macrophage response. It is hypothesized that garlic bioactives, specifically DADS, will alter MMP expression patterns in M1 response to inflammatory stimuli. To test this hypothesis, bone marrow derived macrophages (BMMs) were exposed to vehicle or DADS (5-10µM) for 24 hours and then activate with lipopolysaccharide and interferon gamma (LPS/IFNγ) for an additional 4 hours. Expression patterns of more than 15 matrix remodeling enzymes were then evaluated by quantitative PCR. Exposure of BMMs to LPS/IFNγ led to a differential expression of MMPs with MMP-3, 10, 11, 12 downregulated while MMP-8, 13, and 14 were up-regulated. Pre-treatment of M1 with DADS inhibited the expression of MMP-13 and 14 when compared to vehicle treatment. In conclusion, macrophage function is critical for innate immune response but also a key feature of a number of chronic diseases including heart disease where macrophage dysfunction may influence tissue remodeling and long-term organ dysfunction. MMP expression is closely related to clot formation (overexpression) and arterial stenosis (underexpression). Defining key regulators including dietary bioactives such as those discussed here which can finely control MMP expression patterns could prevent or stabilize atherosclerotic plaque thus decrease cardiovascular incidents.

UP126

Biomolecular Alterations in the Snatch during a Bout of 30 Repetitions

Hannah E. Black, Ryan E. Womble, Robyn N. Sperranza, Patrick M. Rider

Interest in high intensity weightlifting for overall fitness is rapidly spreading throughout the fitness industry. Crossfit, weightlifting boot camps, and athletic style training classes are just a few examples of exercise programs that incorporate these types of weightlifting movements. Research studies have suggested that high intensity weightlifting programs have high injury rates, however it is unclear why these high rates of injury are occurring. Researchers have suggested that as lifters do multiple repetitions of a movement, their mechanical technique may change in a way that could increase injury risk. The purpose of our study is to quantify mechanical changes in a high intensity weightlifting workout incorporating the snatch movement to determine relationships to increased injury risk. We hypothesized that participants will exhibit observable biomechanical technique alterations as they completed increased repetitions of the snatch exercise.

3 participants (1 Male, 2 Female) completed the CrossFit benchmark workout “Isabel” which consists of 30 repetitions of the snatch for time. Weight lifted (males 64kgs and females 43kgs) was held constant for each athlete across all 30 repetitions. Each participant had previous experience with this specific lift pattern and workout. Video cameras were placed to record the frontal plane and the sagittal plane of the lifter during the snatch repetitions. Dartfish software was used for video analysis. Key biomechanical variables (such as joint and segment angles) of each rep were measured and compared to the participant’s first lift.

All participants exhibited considerable amounts of technique alterations, most notably towards the last reps (25-30) of the workout. Participants’ trunk angle was on average 28.3 degrees more flexed from the first repetition to the last. Participants’ knee angle was on average 71 degrees more extended from the first lift to the last. Participants also caught the bar an average of 24.1 centimeters lower from the first lift to the last. Our results indicated that as the number of snatch repetitions increases in a workout, significant changes in technique occur and that some of the observed changes were consistent with technique associated with increased injury risk. Coaches should address visible technique alterations that could lead to injury when athletes are performing these types of benchmark assessments.
Creating a Club to Increase Sexual Assault Awareness and Prevention on ECU’s Campus

Danielle Adams, Phoenix Little

Everyone knows that sexual assault is a problem on college campuses, including at East Carolina. 14.8% of students will experience some form of sexual assault while in college (Cantor, Fisher, Chibnall, Townsend, et al., 2015). However, it can feel like little is done to prevent it. We saw the need for something to be done about the prevalence of sexual assault on ECU’s campus, and during the 2016 semester, a committee was created on campus organization. Our main goal for this organization is to raise sexual assault awareness by presenting the hard statistics and facts to the students of ECU in a familiar, on campus setting. Our hope was that with more awareness of the problem, the more it would be prevented. With this aim in mind, we also wanted to have speakers and figures on campus share their stories and perspectives to help personalize a subject that is often hard to talk about. At the start of this year we created the organization A Better World in aims of beginning this important conversation.

In trying to go about this process we ran into many challenges, with barriers both outside and inside of our group. These included challenges such as finding campus resources with the high turnover rate in many departments, and trying to gauge student interest with the material we presented and the club itself. Despite this, we are pushing forward. We are currently preparing materials for our first interest meeting set to be on Thursday, February 21st, 2019. From that meeting we hope to begin collecting data on how our presence as a club influences the awareness of sexual assault. We intend to do that by giving students a survey on both their happiness with the club and the effect of the club on their knowledge on sexual assault and its prevention.

Factors Influencing Community Collaboration in Public Health Initiatives in Developing Countries

Claudia Josephine Wozniach
Kim Larson, PhD, RN, MPH, FNAP
Amanda Haberstroh, PhD, MLIS

Global health is one of the four priority areas for nursing science in the 21st century (Eckardt et al., 2017). Safe drinking water is a basic necessity that remains out of reach for many people living in developing countries. Rural regions of Latin America are the least likely to have access to clean drinking water resulting in high morbidity and mortality (UNICEF, 2014). The World Health Organization (2015) urges community involvement in decreasing illness related to unsafe drinking water. For the past 12 years ECU College of Nursing has been working with community partners in Guatemala to address safe drinking water. Yet, it is unclear what factors contribute to the effectiveness and sustainability of community collaboration in public health initiatives, such as safe drinking water.

A systemized review of the literature was conducted to ascertain the current state of the science with regard to the effectiveness and sustainability of community collaboration in public health initiatives in developing countries. Nursing faculty and an honor student along with social and health science librarians created a comprehensive list of search terms, based on inclusion and exclusion criteria. We searched the databases PubMed, CINAHL, Embase, Sociological Abstracts, and SocINDEX. Inclusion criteria were studies in English, recent (within 5 years), qualitative/quantitative, conducted in developing countries, utilizing community collaboration, engagement or partnerships, and addressing a public health initiative. Exclusion criteria were: developed country, community health workers, lay health advisors, and outreach workers. Three research team members independently reviewed the titles of articles. The deduplicated combined bibliography of the five databases yielded 522 citations. Investigators will review abstracts for effectiveness and sustainability of community collaboration to determine the final citations to be included in the review.

Charity sport events are an effective and fun way to raise money for non-profit organizations and charitable causes. In 2018, approximately 40,000 charity sport events attracted over one million attendees (American Cancer Society Vital Statistics, 2018). The primary consumers and contributors of charity sport events are sponsors and the event participants. Both are vital to the success of charity sport events, and as more annual events are occurring, keeping sponsors and event participants coming back is crucial. Consequently, understanding the motives of sponsors and charity event participants is fundamental to increase event popularity, which would likely result in an increase in funds for the charitable cause. Researchers have found that participant motivation for charity sport events can be divided into three categories: these categories are social, health, and advocacy motives (Wonet al., 2010). For sponsors of charity sport events, motives are primarily philanthropy or social responsibility and increased brand recognition (Abratt et al., 1987). This research study seeks to discover if these same participant and sponsor motives hold true for a small-scale local charity sport event, the CoopStrong 4-Miler. CoopStrong, a non-profit organization started in 2017 in Greenville, NC, seeks to support the fight against ALS by assisting local families living with the disease and supporting ALS research. After IRB approval is received and with the support of the organization, 2018 CoopStrong 4-Miler sponsors and event participants (approximately 550) will be asked to complete an online survey. The survey consists of demographic and open-ended questions regarding motives and current involvement in the CoopStrong event. The results from the survey will then be analyzed with NVivo 12 software. Using open-coding the researcher will seek to determine the participants and sponsors motives for the event and explore any differences between the groups. The results will be compared to the current literature and then be used to provide a set of recommendations and practical implications for small-scale local charity sport events. Americans annually give billions of dollars to charities (Giving USA, 2018). However, due to underperformance and lack of participation, almost 1,000 charity sport events were cancelled in 2017 (Kadet, 2011). CoopStrong and other charities must understand event sponsor and participant motives to ensure future and sustainable success.
were engaged in critical thinking about mental, social, and physical health through various planned sessions, which were approximately thirty minutes. These sessions consisted of games, arts and crafts, and discussions about individual health. Students were required to maintain a journal as a way to observe potential changes in their viewpoints on health. Surveys for the parents and staff at the Boys and Girls Club will be distributed based on a volunteer basis at the conclusion of the program to examine the gain in health knowledge of the students and to evaluate the program. This allows for the modification of the sequential courses in the program. The faculty of the Boys and Girls Club have reported that the students are continuing to follow the health plans they devised during the interactive presentations.

An Exploratory Study of Early Childhood STEAM Parenting Workshop Development in Pitt County Community

Nikita Rajan Revankar1, Lyndsey Graham1, Jenny Bolton1, Kiersten Mahaffy2, Tracy Chamberlin2

1 Department of Human Development & Family Science, East Carolina University 2 Martin-Pitt Partnership for Children, Pitt County

Mentor: Chia Jung Yeh1

The integration of Science, Technology, Engineering, Arts, and Math, also known as STEAM, is rapidly becoming an integral part of today’s society. Several research studies have discovered that early exposure to STEAM has an incredible effect on long-term educational/societal outcomes (Brenneman, 2011; Dejarnette, 2012, Lamb, Akmal, & Petrie, 2015). While strategies and plans are being designed in the school environment to more seamlessly integrate STEAM, little has been done to equip parents, who are considered children’s first teachers, with the appropriate tools and information to better implement STEAM into early childhood activities at the home-level. As a community engagement research project supported by Office of Community Engagement and Research, the purpose of this research study is to examine parents’ attitudes and concerns toward early childhood STEAM education and to develop a parent workshop to promote early childhood STEAM activities at the home-level. By achieving this seemingly small feat, it will create a widespread impact that will continue to affect the ECU student body for many years to come.

Ending Drunk Driving at East Carolina University

Amber Bryant, Michael Cramerle, Anna Seguin, Emily Seguin, Lauren Tarfle
Mentor: Tim Christensen

East Carolina University, Honors College

Impaired driving, better known as driving under the influence (DUI), refers to drinking alcohol and then operating a motor vehicle. Driving under the influence is as widespread as it is deadly. According to the U.S. Department of Transportation, close to 4 million adults in America committed an estimated 112 million drunk-driving accidents in 2010 alone. Even though there is a high volume of drunk driving episodes, only a miniscule percentage of impaired drivers are arrested (Drunk Driving, 2019). The abuse of alcohol on college campuses is undeniably high. Alcohol use affects many aspects of a student’s life; mental, emotional, and physical health are all negatively influenced by substance abuse. While eliminating this harmful behavior entirely is going to remain an ongoing problem that cannot be fixed with one simple solution, we plan to greatly decrease one facet of the effects.

Ending Drunk Driving at ECU is a mission to inform, persuade and educate the population of East Carolina University on the dangers of driving and driving. We hope to make the Greenville community a safer environment by providing a wide array of educational opportunities for the students of East Carolina University. If college students continue this behavior, the number of students that drive while intoxicated and are injured in alcohol-related car accidents will continue to rise. Students will continue to believe that they cannot and will not be affected by the consequences of this behavior. As a result, they will continue to risk their own lives as well as the lives of others.

Thanks to input from students and faculty alike, we have a concept that we would love to turn into an educational video for the Health 1000 classes. We plan to make an entertaining video that gets the facts out there but does not shove statistics down the audience’s throats. Our goal is to create an entertaining video so that if/when students are downtown partying, they will remember the resources we provided through the video. We are hoping that by achieving this seemingly small feat, it will create a widespread impact that will continue to affect the ECU student body for many years to come.

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Healthy Pals

Hannah Butler1 Camille Whitlock1 Madeleine Rector1 Morgan Agner1 Ross Judd1 Sydney Johnson1 Sydney Johnson1

Honor College, East Carolina University

A common problem faced today is the lack of healthy eating, specifically in children. Programs across the country have measured gains scores from students in a classroom setting, however we aim to look at it from an after-school setting. This way, students can view healthy snack choices as fun, interactive, and in a relaxed manner. Meaning, we are studying the effectiveness of the implementation of an educational intervention focused on healthy snack choices. Our curriculum, meant for elementary age students grades 3-5, would participate in engaging, interactive lessons that excite children to want to eat healthier. Lessons would last roughly 30 minutes each week, and every session the students get to participate in the making of their own personal snacks. Through all of this, we are striving to find ways to make learning about and eating nutritious foods interesting to students and gather data from pre/post testing, that prove our implementation could be successful.

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Not Broken: Improving Disability Sport

Sarah Elizabeth Horrell

Individuals with disabilities are similar to typically developing people in that both have a need for community as well as physical activity. Disability sport can provide an avenue for community and meeting the daily recommended amount of physical activity (Laskowski, 2016). Statistically, individuals with disabilities are less likely to meet this. While “normally-developing” people...
are given numerous physical activity opportunities, fewer opportunities exist for those with disabilities (Nixon, 2007). Despite U.S. laws requiring schools and communities to provide equal access and opportunities for extracurricular activities (i.e., Section 504 of the Rehabilitation Act), people with disabilities have limited participation opportunities. Thus, explaining why physical activity is 4.5 times lower for children and youth with disabilities than their peers without disabilities (U.S. Department of Education, 2011). This staggering statistic indicates a greater understanding of how disability sport can be improved is needed.

This study aims to better understand this issue by conducting a survey of leaders of organizations focused on disabilities (e.g., The Autism Society, The Special Olympics). This online survey will take a mixed method approach. The first section will consist of open-ended questions and seek to better understand why the organizational leader chose to work in the field, and capture how they believe disability sport could be improved. The second section will seek to measure and quantify the participant’s view of disability sport. Using a 5-point Likert scale (strongly disagree, somewhat disagree, neutral, somewhat agree, strongly agree) statements such as “Disability sport is an ideal way to integrate individuals into society.” “Disability sport perpetuates negative stereotypes” etc. Descriptive analysis will then be used to determine the participant’s perceptions of disability sport. Given the survey participants are ultimately in charge of implementing disabled sport opportunities in the Pitt County, this research will gauge their current desire and perceived obstacles to do so.

UP140
Gregory Poole Abstract
Jarrett John-Vincent DePizzol
Kaleb Paul Spencer
Project Abstract
Company: Hog Slat
Champion: Fred Rick, Jerry Calhoun
Students: Kaleb Spencer, Jarrett DePizzol
Gregory Poole is the exclusive Cat construction equipment dealer for eastern North Carolina. Currently, it is thought that the parts disassembly part shelf processing is insufficient and not capable of getting parts on the shelf in a timely manner. This results in lost sales for there is no visibility that these parts are on hand and ready to sell. If there is a more streamlined process to shelf used parts employed, there will be much more visibility to the sales force that parts are ready to sell. This visibility can result in more parts sales, quicker bay turnaround and faster inventory turns. Implementing visual management and 5S could also help the process throughput as well as a safer place to work. This process will begin when the part is removed from a teardown machine and ends when the part is on hand and ready to sell.

We will measure current performance levels, calculate defect rate, analyze the process for a root cause, and develop the future state process from removing root cause from the process. We will do this with the help of our champion, Fred Rick, and Jerry Calhoun.

UP141
Development of a second generation novel air puff system prototype for use in medical, cosmetic, and food industry
Keith Richard Williams

Past research with a team in the Engineering Department here at ECU has had promising results on the development of a novel air puff system named AERO that could be used to help quantify and diagnose edema, particularly lymphedema in breast cancer patients. Aero is a system made of a compressed air system that puffs air onto the skin of a patient or individual. The indentation caused by the air puff on the skin is recorded using a micro camera. Electrical parts are being added to the system to make automation possible. There is also research being conducted on the use of AERO for other applications. A second prototype is being constructed that builds on past research and observations of the current prototype. The main benefit of this new design is the mobility of the device. The current prototype is limited to labs that provide compressed air outlets. Several other factors, listed below, are also being accounted for in the new design of the prototype.

- Distance of the nozzle to the skin
- Automation of each air puff
- Automated control of micro camera
- Controlled lighting
- Controlled pressure of each air puff

The design process used to make a more robust air puff system will be outlined and documented in this presentation. Future research topics and experiments involving the device will also be discussed.

UP142
Characterizing Pulmonary Artery Hemodynamics in End-Stage Renal Disease Patients
Daniel Patterson Pearce1, Dr. Veeranna Maddipati2, Dr. Bogdan Marcu3, Dr. Stephanie George1
1Department of Engineering, East Carolina University
2Department of Internal Medicine Pulmonary, Brody School of Medicine
3Department of Cardiovascular Sciences, Brody School of Medicine

Characterizing Pulmonary Artery Hemodynamics in End-Stage Renal Disease Patients
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1Department of Engineering, East Carolina University
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Over 15% of United States adults suffer from chronic kidney disease. This condition leads to impaired renal function and, if unaddressed, can develop into end-stage renal disease, which affects diabetics, hypertensive, African-American, Hispanic, and elderly patients at higher rates. Dialysis, which typically requires creation of an arteriovenous fistula in patient’s forearms, is one treatment currently used for end-stage renal disease patients, however, this method has recently been suggested to promote development of pulmonary hypertension in these individuals. The objective of this project is to characterize pulmonary hemodynamics before and after fistula creation in end-stage renal disease patients, providing physicians with a better understanding of pulmonary hypertension development in these patients and evidence for the adoption of novel, non-invasive screening techniques, such as computational fluid dynamics (CFD), to replace invasive and costly right heart catheterizations. CFD software has been used to model blood flow properties such as maximum velocities, wall shear stresses, and dynamic pressures. Past studies utilizing CFD have found decreased wall shear stresses in hypertensive patients. These results were corroborated by projects completed here at East Carolina University.

The findings and techniques from past work will be further applied in this project to quantify pre- and post-fistula hemodynamics in end-stage renal disease patients, which will be collected non-invasively and observed by using a Student’s T-Test if applicable. These results would provide insight into pulmonary hypertension development in end-stage renal disease patients, resulting in improved non-invasive and cost-effective screening techniques for end-stage renal disease patients at-risk of pulmonary hypertension development and, hopefully, a reduction of ethnic and age-related health disparities.

According to the Anxiety and Depression Association of America, 18.1% of the US adult population suffers from some form of anxiety disorder including phobias, obsessive-compulsive disorder, and post-traumatic stress disorder (PTSD). Of the 40 million adults suffering from anxiety disorders, only 36.9% receive treatment [1]. A sensor-based system with positive feedback could improve mental health and overall quality of life as an anxiety management aid.

The goal of this project was to create a discreet wearable sensor system to detect anxiety. This was accomplished with the development of a form-fitting sensor to measure electrodermal activity (EDA) on the foot. The bottom of the foot is the optimal location for discrete measurement of EDA. The sensor was paired with an app via a Bluetooth module that sent real-time updates of anxiety measurements.

Anxiety measurements are recorded in a log, allowing the user to view peak anxiety times. When certain levels of anxiety are detected, the app will alert the user and provide various
coping techniques for both stress and anxiety management. The development of discreet, wearable sensors allows for measurement of an anxiety without drawing attention to the individual wearing the device, ensuring privacy. This system provides an alternative or augmentation to pharmaceutical intervention.

Anxiety measurement can also be integrated into other applications such as education and training tools to determine when new employees or students are confident in performing a new task. This system could assist those with phobias or PTSD to cope with their conditions. This task was accomplished through research into EDA and coping techniques and the development of a microcontroller-based data collection system. A prototype wearable sensor has been developed using flexible circuit material and an app was developed to read the data and to provide positive feedback.

Citations:

UP144
IENG4900: Capstone Abstract
Crown Equipment Corporation
Cole Brunet

My capstone project is for a company called Crown Equipment located in Kinston, NC. The goal of the project is to find a more efficient way to manufacture tension bars for the forlifts. The process is a 4 machine operation using only two workers, the operation goes: Band saw, Lathe, torch cutter, weld. I plan to reduce operator downtime, improve the plant layout and create a more efficient and effective work process. Some tools that will be used are as follows: Time studies, Plant layouts, line balancing, SWVA, etc.

Currently they have one worker running three operations (lathe, torch, and welding), the layout seems to be in-efficient, and the one operator is overloaded with work while the other has down time. So far, my progress in the project includes: Conducted time studies, and created multiple options for plant layout.

I would like to move some machines around and change the order of operations in order to improve the efficiency and output of parts in that area. I hope to be able to save the company at least $100,000/yr.

UP145
DSM Dyneema Process Improvement Project
Andrew Robert Thomas

DSM Dyneema is a manufacturer that makes the ballistic material that goes into bullet proof vest and armor plates for vehicles. DSM makes the ballistic thread and then processes it into a matrix paper spool to send off to the final manufacturer to make the final product. The raw materials into the process are an aqueous rubber compounds and ballistic yarn of which are combined to make the deliverable product, the matrix paper. Our goal for the project is to optimize the product changeover process for the raw material utilizing 5s tools to sort and standardize the process line. The project will start by making a current state value stream map to fully visualize the process. After the information has been collected we will find a way to optimize the initial steps in this process allowing for a better changeover of their ballistic yarn. This can be potentially done by utilizing the batch method.

To judge the progression of the project, milestones will be established. Our first milestone will be the creation of the current state value stream map, next we will develop metrics to measure each machine’s production time or cycle time. Finally, we will determine the takt time, the total time it takes a part to be produced and the total time the manufacturer needs to meet customer demand. Once we find the problems in the production line we will create a future state value stream map which will depict how to improve the process. If done correctly the lead time will be decreased dramatically and allow for a smoother operation.

UP146
Modeling of human insulin-glucose response mechanism for diabetes analysis
Natalie Bell, East Carolina University
Linkun Lee, East Carolina University

Diabetes affects majority of the population, and there has been a need for a change in how our society implements diabetes treatments. Recent approval of automated insulin delivery and continuous glucose monitoring system by FDA enables variety of control scheme for the better treatment. An insulin infusion therapy integrated into the treatment plan of many diabetic patients receive a surge of interest due to control consistency as well as potential of less dosage of insulin. Minimizing insulin dosage is critical to a long term diabetes treatment when considering an insulin resistance. In order to design an insulin pump controller, we first need to understand the mechanism between insulin and glucose that can be described by mathematical models, a system of ordinary differential equations and an autonomous control algorithm. This model will be useful at designing a model-based insulin pump controller. In this paper, we investigate the literature of insulin-glucose interaction models and propose an improved model. We provide numerical examples to validate the proposed model and discuss its efficacy as well as future direction of this work.

UP147
Design of a Patient Orientation Monitoring System
Christopher Edward Satterley
James Richard Silva Barros, III

Pressure ulcers (PUs), also known as bedsores, are a major concern for bariatric patients in hospitals. PUs acquired during hospital stays are considered preventable and not covered by insurance; the cost to treat these injuries are absorbed by the hospital. Repositioning patients at appropriate time intervals is important for the prevention of PUs. Several devices have been developed to track body position, but they are all cumbersome to wear and too expensive to be disposable.

The goal of this study was to design a patient monitoring system to 1) read body orientation, 2) log orientation data for future analysis, and 3) alert nurses to adjust the position of patients at prescribed time intervals. This study focused on designing a device for bariatric patients who are more susceptible to developing PUs due to both difficulty in rotating and added forces on their skin due to their body mass.

The study examined several options for ergonomic sensor placement, and data collection techniques to design a reliable, noninvasive patient monitoring system. The system developed includes three aspects: measurement of patient orientation, data transmission, and data processing. Orientation measurement is performed by an accelerometer attached to the patient. Several locations on the body were considered for acceptable sensor placement. Radio frequency-based energy harvesting is used to power the accelerometer system, eliminating the need for a bulky battery, reducing the device’s weight and size. Orientation data is sent wirelessly to a nearby data collection unit via RFID technology.

The data is then processed to determine current position, and can be programmed to send a notification at a set time, or a specific orientation is reached, or a combination of both.

UP148
Pressure Evaluation of Tracheal Suction Catheters to Reduce Damage to Respiratory Airways
Marcus Moody1, Dr. Veeranna Maddipati2, Dr. Stephanie George3
1Department of Engineering, East Carolina University1, Brody School of Medicine, East Carolina University2

Tracheal suction catheters are used to remove fluid from respiratory airways and artificial airways such as an endotracheal tube. During this procedure the soft epithelial tissues which line the airway may come in direct contact with the catheter, obstructing the primary inlet. The high pressures combined with direct contact can result in damage to the tissues by inducing lesions and causing deterioration of the epithelium. The indicated trauma requires additional medical attention and prolonged care and recovery. The objective was to determine the amount of pressure present at the distal hole of a catheter, where primary fluid intake occurs, termed the primary inlet, through the use of computational fluid dynamics (CFD) modeling.

The premise of this experiment was to assess the pressures associated with the various catheter tips commonly used in the field of medicine. This approach utilized computational modeling to determine if various catheter tip designs, which have side holes of different shape, size, and orientation, will show decreased pressure when the primary inlet has been obstructed stimulating contact with tissue. Three commonly used suction catheter tips, Whistle Tip, Gentle-Flo and Tri-Flo, were used to create fluid models in SolidWorks 2015. Each model represented only a 40 mm section of a 14 French catheter (4.7 mm in diameter), which is the average size catheter used for suction. Along with these solid models, a straight-line catheter with no additional holes was designed as a control. The part files were imported into ANSYS v17 for meshing and ANSYS Fluent for CFD simulations. A negative pressure of 100 mmHg was used to simulate vacuum pressure at the catheter outlet hole, and inlet pressures were varied at 0.5, and 10 mmHg. This was to model average suction pressure and intrapulmonary pressure during respiration.

Based on preliminary results it appears that when obstructed the catheters produce almost two times the amount of pressure when compared to unblocked flow. Once all simulations are completed comparisons will be made between the different catheter models, along with a comparison with the control model.
The Future of Advanced Manufacturing in High Bay
Eric Douglas Clark
Wayne Godwin
3Innovation Design Lab, East Carolina University

Abstracts | Undergraduate Poster Presentations

UIP49
The Future of Advanced Manufacturing in High Bay
Eric Douglas Clark
Avery Jeffers

As a group, Avery and I will work to organize and improve the utilization of high bay in Sci Tech room 141. Currently, High Bay (ST 141) is undergoing several updates in equipment and standards and is in need of an organizational pattern that best utilizes the equipment while also implementing safety standards. Our group will use tools such as autoCAD to create a 3D drawing of High Bay and allow us to visualize the space and augment it virtually so we can gain a better understanding of the space and help us find the best layout for the room. Ultimately, Avery and I will design and implement the best fit and future of advanced manufacturing within High Bay.

UIP50
3D Printing Patient-Specific Images for Diagnostics and Perioperative Planning
Joshua Ryan Butler1, Andrew Ray2, Barbara Mueller-Boer1, Wayne Godwin3
1Department of Engineering, East Carolina University
2Body School of Medicine
3Innovation Design Lab, East Carolina University

Surgical operations at the East Carolina Heart Institute (ECHI) are planned by virtual 3D modeling with 3Mensio; however, it may be difficult for surgeons to fully understand the scale of the anatomy until seen in the operating room. This project integrated 3D printing with established perioperative planning techniques to facilitate diagnosis, perioperative planning, and surgeon-patient communication.

Computerized tomographic (CT) images of the patient's anatomy were obtained as part of routine medical care. These images were 3D modeled using Materiaize Mimics. Further model processing was completed with Meshmixer. Refined 3D models were imported into MakerBot Print and printing using polylactic acid (PLA) filament.

Three patients with unique medical conditions requiring surgery were being followed in this case series: a patient with chronic lateral chest wall pain with nonunion of previously fractured ribs, dyspnea on exertion due to tracheal stenosis with a prior history of tracheostomy, and portal hypertension due to alcoholic liver cirrhosis with umbilical vein recanalization.

The first patient has been already been followed, who presented with chronic lateral chest wall pain thought to be secondary to malunion of the fractured ribs to thoracic surgery for evaluation. Numerous therapies were attempted to palliate the patient's pain, but all were unsuccessful. CT images showed possible malformation of the previously fractured ribs. For further assessment, a model of the patient's rib cage was 3D printed. After assessing the patient in the clinic, the surgeon, with the 3D model, was better able to define the anatomical defect leading to the patient's chronic pain.

On the day of surgery, the 3D printed rib cage was presented to the patient. The surgeon used the model as an educational tool to explain the upcoming procedure. In the operating room, the surgeon confirmed the surgical site by palpating the patient's rib cage and referencing the 3D printed model. Approximately 4 inches of the 10th rib were successfully resected from the patient. Following up, the patient showed remarkable improvement with increased mobility and decreased pain. Continued rehabilitation with physical therapy is being pursued. Following each case, the surgeon will be given a brief survey to assess their opinion of 3D model accuracy and benefit for diagnostics and perioperative planning.

UIP51
The Future of Engineering Education
Jeremiah L. Johnson and David D. Harr
Mentor: Arun P. Aneja

To create a harmonious and balanced world in which we all live in peace and prosperity is a lofty and desirable goal which remains stubbornly elusive. Many indices of human welfare and progress have been studied to arrive at some justification of why this is so. However, there does not seem to be unanimity on which variables of human progress may provide a viable direction for a better future for all. There is anecdotal evidence of a relationship between social progress indexes versus technology/innovation progress indexes. A richer analysis is needed if we are to understand what fundamental factors influence a country's social and technological growth rates. It is our hypothesis that there is a divergence between societies' technological progress and social progress, and that the rate of technological growth exceeding the rate of social growth exacerbates inequality. We propose that engineering education may offer a means to converge a country's social and technological growth rate. Our hypothesis is that there is a divergence between societies’ technological progress and social progress, and that the rate of technological growth exceeding the rate of social growth exacerbates inequality. We propose that engineering education may offer a means to converge a country's social and technological growth rate. The education system plays an important role in molding the thought processes of the next generation. It should continuously improve, evaluate, and revise as it is a direct reflection of the future of our society. Technology offers a means to disseminate knowledge but detracts from personalized education. Improvements to engineering education would coalesce pedagogical methods with technology based individual inquiry. We plan to analyze various criteria of human progress over time for the United States and a few other European and Asian nations. Data on composite measures of societal development such as economic progress, gross national happiness, and the social progress index will be compiled, normalized, and parsed into their component factors. These factors will be correlated with the technological/innovation growth index to determine factors with the greatest influence on trends. To make an impact of our findings, these factors will be compared with current engineering education techniques to propose recommendations and improvements in the current educational system to rectify the growing disparity between social and technological growth.

UIP52
Detection of Skin Hydration Levels Using a Novel Air Puff Device
Antonia Dingemans1, Keith Williams1, Jason Yaiol, Stephanie George1, Joshua Dupaty2
1East Carolina University, Greenville, NC and 2Mercer University, Macon, GA

The US skin care market is approaching ten billion dollars, with one of the main focuses being skin hydration levels. Regulating the hydration levels of the body is key to maintaining health and normal bodily functions. Currently, there are no devices or apparent methods for measuring the hydration of an individual.

East Carolina University’s Engineering Department and College of Nursing are developing an Air Puff System (APS) for objective peripheral edema, which is currently named AERO. Air Edema Rep Ortling. The APS is a device that records a puff of air on a surface, in this case it is the forearm. Testing has been done to determine if AERO can distinguish and assess differences in hydration levels. If the device provides enough data that shows a difference in hydration levels, this would prove that the device could be used for hydration testing. The device could be a potential means at filling the necessity of a method for measuring hydration levels. With appropriate IRB approval, a total of thirty participants volunteered for this study. There was a total of three hydration changes throughout the testing. The first was water loss from physical activity, participants were asked to run for ten minutes to their best ability. The second involved body lotion, where participants applied lotion to their forearm for ten minutes. The final test the participants soaked their forearm in water for ten minutes. For all three tests, a set of five videos were collected before and after. After a test was performed with the current collected data, the Vaseline lotion results have a p value under .05. This means there is a significant difference between the measured area of the indention, caused by the air puff, in the skin before and after. More data analysis will be completed to continue to evaluate and find relations within the data.

UP143
System for Elopement Prevention in At-Risk Populations
Chelsea L. Carter1
Morgan D. Robertson1
Daniel P. Pearce1
Thomas R. Buckner1
Dr. Stephanie George1
1Department of Engineering, East Carolina University

Various rehabilitation centers across the United States frequently see and assist traumatic brain injury (TBI) patients suffering from impaired cognitive ability and safety awareness; these patients are typically referred to as walking wounded patients. A common problem with walking wounded patients is elopement, which is a problem with walking wounded patients is elopement, which is when patients leave caregiver supervision without consent. A device or process was needed to prevent and/or alert the families and caregivers when elopement occurs in order to reduce the risk of injury and readmission to the clinic. Research was conducted into prior art, current solutions, and economic burdens of elopement and TBIs. Alternative solutions were generated and assessed for their efficacy in elopement prevention and caregiver notification. A three-step process involving distracting patients, alerting caregivers, and physically preventing elopement was found to be the preferred solution. Distraction and positive redirection can be accomplished through visual cues, such as stop signs and arrows, physical artifacts, such as games, puzzles, and finding relations within the data.
eliminate waste to satisfy the customer. This project will be beneficial to the company goals as KCST.

Benefits: The cost of scrapping a single ECU costs KCST $65.80. tests and qualifications before it is implemented.

to repair ECU’s with defective bonding and reduce the circuit boards inside an aluminum frame and seal them together with bonding to prevent water intrusion. Sometimes there will be an issue with the process where not enough bonding is added to the frame and connector or gaps are apparent in the bonding. There is also an issue with excessive bonding being placed around the frame and connector. KCST has a visual specification and the employees enjoy what they're doing just a little bit more. One of the benefits of this process adaptation is that we are ultimately improving and increase efficiency in the CNC lathe department at Winterville Machine Works will be devised, measured, implemented and controlled. The main focuses of this project will be designing and increasing flow, redeveloping an organization system for tooling, as well as raw and finished goods. 5S and lean principles will be used to devise the best possible plan.

Some of the issues in the present state at Winterville Metal Works is that there is a lot of time wasted on trying to find certain tools, materials, etc. We would implement some strategies and tools to help with organization along with optimization. After gathering the specifics from the blueprints of the facility, storage departments, and material – we can begin creating something that demonstrates efficiency. One major tool that we plan to utilize, is using a Spaghetti Diagram. The Spaghetti Diagram will help us illustrate what is wrong and why so much time is being wasted. Then we will show a before and after to help demonstrate the changes that are going to be implemented and the time/money savings from doing so. Another tool will be to run a Plant Layout diagnosis along with a flow chart, to show from another perspective why and what is going wrong. This will help us explain with fine detail and percentages of why so much time is being wasted.

The anticipated future state will demonstrate an organized machine shop with precise efficiency. We expect to reveal something that will be implemented and maintained for years to come. With work stations organized, reduction in F.O.D. (Foreign Objects Debris), materials and tools put where everyone can find them, we expect to see a more appreciated work facility where the employees enjoy what they’re doing just a little bit more. One of the benefits of this process adaptation is that we are ultimately looking at easing the lives of those who are creating the product. The amount that could be saved is really up to the user of the implemented process as we give them the tools to be optimal and efficient.

Future State: To develop and qualify an approved process that will successfully repair ECUs with defective bonding and reduce the amount of scrap. The repair process will go through a series of tests and qualifications before it is implemented.

Benefits: Cost of scrapping a single ECU costs KCST $65.80. Every ECU that can be repaired will be direct savings to the company.

The global seafood market is forecasted to reach over 150 billion dollars in the upcoming years. One of the main issues revolving around the seafood market is the freshness of the meat. Currently, there are very few devices or apparatuses that measure freshness of fish. These devices are hard to obtain and are not user-friendly. East Carolina University's Engineering Department is developing an Air Puff System (APS), currently named AERO, for measuring the freshness of fish. The AERO is a device that records a puff of air on a surface, in this case it is cuts of fish. Testing has been done to determine if the AERO can distinguish and assess differences in freshness levels. If the AERO shows enough data to represent a difference in freshness levels, proving the device can be used for freshness testing, it will make the device a potential means for filling the necessity of testing fish. A total of eighteen fish were tested using the AERO. There was a total of three freshness levels in the testing. The first was fresh fish that was safe to two three days. For the final test, the fish were spoiled for ten days. For all three tests, data was collected from fish fillets and whole fish. Once the analysis of the data is complete, a T-test will be used to compare the results.

Weyerhauser Capstone Gregory DeDecker Conner Briley Clay Wagner The name of our company is Weyerhauser located in Jameville, North Carolina. The present state of the company is that there are two strapers and two stackers separated across the warehouse from each other. These are what stack the lumber and strap it together for shipping. The issues with this are that the cycle time is around a minute and a half and the plant that has changed this is getting around 30 seconds. Changing this will also reduce the workers by two thus freeing up around $200,000. Tools needed for this will be measurement devices, drafting software, time studies, and data from the plant. Product matrices will be needed to complete this as well. The anticipated future state is to re-arrange plant layout by putting stackers and stackers in a line thus reducing cycle time. Improvement events will be actually re-arranging the plant if data proves to be valuable. The estimated savings will include the reduction of two full time employees, lower cycle times, and added time for maintenance.

Size Inclusivity

The aim of this capstone project was to develop an inclusive fashion brand and celebrating women of all shapes and sizes. To achieve this aim, this project investigated the size distribution of US female population and the apparel market; the history of sizing and will be utilized to develop a better strategy of harvesting oceanic energy.

With the increasing demand of energy usage, people started pursuing different alternatives, especially renewable energy sources. This research aims to investigate the efficiency of harnessing the untapped reserve of renewable oceanic energy.

Considering the large amount of energy stored in the ocean, energy harvested from the ocean through tidal waves has the potential to relive the stress of traditional fuel energy in the coastal regions. The oceanic energy under consideration in this work may be generated from the following three sources: potential, kinetic, and thermal energy. Potential energy can be gathered from the tidal waves’ height variation. Kinetic energy is introduced by the movement and speed at which the current carries the wave. Thermal energy is generated by the heat changes in the ocean, either from the movement of waves or creatures within. To collect the energy in an ocean channel, the energy harvesting devices (different types of electric generators, for example) would be source-specific. Furthermore, it is critical for the design and application of these devices to improve the efficiency in energy conversion.

The focus of this study is to investigate all three types of the energy sources, how they change over time, and how they are related to each other. A numerical model will be developed to compare the energy characteristics including peak amplitude, variations, period, and mean values. The input to these models will likely include the constraints and attributes of an ocean channel and local weather conditions. This model will be implemented in numerical simulation software, such as MATLAB, and will be utilized to develop a better strategy of harvesting oceanic energy.
I. Introduction

The purpose of branded mobile applications is customer retention, the ideals come up with Brand Attachment, continuance intention of users business. Social presence builds relationships through the application the consumer to retain them and keep them loyal. In regards to Brand Attachment, through the application the consumer shows interest in a brand being, many ways to reach out to their consumers. There are two major concepts into which a consumer shows interest in a brand being, and brand attachment is positively associated with repurchase intention. The survey will feature terms that will indicate emotion to further predict the amount of attachment the consumers have to a brand in its entirety. This bond can be paralleled with that of human connection: the greater degree of attachment an individual has for someone, the more likely he or she is to continue buying their products, and 90% of people said they would be more likely to do business with companies they feel a connection to.

II. Methods

Using the lean launchpad method, our team conducted 50 interviews with patients, healthcare providers, game developers, and other stakeholders to determine the feasibility of creating interactive digital media for dialysis patients. The goal of this project was to complete fifty I-Corp style interviews with patients, healthcare providers, game developers, and other stakeholders to determine the feasibility of creating interactive digital media for dialysis patients. Our focus shifted from dialysis patients to CKD patients as a challenge for CKD patients. Interview questions focused on disease management, patient education needs, interactive digital media structure, clinical delivery, and business model structure.

III. Results

Technology has the potential to revolutionize the way patients are able to partner with their healthcare providers thought education should start earlier in the disease process. Healthcare providers suggested phosphorus as a starting point because it is often a dietary concept and challenge for CKD patients.

IV. Conclusion

There is an opportunity to develop educational products to improve patient health, reduce risk for kidney failure and dialysis, and proceed with commercial exploration of products with Nerd Clutch under federally funded SBIR grants. Upcoming work includes a beta testing phase with patients and healthcare providers to gather feedback on the prototype and make improvements before developing a final product.

Abstracts | Undergraduate Poster Presentations

UP163
The Failure of Lehman Brothers: What went wrong?

Victoria R Bishop

Abstract

The year 2008 proved to be a difficult year for financial markets and institutions. Lehman Brothers, the 4th largest investment bank on Wall Street at the time, was hit hard by the beginning of the crisis. The ultimate end of Lehman Brothers came on September 15, 2008, when it filed for bankruptcy. This action brought on the worst part of the financial crisis. Pressure and worry were moved from Lehman Brothers to other investment banks on Wall Street. What happened that led Lehman Brothers to bankruptcy? It had survived many crises before, including the Great Depression. What external and internal influences on the institution led it to its failure this time?

Was it the failure of the mortgage backed securities market, the Federal Reserve or Treasury, or the company itself? This paper explores the factors that contributed to the fall Lehman Brothers including wealth and interactivity is positively associated with brand attachment, brand attachment is positively associated with continuance intention, and brand attachment is positively associated with repurchase intention.

Katherine McKenzie May

UP162
Investigation of Effects of Social Factors of Apps on Customer Continuance Intention

How Does Interactivity With App Affect Customer’s Continuance Retention?

Richard Charles Fisher, Dr. Trang Tran

The Branded Mobile Application presence is making a huge affect on the marketing industry. It provides business marketers many ways to reach out to their consumers. There are two major concepts into which a consumer shows interest in a brand being, interactivity and brand attachment. Interactivity by definition in a summary is the process of two people working together to influence each other. Companies need to pose a tremendous influence on the consumer to retain them and keep them loyal to their brand. Brand Attachment is the consumer forming a more emotional, mental connection with the company. The one thing is clear: they must prepare for a changing environment.

UP164
Preparing the Future Accounting Professional for a Rapidly Changing World

Mariana Grace Shurina, Dr. Cal Christian

Whether a CPA is working in public accounting or industry, one thing is clear: they must prepare for a changing environment. Disruptive technologies (such as artificial intelligence, data analytics, robotics process automation and blockchain), are leading this change and are not only affecting the accounting profession, but are also impacting other professions and industries. The accounting profession will need to adapt and learn new skills required to master these technologies. This study will demonstrate the scale designed to depict consumers’ attachments to brands. In order to test this, we created an online survey that is on Qualtrics. This survey will be given with an anticipated response forecast of 200 individuals.
of renewable energy. One example is the case of golf carts used off computers at the end of the day, and increasing the usage measures such as replacing inefficient electric devices, turning renowned park. Analysis conducted after the visit also highlighted Energy and Environmental Engineering (CSE3) of a nationally- audit, energy wastage can be reduced, and enhancement of buildings, industrial installations, residential units, warehouses, Energy Waste can adversely affect operational sustainability of a nationally- plant floor, a place for the employee to mark the date and time of when it came in and have the employee sign next to it. Then the employee will either take the part out to the plant or store it in the warehouse. Fixing this system for Ameratrial will allow them to continue to produce trailers in a timelier manner.

Enhancement of operational sustainability of a nationally-renowned park through the use of renewable energy and energy-efficient technology

Matthew J Yaeger, Julian Brady, Dr. Praveen Malal, Dr. Tarek Abdel-Salam
Energy Waste can adversely affect operational sustainability of both for-profit and non-profit institutions by causing unnecessary financial losses. Energy waste is everywhere, from large commercial buildings, industrial installations, residential units, warehouses, parks and recreational facilities. By performing an energy audit, energy waste can be reduced, and enhancement of operational sustainability can be attained. This study reports one such energy audit conducted by the Center for Sustainable Energy and Environmental Engineering (CSEE) of a nationally-renowned park. Analysis conducted after the visit also highlighted that financial savings could be attained by implementing measures such as replacing inefficient electric devices, turning off computers at the end of the day, and increasing the usage of renewable energy. One example is the case of golf carts used for providing people a tour of the park. Currently, the annual electricity that is used to charge the park's golf cart battery for 8 hours per day is 1.875 kW. This energy can be generated with the implementation of a Thin Film Solar Panel on the roof of the golf cart which can provide an annual savings of $188. In addition to solar-powered golf carts, the implementation of a compact solar water heater provides another potential to conserve energy through renewable energy technology. The annual energy consumption of the existing water heater was found to be 4,640 kWh. With the implementation of a compact solar water heater, an annual savings of $300 can be achieved. Along with the savings provided by renewable energy technology, the implementation of an occupancy sensor within restrooms can reduce the amount of energy that is being used when they are unoccupied. These savings can be increased even more by using LED bulbs as opposed to Halogen or CFL bulbs. With the implementation of a programmable thermostat, monthly savings of 10-30% can be achieved in the heating and cooling of buildings at the park. With the use of energy efficient technology and renewable energy resources, a more sustainable mode of operations can be developed for not-for-profit entities such as parks and educational campuses. By reducing unnecessary energy consumption, long-term savings can also be attained. This study clearly shows that renewable energy and energy savings' measures can be easily applied at other parks and recreational facilities across the nation.

HMF Express Process Improvement Project

Theotokis Kostadino Mavroidis, Tristan Hindman
Abstract
HMF Express is a leading manufacturer in specialty steel doors and frames, located in Wilmington, NC. When visiting the facility, we met with our projects champion, Bob Drach, who presented us their manufacturing process. He showed us each step of the process and how the engineers and operators transfer the customer requirements for each door manufactured. This is done by passing a hard copy file with the information to each step of the process. The issues in the present state are the transfer of manufacturing information. This may be the door specifications, instructions on completing each step of the process, safety within the process, or new process techniques. Bob Drach has asked us to develop and test an inter-company knowledge base tool to assist in the efficiency of acquiring needed information. We plan to implement this on the manufacturing floor with the use of tablets that are assigned to the different task of the process and are capable of sharing real-time information. The best way we test this is by using a time study. By doing this, we will be able to see how long it originally takes to gather information then compare it to the use of the knowledge base tool. Once we have confirmed our knowledge base tool is successful, we are estimated to save 2-3 minutes from each step of the process.

Real-time Augmented Reality Data Visualization Based On External Sensors

Spirit Aero Capstone Abstract
Everett Sawyer, Chase Taylor, Cameron Colman, Treven Parker
At Spirit Aero in Kinston NC, this plant is only one of the many manufacturing facilities that Spirit uses to build the air buses that they manufacture. This plant designs the barrel section and the wings will later be attached at another plant. In one section of the plant, workers set and fasten the outer shell panel to the frame of the barrel of the jet. At this section there is a problem with improper workstations which are missing parts and tools and missing or using incorrect drawings. These workstations are where the workers work all day, so it is not as efficient as it should be. We will involve the workers by possibly inviting them to a meeting and asking them to explain what they do. Also, we will participate them in filling out a Pareto diagram with us. Our anticipated future plan would be to have the workers enter their work station and not exit the workstation until lunch and other designated breaks. The improvement events will include establishing a way of organizing tools and parts and establishing a set working procedure. Additional improvements will include procuring correct part drawings. The final improvement would be reducing worker movement and increasing production rate. We are not able to predict the amount of cost savings we will be able to obtain at this point in the project, but anticipate that it will result in decreased production costs.

UP171
Big Data Analytics for Historical Document Processing
James Patrick Philips
Abstract
Historical Document Processing is the process of digitizing written material from the past for future use by historians and other scholars. It incorporates algorithms and software tools from various subfields of computer science, including computer vision, document analysis and recognition, natural language processing, and machine learning, to convert images of ancient manuscripts, letters, diaries, and early printed texts automatically into a digital format usable in information retrieval systems. Within the past twenty years, as libraries, museums, and other cultural heritage institutions have scanned an increasing volume of their historical document archives, the need to transcribe the full text from these collections has become acute. Big Data Analytics and infrastructure will be essential tools in this field. This study compares performance analysis of two OCR systems, discusses an Historical Document Processing (HDP) workflow, and highlights the role of OCR software in a RESTful API for an HDPaaS (HDP as a Service) system.

UP172
In Pursuit of Green Office Certification
Leanna Pondli, Jason Lorita
Abstract
Green Office Certification is a program administered by Sustainability. As one of the 17 constituent institutions to be part of the UNC system, ECU requires major resources to sustain its mission. SustainECU exists to facilitate the reduction of waste and to help the UNC System to become more sustainable goals. Currently, two ECU offices are green office certified: Student Center and Engineering Building. The intent is to help ECU realize a 40% reduction in its energy consumption by 2025 and to help the UNC System to become more sustainable. Specifically, the intent is to help ECU realize a 40% reduction in its energy consumption by 2025 and to help the UNC System to become ‘climate neutral’ by 2050. It is designed to help ECU and ECU offices work toward carbon neutrality and to reach its sustainability goals. Currently, two ECU offices are green.
certified. Center of Leadership & Civic Engagement and Campus Recreation & Wellness. The Department of Technology Systems is the first academic department to pursue a green office certification. At the onset of the certification process, a commitment on the part of 75% of the staff and faculty had to be attained. Once attained the department would have done its part in helping the university go green. At the start, we had to attend a staff meeting to then propose our idea to the staff. Mr. Carwein had to then conduct an initial baseline audit on both office waste and energy usage. We provided a checklist that the staff needs to have completed and made a spreadsheet public so that they could keep track of the progress that had been made and what else needs to be done. Weekly we would send out email reminders on what needed to be completed. In shared areas of each of the department’s offices, we set up a Go Green bulletin boards with more resources. When needed, we would meet one on one with individuals or with small groups and talked with the staff on other things that needed to be done and how they could complete the checklist. While a framework for pursuing Green Office Certification was available, the framework provided numerous opportunities to pursue the end state creatively and as we saw fit.

UP173

Public firearm surveillance using object detection and object position analysis

Jiahao Li, Marco Agostini, Elliot Paul, Charles Ablan

Over the years, gun violence has caused significant grief for American families. With the interest of public safety in mind, this project is pioneering automatic threat detection by combining stereovision and object detection. Past studies have explored using deep learning to detect threats. Neural Network object detectors have achieved an average accuracy of 85% (Simonyan and Zisserman, 2014). We hypothesize that accuracy can be dramatically improved when combined with stereovision techniques. Our research aims to combine these two techniques into one system to improve the threat detection capability of public surveillance systems.

Our team has a combined seven years of programming experience and has already finished a prototype of a new program in MATLAB – named JEM-net – that yielded promising handgun detection results. This network is being modified to optimize simplicity while maintaining a high accuracy of detecting a given object. Current research involves taking controlled images of a handgun to determine the role variables in training images (lighting, resolution, contrast, etc) play in the accuracy of detection. The team has also developed an algorithm capable of measuring object distance with an accuracy of over 95% using the BlackBird2 stereoscopic camera. This same approach is being applied to two GoPro Hero7 cameras. The two Hero7 cameras allow us to vary the base length between cameras to study how base length can be adjusted to best analyze objects at given distances. These cameras provide higher resolution images, a zoom function, and wireless connection to a cell phone to streamline the stereoscopic imaging process.

The future role of the student researchers will be to continue to develop the software for each technique – object detection and distance analysis – and integrate the two components into a standalone system. Camera apparatus will be designed and mounted on a wall to test and finetune the technology until it can identify a threat and its location within a surveillance image. Finally, the complete system will be uploaded to a separate processing board to conduct live trials in the Innovation Design Lab to finetune the technology for surveillance applications.
## Presenters’ Index

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THANK YOU!

Thank you for your interest in East Carolina University's RESEARCH & CREATIVE ACHIEVEMENT WEEK 2019

The RCAW Committee would like to thank all of those who participated and attended.

We look forward to seeing you again next year for RCAW 2020!

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