Research & Creative Achievement Week 2019

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

DINING

1907 137
Au Bon Pain 140
Panda Express 138
Raising Cane's 142
Starbucks 143
Sweet Shop 112

EVENT SPACES

Multipurpose Room ... 125
The Patio ..... Outside
The Pit ..... Outside

RETAIL

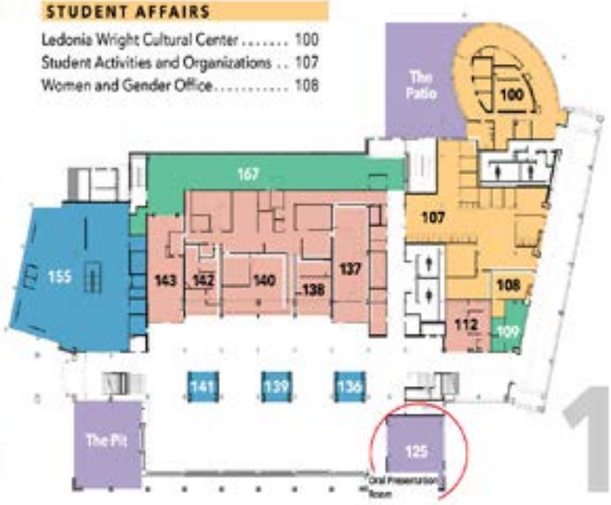
Dowdy Student Stores . 155
Pirate Techs 139
Coming soon 136
Coming soon 141

SERVICES

Game Room 167
Ticket Office 109

STUDENT AFFAIRS

Ledonia Wright Cultural Center 100
Student Activities and Organizations .. 107
Women and Gender Office 108



EVENT SPACES

Alice Crawford Ballroom (Ballroom C) 235C
Ballroom A 235A
Ballroom B 235B
Black Box Theater 200
Meeting Room 206
Meeting Room 234
Meeting Room 236
Meeting Room 237
Multipurpose Room ... 249
Multipurpose Room ... 253

STUDENT AFFAIRS

Center for Leadership and Civic Engagement ... 208
Greek Life 282
Dr. Jesse R. Peel LGBTQ Center 209
Student Government Association 223

Make your mark

Table of Contents

06 Letter from Provost **Ronald Mitchelson**, Vice Chancellor for Health Sciences **Mark Stacy**, and Vice Chancellor, Division of Research, Economic Development and Engagement **Jay Golden**

07 Program Sponsors

08 Research and Creative Achievement Week Committees

09 Event Schedule

10 Lectures and Symposia

18 Mentor Listing

19 Student Presenter Schedule

19 Graduate Oral Presentations
24 Graduate Poster Presentations
31 Graduate Online Presentations
32 Post Doctoral Scholar Presentations
33 Undergraduate Oral Presentations
37 Undergraduate Poster Presentations

50 Graduate Abstracts

51 Oral Presentations
77 Poster Presentations
114 Online Presentations

116 Postdoctoral Scholar Abstracts

118 Undergraduate Abstracts

118 Oral Presentations
140 Poster Presentations

213 Presenter Index

ACADEMIC COUNCIL
Ronald L. Mitchelson, PhD, Provost & Senior Vice Chancellor for Academic Affairs | mitchelsonr@ecu.edu
Mark A. Stacy, MD, Vice Chancellor for Health Sciences | stacyma17@ecu.edu
Jay S. Golden, PhD, Vice Chancellor for Research, Economic Development, & Engagement | goldenj17@ecu.edu
Greenville, NC 27858-4353 | **www.ecu.edu**

March 2019

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.

Ron Mitchelson Mark Stacy Jay Golden

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 Dolbier: 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

Monday

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

Tuesday

APRIL 2

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

Wednesday

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

Friday

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

Monday

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

Global Issues
Virtual Conference

Together Creating a Global Community

Virtual Conference

powered by: Global Academic Initiatives, ECU and Krosno State College, Poland

Come Join Us!

April 1-4, 2019

Virtual Conference

http://thegpe.org/gic-4/

For more information email
gpeglobalissues@ecu.edu

ECU

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/279287412
- Education & Methodology - Monday, April 1st -10am
  https://zoom.us/j/237600861
- Social Change - Tuesday, April 2nd - 7am
  https://zoom.us/j/279287412
- Environmental Issues - Tuesday, April 2nd - 10am
  https://zoom.us/j/237600861
- Business & Economics - Wednesday, April 3rd - 7am
  https://zoom.us/j/279287412
- World Health Issues - Wednesday, April 3rd - 10am
  https://zoom.us/j/237600861
- Global Culture - Thursday, April 4th - 7am
  https://zoom.us/j/279287412
- Education & Methodology 2 -Thurs, April 4th - 10am
  https://zoom.us/j/237600861

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

Please Join the Conversation

Państwowa Wyższa Szkoła Zawodowa

GPE Global Partners in Education

RESEARCH & CREATIVE ACHIEVEMENT WEEK

TEDx ECU
x = independently organized TED event

CALLING ALL RESEARCHERS!

PRESENT YOUR RESEARCH AND WIN UP TO $100!

April 1, 2019 12-1PM | Black Box Theater

ECU EAST CAROLINA UNIVERSITY

GPSS Graduate and Professional Student Senate

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)

STUDENT GOVERNMENT ASSOCIATION SGA EAST CAROLINA UNIVERSITY

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)

GPSS Graduate and Professional Student Senate

ECU GRADUATE & PROFESSIONAL STUDENT APPRECIATION WEEK 2019

WHATS 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

STUDENT GOVERNMENT ASSOCIATION SGA EAST CAROLINA UNIVERSITY

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)

GPSS Graduate and Professional Student Senate

INTERNATIONAL SCHOLARS'&STUDENTS' SYMPOSIUM- EAST CAROLINA UNIVERSITY

Tuesday April 2nd, 2019
Black Box Theater, New Student Center on East campus (2:30- 5:00 PM)

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 Denning, Pranaya 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

Innovation, Entrepreneurship, and Intersection of Arts and Sciences Showcase

ECU's Research and Creative Achievements week expanded beyond traditional scientific research this year by showcasing an eclectic collection of innovation, art, performing arts and entrepreneurial works.

The event includes posters, oral presentations, performances, and solution driven pitches developed through interdisciplinary conversations.

ECU Main Student Center Ballroom A
Friday, April 5, 2019

1PM – 2PM	Poster Session
2PM – 3:45PM	Oral Presentations and Performances
3:45 – 4:15PM	Provost's Challenge
4PM – 5:30PM	Reception
4:30PM	Awards Ceremony

Audience members are welcome to enter and exit between presentations.
Questions email vanscottm@ecu.edu

ECU Research and Creative Achievement Week | Economic Development and Engagement Council

Faculty and Student Research Showcase

April 3, 2019

Invited Lecturers

Faculty	Presentation
Dr. Shawn Moore Dr. Dan Dickerson	*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	Presentation
Dr. Jessica Chittum	*A Person Centered Investigation of Patterns in College Students' Perceptions of Motivation in a Course*
Dr. Allison Crowe Dr. Janee' Avent Harris	*Help for the Helper: Mental Health Concerns, Supports, and Stigma in School Counselors*
Dr. Kristin Gehsmann	*The Impact of Adaptive, Web-Based, Scaffolded Silent Reading Instruction on the Reading Achievement of Students in Grades 4 and 5*
Dr. Kristen Gregory	*CC Discipline Faculty Attitudes & Self-Efficacy with Literacy Instruction*
Dr. Christy Howard Dr. Allen Guidry	*Preparing Pre-service Teachers to Make the Literacy –History Connection*
Dr. Xi Lin	*An Exploratory Study Using Danmaku in Online Video Based Lectures*
Dr. Christopher Rivera	*Improving Study Outcomes for College Students With Executive Functioning Challenges*

Student Roundtable Presentations

Student Scholar	Presentation
Lauren Brewington	*Student Perceptions of Small Group Instruction in the Science Classroom*
Sandy Burgess	*The Impact of Direct Phonics Instruction*
Brittany Campbell	*Explicit Comprehension Instruction through Interactive Read Alouds*
Kimberly Carpenter	*Moving with Math: The Effects of Movement on Secondary Mathematics Achievement*
Amy Cooper	*The Effects of Direct Instruction in Thinking Strategies on Reading Comprehension*
Courtney Corvin	*The Impact of Tutoring on the Whole Student*
Julie Ham	*Singing in Social Studies*
Maranda Hogel	*Implementing Instructional Practices and Incentives that Promote Intrinsic Reading and Motivation*
Hannah Honeycutt	*Phonics in First Grade*
Lauren Ingold	*Literature Circles and their Impact on Reading Comprehension*
Allison Mozingo	*Impacts of Read-Alouds on Reading Engagement in Pre-K Students*
Kelsey Phillips	*Real-world Motivation for Low Socioeconomic Students with STEM Career Awareness*
Kelsie Roper	*Implementing Differentiated Small Group Word Study to Promote Spelling Achievement in Second Grade*
Beth Wantz	*Understanding the Impact of Talk Moves with English Language Learners*
Renee Whitaker	*Exploring the Effects of Book Choice to Motivate Students to Read Independently*

Mentor List

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

Ables, Elizabeth Tweedie
Alexander, Marina
Aneja, Arun
Asagbra, Oghale Elijah
Asch, Rebecca G
Atherton, William Leigh
Atkinson, Terry Stafford
Aziz, Shahnaz
Baker, Michael Drew
Balakrishnan, Christopher
Ballard, Sharon M
Banerjee, Sambuddha
Baugh, Eboni Jacanne
Bee, Beth Anne
Bier, Martin
Blakeslee, April Monica Houghton
Blanchflower, Tiffany Machado
Bolin, Linda Prior
Bolin, Linda Prior
Bond, Diana Kinzer
Bonner, Heidi Stone
Bova, Kenneth Paul
Bradby, Cassandra
Brault, Jeffrey John
Brewer, Kori Louise
Brewer, Michael Scott
Brimhall, Andrew S
Cabot, Myles Clayton
Callis-Duehl, Kristine L
Campbell, Lisa
Carraway, Marissa Errickson
Castles, Ricky Thomas
Chambers, Crystal Renee
Chaney, Elizabeth H
Chen, Runying
Chen, Yan-Hua
Chin, Robert A
Chou, Te-Shun
Christensen, Timothy W
Christian, John C
Clemens, Stefan
Cooper, Hannah
Cortright, Ronald N
Cox, Melissa Jean
Crane, Patricia Ann
Crowe, Allison Leannah
Culver, Stephen J
Curtindale, Lori Marie
Curtis, Walter Robert S
Danell, Allison S
Daniel, Isaac Randolph
Das, Bhibha Mayee
DeWitt, Regina
Dias, Nancy
Dickerson, Anne
Dingfelder, Michael
Dodor, Bernice
Dolbier, Christyn
Dolbier, Christyn
Donica, Denise
DuBose, Katrina D
Durland, Alexander Nathaniel
Eagle, John Scott
Egan, Matthew J
Erickson, Timothy Paul
Erickson, Timothy Paul
Ericson, Richard E
Etheridge, James Randall
Everhart, Daniel
Ewen, Charles R
Farr, Deeonna Emm
Field, Erin Kirby
Fish, Matthew Taft
Floegel, Theresa Ann
Forbes, Thompson Hollingsworth
Gantt, Laura T
Garcia, Brandon L
George, Stephanie
Goodwillie, Carol
Guan, Shanyue
Hannan, Johanna
Harris, Brenda Lynn
Harris, Janee' Rolonda Avent
Hegde, Archana
Hines, Ian Neil
Hodgson, Jennifer
Holt, Yolanda Feimster
Howard, Gregory Edward
Huang, Hu
Hubbard, Glenn T
Hudson, Nathan E
Hughes, Robert Murray
Humphrey, Charles Pittman
Huo, Shouquan
Hvastkovs, Eli Gerald
Issa, Fadi Aziz
Jensen, Jakob F
Jubran, Hanna
Jung, Jae Won
Kang, Jin-Ae
Kariko, Daniel Josip
Katwa, Laxmansa C
Kearney, Gregory Dale
Keene, Keith L
Kermiet, Tara Nicole
Kew, Kimberly Ann
Knox, David H
Lake, Donna Marie
Lamb, Alfred C
Lamson, Angela Lynn Smith
Larson, Kim L
Lee, Jinkun
Lee, Mi Hwa
Lee, Myon Hee
Lee, Tammy D
Lemasson, Isabelle
Lin, Ziwei
Littleton, Heather
Litwa, Karen Ann
Loudon, James Ernest
Love, Brian
Lu, Qun
Luczkovich, Joseph John
Lust, Robert M
Malali, Praveen
Mannie, Mark D
Mansfield, Kyle David
March, Juan A
Mathews, Holly F
May, Linda Elizabeth
McClung, Joseph Matthew
McCoy, Krista Ann-Marie
McIntyre, Amy Elizabeth
McKinnon, Jennifer Faith
McRae, Susan B
Meardon, Stacey Augusta
Medina, Almitra
Mehta, Merwan B
Mitra, Siddhartha
Mizelle, John Christopher
Mobley, Jennifer Scott
Mukherji, Anuradha
Muller-Borer, Barbara Jean
Murata, Ramiro Mendonca
Murenina, Elena Konstantinovna
Murray, Nicholas P
Nassehzadeh-Tabrizi, Moha
Neufer, Peter D
Offenbacher, Adam Richard
O'Halloran, Cynthia Shirley
Olson Lounsbery, Marie
Oyen, Michelle Lynn
Papalas, Marylaura
Paynter, Sharon R
Pender, Jack Edward
Peralta, Ariane Legaspi
Perry, Jamie L
Perry, Megan A
Pesci, Everett Carl
Pories, Walter J
Raftery, Josh James
Reyes, Enrique
Richards, Keith Andrew
Richards, Stephanie Lynn
Richman, Alice Rose
Rickenbach, Thomas M
Rider, Patrick Michael
Romack, Timothy J
Roop, Roy M
Roper, Rachel L
Ryan, Caitlin Law
Ryan, Teresa Jean
Sargent, Andrew
Schultz, Brandon Kyle
Shearman, Sachiyo M
Shewchuk, Brian M
Shinpaugh, Jefferson
Sira, Natalia E
Smith, Raychl Elizabeth
Soderstrom, Kennth M
Speicher, James Edward
Sperry, Ann O
Sprague, Mark William
Spuches, Anne M
Stage, Virginia Carraway
Stellefson, Michael
Summers, Kyle
Swank, Katherine Louise
Swift, Damon
Sylcott, Brian
Thomassen, Mary J
Thompson, Beth
Thomson, Deborah
Tisnado, James R
Torres, Essie Talina
Tran, Trang Phuc
Tran, Tuan D
Tucker-McLaughlin, Mary
Tulis, David Anthony
Turnage, Allyson Hill
Vahdati, Ali
Van Scott, Martha J S
Vermiglio, Andrew J
Walker, Joi Phelps
Walker, Matthew Alexander
Wardle, Robert L
Warner, Stacy M
Watts, Clifton
Wheeler, Michael D
Whited, Matthew Charles
Witczak, Carol
Wolf, Steven
Wu, Rui
Yao, Jianchu
Yeh, Chia Jung
Zeczycki, Tonya N
Zhu, Yong

Graduate Oral Presentations

MSC 125 | Human Health — 8:15 AM - 10:30 AM

GO1 8:15 - 8:30 Effectiveness of Mental Health Programming in Law Enforcement Agencies Across the United States, Kristen Proctor

GO2 8:30-8:45 Impact of a course-based physical activity program on college students' mental health, Anna Gold

GO3 8:45-9:00 Investigating Genetic Variants of the LIMS1 Chromosomal Region for Associations with Recurrent Stroke, Catherine Darcey

GO4 9:00-9:15 Fine-mapping a novel locus on chromosome 1 for association with recurrent stroke, Dunya Safa

GO5 9:15-9:30 Law Enforcement and Firefighters Physical Activity Study, Jourdyn Holsinger

GO6 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

GO7 9:45-10:00 A metabolomics approach to understanding stroke recurrence in VISP, Kelsey Spragley

GO8 10:00-10:15 The Effects of High Perceived Exertion on Joint Kinematics during the Power Clean, Theodore Morrison

GO9 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

GO10 10:45-11:00 Does Teacher Feedback Improve Student Writing?, Kimberly Rogers

GO11 11:00-11:15 Assessing Pre-Service Early Childhood Teachers' Perceived Preparedness on Early Childhood Social-Emotional Competencies and Resources Needed, Tyla Ricks

GO12 11:15-11:30 The Impacts of Virtual and Traditional Labs on Student Leraning in Middle School Science, Samantha Brown

GO13 11:30-11:45 Examining the Outcome of Implementing Instructional Practices and Incentives that Promote Intrinsic Reading Motivation, Maranda Hogel

11:45-1:15 LUNCH

*Co-Presenter

Graduate Oral Presentations

MSC 125| Natural Sciences — 1:15 PM - 2:45 PM

GO14 1:15-1:30 Evolutionary changes in visual perception following a dietary shift in manakins (Pipridae), Robert Driver

GO15 1:30-1:45 Parasites as Long-term Indicators of Biodiversity in Restored Coastal Habitats, Christopher Moore

GO16 1:45-2:00 Debunking 1 + 2 + 3 + ... = -1/12, Jacek Teller

GO17 2:00-2:15 Towards an improved classification of robber flies (Asilidae) using ultraconserved elements, Christopher Cohen

GO18 2:15-2:30 Comparative venom gland transcriptomics of the U.S Ctenidae (Order: Araneae) , Timothy Cole

GO19 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

GO20 3:00-3:15 The Representations of Child Narrators in French Avant-Garde Literature, Rachel Griffith

GO21 3:15-3:30 Archaeological Investigations of an Early American Farmstead: The Wiley Smith Site, Kelsey Schmitz

GO22 3:30-3:45 Need for Spanish Medical Interpreters: A Mixed-Methods Study, Corichi Jimenez-Garrido

GO23 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

GO24 8:30-8:45 Improved Strain Analysis of Left Ventricular Function Post Myocardial Infarction in Mice, Danielle Wilson

GO25 8:45-9:00 Tags-Aware Recommender Systems: A Systematic Review, Babak Maleki Shoja

GO26 9:00-9:15 Using mechanically robust hydrogels as a base for cartilage tissue engineering, Jacob Ludwick

GO27 9:15-9:30 Personality Prediction from Online Social Network data and digital footprint, Shahin Taghikhani

GO28 9:30-9:45 Automatic Text Summarization and Using Cognitive Computing tool to perform Sentiment Analysis on News dataset, Vishwa Patel

*Co-Presenter

Graduate Oral Presentations

GO29	9:45-10:00	Machine Learning Based Medical Information Retrieval Systems, Akhil Gudivada
GO30	10:00-10:15	Revenue Prediction, A systematic review, Kasra Khademorezaian
GO31	10:15-10:30	Experimental Assessment of a Subordinate Oscillator Array, Jules Zapanta
	10:30-10:45	BREAK

MSC 249| Natural Sciences **10:45 AM - 11:45 AM**

GO32	10:45-11:00	Using Environmental DNA to Detect Secretive Marsh Birds, Amberly Neice
GO33	11:00-11:15	Cloning and Characterization of Classical Maize Mutant, Polytypic1, Anastasia Amoiroglou
GO34	11:15-11:30	Centrifuge Force Fluorescence Microscope, Sean Cavenaugh
GO35	11:30-11:45	Characterizing the Microbial Communities on Pappy's Lane Shipwreck, Kyra Price
	11:45-1:15	LUNCH

MSC 249 | Biomedical Sciences **1:15 PM - 2:30 PM**

GO36	1:15-1:30	Glucose transporter 1 (GLUT1) is not necessary for basal or overload-induced glucose uptake in mouse skeletal muscle, Shawna McMillin
GO37	1:30-1:45	Demystifying the Role of Matrix Metalloproteinase-12 in Sarcoidosis, Nicole Neequaye
GO38	1:45-2:00	Neutron Production in Passive Scattering Proton Therapy, Dillon Ellis
GO39	2:00-2:15	Centrally Circulating α-Klotho Functions as a Novel Hypothalamic Factor Regulating NPY/AgRP Neuron Actiivty, Energy Balance, and Glucose Homeostasis in Mice, Taylor Landry
GO40	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**

GO41	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
GO42	3:00-3:15	AgRP Neuron Activation is Required For Acute Exercise Induced Feeding Behavior in Untrained Mice, Wyatt Bunner
GO43	3:15-3:30	Influence of Muscle Phenotype on Ischemic Contractile Function and Capillary Perfusion, Emma Goldberg

*Co-Presenter

MONDAY 4.1.19

Graduate Oral Presentations

GO44	3:30-3:45	Focal Adhesion Characterization of Developing Human Neuons, Amanda Petritsch
GO45	3:45-4:00	Construction of Realistic Hybrid Computational Pregnant Phantoms for Radiation Risk Assessment, Rasha Makkia

MSC 253 | Fine Arts **8:30 AM - 11:45 AM**

GO46	8:30-8:45	Aesthetics of the Commons, Robin Carter
GO47	8:45-9:00	Invasive species, Youngjae Kim
GO48	9:00-9:15	HelloKinston, Heather McLelland
GO49	9:15-9:30	Darkness made Light, Timothy Christensen
GO50	9:30-9:45	Images I Haven't Made Yet, Dana Smessaert
GO51	9:45-10:00	Truth, Honor and Inspiration; Printing from the Photographs of Shah Marai, Peter Borsay
	10:00-10:15	BREAK
GO52	10:15-10:30	Design Methodology in Natural Material , Junghoon Han
GO53	10:30-10:45	Unsweet, Mairin Gwyn
GO54	10:45-11:00	Metempsychosis, Yichen Guan
GO55	11:00-11:15	Cosmetics Under Fire and Fused, Lauren Purcell
GO56	11:15-11:30	Archetypes and Explorations of the Unconscious, Amy Gunn
GO57	11:30-11:45	Learning to Fail, Epiphany Knedler
	11:45-1:15	LUNCH

MSC 253 | Social Sciences **1:15 PM - 4:15 PM**

GO58	1:15-1:30	Victim Intimidation and Intimate Partner Violence, Ellen Mcadams
GO59	1:30-1:45	The Influence of Cannabis on Sexual Functioning and Satisfaction, Amanda Moser
GO60	1:45-2:00	"God is a Keeper": A Qualitative Exploration of Religious Coping for African Americans, Jasmine Garland McKinney
GO61	2:00-2:15	Emotional Evidence of Change: Highlanders Experiences with Glacial Retreat in the Peruvian Andes, Kara Chipiwalt
GO62	2:15-2:30	The Role of Gender in Iranians' Immigration Related Trauma in the US: A Narrative Analysis Study, Afarin Rajaei

*Co-Presenter

Graduate Oral Presentations

GO63	2:30-2:45	Tattoo Biases Toward Healthcare Providers, Kayla Daugherty
	2:45-3:00	BREAK
GO64	3:00-3:15	Food Insecurity among Undergraduate Students at East Carolina University, Willa Midgette
GO65	3:15-3:30	Combatting Body Dissatisfaction: A Health Advocacy Campaign to Enact a Federal Photo Manipulation Law, Caroline Alexander
GO66	3:30-3:45	Crossroads on Campus: Quantifying Community in Major Student Buildings, Hannah Wiser
GO67	3:45-4:00	Colors of primate pelage: The independent evolution of sexual dichromatism in the primate order, Thomas Wilson
GO68	4:00-4:15	The Value of Exposure: The Connection Between International Contact, Ethnocentrism, and Intercultural Sensitivity, Erin Taylor

*Co-Presenter

Graduate Poster Presentations

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

MONDAY 4.1.19

GP1	Reactions to a Sexual Assault Disclosure: Evaluation of an Alternative Scoring Method for the Social Reactions Questionnaire, Laura Haney
GP2	Family members of patients with ALS: Their BPSS health and overall family functioning, Rachel Williams
GP3	Efficacy of a brief self-compassion intervention for women with Internalized Weight Bias: A review of project progress and preliminary findings, Erin Haley
GP4	Benchmarking Integration of Environmental Assessments as Part of Best Practice Heritage Site Management Strategies, Tara Van Niekerk
GP5	Microbially Influenced Corrosion of Aluminum Aircraft Wrecks in the Pacific, Dominic Bush
GP6	Sleep Across the Ages: Investigating the Validity of the Adolescent Sleep Wake Scale in a National Sample of Emerging Adults, Nichelle Huber, *Alexandra Nicoletta, *Jordan Ellis
GP7	Psychometric Properties of the Physical Activity, Nutrition, and Technology Survey, Karlie Mirabelli

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

GP8	Gender Differences in Heart Rate Variability After a Breathing Intervention, Amelia Saul, *Lauren Scroggs
GP9	Archaeology and Climate Change: North Carolina's Coastal Heritage At Risk, Michael Harrup
GP10	Adverse Childhood Experiences and Psychological Symptomology: Moderating and Mediating Roles of Mindfulness and Self-Compassion; Lauren Conder, *Erin Haley
GP11	Normative Perceptions Of Smoking And Smoking Behaviors Among College-Aged African American Women, Shelly Thornton
GP12	Work Hard, Play Hard…Or Not: A Look at the Relationship between Workaholism and Work-Leisure Conflict, Emily Meier
GP13	Childhood trauma and BPS: How do bad things affect good people?, Erin Sesemann, *Natalie Richardson
GP14	Modeling farmers preferences for onversion of agricultural lands to solar farms, Ruth Quainoo

*Co-Presenter

Graduate Poster Presentations

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

GP15 RELIGIOSITY: 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 — 10:00 AM - 12:00 PM

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

GP22 Prevalence of Recreational Activities and Perceived Stress in Emergency Medical Service Personnel: A Cross-Sectional Study, Allison Bradley Barrett

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 — 1:30 PM - 3:30 PM

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

GP27 Exploring Community-Based Keyboarding Instruction for At-Risk Youth, Kelly Semon, *Ceclia Rabil, *Rose Condon, *Meredith Stancill

GP28 An Algorithm for Student Motivation and Achievement , Victoria Gemelli

GP29 Culturally Responsive Curricular Collaborations: A Course-Spaced Exploration of Undergraduate Research, Davis Martin, *Emilee Manning, *Elizabeth Hawley, *Aaryn Shawley, *Noelys Montilla, *Jordan Van Snow, *Elizabeth Camden, *Jordan Cartrette

*Co-Presenter

MONDAY 4.1.19

Graduate Poster Presentations

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

Ballroom | Human Health — 10:00 AM - 12:00PM

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 — 1:30 PM - 3:30 PM

GP38 The Acute Effects Of Common Physical Therapy Interventions On Passive Hamstring Stiffness: A Blinded Randomized Controlled Trial, Kellie Baker, *Ashlee Hall, *Nathan Norris

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 Dillane Carter

GP41 Prevalence of Asthma Among Hispanic Child Farmworkers in North Carolina, David Wambui

*Co-Presenter

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

GP49 Inspired Design for Microbes: How Iron-Oxidizing Bacteria Serve as Ecosystem Architects in a Changing World, Chequita Brooks

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

GP53 Safe Havens and Hot Spots: Ionizing Radiation in Permafrost and its Influence on the Survival of Ancient Life , Offormata Osunkwor

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

*Co-Presenter

MONDAY 4.1.19

Graduate Poster Presentations

Ballroom | Natural Sciences — 8:00 AM - 10:00AM

GP57 Documenting Responses in Ecological Communities to Environmental Changes and Time Using Benthic Foraminifera, Seth Sutton

GP58 Modeling Cognitive Network Structure to Study Novice and Intermediate Physics Thinking, Timothy Sault

GP59 Differentiation of Interpolation Techniques for Estimating the Spatial Distribution of Average Rainfall in Bangladesh, Mizanur Rahman

GP60 Climate change impacts on spawning habitat suitability of Cubera snapper, Esra Gokturk

GP61 Determination of River Herring eDNA Shedding and Decay Rates Via Two Fish Hatchery Experiments, Seth M. Gibbons

GP62 Localization of sound producing fish using a steered-response power method, Phillip Deville

GP63 Particle Induced X-ray Emission: Calibration of GUPIX Software for Elemental Analysis, Robert Seip

GP64 Novel genetic mutant renders lateral line non-functional, causing survivability and behavioral deficiencies in zebrafish, Alexandra Venuto

GP65 Applying the Optically Stimulated Luminescence Property of Tooth Enamel to Radiation Exposure Triage, Aaron Lee, *Aaron Lee, *Julien-Fabrice Momo

GP66 Microbial Community Impact on the Host-Parasite Coevolutionary Arms Race, Kyle Swanson

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

GP67 Analysis of functional domains in Tomt, a protein required for mechanotransduction in sensory hair cells, Denise Zangwill

GP68 Parion Sciences Compound Attenuates Aeroallergen-Induced Responses in House Dust Mite-Sensitive Rhesus Macaques, Hannah Woolard

GP69 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

GP70 Poxvirus Virulence Proteins A35 and O1L as Host Immunoregulators, Alexandra Hayes

GP71 Ozone exposure increases gene expression of inflammatory markers in the urothelium of mouse bladders, Laura White

GP72 Loss of Function in Dopamine Receptor-3 (D3R) Alters Left Ventricular Cardiac Fibroblast Migration in Response to Wound and Proliferation In Vitro, Andrew Kisling

*Co-Presenter

Graduate Poster Presentations

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

Ballroom | Biomedical Sciences **1:30 PM - 3:30 PM**

GP75 The role of neuropilin-1 in cell-to-cell infection of T-cells by human T-cell leukemia virus type 1, Wesley Kendle

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

GP77 Electrochemical detection of mutated DNA from Brca1-KO mice, Elizabeth LaFave

GP78 Unipolar Polysaccharide Production in Brucella abortus., Dariel Hopersberger

GP79 Using Two Sets of MRI Images to Create CT Images, Samuel Leu

GP80 A Low-Efficacy Tolerogenic Fusion Protein Elicits Stable Outgrowth of FOXP3+ Regulatory T cells In Vitro and In Vivo, Kayla DeOca

GP81 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**

GP82 Effects of Mettl3 Knockouts in MCF10 Breast Cancer Cell Line, Mohammed Dorgham

GP83 Uric acid decreases mitochondrial bioenergetic efficiency in liver mitochondria and HepG2 cells, Katherine Buddo

GP84 WITHDRAWN

GP85 Investigating the Role of Hyaluronan in Cortical Brain Development, Emily Wilson

GP86 Metabolic and Cardiac Responses to Monocrotaline-Induced Pulmonary Hypertension in Sprague-Dawley Rats, Musaad Alsahly

GP87 PPP1R2 Plays a Key Role in Regulation of Centrosome Function and Cell Division, Alan-Michael Bresch

GP88 Elucidating the Role of Trehalose in Acinetobacter baumannii's Stress Response, Samantha Palethorpe

*Co-Presenter

MONDAY 4.1.19

Graduate Poster Presentations

Ballroom | Biomedical Sciences **1:30 PM - 3:30 PM**

GP89 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

ONLINE

Graduate Online Presentations

Online Presentations | General

GON1 Peer Support and Mnemonic Vocabulary , Rachel Lowery

GON2 Assessment of Insecticide Resistance to Organophosphates and Pyrethroids in Aedes aegypti, Natalie Cataldo

GON3 Preconceptions in Newton's Laws of Motion for 7th Grade Students, Brian Maccarelli

GON4 Science Recommendations for URM Students at Ravenscroft School, Zoe Welsh

GON5 Social Influence and Online Health Community Participation: Impact on Self-Efficacy and Health Outcome Expectations, Leslie Ives

*Co-Presenter

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

*Co-Presenter

MONDAY 4.1.19

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 Patient 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

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

10:15-10:30 BREAK

UO7 10:30-10:45 A lesson learned the hard way: USA Gymnastics Larry Nassar Sexual Abuse Crisis, Kaitlyn Graden

UO8 10:45-11:00 Familial Impacts on Childhood Cancer Abstract: A Literature Review, Caroline Morton

UO9 11:00-11:15 A critical analysis of United Airlines' Response Strategies for its Multiple Crisis Series, Matthew Campbell

UO10 11:15-11:30 The Role of Gender in the Association Between Symptoms of Depression, Substance Use, and Experiential Avoidance, Hunter Marie Davis

UO11 11:30-11:45 A Case Study in Social Media Management and Non-Profit Sport
Big League Social Media: Cultivating Community Online, Ashley Weingartz

11:45-1:15 LUNCH

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

Undergraduate Oral Presentations

WEDNESDAY 4.3.19

UO18 2:45-3:00 Evaluation of UAV Atmospheric Sensor Configurations on Satellite Signal Acquisition, Julian Quintero-Rivera

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

UO19 8:30-8:45 Clean Up Your Health Intervention - Healthy Housekeepers Initiative Phase Two Social Media Intervention, Christina Larkins

UO20 8:45-9:00 Bridging the Gap of Uncertainty and Doubt Between the Latino Immigrant Community and the Healthcare System, Becky Leon

UO21 9:00-9:15 miRNA regulation of TLR4 pathogen receptor expression and cytokine response in macrophages, Erin Lucci

UO22 9:15-9:30 Newborn Drug Screening: Methadone and EDDP Quantitation using LC/MS, Samantha Poppenfuse

UO23 9:30-9:45 Simulation of Patient Caregiver Counseling in Speech-Language Pathology, Leigh Harper

UO24 9:45-10:00 Environmental Assessment of On-Premise Drinking Establishments in Uptown Greenville, NC, Meredith Moskwiak

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 β-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

11:45-1:15 LUNCH

*Co-Presenter

Undergraduate Oral Presentations

MSC 253 | Education — 1:15 PM - 2:15 PM

UO31 1:15-1:30 Pilot Project for Global Competency Education in Eastern North Carolina Schools, Taylor Quinones

UO32 1:30-1:45 Insects and Persisent Misconceptions, Emma Rae Wester

UO33 1:45-2:00 More PEAS Please: Can Food-Based Learning Improve Preschoolers Vegetable Intake?", Jocelyn Bayles

UO34 2:00-2:15 Argument-Driven Inquiry: Tracking Progress Through General Chemistry, Meghan Lower

MSC 253 | Natural Sciences — 8:30 AM - 11:45 AM

UO35 8:30-8:45 A Computational Analysis of the Hydroacylation of Aldimines in the Presence of a Wilkinson's Catalyst, Alison Moller

UO36 8:45-9:00 Platinum Catalyzed Synthesis of Gamma-Keto Esters via C-H Bond Functionalization, Dylan Hardee

UO37 9:00-9:15 Where Do They Goby?: The Study of Gobiosoma bosc Behavior in Response to Visual Implant Elastomer Tags, Corey Winkler

UO38 9:15-9:30 WITHDRAWN

UO39 9:30-9:45 Settling differences: factors affecting nest size variation in the Eastern Bluebird Sialia sialis, Angelica Reed

UO40 9:45-10:00 Standard Practice for Formulating Green Enzymatic Detergent Products through the use of Wash Performance Evaluation, Stability Testing Techniques, and MALDI/MS, Anan Islam

10:00-10:15 BREAK

UO41 10:15-10:30 Investigating What Effect Flow Has on Fibrin Properties using Microfluidics, Miranda Lee

UO42 10:30-10:45 Expression and characterization of an immobilized Tobacco Etch Virus (TEV) protease: Streptavidin fusion protein, Jessica Norris

UO43 10:45-11:00 Characterizing the Binding of Ca(II) and Cd(II) to Wild Type and Mutant C35A and C84A hcTnC by ICP-OES and Isothermal Titration Calorimetry, Caitlin Palmer

UO44 11:00-11:15 Mechanics Regulating the Dissolution of Fibrin in Blood Clots, Sean Cone

UO45 11:15-11:30 Applying data science to study high-resolution precipitation delivery in rural Jamaica: 2014-2015, Calie Hemgen

*Co-Presenter

Undergraduate Oral Presentations

UO46 11:30-11:45 What Factors Maintain the Mixed Mating System of a Local Annual Plant, Triodanis perfoliata?, Anna O'Brien

11:45-1:15 LUNCH

Great Room 3 | Human Health — 1:15 PM - 2:45 PM

UO47 1:15-1:30 The Anger and Anxieties of the Asian and African Diaspora as Explored Through Poetry Film and Textile Arts, Andrew Li

UO48 1:30-1:45 Human: An Exploration of the Subjective and Objective Factors that Influence Our Understanding of What It Means to Be Human, Megan Piggott

UO49 1:45-2:00 Art: The Grand Illusion, Alexander Stoehr

UO50 2:00-2:15 Unlikely Hero, Carrie Thompson

UO51 2:15-2:30 Documenting a return to historical jazz through musical research and creation, Thomas Weybrecht

UO52 2:30-2:45 Increasing Cultural Awareness through my Passion for the Arts, Bina Amin

*Co-Presenter

WEDNESDAY 4.3.19

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

*Co-Presenter

Undergraduate Poster Presentations

Ballroom | Human Health **8:00 AM - 10:00 AM**

WEDNESDAY 4.3.19

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

Ballroom | Human Health **10:00 AM - 12:00 PM**

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, Alexandria 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

*Co-Presenter

Undergraduate Poster Presentations

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

UP30 Examining the Relationship between Food Consumption Motives and Tourist Characteristics, Mitchell Carstens, *Alexandra Kirk, *Taryn Sutton

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 1:30 PM - 3:30 PM

UP37 Romantic Breakup: Difficult Loss for Some but Not for Others, Kerry Carter

UP38 Examining Cardiovascular Risks in a Community Sample, Kaitlin Guard

UP39 Humanitarian Aid and its Effect on Conflicts with Multiple Rebel Factions, Madeline Fleishman

UP40 Family Matters: The Relationship between Eating Family Meals, Attachment, and Eating Behaviors, Amanda Lionelli, *Tori Blanchette

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 8:00 AM - 10:00 AM

UP44 Creation of Radar Imagery to Study Seasonal Changes in Precipitation Regimes in the S.E. United States, WITHDRAWN

UP45 Behavioral Assessment of Wandering Spiders, Radha Patel

UP46 Influence of Ethics on Evolution, Mohammad Farah

UP47 “A Comparison of Fitness Benefits of Two Flower T?ypes in Triodanis perfoliate”, Franklin Xiong

*Co-Presenter

Undergraduate Poster Presentations

UP48 The Generation of an Antibody to the Bearded-Ear Protein in Maize Plants, Jessica Bland

UP49 Protocol Development for Extracting Microbial DNA from Agarose, Allison Fisk

UP50 Codon Usage Bias of Genes Expressed in Venom Glands, Khaleb Enoch

UP51 Submerged Aquatic Vegetation (SAV) loss in North Carolina Estuaries , Noah Gwynn

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

UP52 Elucidation of 15-Lipoxygenase-2 and PEBP1 Interactions Implicated in Acute Renal Failure, Katherine Ray

UP53 Mitochondrial DNA variation in the pitcher plant fly Sarcophaga sarraceniae: Exploring possible influences of host specificity and geographic structuring, Joshua Parker

UP54 Determining the Energy Landscape of the Integrin-iC3b Bond Under Dynamic Force, Justin Litofsky

UP55 Working hard or hardly working? Life as a non-dominant iron oxidizing bacteria, Sophia Pearce

UP56 The Synthesis of Salicylaldehyde Derivatives, Adam Burch

UP57 Time for Tea: Consequences of long-term fertilization on wetland microbial community structure and decomposition, Megan Koceja

UP58 Effects of Hurricane Florence on marine carbon cycle processes, Sara Roozbehi

UP59 Examining the Role of Microorganisms in Underwater Carbon Cycling, Matthew Woodlief

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

UP60 Molar Mass, Molar Mass Distribution and Mass Bias for synthetic polymers using Low Charge State ESI-MS compared to GPC and GPC-MALS, Michael Dragulski

UP61 Elucidation of allosteric behavior and enzyme-effector complexes of human 15-lipoxygenase-2 through hydrogen-deuterium exchange mass spectrometry, Amy Musgrave

UP62 Determination of Bisphenol A in Vervet Monkey, Chlorocebus spp., Hair Using Liquid-Chromatography/Mass Spectrometry and Liquid-Chromatography/Ultraviolet-Visible Spectroscopy, Samuel Lindsay

UP63 Variations in morphometric condition of larval Atlantic Croaker (Micropogonias undulatus) as a function of temperature, zooplankton, and seasonality, Erika Desiderio-Segovia

*Co-Presenter

WEDNESDAY 4.3.19

Undergraduate Poster Presentations

UP64 Geographically distinct but non-monophyletic morphs: Reexamining the evolution of color in Florida burying beetles (Coleoptera: Geotrupidae: Peltotrupes), Emily Scott

UP65 Androgen and progesterone receptor knockouts in zebrafish affect aggression and social dominance, Julia Brown

UP66 Use of HPLC Column Retention Probes to Predict Pharmaceutical Method Development Direction, Caleb Collins

UP67 Development of novel tryptophan analogues to study and expand protein function, Kristin Tyson

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

UP68 All About the Reads: Sequencing Environmental Microbial Genome with Nano-pore Technology and Comparing Its Quality to Other Sequencing Methods, Kelvin Macklin

UP69 Social Regulation of the Escape and Swim Motor Circuits in Dopamine Receptor Type 1 Mutant Zebrafish (Danio rerio), Joseph Ward

UP70 Parasites as Indicators of Biodiversity in Coastal Shoreline Habitats, Emily Edmonds

UP71 Measuring Soil Sulfate Reactions Rates And Redox Potential Under Nutrient Manipulations In A Pocosin Wetland, Brent Williamson, *Christopher Rogers

UP72 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

UP73 Fluorescent Protein Cell Sorting as a Method to Isolate a Stable Cell Line, Elizabeth Viverette

UP74 Conversation Dynamics and Building Connections through Conversations , Marshall Adkins

UP75 Describing Collaborative Exams Using Random Graphs, Aaron Bain

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

UP76 Tackling Student Debt, Bradley Atkinson

UP77 Building QI Nurse Leaders: Validating a MSN– Nurse Leader “Stand-alone” Quality Improvement Course (QI) Based on Student Learning Outcomes, Madison McCauley

UP78 The Need and Impact of Peer Education in the Field of Mental Health || PsydeKick, Danielle St. Onge, *Sara Poston, *Molly Moseley, *Nicholas Mork

UP79 Using Dialogic Reading to Foster a Growth Mindset in Early Elementary Students, Jenna Murdock

*Co-Presenter

Undergraduate Poster Presentations

UP80 More PEAS Please! Assessing the Implementation of a Hands-on Nutrition Education Curriculum in Head Start, Jeremy Cox, *Danielle Adams, *Lauren Butler

UP81 The Impact of Experiencing Immersive Simulation in Teaching, Carley VanHoy

UP82 Improving Student Understanding of Mitochondrial Bioenergetics with Teaching Tool, Jessica Brush, *Patricia Malcolm, *Basel Abdelfattah, *William Blake, *William Guptill

UP83 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

UP84 I Made It Up: Maps, Essays, and Other Guides for the Queer Black Girl, Glenesha Berryman

UP85 Linking Tsiolkovsky’s Rocket Science to the Humanities, Chase Neese

UP86 Chekhov and Shakespeare on the Modern Stage: Two Plays in One Show, Katie Collins

UP87 The H&M Racist Scandal: Diversity Deficits in an Era of Global Public Relations, Ava Criscitiello

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

UP88 Role of Dopamine-3 Receptors in left ventricular cardiac fibroblasts proliferation, Deepthy Melit Thomas

UP89 Expression of Human IFN-β Protein by Chinese Hamster Ovarian Cells, Todd Hylton

UP90 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

UP91 Impacts of an Organophosphate and a Pyrethroid on Insecticide Resistance in Culex quinquefasciatus (Diptera: Culicidae), Deryn Smith

UP92 Age-dependent study of pathological progression of Alzheimer’s disease in hippocampal and cortical tissue of human and an AD mouse model, Taylor Leposa

UP93 Characterization of predicted microtubule-associated proteins in sensory hair cells of zebrafish (Danio rerio), William Biggers

UP94 Molecular chaperone Tetratricopeptide repeat protein 2 (Tpr2) is essential for germline stem cell self-renewal and timely cyst divisions in Drosophila melanogaster oogenesis, Morgan Phillips

*Co-Presenter

WEDNESDAY 4.3.19

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 Neuron Survival is Improved by Testosterone Supplementation, 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

*Co-Presenter

Undergraduate Poster Presentations

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

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 Diisopropylfluorophosphate, 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 Melanocortin-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, Anuj 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 Oliveira

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

*Co-Presenter

WEDNESDAY 4.3.19

Undergraduate Poster Presentations

Ballroom | Biomedical Sciences — 1:30 PM - 3:30 PM

UP127 Effective Recruitment Strategies for Community-Based Health Initiatives in At-Risk Communities, Michael Denning

UP128 All Hands on Deck, Caitlin Cartwright, *Morgan Nobles, *Emily Patton, *Ashley Elwell

UP129 Creating a Club to Increase Sexual Assault Awareness and Prevention on ECU's Campus, Danielle Adams, *Phoenix Little

UP130 Factors Influencing Community Collaboration in Public Health Initiatives in Developing Countries, Claudia Woznichak

UP131 Sustainable Success: Motives & Charity Sport Events, Bailey Cooper

UP132 Quiz of Student Interest (QSI), Stephanie Goodman, *Madison Dalgreen, Elizabeth Majette, Abigail Squires

Ballroom | Community Engagement — 1:30 PM - 3:30 PM

UP133 Health4PINE: Our Health Our Responsibility Course Effectiveness, Pranaya Pakala

UP134 Beaufort County Regional Park Site, Samuel Hunter

UP135 An Exploratory Study of Early Childhood STEAM Parenting Workshop Development in Pitt County Community, Nikita Revankar, *Lyndsey Graham, *Jenny Bolton

UP136 Ending Drunk Driving at East Carolina University, Michael Crumpler

UP137 Healthy Pals, Hannah Butler, *Ross Judd, *Camille Whitlock, *Madeleine Rector, *Morgan Le Agner, *Sydney Johnson, *Sydney Johnson

UP138 Not Broken: Improving Disability Sport, Sarah Horrell

Ballroom | Engineering — 10:00 AM - 12:00 PM

UP139 Hog Slat Process Improvement Capstone, Houston Beasley, *Dylan Scheck

UP140 Gregory Poole Abstract, Jarrett DePizzol

UP141 Development of a second generation novel air puff system prototype for use in medical, cosmetic, and food industry, Keith Williams, *Antonia Dingeman, *Grace Krell

UP142 Characterizing Pulmonary Artery Hemodynamics in End-Stage Renal Disease Patients, Daniel Pearce

UP143 Design of a Sensor-Based Anxiety Monitoring System, Riley Dumm, *Gunnar Price, *Griffin Steinbaker

UP144 Crown Equipment Corporation, Cole Brunet

UP145 DSM Dyneema Process Improvement Project, Andrew Thomas, *William Jackson

*Co-Presenter

WEDNESDAY 4.3.19

Undergraduate Poster Presentations

Ballroom | Engineering — 8:00 AM - 10:00 AM

UP146 Modeling of human insulin-glucose response mechanism for diabetes analysis, Natalie Bell

UP147 Design of a Patient Orientation Monitoring System, Christopher Satterley, *Christopher Satterley, *James Barros

UP148 Pressure Evaluation of Tracheal Suction Catheters to Reduce Damage to Respiratory Airways, Marcus Moody

UP149 The Future of Advanced Manufacturing in High Bay, Eric Clark, *Avery Jeffers

UP150 3D Printing Patient-Specific Images for Diagnostics and Perioperative Planning, Joshua Butler

UP151 The Future of Engineering Education, Jeremiah Johnson, *David Harr

UP152 Detection of the Freshness of Fish Using A Novel Air Puff Device, Antonia Dingeman

Ballroom | Engineering — 10:00 AM - 12:00 PM

UP153 Mestek's Replacement Parts, Steven McKinney, *Alexander Roten

UP154 System for Elopement Prevention in At-Risk Populations, Chelsea Carter, *Thomas Buckner, *Daniel Pearce, *Morgan Roberson

UP155 Capstone Project for IENG 4900, Patrick Thompson, *Nicholas Clarke

UP156 Winterville Metal Works, Cody Blackburn

UP157 Detection of the Freshness of Fish Using A Novel Air Puff Device, Grace Krell

UP158 Weyerhauser Capstone, Gregory DeDecker

UP159 Analytical Model of Ocean Energy: Determining Peak Energy Level Potential, Angela Krebs

Ballroom | Business — 1:30 PM - 3:30 PM

UP160 Size Inclusivity, Ronicka Evans

UP161 How Does Interactivity With App Affect Customer's Continuance Retention?, Richard Fisher

UP162 Investigation of Effects of Social Factors of Apps on Customer Continuance Intention, Katherine May

UP163 The Failure of Lehman Brothers: What went wrong?, Victoria Bishop

UP164 Preparing the Future Accounting Professional for a Rapidly Changing World, Marianna Shurina

UP165 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

*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

UP173 Public firearm surveillance using object detection and object position analysis, Elliot Paul, *Elliot Paul, *Marco Agostini, *Charles Ablan

*Co-Presenter

ABSTRACTS

GO1

Effectiveness of Mental Health Programming in Law Enforcement Agencies Across the United States

Kristen N. Proctor1, Dr. Allison Crowe1, Dr. Heidi Bonner2

1Counselor Education, Department of Interdisciplinary Professions, East Carolina University
2Criminal Justice, Department of Criminal Justice, East Carolina University

First responders, or professionals who deal with emergencies, crime, and other traumatic events, include police officers, firefighters, and EMTs (Meadows et al., 2011). The nature of first responder positions requires the performance of critical tasks, which may impact mental and physical wellbeing. Along with the traumatic experiences that are inherent to the job, other factors such as long and irregular shifts, overnight hours, dangerous environments, and physical demands contribute additional stressors (Meadows et al., 2011). Scholars have posited that some first responders struggle with mental health concerns including depression (Benedek, Fullerton, & Ursano, 2007), posttraumatic stress disorder (Benedek et al., 2007), and alcoholism (Jacobson et al., 2008) due to the nature of the work. Seeking formal help for mental health concerns, however, is counter to law enforcement (and similar first responder) culture, as the job involves emotional and physical toughness and control (Crowe et al., 2015). Because of this, law enforcement and other agencies have begun to adopt in-house resources and supports that assist officers in dealing with mental health concerns. This oral presentation will discuss a recent study that sought to examine what supports, programs, and resources were available in law enforcement agencies across the United States to assist law enforcement officers in coping with mental health concerns when they arise. This study used a stratified sampling method of law enforcement agencies across the United States, and asked Police Chiefs and similarly positioned administrators to rate the perceived level of effectiveness of the supports and resources their police department had for officers with mental health concerns. Using a Likert scale of 1-5, respondents ranked the level of effectiveness for programming such as staff psychologist/psychological services, resiliency training, and peer supports. Designed specifically for RCAW at ECU, this oral session will highlight results from this survey on perceived effectiveness of the programming. Of particular importance will be the clinical, practical, and programming implications related to human health, as the mental health of law enforcement officers is a critical topic for both officers and those they serve.

GO2

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. Students who strive to meet the physical activity guidelines may recognize that physical activity may play a crucial role in self-efficacy, resiliency, and grit, which all contribute to one's mental health.
A credit-based physical activity course may provide an opportunity for college students to address, alter, and improve their physical activity behaviors and their mental health. The program may be a resource for students to implement physical activity behaviors that assist in reducing their stress, anxiety, and depression levels associated with being a college student.
The purpose of this study is to examine the impact of course based physical activity 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.

GO3

Investigating Genetic Variants of the LIMS1 Chromosomal Region for Associations with Recurrent Stroke

Catherine Ann Darcey1, Dr. Michael Brewer1, Dr. Keith Keene1,2

1Department of Biology, East Carolina University
2Center for Health Disparities, Brody School of Medicine

As the fifth leading cause of death and number one cause of long-term disability, stroke affects 795,000 people annually, according to the American Heart Association. Recurrent stroke accounts for 185,000 of these individuals, 54% of which will become disabled and, if the recurrent stroke occurs within the first 30-days post initial stroke, will have a 14% fatality rate. We have recently discovered a novel locus on chromosome two associated with recurrent stroke through genome-wide association study (GWAS) in the ethnically diverse Vitamin Intervention for Stroke Prevention (VISP) clinical trial population. Due to the high linkage disequilibrium and low recombination within this locus, fine-mapping is currently underway to identify the genetic variant(s) associated with recurrent stroke risk in this region (including LIMS1, SULT1C2, SULT1C4, GCC2, RANBP2, CCDC138, and EDAR). Utilizing next-generation sequencing (NGS), the 720 Kb LIMS1 chromosomal region has been sequenced in 182 recurrent stroke patients from the VISP clinical trial to discover genetic variants to be genotyped using TaqMan assays in all 2,100 VISP genomic participants. Genetic variants will then be analyzed individually and in haplotypic blocks for associations with recurrent stroke risk and biomarkers. A clearer understanding of the genetic factors that predispose individuals to stroke recurrence has the potential to prompt more efficient genetic risk screening. Subsequent research prompted by my findings will lead to functional studies to determine the mechanism of discovered single nucleotide polymorphisms which could stimulate the development of therapeutic treatments and pharmacogenomics studies.

GO4

Fine-mapping a novel locus on chromosome 1 for association with recurrent stroke

Dunya Moneer Safa

Stroke is a multifactorial, complex disease with both genetic and environmental contributors. Stroke is also the fifth leading cause of death and the leading cause of long-term disability in the United States (US). Of stroke survivors, approximately 25 percent will suffer a recurrent stroke within five years of the initial occurrence. Moreover, those recurrent attacks are more deadly and more likely to result in a debilitating long-term disability in individuals when compared to initial stroke. While many genetic studies have focused on stroke, few have addressed the underlying associations with recurrent stroke. Using the genetic data from a clinical trial, Vitamin Intervention for Stroke Prevention (VISP), a genome-wide association study (GWAS) was performed by collaborators, which identified two novel loci associated with recurrent stroke. The primary objective of this project is to use fine-mapping approaches to identify the potentially causal single nucleotide polymorphisms (SNPs) contributing to the association detected in a gene desert region found on Chromosome 1. First, targeted next-generation sequencing (NGS) was performed to identify all variants spanning a 750,500 bp region, followed by prioritization of variants. Next, genotyping of these high priority variants will be performed using TaqMan SNP Assay Genotyping methods. Finally, statistical analyses will be performed to test for genetic association with recurrent stroke and stroke-related phenotypes. Identifying the genetic risk variants associated with recurrent stroke can be instrumental in an array of applications, particularly in medical settings. This study, along with future functional assays, can ultimately help in determining the exact role of these variants in stroke and recurrent stroke individuals, paving the way for precision medicine.

GO5

Law Enforcement and Firefighters Physical Activity Study

Jourdyn Rae Holsinger

Law enforcement and firefighters serve a vital role in maintaining the safety and order in our communities. They suffer from numerous health problems including heart disease, psychological stress and sleep disorders. Their jobs are stressful and at times, life-threatening. The stress associated with these professions can have a negative effect on their physical, mental, and occupational health. These stressors may increase obesity, fatigue, and cardiovascular disease; decrease quality of life and satisfaction with life; and lead to burnout and compassion fatigue. Among other working populations, physical activity has been to provide health benefits PURPOSE: The purpose of this study is to examine the correlational relationships between physical activity levels and measures of physical, mental, and occupational health in firefighters and law enforcement officers. Physical health is defined as body mass index (BMI), aerobic fitness, and sleep quality. Mental health is defined as quality of life, stress, and satisfaction with life. Occupational health is defined as compassion fatigue and job stressors. METHODS: Law enforcement officers and firefighters will be assessed for physical activity via the Fitbit Flex activity tracker over a 7 day period and the International Physical Activity Questionnaire (IPAQ) and 30-day Physical Activity Recall (30-Day PAR). Body mass index will be measured using the Dual-Energy X-Ray Absorptiometry (DXA). Each of the remaining measures of health were assessed via questionnaires. Pearson correlations will be used to determine the relationship between physical activity and

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 stroke-related phenotypes. One SNP in particular, found in the MTHFR and known as rs1801133, or C677T, was found to be significantly associated with folate levels in the blood. This polymorphism has been previously associated with a number of fertility and developmental disorders, cancers, and vascular diseases, including stroke. Other SNPs and gene regions were significantly associated with other stroke-related phenotypes, such as homocysteine levels in the blood. Implications of these findings could pave the way for clinical and functional assays that may lead to more precise therapeutics to alleviate the effects of stroke.

GO7

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 ceramides 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.

GO8

The Effects of High Perceived Exertion on Joint Kinematics during the Power Clean

Morrison, Theodore; Silberg, Ryan; Nezlek 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 high 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 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.

GO9

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 (HFASD) 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 than rates in 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.

Occupational therapists' scope of practice includes driving, using evidence-based guidelines, resources, and studies to evaluate driving and provide interventions to assist teens with ASD to achieve goals of becoming independently mobile in the community and/or driving a motor vehicle. One evidence-based method to meet this goal is driving on an interactive driving simulator. Simulators offer a safe alternative to learn and practice driving skills and knowledge. This presentation will demonstrate how eye tracking technology was used to determine the effectiveness of hazard perception training on a driving simulator for teens with ASD. Analyses will determine if there is a significant difference between the pre- and post-simulator drive; specifically, how long to find a hazard, the amount of time looking at a hazard, and how many times a participant looks at a specific hazard. These results will help occupational therapists understand hazard perception of teens with ASD and develop strategies to assist in improving independence in driving for teens with HFASD.

GO10

Does Teacher Feedback Improve Student Writing?

Kimberly Alice Rogers

Abstract

This action research will determine if teacher feedback left on

high school science students' weekly writing assignment will reduce the number of errors and improve the thoroughness of answers when following the 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 research and find a current science article relating to the topic being studied in class, choosing a different one every week. Given the same guidelines and questions to answer weekly, students will write or type their summary and question responses, and turn in every Friday. Each question answered incorrectly or omitted by the student will count as an error, coded, and graphed. Suggestions for improvements will be written for the students on their documents. 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.

GO11

Assessing Pre-Service Early Childhood Teachers' Perceived Preparedness on Early Childhood Social-Emotional Competencies and Resources Needed

Tyla Ricks[1]

Department of Human Development and Family Science, East Carolina University[1]

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 bridge this gap by creating social-emotional competencies, which acknowledge mental health challenges as a product of factors relating to genetics, environmental, and demographics. These competencies are important for pre-service and in-service teachers' who work with young children. Given the need for pre-service teachers to feel competent in working with children who display mental health challenges, the present study assesses early childhood pre-service teachers' perceived preparedness (having the knowledge to deal with, skills developed or being aware of resources) to best meet the needs of the young child in their own classroom or school, measured by an adapted version of the Early Childhood Social-Emotional Competencies, developed into a measurable scale by the researcher. The scale consists of three parts: background information, adapted and revised social emotional competency scale, and the importance of resources to the participants. The survey will be evaluated using quantitative and qualitative methods. The present study will lend insight by showing how prepared pre-service teachers are on various socioemotional competencies that are important for their work as in-service teachers in their own classroom. Pre-service programs can also utilize the ECSEC scale to assess their pre-service programs, utilize resources based on this research to strengthen their teacher education program and better prepare teacher candidates for the world of teaching.

GO12

The Impacts of Virtual and Traditional Labs on Student Leraning in Middle School Science

Samantha Marie Brown

Effective science instruction should provide students the opportunity to participate in laboratory experiments that deepen student learning of various topics. The overall purpose of this research is to determine which type of lab, virtual or traditional, has the greatest impact on student learning when studying physical and chemical properties of elements. This research is important to determine which form of laboratory experiences will promote further understanding of the science concept. The overall design of this research is a Group Comparison Design to determine any significant learning gains found when two classes perform virtual and traditional labs. Overall trends in the classroom show that virtual labs help to enhance higher levels of thinking along with allowing for greater understanding of the concepts being taught. It is anticipated that the results of this study will support the use of virtual labs in science classes. Evidence collected will help to determine which style of laboratory experimentation, virtual or traditional, will have the greatest influence of the overall learning of students in the science classroom.

GO13

Examining the Outcome of Implementing Instructional Practices and Incentives that Promote Intrinsic Reading Motivation

Maranda Leighann Hogel

The purpose of my action research project is to examine how implementing intrinsically motivating practices and incentives will affect student attitudes toward reading. The goal is to create an atmosphere in which students are excited and motivated to read. Students often resent reading and resent teachers for "making" them read, because students view reading as an assignment and/or obligation. The intention of this project is to make reading less of an obligation and more of a desirable activity for students. Many teachers use incentives to promote reading in their classrooms and at home, but the incentives are often unrelated to reading and extrinsically motivating. I will be shifting to incentives that are related to reading and that will motivate students to continue reading. I am completing a qualitative study in which I will be observing students' attitudes and behaviors regarding reading. I am recording findings and observations daily in a researcher log. A reading attitude survey was administered pre-intervention, and the same survey will be administered post-intervention. These surveys will provide me with data on how the intervention affected students' attitudes toward reading. My recordings in the researcher log will also allow me to see how attitudes were affected througout my study. My anticipated outcome is that students will be more excited to read in my classroom. I predict that students will read more frequently because they want to, not because they have to.

GO14

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 opsins to understand rates of evolutionary change in genes associated with visual perception, as well as specific nucleotide changes in this gene family tha may enhance fruit detection.

GO15

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 lifecycles, and parasite 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 lifecycle (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 of parasite diversity (January – May 2018) showed no significant differences among treatment sites, and post-restoration monitoring is on-going and planned for an additional 2-3 years.

Many host organisms are elusive (e.g. diamondback terrapins), or time-intensive and costly to sample using traditional survey methods (e.g. shorebirds, large demersal fishes). However, because of the tight co-evolutionary relationship between hosts and their parasites, parasite diversity in easily collected upstream hosts provides clear evidence that the necessary downstream hosts are recruiting to the restored habitat. Parasites thus offer a promising assessment tool for quantifying biodiversity and environmental health, particularly in sensitive ecosystems subject to frequent monitoring.

GO16

Debunking 1 + 2 + 3 + ... = -1/12

Jacek Teller

Scientists have a social obligation to debunk unfounded theories, and misinterpretations of experimental results. Often, such problems originate with lay-persons, but occasionally, they originate with other scientists—leaving us with a professional dilemma. In this presentation, I respectfully and sensitively debunk the summation

1 + 2 + 3 + ... = -1/12

which is often repeated in popular and academic physics works, in particular those on string theory. I briefly point out the flaws in the derivations, and offer definitive proof that such a result is not possible.

The proof that I offer hinges on a little known theorem due to Alexander Ostrowski, published in 1916. In evoking Ostrowski's Theorem, my presentation departs from other academic rebuttals to the false summation claim. Unlike other published responses, that simply show the result is not justified (implying that it may be true, we just need to find a better derivation), I offer mathematically rigorous proof that it cannot be true.

NOTE: This talk is based on a poster presentation at RCAW 2018. It caused enough controversy and emotion that I have turned it into an oral presentation for RCAW 2019.

GO17

Towards an improved classification of robber flies (Asilidae) using ultraconserved elements

Chris Cohen, Katherine Noble, Jeff Cole & Michael Brewer

The most recent classification organises 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.

GO18

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 neotropial habitats and have known medically relevant venoms. For example, the bite of the highly aggressive Brazilian wandering spider (Phoneutria nigriventer) causes pain, cramps, priapism, and arrhythmia with a median lethal dose (LD 50) of 134 µg/kg in mice. Alternatively, the bites of ctenids dwelling in the temperate forests of North America have no recorded adverse symptoms. The aim of this study was to determine what venom homologs are shared between four species of ctenids in the U.S with their neotropical counterparts using venom gland transcriptomics. Homology searches inferred numerous multi-gene venom families containing homologs to confirmed noxious venom proteins in Phoneutria. This research provides the first insight into the venom components of U.S ctenids, and provides a framework for investigations of the evolutionary processes that have contributed to the drastic toxicity differences within this family.

GO19

Investigating the αC Connector for Roles in Fibrin Extensibility and Polymerization

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 polymerization 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 pathologies. 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 florescence 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

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 Fixxiondemonstrates 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 naiveté, between adulthood and authority and how does this inform understandings of amorous relationships, family relations, and more generally the modern occidental social fabric?
- How do first-person child narrators construct themes of urbanism and domesticity, and what do these visions say about the work's ultimate message?

GO21

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.

GO22

Need for Spanish Medical Interpreters: A Mixed-Methods Study

Corichi Francisco Jimenez-Garrido

ABSTRACT

North Carolina boasts one of the largest and fastest growing immigrant populations in the United States. In fact, five of the 30 counties in the US that showed the most rapid growth were located in North Carolina: Wake, Mecklenburg, Forsyth, Guilford and Durham, in order of percentage growth. According to the US Census Bureau, in 1997 the Hispanic population grew 95%. This rapid growth has thus created a myriad of problems that need the attention of local authorities. Of these, a central concern is over the provision of certified interpreting services. Although collaborative efforts between language departments and professional health care schools have been made to respond to the expressed need for trained and qualified interpreters, as well as language courses or programs that focus on developing or enriching students basic language and cultural skills (Levi Altstaedter, 2017), it is not yet known whether these efforts have been fruitful and, if so, to what extent.
The general purpose of the present study, therefore, is to investigate effective practices of Spanish for Medical Purposes Programs in Eastern North Carolina (ENC) and the impact that they may or may not have in the development of properly trained Spanish medical interpreters who are hired to work in the same region. In addition, it is crucial to understand the needs of local medical facilities in terms of Spanish interpreters' services and how it is that these are covered, including, but not limited to, the following modes of interpretation: simultaneous, continuous, sight, ad hoc, Video Remote Interpreting (VIR) and telephone. Therefore, this study will answer research questions, such as: What is the impact (if any) of Spanish for Medical Purposes programs in local and accredited medical centers in the ENC region? And what is the impact (if any) that people enrolling in these programs may have in local Spanish medical interpreting departments.
Survey and interview data will be gathered from nurses, primary care providers, Spanish Language instructors, Spanish Language students, Spanish medical interpreters and Spanish-speaking patients in a convergent-mixed methods design, in which qualitative and quantitative data are collected in parallel, analyzed separately, and then merged (Creswell, 2015). Preliminary results will be discussed as will directions for future research.

GO23

Fantastic Things and How we Find Them: Promoting Archaeology at Historic Brunswick Town

Kimberly Elane Byrnes

Technological advancments have been an aid to musuems, but not all facilities may be able to afford the newest gadets. Quick response (QR) codes offer a cost effective way for every museum to impliment new technology into their displays and more frequently change their exhibits. This paper will discuss the visitor use of and response to QR codes aimed at explaining the archaeological process at the Brunswick Town/Fort Anderson State Historic Site.

GO24

Improved Strain Analysis of Left Ventricular Function Post Myocardial Infarction in Mice

Danielle Wilson1, Dr. Zhen Zhu1, Dr. Jitka Virag2, and Dr. Stephanie George1

1Department of Engineering, East Carolina University
2Department of Physiology, Brody School of Medicine

A myocardial infraction (MI), caused by an arterial blockage preventing blood from flowing to a part of the heart, restricts tissue oxygenation and results in myocardial dysfunction and cell death. This compromises contractility, resulting either in sudden death, or ventricular remodeling and eventually heart failure. Echocardiography is the standard cardiac imaging technique for humans and small animals. The standard measurements obtained from M-mode echocardiography to assess left ventricle (LV) function lack the sensitivity to detect subtle changes in regional LV performance at the early stages of disease. Speckle tracking techniques in conjunction with strain (SN) analysis overcomes this issue by tracking the movement of the myocardium across 6 transverse segments of the LV. Analysis of SN in more regions of the heart from the apex (bottom) to base (top) would reveal earlier, localized detection of LV dysfunction.
The purpose of this study is to develop a methodology to improve regional specificity in the analysis of SN and strain rate (SR) relative to the site of injury in mouse hearts in 12 equal segments along the myocardium and compare these results to the VevoStrain software (VisualSonics) SN values. Echocardiographic images obtained from the Vevo 3100 (VisualSonics) ultrasound in uninjured hearts or after acute ischemia/reperfusion (30minI/24hr R) injury induced by ligation of the left anterior descending coronary artery were analyzed using MATLAB (MathWorks). To quantify SN, the 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 investigated what areas are getting more attention and where the trends are increasing. Last but not least, we provided insights regarding future research directions in the area of tag-aware recommendation systems.

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 doctor diagnosed 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 vasculature that brings nutrients to the injury site allowing for the 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 ratio of the beads was 21500%. Hydrogels are an 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 increase the fracture toughness of the material which increases the composites tensile strength (Tonsomboon K et al 2017). The addition of polyacrylic 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 nformation sharing among people through various mediums of communication such as text, pictures, audio, and video in various forms such as pictures, text, audio, and video 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 focus 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 .... 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.

GO28

Automatic Text Summarization and Using Cognitive Computing tool to perform Sentiment Analysis on News dataset

Vishwa S Patel

In this 21st century, the data is growing exponentially every day. Sometimes data is too large to understand, and it consumes a lot of time. In addition to that knowing the sentiment of the text is also important like positive or negative. In this research, I am trying to summarize different news into few lines which are easy and fast to understand. This can be done using Text Summarization concept in Natural Language Processing. Along with this, I am trying to analyze the sentiment behind the news using Cognitive Computing. This can be very helpful in categorizing news into positive and negative. Using Cognitive Computing tool like IBM Watson, it gives us better data analysis of the data.

GO29

Machine Learning Based Medical Information Retrieval Systems

Akhil Gudivada

As many fields progress with the assistance of cognitive computing, the field of health care is also adapting, providing

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 Khademorezaian

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 they 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 Alejand 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 cantilevers then 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 Neice

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 elegans) 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 2018). 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 surveys enabling more sites to be sampled. Thus, eDNA could provide much needed data on range and occupancy for these 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 Amoiroglou, 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 A619, however, the Pt1 phenotype is mild and Pt1/+ are female fertile. In A619, both ears and tassels from Pt1 homozygotes 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 6.8cM interval (~5Mbp) 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 are differentially expressed (FC>2,padj< 0.05). However, none of these genes are striking candidates. We are currently analyzing our data to identify RNAs with sequence changes that could be responsible for the Pt1 mutant phenotype. We are also 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. se technological advances to help our planet.

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 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 microscopic 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 fluorescent 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 completed upgrade to a CFM system will enhance the capabilities of the CFM with intention for use in mechanomics experiments and other biophysical applications, specifically those that would benefit from a system that can apply and mechanical force onto a sample

and quantify it.

GO35

Characterizing the Microbial Communities on Pappy's Lane Shipwreck

Kyra A. Price1, Cody E. Garrison1, Nathan Richards2, Erin K. Field1

1Department of Biology, East Carolina University, Greenville, NC 27858,
2Program in Maritime Studies, Department of History, East Carolina University, Greenville, NC 27858

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/cm2on 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 OTU11 have been identified to contain nitrogenase genes which suggests they may be specialized to carry out nitrogen fixation. The microbial community composition was characterized through 16S rRNA gene sequencing and compared across sample types. The community comparison results suggest that community composition is unique to the sample type and shipwreck sample communities were more similar to each other than their surrounding sediment and water samples. Marine iron-oxidizing bacteria 16S rRNA gene sequences were found only in sample O-1, which suggests that FeOB make up a small proportion of the overall community. Characterizing the microbial communities found across the shipwreck can help us understand their influence on degradation. This information will ultimately be used to help protect shipwrecks and preserve their history.

GO36

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

Shawna L McMillin, William M Taylor, Temple L Dahn, Erin C Stanley, Parker L Evans, Luke A Weyrauch, E Dale Abel, Carol A Witczak

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 (~60%), suggesting that beyond basal glucose uptake GLUT1 may also regulate resistance exercise training/overload-induced muscle glucose uptake. To date, no studies have examined the role of GLUT1 in this process. Thus, our goal was to determine whether GLUT1 expression is required for overload-stimulated glucose uptake in mouse skeletal muscle. GLUT1 LoxP mice were bred to muscle creatine kinase-Cre recombinase mice to generate muscle-specific GLUT1 knockout (mGLUT1KO) mice; and for these studies only age (11-13 week old) and gender (male)-matched littermates (wild-type, Cre+, LoxP+) 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 examined before and during a glucose tolerance test. Surprisingly, mGLUT1KO mice did not exhibit impairments in fasted 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 and soleus. The contralateral leg was sham-operated as the control. Muscle weights and ex vivo muscle [3H]-2-deoxyglucose uptake were assessed 5 days later. Overload increased muscle weight ~43%, and this growth was not inhibited by the loss of GLUT1. Basal muscle glucose uptake was unaltered and overload-induced muscle glucose uptake was not significantly impaired in mGLUT1KO mice (30%) compared to control mice (34%). Collectively, these results demonstrate that muscle GLUT1 expression is not necessary for the regulation of basal or overload-induced muscle glucose uptake, and provide for the first time direct evidence indicating that another glucose transporter(s) are responsible for these effects in skeletal muscle.

GO37

Demystifying the Role of Matrix Metalloproteinase-12 in Sarcoidosis

Nicole Naadei Neequaye
A Malur, W Knudson, A Mohan, MJ Thomassen.

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 multiwall 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: C57/Bl6 (wildtype) and MMP-12KO 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 suggestions 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 within patients. Because heavy charged particles have a relatively finite range within media, they allow for more predictable and acceptable margins inside and around a target volume. Compared to photon beams used in the clinic, which range from 6 MV to 18 MV, proton beams have a much higher average energy, around 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.

To quantify this secondary dose and determine its significance, we have utilized a Monte Carlo method to simulate passive scattering beams. Using Topas (Tool for Particle Simulation) we were able to simulate the Ion Beam Application's (IBA) Universal Nozzle, a popular nozzle type in proton therapy, and determine the number and energy of neutrons, by component, produced during passive scattering proton therapy treatments. Passive scattering treatments use a series of components placed in the path of a pencil beam which spread the beam and create protons 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 α-Klotho Functions as a Novel Hypothalamic Factor Regulating NPY/AgRP Neuron Actiivty, Energy Balance, and Glucose Homeostasis in Mice

T. Landry. 1, 2, B. Laing1,2, P. Li1, W. Bunner1,2, Z. Rao1, H. Huang 1,2,3

1 East Carolina Diabetes and Obesity Institute, East Carolina Heart Institute, 115 Heart Drive Rm 4108, Greenville, NC, United States
2 Department of Kinesiology, East Carolina University, 115 Heart Drive Rm 4108, Greenville, NC, United States
3 Department of Physiology, East Carolina University, 115 Heart Drive Rm 4108, Greenville, NC, United States

Methods: Central administration of α-klotho was performed by using intracerebroventricular (ICV) injection for seven days in diet-induced obesity (DIO) and streptozotocin-injected (STZ) mice. hrNPY-GFP reporter mice were utilized for electrophysiology and immunofluorescent staining experiments to investigate the effects of α-klotho on NPY/AgRP neurons. To determine the mechanism/s of hypothalamic α-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 α-klotho administration decreased food intake

and improved glucose profiles in DIO and STZ mice. Liver lipid content and gluconeogenic 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 mIPSC's. In vitro, α-klotho blunted serum-starvation-induced AgRP gene expression and increased phosphorylation of ERK44/42, AKTser473, and Foxo1ser256. These downstream effects were abolished by pretreatment with inhibitors of either FGFR1 or PI3kinase. Furthermore, α-klotho-mediated suppression of food intake, but not glucose levels, was blunted in response to inhibition of FGFR1 signaling.

Conclusion: These results indicate a prominent role of hypothalamic α-klotho-FGFR1-PI3K 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 Lisowski, Steven Yuvan, Martin Bier

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 Belt are detailed, which has seen dangerous periodic outbreaks due to clustering of the unvaccinated. We demonstrate the statistical inevitability of these events through the SIR model - a well known mathematical description for the spread of disease.

This scenario is compared to conditions that are beginning to develop in other places in Europe, particularly in Poland, and the enhanced lethality of such periodic outbreaks is explained. A short history and origin of the virus is provided, supported with reasoning derived from the SIR model and a novel linguistic analysis, and finally we speculate on the possible future evolution of the virus based upon the environment it will face.

GO41

Expression of constitutively active Ca2+/calmodulin-dependent protein kinase kinase α attenuates denervation-induced atrophy in mouse skeletal muscle

Luke Weyrauch
Shawna McMillin
Carol Witczak

Spinal cord injury/ denervation induces muscle atrophy via a dysregulation in the balance between protein synthesis and protein degradation; and the loss of muscle mass contributes to increased morbidity and mortality. Thus, identifying new ways to attenuate muscle atrophy would be beneficial for those affected. Ca2+/calmodulin-dependent protein kinase kinase α (CaMKKα) is a Ser/Thr kinase; and our previous work has shown that expression of a constitutively active form of CaMKKα in muscles from healthy mice increases muscle mass and protein synthesis rates. Whether CaMKKα is able to attenuate muscle atrophy is currently unknown. Thus, the goal of this study was to determine if active CaMKKα expression could attenuate denervation-induced muscle atrophy, and if so determine whether it occurs via increased mechanistic target of rapamycin (mTOR) signaling. To express active CaMKKa, tibialis anterior muscles from female, 10-11 week old, CD-1 mice were transfected with plasmids containing constitutively active CaMKKa or empty vector using in vivo electroporation. Immediately following electroporation, hindlimb muscles were denervated via unilateral resection of a ~0.25 cm segment of the sciatic nerve. The contralateral limb was sham-operated as control. Two weeks later, muscles were excised and weighed. Denervation decreased muscle weight 38% in empty vector-transfected muscles, but only 26% in active CaMKKa-transfected muscles, demonstrating that active CaMKKa can attenuate denervation-induced muscle atrophy. To assess whether this was due to increased mTOR signaling, immunoblots were performed. Neither denervation nor active CaMKKa increased the phosphorylation of mTOR (Ser2448), or the mTOR substrates eukaryotic translation initiation factor 4E-binding protein 1 (4E-BP1; Thr37/46), or p70S6 kinase (Thr389). Collectively, these results suggest that the ability of active CaMKKa to attenuate denervation-induced atrophy is not through increasing mTOR signaling and protein synthesis, but may instead be through decreasing protein degradation. Future experiments are planned to directly assess muscle protein synthesis and degradation rates.

GO42

AgRP Neuron Activation is Required For Acute Exercise Induced Feeding Behavior in Untrained Mice

Wyatt Bunner1, 2,3, Brenton Thomas Laing1,2,3, Taylor Landry1,2,3, Hu Huang1,2,3,4

1Department of Kinesiology, East Carolina University, Greenville, North Carolina, USA
2East Carolina Diabetes and Obesity Institute, East Carolina University, Greenville, North Carolina, USA
3Human Performance Laboratory, Collage of Human Performance and Health, East Carolina University, Greenville, North Carolina, USA
4Department of Physiology of East Carolina University, Greenville, North Carolina, USA

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 neuron 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 immediately after the bout of exercise by intracardial perfusion and brains were harvested and sectioned. For POMC identification, immunofluorescence staining was conducted. Co-localization of c-FOS with the neurons of interest was used as a proxy of neural activation. To measure changes in firing rate, the same exercise protocol was employed, and cell attached patch-clamp electrophysiology recordings were performed on arcuate NPY-GFP expressing neurons (N=10). AAV carrying inhibitory DREADD was injected into arcuate nucleus of AgRP-ires-CRE mice along with a Clozapine N-Oxide (CNO) injection before acute exercise to inhibit AgRP neuronal activation. Food intake was measured at different time points after acute exercise (N=8).

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 arcuate 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.

Emma J. Goldberg1,2, Cameron A. Schmidt1,2, T.D. Green1,2, R. Karnekar1,2, D.J. Yamaguchi3,4, E.E. Spangenburg1,2, & Joseph M. McClung1,2,3*

1Dept. of Physiology, Brody School of Medicine
2East Carolina Diabetes and Obesity Institute
3Department of Cardiovascular Sciences
4Division of Surgery, Brody School of Medicine, East Carolina University

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 – EDL) 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 reperfusion and contractile function recovery using an in vivo model of ischemia in Sol and EDL 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 EDL 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 EDL revealed disordered capillary networks, reduced capillary perfusion (perfused lectin+ area/cross sectional fiber area) and severe myopathy, indicated by loss of isometric force production and dystrophin 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. EDL: 0.039 ± 0.005, Isch. EDL: 0.0035 ± 0.005; lectin+area/um2). Myofiber CSA (μm2) and isometric force production, however, remained reduced compared with contralateral controls. Our results reveal that Sol muscles are functionally more resilient to acute ischemia. During chronic ischemia, however, Sol and EDL muscles share a similar timeline of perfusion recovery and suffer from sustained myopathy beyond the restoration of tissue perfusion.

GO44

Focal Adhesion Characterization of Developing Human Neuons

Amanda Petritsch, Brenna Kirk, Karen Litwa

Focal adhesions are points of contact between the cell and its environment. Focal adhesions are dynamic structures that regulate cell signaling, morphology, and motility as adhesions form, mature and disassemble. Focal adhesions are critical to developing neurons, which function in highly organized circuits relying on specific cell morphology and spatial organization. It is currently unknown how focal adhesions change during neuronal differentiation. As neurons develop they extend processes to locate synaptic partners through the soft environment of the developing brain; we use human induced pluripotent stem cells (hIPSCs) as a tractable model to study changes in focal adhesions within the first 120 hours of neuronal differentiation. In order to produce a soft three-dimensional substrate that more accurately recapitulates the in vivo neuronal environment, we develop Collagen-Hyaluronic Acid-Laminin hydrogels. We use these soft hydrogels to investigate the impacts of dimensionality and stiffness on focal adhesions during neuronal differntiation. In order to evaluate focal adhesion complexe, we stain neuronal progenitor cells and neurons for focal adhesion proteins including α-actinin found in nascent adhesions, as well as paxillin, vinculin, and zyxin which are recruited during focal adhesion maturation. Total Internal Reflection Fluorescence (TIRF) microscopy resolves the adhesion complexes into discrete structures throughout the time course of neuronal differentiation. We then use ImageJ and Sigma Plot software to analyze focal adhesion composition, size, area, and distribution. With this study, we hope to further our understanding of the impacts of dimensionality, substrate stiffness, and cell differentiation on focal adhesion complexes. Future studies will explore how neurodevelopmental disorders alter focal adhesion dynamics using 3-D cortical organoids to mimic both the dimensionality and stiffness of the brain.

GO45

Construction of Realistic Hybrid Computational Pregnant Phantoms for Radiation Risk Assessment

Rasha Makkia1, Keith Nelson2, Habib Zaidi 3, and Michael Dingfelder1

1 Department of Physics, East Carolina University, Greenville, NC
2 Department of Obstetrics and Gynecology, East Carolina University, Greenville, NC
• Division of Nuclear Medicine and Molecular Imaging, Geneva University Hospital, CH-1211 Geneva, Switzerland

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 3D fetus phantom model sets. All fetus 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.

Radiation risk for fetus is a big concern for a pregnant patient who is undergoing radiation therapy or diagnostic treatment. The series of computational pregnant models can be used to estimate the radiation dose to the fetus and evaluate the risk from radiation exposure due to a particular procedure. A complete set of the 31 weeks fetus model with all major fetus organs is presented and discussed.

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.

GO46

Aesthetics of the Commons

Robin Carter

What makes art significant? Who gets to decide? Whose values are represented in art?

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 conveniently been overlooked, or ignored, 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.

GO47

Invasive species

Youngjae Kim

An invasive species is a species that is not native to a specific location, and that tends to spread to a degree believed to cause damage to the environment, human economy or human health. This is a brief terminology of what invasive species means. With the exaggeration, the term invasive species can apply on current immigrants in the US. As an immigrant from South Korea, I value myself as one of the invasive species. However, the valuing comes from the outside of self-recognition that the term invasive species is given to the immigrants or even branded from the rest, in this case, the non-immigrants. This means a group only becomes an invasive species if other groups agreed to name it.

Currently, America's view on immigrants is not so positive. Immigrants are taking American's jobs. There was a policy called affirmative action in school. Moreover, recently, America brands a group of immigrants as a potential spy. With the limited knowledge and understanding of America's history and culture, this nation's foundation came from immigration. The European race that arrived in America was the first generation of invasive species. With the understanding of European domination to this continent and with the panegyric on their achievements and their contribution to the rest of the global, ultimately with the time to decay the past, I accept that the native species have been laundered.

The question remain about who belongs in the native species and who belongs in the invasive species. By substituting personal understanding, the examples need to be localized as South Korean's. With that said, there are many Koreans who were born in the states who are rightfully American citizen and recognize themselves as American. Which category should they belong? This question is impossible to answer as an immigrant because only the native species can determine the invasive species. It would be wrong to merely categorize European race as native species in America. However, the discrimination and racism happens in America and even attempt to root out those discrimination and racism prove who is at the least, close to being a native species in America.

This series of my work questions about the invasive species and native species in America. Combining with the Greek mythology to represent the western influence, the images speaks about both South Korean and American social, political and cultural confusion which became the foundation of my selfhood.

GO48

HelloKinston

Heather Lee McLelland

Kinston, NC was once know for its tobacco, cotton and textile trade and production. Downtown was a thriving place, but population and economic prosperity has declined with the movement of trade and production to other places. I am interested in collecting peoples perspectives and opinions on these changes. With these collected narritives, I would like to document their experiences through the creation and installation of a ceramic body of work.

GO49

Darkness made Light

Timothy W Christensen

Whenever we remember we destroy the past. The very neurological act of recall necessitates re-encoding the memory in a way that writes over the original. Our recollections and re-codings are colored by recent events in our lives and our current mental states. We change the past by seeing it in a new way. Each time an image is recorded it becomes the past. These digital memories remain true each time they are viewed. The same zeros and ones, each time. We, however, do not remain true. Our perceptions change with hindsight. We can become victims or architects of revisionist histories by changing how we "choose" to relate to these images of the past. In dealing with the dissolution of a 30 year relationship and the fracturing of a family, I have this choice. Thousands of pictures can become colored by pain or

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 mere glances of when deployed to southern Helmand Province in 2013-2014. I was inspired by 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 a way 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

Unsweet

Mairin Gwyn Narron

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.

Abstracts | Graduate Oral Presentations

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 have withered 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 Peerey 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 surrealists methods such as automatic drawing and painting, and also video taping myself as these characters acting 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

Epiphany 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 experimentations 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 Mcadams
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 presents, 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 defendant was to be prosecuted. The present study involved three steps: First, a literature review on intimate partner violence and victim intimidation was conducted. This was to evaluate the current understanding of victim intimidation. Second, ongoing survey analyses have provided descriptive information about the frequency, severity, and communication style most often utilized in victim intimidation (e.g. through family, in

person, through text message), as well as insight into the help-seeking behavior of intimate partner violence victims who have experienced intimidation. The surveys (N = 190) were collected as a supplement to an ongoing study that includes interviews with victims of IPV. Finally, the ultimate goal is to contribute to the existing gap in the literature on intimate partner violence and victim intimidation, informing practice, community partners, and policy.

GO59

The Influence of Cannabis on Sexual Functioning and Satisfaction

Amanda Moser

Cannabis has been considered as an aphrodisiac for many centuries (Touw, 1981) and other studies report cannabis as a potential treatment for sexual dysfunctions (Dawley, Baxter, Winstead, & Gay,1979). The purpose of this study is to examine the influences of cannabis on sexual functioning and satisfaction using the stages of the sexual response cycle (Kaplan, 1979; Masters & Johnson, 1966) as a framework. Sexual functioning includes the physiological responses associated with the sexual response cycle while sexual satisfaction encompasses both emotional and physical satisfaction (Basson, 2001; Kaplan, 1974; Masters & Johnson, 1966). This study incorporates feminist theory by emphasizing women's sexual functioning and satisfaction, as well as men's, and recognizing the orgasm inequality gap that is present in our society.
Research questions addressed by this study were : R1: What effect does gender, age, duration of cannabis use, method, intentionality, frequency of cannabis use, and form have on predicting sexual functioning and satisfaction? R2: How does cannabis influence sexual response (e.g. lubrication) and sexual activity (e.g. masturbation)?

Data were collected using a Qualtrics survey that was distributed nationwide using social media through various cannabis groups. Preliminary results indicated that the majority of the participants were female (65%), White/Caucasian (77%), not LGBTQIA+ (76%), at least some college education (80%), and in a monogamous sexual relationship with one person (73%). A majority of participants indicated that they use cannabis for both recreational and medicinal purposes (55%), use cannabis daily (61%), intentionally use cannabis before having sex (57%), and that cannabis does not affect their sexual decision making (78%). A majority of participants reported cannabis slightly or significantly increases relaxation during sex (83%), sexual desire (66%), intimacy/emotional closeness during sex (66%), physical pleasure (75%), and intensity of orgasm (64%).

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, Janeé Avent Harris, PhD1
1Department 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.

GO61

Emotional Evidence of Change: Highlanders Experiences with Glacial Retreat in the Peruvian Andes

Kara Brooke Chipiwalt

Global climate change is a phenomenon studied by some, but experienced by many. Communities in various places across the globe live with the physical and social effects of that phenomenon each day, with the most highly vulnerable residing in developing countries, especially those in mountainous environments. Much like a keystone species, glaciers are largely dependent upon at global and local scales. They offer climate data from core samples, influence sea level, serve as a water resource for individuals, communities, and agriculture, provide spaces for recreational activities and cultural practices, as well as influence religion and beliefs. Because of this, they are widely representative for showcasing the effects of climate change. There is ample evidence within the physical sciences backing the occurrence of changes in mountain environments, with less evidence present in the human dimensions, and particularly less on how it affects individuals who reside in these spaces on an emotional level. An emotional geography lens unveils the need for a deeper understanding of the individualistic ties humans have to people, places, and spaces, while a feminist political ecology lens helps illuminate the gendered capabilities and needs to adapt to a changing climate. This paper draws on a case study conducted using qualitative methods from communities in the Peruvian Andes as evidence of the need to address emotional welfare. This study utilizes the frameworks of feminist political ecology and emotional geography to understand the various challenges to adapting to climate change in a mountain environment.

GO62

The Role of Gender in Iranians' Immigration Related Trauma in the US: A Narrative Analysis Study

Afarin Rajaei

Department of Human Development and Family Science

Approximately 1.5 million Iranians currently live in the United States (U.S.; Esfandiari, 2016), with most immigrating for cultural, social, political, and economic reasons (Preston, 2014; Tsapenko, 2015). Nevertheless, researchers have yet to consider the disparate immigration traumas associated with gender faced by Iranian men and women (Tafreshi & Yahya, 2014). Consequently, researchers, health care providers, and policymakers often struggle to provide tailored support to Iranian men and women following immigration (Kazemi et al., 2018). To mitigate these concerns, the current qualitative study considered the following question: Do Iranian men and women in the U.S. experience immigration trauma differently? Fifty Iranian people who live in the USA, aged 21-36 years, agreed to participate. Participants lived in Pennsylvania, California, Florida, Texas, Illinois, and Kansas. The design was a multiple case study with semi-structured interviews using a narrative methodology (Mertens, 2015). Researchers analyzed transcripts of conversations that occurred during interview sessions. Initial narratives were identified (Fraser, 2004) and the following two themes were discerned: (1) a journey from oppression to freedom for women and (2) a sense of powerlessness for men. The findings of this study are informative, but they cannot be generalized to all individuals or minorities. It is surprising given the significant impact of trauma on people's lives, there has been no research in this area thus far. The current study is the first to show that Iranian women experience less trauma in the U.S. compared to Iranian men. This appears to be partially associated with previous lived experience in Iran, which was saturated with discrimination and oppression. The findings of the study inform researchers, policymakers, clinicians, and educators regarding comprehension of Iranian immigration to the U.S. and the role of gender in responding to trauma.

References:

Morales, E. E. (2014). Learning from success: How original research on academic resilience informs what college faculty can do to increase the retention of low socioeconomic status students. International Journal of Higher Education, 3(3).

GO63

Tattoo Biases Toward Healthcare Providers

Kayla Daugherty1, Michael Wheeler2

1Department of Nutrition Science, East Carolina University

Implicit bias refers to the unconscious stereotypes or attitudes we have towards people, that usually begin with their appearance. Whether it is race, gender, weight, or body modification such as tattoos, we all encompass unintentional biases. The perception of workers in healthcare with tattoos has been negative in the past, viewed as unprofessional and less competent by patients. As tattoos become increasingly popular it is vital to determine a persons' willingness to compromise their own healthcare, for instance, by denying care from a tattooed physician, in order to satisfy their tattoo preference, or lack thereof. The purpose of this study was to assess bias regarding tattoos on health care professionals. The current study also considers gender and educational biases individuals may also have against their providers. Participants were presented one of sixteen photo

cards with variations of gender, presence or absence of visible tattoos, and educational status. A survey was then administered evaluating perceptions of the provider's agency (i.e, respect, empathy, professionalism and competence). Several main findings from the study include a more favorable perception of non-tattooed over tattooed physicians. However, It was also found that educational status outweighs bias against visible tattoos. Participants reported less confidence in the ability of female physicians, both with and without tattoos, and non-tattooed surveyors reflected an overall lower favorability in physicians compared to tattooed surveyors who reflected higher confidence. Ultimately, this approach to understand patient biases can be extended to understand other physician factors such as race/ethnicity, weight, overall presentation, and other body modifications on patient perceptions of a physician's agency. 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 Midgette1, Sharon Paynter2

1Department of Anthropology, East Carolina University
2Office of Research, Economic Development and Engagement

Hunger 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, Freudenberg et. al 2011). Stigma associated with an inability to afford basic needs (King 2017) as well as a lack of federal assistance programs that are inclusive of college students leave fewer options for college students than for the average person (Blagg et al 2017). Given this information, this study seeks to identify the prevalence and impact of food insecurity among undergraduate students who attend East Carolina University. This study involves three steps. The first step is a literature review conducted of the existing college food insecurity studies in the United States to understand the best way in which to format the current study. Second, ongoing analyses assess hypotheses that food insecurity affects first generation students, students who utilize financial aid or are Pell eligible, and minority students at higher rates. Methods include a survey distributed to 5500 students electronically by the Office of Community Engagement and Research to gain quantitative data, and 20 in-person interviews to generate in-depth information about how undergraduate students make decisions about food.

GO65

Combatting 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 a 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 a model's body; and 3) companies in violation of this law will face fines that increase with each subsequent infraction. 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 share a website I developed as an advocacy tool 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

Abstracts | Graduate Oral Presentations

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. Focus will be put on overlapping aspects of wellness that relate to both the community and the workplace. These include Environmental, Emotional, Social, and Occupational. Features that support community will be evaluated for both users of the space and people who work there through the method of contingent valuation. To translate qualitative behavior patterns into quantitative data, ordinal value will be assigned to building features based on comparable trade-offs, imposing an assumption that frequency of use, time spent in a location, and preference over other options are valid gauges for evaluating utility gained while being in a space.

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 primate (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 genetic 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), long-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. In contrast, 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 socioecological 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.
GO68

The Value of Exposure: The Connection Between International Contact, Ethnocentrism, and Intercultural Sensitivity

Erin Reade Taylor
Sachiyo Shearman

For higher education institutions, globalization has become increasingly important for producing highly qualified professionals (Bidyuk, 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 & Zhou, 2016). Gordon Allport's (1954) Contact Theory, predicts that exposure to the outgroup 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 students' ethnocentrism and intercultural sensitivity. The online survey is currently being conducted to understand the impact international contact has upon students' intercultural sensitivity. This study utilizes McCroskey and Neuliep'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.

fproteins and downstream transcription factors. Additionally, 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.

GP1

Reactions to a Sexual Assault Disclosure: Evaluation of an Alternative Scoring Method for the Social Reactions Questionnaire

Laura Haney1, Heather Littleton1

1Department of Psychology, East Carolina University

Sexual assault survivors receive a range of reactions when they disclose. These reactions influence post-assault recovery. Specifically, receiving "negative" reactions (e.g., blaming, controlling responses) is associated with distress, negative cognitions, and maladaptive coping. Conversely, findings regarding "positive" reactions (e.g., support, belief, tangible aid) are mixed, with some linking these reactions to less self-blame and distress, while others find no relationship. One possible explanation for these inconsistencies is that survivors differ in their perception of the helpfulness or harmfulness of the reactions they receive. However, little research has examined survivors' perceptions of these reactions and post-assault outcomes. Therefore, the current study examined college sexual assault survivors' (n = 277) perceptions of the helpfulness and harmfulness of reactions they received, utilizing a modified Social Reactions Questionnaire. Results supported four types of harmful 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 briefer measure with good psychometrics 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 have 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 Haley, 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) (Durso & 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 (Latner, Barile, Durso, & O'Brien, 2014), maladaptive eating patterns, lower self-esteem, body image concerns, and greater psychopathology (i.e., stress, anxiety, and depressive symptoms) (Durso & Latner, 2008). Further, IWB has been shown to uniquely contribute to harmful outcomes, above and beyond that of body mass index (BMI) (Durso & Latner, 2008). Women who are overweight may be at greater risk for harmful consequences due to additional sociocultural factors (Fredrickson & 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., Tylka et al., 2014), 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 submerged historic 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 proficiency, or other disciplinary or agency challenges to including environmental assessments as part of heritage management best practices.

GP5

Microbially 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 microbially 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 these aircraft and determine 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 24S and 75S), 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.

GP6

Sleep Across the Ages: Investigating the Validity of the Adolescent Sleep Wake Scale in a National Sample of Emerging Adults

Nichelle Huber1, Alexandra Nicoletta1, 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 health 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 an online survey including the ASWS, the Pittsburgh Sleep Quality Index (PSQI) and the Insomnia Severity Index (ISI). It was hypothesized that specific ASWS subscales would be highly correlated with corresponding validated subscales used in adult populations. For example, the ASWS Falling Asleep Subscale should be most strongly associated with the PSQI Sleep Latency scale. The results suggest that subscales of the PSQI, including Sleep Latency, Sleep Disturbance, and Daytime Dysfunction were correlated with corresponding ASWS domains, and weak correlations with other subscales provided discriminant validity. The ASWS total score was also strongly correlated with both the PSQI total score (r = .68) and ISI (r = .71) total score. This suggests that the ASWS measures areas of sleep problems in a manner consistent with current "gold standard" assessment in adults. Implications and limitations of these findings will be further discussed.

GP7

Psychometric Properties of the Physical Activity, Nutrition, and Technology Survey

Karlie Marie Mirabelli, Alex Shoemann, Brandon K. Schultz

Department of Psychology, East Carolina University

In the United States, 12.7 million children and adolescent are currently obese. The serious medical and psychosocial implications of obesity have made monitoring weight and related health outcomes a critical interest for treatment developers. Motivating Adolescents with Technology to CHOOSE Health (MATCH) is a wellness intervention tailored to the national curriculum standards for seventh grade students. Self-monitoring in the MATCH program is achieved using the Physical Activity, Nutrition, and Technology (PANT) Survey, which was developed by the MATCH research team to measure weight management strategies across the domains of physical activity, nutritional choices, 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, but the relationships with both the physical activity subscale (r= -0.12) and the healthy choices subscale (r= 0.09) appear small. I discuss the implications of my results for instrument development and offer several suggestions for improving the PANT survey for future use.

GP8

Gender Differences in Heart Rate Variability After a Breathing Intervention

Amelia Day Saul, MS, LRT/CTRS, Department of Addiction and Rehabilitation Studies
Lauren Bethune Scroggs, MS, NCC, CCMHC, LCAS-A, LPC-A
Linda Bolin, PhD, RN, ANP, FAHA, Department of Nursing Science
Carolyn Horne, PhD, RN, ANP, FAHA, Department of Nursing Science

Introduction: Approximately 103 million Americans have hypertension and that number is projected to grow substantially by 2030 (Benjamin et al., 2018). Anger, depressive symptoms and stress are risk factors for hypertension and can lead to temporary increases in blood pressure (Benjamin et al., 2018).

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 their 20s with females being less likely to be hypertensive (Everett & Zajacova, 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 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.

GP9

Archaeology and Climate Change: North Carolina's Coastal Heritage At Risk

Matthew Harrup

North Carolina's coast is home to thousands of archaeological sites threatened by the long-term processes of climate change, accelerated sea-level rise, and erosion. Hurricanes Matthew and Florence are stark reminders that associate near-term risks pose additional challanges such as increased fooding and stronger, more frequent storms. North Carolina's rich coastal and inland maritime history and pre-history means many Native American, African American, and colonial European sites are near bodies of water or in areas of low elevation. Marginilized populations lived and worked in marginal environments and are often the populations we know least about. Identifying which sites are most at risk and developing plans to preserve them is crucial to providing the public benefits of archaeological sites: education, cultural heritage and knowledge, identity, and economic value through tourism. In this study, at-risk sites will be geographically constrained to the region south of Cape Hatteras. Sites will be plotted onto digital elevation models, analyzed through field surveys, remote-sensing, and sea-level rise/ flooding projections constrained to decadal timescales (2050) to provide accurated and manageble risk profiles. The identified sites will be organized by location, risk, and significance (elegibility for preservation according to the National Historic Preservation Act).

GP10

Adverse Childhood Experiences and Psychological Symptomology: Moderating and Mediating Roles of Mindfulness and Self-Compassion

Lauren Hope Conder, William Guiler, Erin Haley, & Christyn Dolbier

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 mindfulness, 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 (ps < .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)

= 45.41, p < .001, R2 = .33; FFMQ x ACEs interaction (t = 2.40, p = .017). GAD-7 lower for those with high FFMQ, particularly when ACEs was high. Significant mediation: ACEs predicted SIAS (B = .15, t = 3.5, p < .001), becoming non-significant (B = .07., t = 1.86, p = .06) when FFMQ was added (B = -.51, t = 14.10, p < .001), F(4,554) = 57.78, p < .001, R2= .29; and in a separate regression analysis became non-significant (B = .04., t = 0.94, p = .35) when SCS was added (B = -.53, t = 14.31, p < .001), F(4,554) = 59.37, p < .001, R2 = .30. Discussion: Mindfulness and self-compassion are beneficial practices that are distinct but often intertwined in certain therapeutic interventions. They both influenced the relationship of ACEs with anxiety symptoms, suggesting they may be beneficial targets for adult anxiety prevention or treatment for individuals who have experienced ACEs.

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.

Participants were recruited through an online research participation system and completed 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 Aziz

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 works 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 BPS: How do bad things affect good people?

Erin M Sesemann, MS, Doctoral Candidate
Natalie Richardson, MS Doctoral Student
Human Development and Family Science
East Carolina University

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, 2009) in people who experience ACEs, which is believed to help explain why they experience cognitive and socioemotional impairments (Gilbert et al., 2010), 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, & Pergamit, 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).

GP14

Modeling farmers preferences for onversion of agricultural lands to solar farms

Ruth Quainoo
Gregory Howard
Siddhartha Mitra

The fundamental factor in the current expansion of utility-level solar generation in coastal North Carolina is the availability of land for conversion from agricultural purposes for the installation of solar farms. This study will therefore estimate landowners willingness to continue leasing or selling their agricultural land for solar energy production. Decision models have been developed to predict the rate and pattern of adoption of voluntary incentive programs for farmers such as the Conservation Reserve Program and Environmental Quality Incentives Program. However, no previous work has developed a model to predict which parcels of agricultural lands are most likely to be converted to solar farms based on farm and landowners characteristics. The discrete choice experiment surveys will be employed to build an agricultural landowner behavioral model in North Carolina. The survey methodology will be in three stages; the initial stage will concentrate on information gathering and survey planning, the second stage will be a preliminary survey of farmers who have leased or sold agricultural land for solar development. The last stage will be a follow-up general survey of farmers in North Carolina. This landowner behavioral model will then be used to estimate how monetary and non-monetary attributes of the contract affect landowners choices. For example, the model will inform us of the location of land, whether the land is leased or sold, the size of the land, as well as amount of payment of the land. Moreover, application of the model will inform us of how these attributes will influence farmers willingness to accept a contract to convert land from agricultural to solar production. The study will develop landowners behavioral model and also fill the gap in knowledge of what factors infuence the landowner decision to convert land from agricultural solar energy production.

GP15

RELIGIOSITY: Impact on Love, Relationships and Sexual Values/ Behavior

Keely M. Fox and David Knox
Department of Sociology
East Carolina University

Scott S. Hall
Department of Early Childhood, Youth, and Family Studies

Ball State University

Douglas Kuck
Department of Sociology
University of South Carolina Aiken

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

Department of Psychology, East Carolina University

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 (Rideout, 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 (Rideout, 2017). In their most recent guidelines, the American Academy of Pediatrics (AAP) recommends that children between the ages of 2 and 5 limit screen media use to 60 minutes of high-quality programming per day. Despite this recommendation, research suggests that children spend more time using media than any other activity except sleeping (Thakkar, Garrison, & Christakis, 2006). Lillard and Peterson (2011) examined the immediate impacts of children's media use on their executive function by exposing preschoolers to different programming styles for nine minutes and then assessing their executive function (EF) with four tasks. Results suggested 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 Berbetty

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 grounds, such as the Rizzo Center, a hotel owned by the UNC Kenan-Flagler School of Business. This initiative might lead to extending services to hotel guests interested in the outdoors within North Carolina and for the Expedition program to receive sustainable resources of income. This project describes the rationale behind the project, the project in practice, the project's outcomes, and its implications for the future.

GP18

ABSTRACT WITHDRAWN

GP19

Professional Collaboration of Family Life Education and Therapeutic Intervention for Adolescents Online

Krista Nichole Hein

Committee:
Dr. Eboni Baugh, Dr. Damon Rappeleye, & Dr. Sharon Ballard

Therapy (MFT) and family life education (FLE), collaboratively, have the potential to impact the relationships and lives of adolescents. Family life education provides adolescents relevant education to navigate the terrain of various relationships: romantic, social, and familial, to name a few. Meanwhile, family therapy offers adolescents intervention and treatment to overcome personal and social difficulties. The idea that adolescents are impacted systemically by their parents, family, peers, and other important individuals is grounded in Bowen Family Systems Theory (Gilbert, 2017) and Erikson's theory of development (McLeod, 2018). Given the potential unique roles and contributions of MFTs and FLEs to encouraging adolescent relational health, the present study utilized a Delphi study method to identify best practices for reaching adolescents through an online medium to promote the best outcomes for adolescents. The researcher seeks to provide a foundation for the usage of online interventions with adolescents that utilize a collaboration of therapeutic and educational approaches. As such, the literature review that follows attempted to aid in the understanding of the similarities and differences between FLE and MFT, the differences between traditional and online interventions, and provide an overview of the theoretical foundation for this study. The Delphi study methodology was used to create an understanding of professional's opinions on the collaboration of MFT and FLE online for adolescents specifically. The poster for Research and Creative Achievement Week will reflect themes from the first round of the study (n=6) and discuss the second round of the study. Finally, the poster will also reflect the implications of the results for informing program development and professional collaboration.

GP20

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

Wesley Nimmo

There is little known about the daily lives of the enslaved and sharecropping African Americans who lived in the Lower Cape Fear region of North Carolina during the 19th and early 20th centuries. Even on the larger plantations in the region, the locations of their communities is often unknown. A combination of historical research and archaeological investigation was used to gain more insight into the use and dates of occupation of a plantation structure in this region, focusing on an area previously identified as a 19th century African American community. The structure excavated during the 2018 archaeological field season was occupied between the late antebellum period and the early 20th century, and was a slave/sharecropper cabin. Now that physical evidence of the community, which was 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 1870's, 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 Hesban. Because subadults are more susceptible to nutritional stress, the remains of the 34 subadults were analyzed for indicators of vitamin C (scurvy) and D (rickets) deficiencies, to understand how these political changes could impact nutritional health. The subadults from Ottoman-Era Tell Hisban, particularly children of weaning age (~2 years), had a higher incidence of these metabolic diseases than was observed in earlier populations from comparable sites, or than would be expected in the case of congenitally caused metabolic disease. Therefore it is likely that weaning children were especially susceptible to nutritional stress

during these changing times.

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 recreation 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 Gause Cemetery at Seaside, located in Sunset Beach, North Carolina, purportedly contains members of a wealthy and influential planter family, the Gause's, who died during the late 18th and early 19th centuries. In 2017, a Gause 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
Rachel Brenner, 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 individuals, respectively (ps < .001) Feminist attitudes were also positively correlated with year in school (r = .13, p< .01).

Abstracts | Graduate Poster Presentations

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-bootstrapped 95% confidence intervals indicated a significant and negative indirect effect of feminist attitudes on orgasm faking through sexual communication (ab = –.06, 95% CI = [–0.02, –0.10]). 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/translation, 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 effective participation in their 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. Hiring 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 Rabil1, 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 grade students 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

these games for approximately 30 minutes per day to enhance keyboarding speed, accuracy, and technique. In addition, students participated in an interactive small group-based session of 30 minutes to address digital citizenship in addition to songs and activities to facilitate memory of the location of the keys on the keyboard. Students in the control group would be emailed a link for off-site access. However, none of the control group participated in the program.

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 evaluate the benefits of incorporate the computer coding program Scratch into a 6th grade science curriculum and evaluate the effectiveness this combination will have on student motivation, and whether it will result in more engaged learners and greater academic growth. Research conducted has indicated that coding programs generally provide stimulating challenges to students, although there was little information regarding how this has translated into academic benefits. The study will include three 6th grade science classes: two test groups and one control. The test groups will have the coding program Scratch incorporated into their science curriculum, with the students being allowed to create Scratch programs of their own design that have connections to the content of the science material they are studying. All classes will complete a pre- and post-Likert style survey, to be used to evaluate changes in student motivation. Students will also complete pre- and post-assessments on the Science topic, with changes being used to determine academic growth. The expected outcome of this study is that the classes that are incorporating the Scratch program into their curriculum will show a higher level of student motivation, and greater academic growth.

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 Cartrette

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 culturally responsive to students' lives outside of the elementary music classroom. Participants in the case study were five undergraduate music education majors enrolled in a general music lab course and thirteen second grade students enrolled in a music class at a local elementary school. Undergraduate students spent the first two months of the semester observing second grade music classes taught by the elementary music teacher and their general music methods professor. During the eighth week of classes, undergraduate students interviewed second grade students about their musical preferences. Undergraduate students used the data from the interview to adapt assigned lessons from the Silver Burdett (2008) Making Music second grade curriculum to appeal to students' musical preferences while teaching the same musical concepts and meeting the same essential standards as previous lessons within the unit. Undergraduate students team taught one lesson from the Silver Burdett (2008) Making Music second grade curriculum (text), and team taught one lesson that was adapted from the curriculum to include culturally responsive teaching practices and relevant musical examples (CRT). Following each teaching demonstration, second grade students completed an age appropriate survey rating their level of engagement in the lesson and their understanding of musical concepts. All lessons were video recorded and viewed by undergraduate students. Undergraduate students rated the second graders level of engagement in the lesson and their understanding of musical concepts. Undergraduate students completed written reflections after watching the video recordings of their teaching, and compared the culturally responsive teaching lessons to the lessons that were taught from the textbook. The undergraduate students analyzed their written reflections, surveys, and second grade surveys to look for emergent patterns and themes related to culturally responsive teaching and teaching effectiveness. We are currently in the data analysis portion of our study, and will present findings this Spring.

Abstracts | Graduate Poster Presentations

GP30

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

Colon 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 understandings 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 grades 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. I will also take note of lateral entry teachers who did not earn a secondary education degree. A neighboring school to my own 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 science 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 to evaluate the socio-economic and wellbeing of family needs.Results: 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

at least one trigger present. Families most often reported, having worries of losing their homes, their safety in their community, and no reliable transportation.Conclusion: Medical providers should consider a child's indoor environment and social determinants of health as considerable risk factors when evaluating children with asthma.

GP33

The Integration of Equine Therapy within Trauma-Focused Cognitive Behavioral Therapy for Individuals Exposed to Trauma

Nicole L. Davis, W. Leigh Atherton
Department of Addictions and Rehabilitation Studies, East Carolina University

According to the National Intimate Partner Violence and Sexual Violence Survey (NISVS), approximately 22.3% of women and 14.0% of men in the United States have identified as a victim of severe physical violence in the context of an intimate relationship (CDC, 2010). When it comes to legally reporting the violence, many victims perceive law enforcement as placing blame upon the victims, not taking requests for help seriously, or doubting the credibility of victims who experience mental health or substance abuse issues (American Civil Liberties Union, 2015). There are several therapeutic treatments that have been shown to be beneficial for those who have experienced trauma, one of which is equine therapy (York, Adams, & Coady, 2008). The purpose of our study was to introduce equine therapy and an alliance with the Pitt County Sheriff's Department to children who have been exposed to domestic violence (DV), with the hope that it would improve the children's self-ratings of trauma-response, behavioral, and psychosocial factors. Researchers assessed these factors through a variety of measures including the Child Post-Traumatic Stress Disorder Scale, Patient Health Questionnaire-9, and Generalized Anxiety Disorder-7 scale. The goal of the study was to establish a community-based intervention for children and non-offending caregivers who have been exposed to DV, as well as improve the community response and resources available for those who have experienced DV. We also intended to examine the influence of the Pitt County Sheriff's Officer's participation in the intervention on the children's perception of law enforcement. Participants for the current study consisted of children ages 7 to 17, who live in Pitt County and who have witnessed or experienced DV-related trauma. The Building Bridges Equine Therapy program through Rocking Horse Ranch in Greenville administered the interventions. Participants took part in four separate interventions over the course of four weeks, exploring themes such as connection and partnership, leading through obstacles, encouraging, and supporting and processing. These interventions took place in the presence of a Pitt County Sheriff's Officer. We predict that following the four equine therapy 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 Equitest 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 Biomechanical 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 uninvolved 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 were 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 uninvolved limb as compared to the uninvolved limb in athletes (514.3773.36 vs. 439.1270.99). 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 uninvolved 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; Jeffery J. Brault

Atrophied 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-1a, which in turn is activated by AMP-activated protein kinase (AMPK), lower levels of AMP might be expected to lower mitochondrial content. Supporting this idea, the AMP degrading enzyme AMP deaminase 3 (AMPD3), a potent AMP degrading enzyme (AMP à IMP +NH3), is highly induced during muscle atrophy. PURPOSE: Determine whether an increase in the enzymes that degrade cellular AMP will result in a decrease in maximal mitochondrial oxidative capacity. METHODS: Cellular AMP levels were decreased by overexpressing enzymes that are typically found in muscle and degrade AMP. Adenoviruses encoding for AMPD3, AMPD1, and 5'nucleotidase (5'NT: AMP à adenosine + Pi) were administered to C2C12 myotubes for 5

days. An adenovirus encoding for GFP was used as the negative control. Oxygen consumption rate (OCR) was assessed in the presence of 2mM pyruvate and 1mM glutamate using a Seahorse XFe24 Analyzer and the Cell Mito Stress Test from Agilent. Oligomycin, FCCP, and a mix of antimycin A and rotenone were injected to measure basal 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). Tukey's post-hoc test found significantly ($P < 0.05$) lower maximal respiration in AMPD3 (-22.3 ± 7.7%) and 5'NT (-22.1 ± 6.0%) compared to GFP. DISSCUSSION: AMPD3 and 5'NT were effective long-term inhibitors 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; Willson, 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 muscle 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 by a researcher blinded to the treatment. The measurement was taken when the subject perceived a "strong but tolerable stretch". They were randomized to one of 5 groups, dry needling (DN), foam rolling, stretching, eccentric exercise, or control. The DN group received pistoning technique to 3 to 5 trigger points. The foam roller group performed self-guided myofascial release using a 6 inch diameter foam roller in a long sitting position with knees extended and feet relaxed. . Subjects rolled for 30 seconds with 30 seconds rest for 3 sets. The stretching group preformed an active self-stretch in supine held for 30 seconds with 30 seconds rest for 3 sets. The exercise group performed an eccentric hamstring exercise commonly known as the Nordic exercise for 10 repetitions with 30 seconds rest for 3 sets. At completion of treatment the subject had their hamstring range of motion re-measured using the above technique by the same blinded researcher. Results : using a repeated measures ANOVA preliminary results are trending toward significant improvement of all groups compared to control with a p value of 0.17, with minimal evidence that one technique is superior to the other. Conclusion : Preliminary data suggests that no technique is superior to another, but all are trending toward methods to acutely improve passive hamstring stiffness. Dry needling may improve passive muscle stiffness similar to stretching or foam rolling. Eccentric exercise does not increase passive muscle stiffness and may in fact decrease it. Clinical Relevance : Clinically, this is the first study to look that the acute effects of dry needling on passive muscle stiffness. Based on the direction of our findings dry needling may be an effective alternative treatment for pre-exercise/sport warm-up or post cool down. This study helps to support the use of foam rolling as an alternative to stretching.

GP39

An Interprofessional Injury Prevention Program for Division I Women's Basketball

Childers, Thomas; Durland, Alex1; Driscoll, Colleen;
Department of Physical Therapy, East Carolina University

Background: Injury prevention screens have been used in athletics to identify neuromuscular or biomechanical deficits with attempt to correct these deviations prior to participation. Several studies have examined the effectiveness of such screens and preventative training routines, such as FIFA 11+, in reducing injury. The FIFA 11+ program has been applied to men's basketball with similar results despite the sport specific tasks differing from those associated with soccer. While the effectiveness of FIFA 11+ and participation screens have been shown in male basketball players, evidence on the benefits in female basketball athletes is lacking. This case presentation's purpose is to examine the effectiveness of a preseason screen, subsequent training program and neuromuscular warm-up in the prevention of injury in a NCAA Division I women's basketball team.
Case Description: Prior to the season, team members were evaluated with a series of tests and measures as part of an injury prevention screen. The screen assessed each player's jump-landing technique, lower extremity range of motion, agility, strength, and endurance in reference to standardized norms. From the results, the preseason program was tailored to correct faulty movement patterns during squatting and jump-landing in addition to addressing mobility and traditional strength training. A neuromuscular warm-up focusing on quality of movement, hip mobility, core/gluteal activation, and agility was developed. The warm-up was performed prior to all practices and games during the season.
Outcomes: A review of injuries sustained during the season found minimal time loss from lower extremity injuries. There were no hip or knee injuries resulting in lost time. There was one lateral ankle sprain caused from a contact mechanism that resulted in time loss with an additional non-contact sprain occurring in the same athlete.
Discussion: It is critical to consider all components of an athlete's program, from preseason conditioning to their pre-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 Skibiel

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 temporarily violated due to extreme groundwater recharge.

GP41

Prevalence of Asthma Among Hispanic Child Farmworkers in North Carolina

David Wainaina Wambui1 Gregory Kearney Dale1
1Department 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 children 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. Triangulating 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 eosinophilic 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 youth farmworkers.

GP42

Combining Augmented & Virtual Reality into a Superior Display System

Toan Vinh Le Huynh
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

contrast to AR, Virtual Reality (VR) systems, such as the HTC Vive, utilizes two lighthouses that can track the user headset. The user headset 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 estimated by matching multiple common point features 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. Nasseh Tabrizi1
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 each 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 set a standard for which systems and designs should follow. The Cybersecurity CLaaS learning system provides participants with a competitive environment to apply hands on knowledge and skills gained in related courses. Participants defend their system while also attacking others, creating a fun and competitive experience. Developed using primary open source technology's, such as Linux and VirtualBox, the CLaaS platform is deployable with minimal configuration and little to no cost. Utilizing embedded virtualization, and current cloud technology, the platforms lab pods can be made accessible over the internet or restricted to participants on a secure local network. Materials and instruction are presented on a graphical user interface (GUI) via a web browser. The GUI also contains a Score and Message Board, that updates participants' scores in to real time. The CLaaS learning system is designed to allow for customization of both the GUI and the environment itself. Changing, adding or removing learning objectives are as easy as spinning up new Virtual Machines.

GP45

A computational study of mechanical characteristic of a thrombus

F. Huda, M. Lee, T. Abdel-Salam, N. Hudson , A. Vahdati

Ischemia,which is a major cause of death,occurs due to the occlusion of blood flow by a thrombus.A thrombus,which is a blood clot, experiences different state of stress due to complex interaction with blood flow.Whether or not occlusion occurs depends on the role of blood and clot properties on this complex interaction .However,the interaction between thrombi and blood for different properties have not been adequately investigated. Previous research has mainly focused on two dimensional models (2D) of thrombi-blood interaction and clot growth due to the complexity associated with a three dimensional (3D) thrombi-blood interaction model .The goal of our research was to develop a 3D non-linear fluid-solid interaction (FSI) model of a thrombus

that couples clot mechanics with the blood flow.We considered both Newtonian and non-Newtonian blood flow since human red blood cell density and deformability may change with age and different pathological states.We developed our 3D FSI model using FEBio 2.8 where we utilized the Neo-Hookean constitutive model for describing thrombus material properties and assigned a range of stiffness value to the thrombus.Our results show that different regions of the clot experience different magnitude of stress.Moreover,we found that thrombus under Newtonian flow experienced noticeably higher shear stresses throughout its thickness.Therefore,our 3D computational model simulating the interaction between thrombus and blood flow could be valuable to overcome the challanges presented by the treatment of ischemia.A next step would be microfluidics channel based experimental verification which will help us to reinforce our computational model outcomes.

GP46

Intrusion Detection Techniques

Author : Deepthi Hassan Lakshminarayana (MSCS)
Mentor: Dr. Nasseh Tabrizi, 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 technologies are discussed. We have also provided an insight into future trends in these areas.

GP47

Design of a MeV Range particle accelerator beamline for the purpose of Optically Stimulated Luminescence

Joel Anthony Pogue1*, Regina DeWitt1, Jefferson Shinpaugh1, Chris Bonnerup1
1Department of Physics, East Carolina University

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.

GP48

Projections of Changes in the Distribution of Nassau Grouper Spawning Habitat Using an Ensemble of Earth System Models

Brian S. Bartlett1, Rebecca G. Asch2
1Coastal Resources Management, East Carolina University
2Department of Biology, East Carolina University

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. striatususing 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,

including MPAs may need to adapt to these changes.

GP49

Inspired Design for Microbes: How Iron-Oxidizing Bacteria Serve as Ecosystem Architects in a Changing World

Chequita N. Brooks, Erin K. Field
Department of Biology, East Carolina University, Greenville, NC 27858

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 organisms, both macro and micro. 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-oxyhydroxides 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 function in the iron mats be maintained? To address this question metagenomic samples were taken from three iron mats in Town Creek from up and downstream of oil point-source pollution and analyzed for variations in functional attributes between up and downstream microbial communities. Concentrations of total iron (Fe2+, Fe3+), dissolved phosphates, non-particulate organic carbon, nitrates and nitrites, and ammonia were also measured at each iron mat. In addition to these traditional geochemical measurements we also measured benzene, ethylbenzene, and total xylenes to assess oil contaminants at each sampling site. By measuring both environmental conditions (i.e. geochemical analyses) and microbial community and function (i.e. metagenomics) we can observe how the microbial community function in this unique ecosystem is structured by and maintained by its environment, while also resolving the influence the microbial community has in maintaining environmental conditions (e.g. through the bioremediation of contaminants).

GP50

Using Digenean Trematode Diversity to Inform Status of Estuarine Fisheries

Timothy S. Lee, April M.H. Blakeslee

Digenean trematodes have life histories that require three host organisms to complete their life cycles. In the U.S. east coast's estuaries there are nine identified species of trematodes which infect eastern mudsnail Tritia obsoleta (T.O.) as its first intermediate host and infects a second intermediate host (polychaetes, crustaceans, fish, or mollusks) followed by infecting a final definitive host (often seabirds or fish). These estuaries have also been colonized by non-indigenous red seaweed Gracilaria vermiculophylla (G.V.), a macroalga that provides shelter and nursery grounds for variety of invertebrates, including T.O. We predicted that habitats with G.V. have higher prevalence of T.O. infected with trematode species that use birds or fish as definitive hosts, because larger biomasses of G.V. can host ample abundance of macroinvertebrates prey for migratory fish and birds alike. We sampled T.O. in four estuarine sites of eastern shore, Virginia in fall 2018 and found 10.58% infection rate of all T.O. dissected (n = 567). Of the infected T.O., 35% and 38.33% were infected with trematodes requiring seabirds and fish as definitive hosts respectively. We found that prevalence of T.O. infected with trematodes using fish as definitive host was 38% in sites with low to no G.V. presence while it was 45% in sites with high G.V. biomass. Trematode diversity of infected T.O. in habitats colonized by G.V. can be a useful indicator of predicting varying abundances of migratory fish and birds in the region. Furthermore, trematodes can be a tool to inform fisheries status locally and regionally.

GP51

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

Heidi Knecht1, Stephanie Richards2
1Department of Public Health, Brody School of Medicine, East Carolina University
2Department of Health Education and Promotion, East Carolina University

Due to the difficulty of obtaining sustained funding for county and municipal mosquito control programs in North Carolina and other factors, many homeowners hire private mosquito control companies to treat their properties. Private companies generally apply residual barrier sprays to foliage, a common method of insecticide treatments for controlling a variety of mosquito species. Although barrier sprays are commonly used, there are few studies evaluating efficacy. This field study evaluated the effect of lambda-cyhalothrin (a pyrethroid adulticide) and pyriproxyfen (an insect growth regulator) exposure on the reproduction (measured by fecundity, fertility, and adult emergence) and abundance of host-seeking Aedes albopictus. The study was conducted from May 14 – October 16, 2018. Nine properties were treated with Demand® CS 0.06% (lambda-cyhalothrin) + Archer® (pyriproxyfen) 0.010% (every 60 days) and 3 control properties received no treatment (N=12 total properties included in the study). Adult (host-seeking) mosquitoes were collected using BG-Sentinel 2 traps and oviposition intensity was monitored using ovitraps for each property. Eggs were reared in the laboratory to assess life table characteristics. Out of 17,903 adult mosquitoes collected, 13% were Aedes albopictus. No significant ($P = 0.785$) differences were observed between the abundance of host-seeking Ae. albopictus in treatment compared to control groups. However, there were significant ($P < 0.0001$) differences observed in abundance of Ae. albopictus adults between weeks at both control and treatment properties.

GP52

Relating groundwater well location and depth to water quality in rural eastern North Carolina

Thomas J. Vogel, Coastal Resources Management Program; Randall Etheridge, College of Engineering and Technology; Ariane Peralta, Department of Biology; Jacob Hochard, Department of Economics

In many rural areas, lack of regular drinking water testing may lead to contaminated water creating adverse health impacts for residents without their knowledge. While annual water quality testing is recommended for private wells, many property owners only test the water at the time of well construction, as required by law. The minimal regulation of private wells has resulted in limited studies examining the impact of non-point source contaminants on well water quality. This study will examine the correlation between well depth, the aquifer being accessed, and groundwater quality between 2007 and 2018 in the rural eastern North Carolina counties of Bladen, Duplin, and Sampson. Kriging interpolation of chloride and combined nitrate and nitrite concentrations within each aquifer can indicate contamination by agricultural sources using chlorinated fertilizers. Potential sources of contamination in this area include confined hog and poultry operations, agricultural fields, malfunctioning septic systems, and other industries upgradient of the wells. The correlation between well depth and contaminant levels could be used to inform the safe depth at which drinking water wells should be installed to minimize risk of adverse outcomes. Future work will attempt to link this correlation analysis to human health outcomes associated with waterborne contaminants.

GP53

Safe Havens and Hot Spots: Ionizing Radiation in Permafrost and its Influence on the Survival of Ancient Life

Offormata Emmanuel Osunkwor1, DeWitt Regina1
1Department of Physics, East Carolina University

Permafrost on Mars is considered a primary target for the search for life. In my presentation I will outline the goal of my dissertation, which is to carry out the first quantitative study of ionizing radiation in permafrost and its influence on the survival of ancient life. To this end, I will investigate microscopic variations in the radiation environment of permafrost through measurements with extracted samples in the lab and through model calculations. This work directly addresses the question of how safe havens and hot spots in the radiation environment influence the survival of microbes and preservation of DNA from microbes.

Permafrost, a mixture of minerals and ice, is highly non-uniform on a microscopic scale. Thus, the effective radiation dose absorbed by a microorganism and its survival probability depends strongly on its microscopic location and its environment. Current values for survival rates on Mars are estimates based on the average expected dose rate in the subsurface due to cosmic radiation. Average values can over- and underestimate the true survival probabilities by an order of magnitude and more. While the microbial diversity in terrestrial permafrost and the radiorestistance of various microbial life forms have been investigated, information on the variability of background radiation in permafrost is not currently available. Yet it is crucial to proving or disproving the idea that microbes can survive as dormant forms for millions of years.

GP54

The Effect of Ca2+ on α-synuclein Binding to Transglutaminase New Espirito Santo Virus inhibits replication and spread of Dengue Virus in mosquitoes

Avian V White
Stephanie Richards
Rachel Roper

Dengue virus (DENV) is an arbovirus with four antigenically distinct serotypes that cause dengue fever and dengue hemorrhagic fever. Over the last decade, a number of new mosquito borne viruses have been discovered, including Espirito

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 ± 0.4 PFUeq DENV-2/mL to 0.8 ± 0.2 log10 PFUeq DENV-2/mL, and decreased leg titer from 3.0 ± 0.3 log10 PFUeq DENV-2/ mL to 0.8 ± 0.2 log10 PFUeq DENV-2/ mL. In mosquitoes from the low dissemination colony, significant reductions in DENV were observed in bodies (decreased from 1.2 ± 0.3 log10 PFUeq DENV-2/ mL to 0.6 ± 0.2 log10 PFUeq DENV-2/ mL) and legs (decreased from 3.9 ± 0.2 log10 PFUeq DENV-2/ mL to2.9 ± 0.3 log10 PFUeq 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

1Department of Physics, East Carolina University

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 so that its properties can by studied. During a RHIC event, two nuclei cross each other over a finite crossing time dt. The Bjorken formula [1] can be used to estimate the initial energy density ε(t) given a formation time τF of the produced particles. However, the Bjorken formula is invalid at lower energies, e.g., lower than √sNN ≈ 50 GeV for central Au+Au collisions, where τF ≤ dt. A recent study by one of us [2] analytically considers the finite time for the initial energy production and results in much weaker dependence on the formation time at low energies. However, the recent formula still diverges as τF → 0. In this study, we extend the recent formula to include the finite width in the beam-direction. We find that our analytical result gives finite energy densities as τF → 0, unlike both the Bjorken and the recent formulas. We first derive an analytical solution for the energy density as a function of time ε(t) for a simple case and then obtain numerical solutions for more complicated cases. We find that, apart from the divergence as τF → 0, our ε(t) agrees with the recent triangular solution [2] for late times and is also quantitatively comparable to it for early times for expected finite τF values.

[1] J. D. Bjorken, Phys. Rev. D 27, 140 (1983).

[2] Z. W. Lin, Phys. Rev. C 98, 034908 (2018).

GP56

Differential gene expression in the upper and lower floret of maize

Hailong Yang1, Kate Nukunya1, Charlene Ding1, Maria Angels De Luis Balaguer2, Rosangela Sozzani2, Beth Thompson1

1Department of Biology, East Carolina University, Greenville, NC, USA
2Department of Plant Biology, North Carolina State University, Raleigh, NC, USA

Flowers are essential for plant reproduction and also produce seeds and fruits that are consumed as food. In maize, male and female flowers are borne on separate inflorescences; the tassel produces male flowers and the ear produces female flowers. Grass flowers (called florets) are contained in spikelets. Maize spikelets initiate two floral meristems that give rise to the upper floret and lower floret. In the tassel, both florets fully develop, resulting in mature tassel spikelets with two male florets. In the ear, the lower floret aborts, resulting in mature ear spikelets 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 abortion in the tassel and stamens arrest in the ear.

To understand the gene regulatory networks that function in floral development, we used lasercapture microdissection coupled with RNA-seq to identify genes specifically expressed in the upper and lower floral meristems. Approximately 600 genes are 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 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 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

SUTTON, Seth 1, CULVER, Stephen J. 1, MALLINSON, David J. 1, ROBINSON, Marci M. 2, DOWSETT, Harry J. 2, BUZAS, Martin A. 3. (1) Department of Geological Sciences, East Carolina University, 101 Graham Building, Greenville, NC 27858, (2) U.S. Geological Survey, Florence Bascom Geoscience Center, Reston, VA., (3) Department of Paleobiology, Smithsonian Institution, Washington, DC 20024, suttonse14@students.ecu.edu

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. Miocene 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 Malcom 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

Mizanur Rahman

Department of Geography, Planning and Environment, East Carolina University.

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 desired in future studies.

GP60

Climate change impacts on spawning habitat suitability of Cubera snapper

Esra 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 (Lutjanis cyanopterus). Cubera snapper inhabit coastal waters near rocky bottoms and reef structures and spawn during March through August off the

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 be eventually 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 will respond sooner and to 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

Seth M. Gibbons1, Austin Eberwein1, Roger Rulifson1, Michael Brewer1, Erin Field1

1 Department of Biology, East Carolina University

River Herring, a term used to describe both the Blueback Herring (Alosa aestivalis) 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 the its coastal river systems make traditional means of sampling difficult. Environmental DNA (eDNA) sampling could be used as a replacement, or alongside traditional sampling techniques due to its rapid and less labor-intensive qualities. By detecting trace DNA shed by River Herring the relative abundances and locations of spawning could be more easily determined. In order to develop a methodology by which to convert the amount of DNA to a number of fish, accurate eDNA shedding and decay rates, an experiment was performed at the Edenton National Fish Hatchery, where 10 River Herring were collected from the wild and placed into holding tanks. Samples were collected over time from the holding tanks at 30 minute, 1 hour, 1.5 hour, 2 hour, 3 hour, 4 hour, 5 hour, and 6 hour points, which were holding various numbers and sizes of fish, continuing even after the fish are removed at the 6.5 hour, 7 hour, 8 hour, 9 hour, and 10 hour points. A second experiment was also performed wherein water samples were taken from a tank that was having more River Herring added every half hour with the number of fish increasing from 5 to 50 over the course of the experiment. The data collected should yield information about how much DNA is shed by different biomasses of River Herring over time, as well as how quickly this DNA is degraded after the fish are removed. With this information, a model can be developed that can be used to quantify eDNA sampling data for River Herring in NC, which has not previously been done and can be used for future monitoring projects.

GP62

Localization of sound producing fish using a steered-response power method

Phillip M Deville and Mark W. Sprague, Ph.D.

Passive acoustic surveys were performed at intertidal creeks located within the North Inlet-Winyah Bay National Estuarine Research Reserve in Hobcaw Barony, South Carolina. 7-channel hydrophone arrays were deployed 05/30/17 for 48 hrs and 6/01/17 for 24 hrs at Oyster Landing and Clam Bank monitoring sites, respectively, at the Baruch Marine Field Institute. The express purpose of this survey was to use the array to locate sound producing fish.

The array consists of a group of hydrophones placed at distinct spatial locations deployed to sample propagating acoustic wavefields. Each hydrophone transduces acoustic field energy into electrical energy in the spatiotemporal domain, and as result the audio tracks recorded by each hydrophone can be combined 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

Robert Michael Seip, Jefferson L Shinpaugh
Department of Physics, East Carolina University

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.

Alexandra Venuto1, Itallia Pacentine2, Teresa Nicolson2,3, Timothy Erickson1,2

1Department of Biology, East Carolina University, Greenville NC.
2Oregon Hearing Research Center, Oregon Health & Science University, Portland OR.
3Current address: Otolaryngology-Head & Neck Surgery, Stanford School of Medicine, Stanford CA.

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 these previous studies have used acute treatments to temporarily 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.
lipoma HMGIC fusion partner-like 5 (lhfpl5) is a gene required for sensory hair cell function in humans, mice, and zebrafish. Here, we show that teleost fishes possess duplicate lhfpl5 genes, lhfpl5a and lhfpl5b, likely originating with the teleost-specific whole-genome duplication event. In zebrafish, these ohnologs are expressed in discrete populations of hair cells: lhfpl5a expression is restricted to auditory and vestibular hair cells, while lhfpl5b expression is specific to hair cells of the lateral line neuromasts. Consequently, lhfpl5a mutants exhibit defects in auditory and vestibular function, and subsequent larval death. However, the disruption of lhfpl5b affects hair cells of the lateral line only, making these mutants unique in that they are born with lateral line deficiencies. The lhfpl5b 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 lhfpl5a and lhfpl5b ohnologs 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
Fabrice 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.

GP66

Microbial Community Impact on the Host-Parasite Coevolutionary Arms Race

K. L. Swanson1, S. Roozbehi1, A. M. H. Blakeslee1, E. K. Field1
1Department of Biology, East Carolina University

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 (Rithropanopeus harrisii) is being negatively affected by a recently introduced and impactful parasite (Loxothylacus panopaei). This invasion has novel selective pressures on Atlantic coast R. harrisii 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 externa (infected crabs only) and internal crab organs of (infected and uninfected) will be removed. Microbial DNA will be extracted and sequenced using the microbial 16s rRNA gene V6-V8 region. Some sequencing has already been completed and the samples will be analyzed to determine differences in microbial communities between infected and uninfected crabs. To test (2), which investigates whether microbial communities impact the parasite's survival and virulence, microbial communities will be manipulated using Chloramphenicol, 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 the treatments of infected/uninfected, antibiotic/no antibiotic 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.

GP67

Analysis of functional domains in Tomt, a protein required for mechanotransduction in sensory hair cells.

Denise Zangwill1, Teresa Nicolson2, and Timothy Erickson1,2

1Department of Biology, East Carolina University, Greenville NC.
2Former address: Oregon Hearing Research Center, Oregon Health & Science University, Portland OR.
3Current address: Otolaryngology-Head & Neck Surgery, Stanford School of Medicine, Stanford CA.

Mutations in the gene transmembrane O-methyltransferase (TOMT / LRTOMT2) cause non-syndromic deafness in humans, mice, and zebrafish. TOMT is enriched in the secretory pathway of sensory hair cells where it facilitates the apical trafficking of Transmembrane channel-like proteins TMC1 and TMC2, the putative pore-forming subunits of the hair cell mechano-electrical transduction (MET) channel. Co-immunoprecipitation experiments show that mouse TOMT and TMC1 can directly interact in cultured cells, but it remains unclear which regions of the proteins are involved in this interaction. Here, we describe our work to define the functional domains in TOMT with the goal of understanding how the TOMT-TMC interaction facilitates the formation of the MET channel in sensory hair cells.

TOMT is predicted to have an N-terminal transmembrane domain (TMD) and "linker" region, followed by an O-methyltransferase (O-MT) domain at its C-terminus. Genetic evidence suggests that the O-MT domain is playing a non-enzymatic role in regulating MET channel assembly. Nonetheless, our preliminary results suggest that both the N-terminal and O-MT domains are required together for TOMT's function. To clearly define the functional domains in TOMT, we are performing structure-function experiments by expressing various GFP-tagged deletion constructs of the murine TOMT in the hair cells of zebrafish tomt mutants. We will determine whether each of the mutated versions of TOMT can rescue MET channel activity via a commonly used fluorescent dye labeling assay. Our results will shed light on which domains in Tomt are critical for mechanotransduction. Based on these results, future studies will define the protein-protein interaction interface between TOMT and the TMCs and determine their functional consequences.

GP68

Parion Sciences Compound Attenuates Aeroallergen-Induced Responses in House Dust Mite-Sensitive Rhesus Macaques

Hannah G. Woolard1, Robert L. Wardle1, Bill Thelin2.
1Department of Physiology, Brody School of Medicine at East Carolina University, Greenville, NC, 2Parion Sciences, Durham, NC.

RATIONALE: House dust mite (HDM)-sensitive nonhuman primates (NHP) exhibit excessive mucus production that obstructs pulmonary bronchi. Parion Sciences is developing a compound (PSC) as a mucolytic agent. We assessed whether treatment with PSC attenuates NHP responses to aerosolized HDM (aeroHDM).

METHODS: NHP were anesthetized, intubated, and instrumented to record SpO2, HR, lung resistance (RL), dynamic compliance (Cdyn). The dose of aeroHDM that provoked a 100% increase in RL, 40% decrease in Cdyn, or a reduction in SpO2 to 70% was determined for each animal, was administered on Study Days 1 and 29 (d1, d29), immediately after a single dose of nebulized vehicle (d1) or PSC (d29). Pulmonary inflammation was assessed by bronchoalveolar lavage (BAL) on d2, d30.

RESULTS: From d1 to d29, the average maximum change in aeroHDM-induced RL and Cdyn improved by 49% and 14%, respectively, and average minimum SpO2 increased from 72% to 81%. Changes in d30 relative to d2 BAL cellularity varied among animals.

Two doses of PSC (d29, d57) resulted in attenuation of allergic asthmatic phenotype for 6-8 weeks. From d-13 to d99, the average maximum change in aeroHDM-induced RL and Cdyn improved by 81% and 30%, respectively, and average minimum SpO2increased from 73% to 80%. Mean responses also manifested a trend for PSC–induced reductions of pulmonary inflammation: BAL Total WBC count at d86, and % Eosinophils and Neutrophils after d29.

CONCLUSIONS: Nebulized PSC is very efficacious to attenuate acute responses to aeroHDM in this chronic model of allergic asthma and administration was not associated with any adverse events.

GP69

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 J. Johnsrude, Joshua E. Pitzer, Daniel W. Martin, R. Martin Roop II

Brucella abortus is a Gram-negative bacterium that causes abortion and infertility in food animals and a chronic debilitating febrile disease in humans known as brucellosis. As with all pathogenic bacteria, the Brucella spp. require sufficient metal nutrition during the course of an infection. Host-mediated 'metal withdrawal' defenses actively restrict the bioavailability of metals which requires invading bacteria to employ high affinity metal acquisition systems to overcome these metal-limiting conditions. While obtaining sufficient metals during host infection is critical to the survival of these bacteria, avoiding metal toxicity is equally important. Excess accumulation of one metal relative to others can lead to protein mis-metallation when surplus metal ions outcompete other metal species for their native binding sites. To prevent metal toxicity, bacteria respond to high intracellular metal concentrations by means of metal-responsive transcriptional regulators that downregulate metal import systems, and exporters that remove excess intracellular metal. Manganese (Mn) is an essential micronutrient for Brucella strains, and the purpose of this study was to better define the cellular components that maintain Mn homeostasis and prevent Mn toxicity in these bacteria. The Mn-responsive repressor Mur downregulates the expression of mntH, the gene encoding the sole high affinity Mn importer in Brucella in response to increased intracellular levels of Mn. But phenotypic analysis of a B. abortus mur mutant suggests that Mur plays a minimal role in preventing Mn toxicity. Instead, an ortholog of the cation diffusion facilitator (CDF) type metal exporter EmfA, which prevents Mn toxicity in the close phylogenetic relative Rhizobium etli, is critical for preventing Mn toxicity in Brucella. The experimental findings of this study indicate that EmfA-mediated resistance to Mn toxicity plays a critical role in the virulence of Brucella strains, and suggests that the primary function of EmfA may be to maintain the proper intracellular balance of Mn in these bacteria during the course of infection.

GP70

Poxvirus Virulence Proteins A35 and O1L as Host Immunoregulators

Alexandra Hayes, Rachel Roper

Dept. of Microbiology and Immunology, Brody School of Medicine

Poxviruses, some of the largest viruses in existence, have a great impact on the human and animal world due to their ability to infect a broad assortment of organisms and cause significant disease. Variola virus, a notorious poxvirus, was responsible for the smallpox epidemic that killed hundreds of millions of people until it was eradicated in 1980. Today, poxvirus infections remain a danger to human health, as natural and potential bioterrorism threats. Monkeypox, an emerging poxvirus, caused an outbreak in 2003 in the U.S. infecting more than 80 people and causing smallpox-like symptoms. Another poxvirus species, cowpox, is especially dangerous for exotic zoo animals and their human

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. Unfortunately, the vaccine 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 Del), O1L deletion mutant (O1L Del), or wild type (WR) 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 experiments to measure 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.

GP71

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

Department of Physiology, Brody School of Medicine, East Carolina University
Department of Pharmacology and Toxicology, Brody School of Medicine, East Carolina University

Introduction: Ozone (O3) is a pollutant present in the atmosphere which can be harmful to human's health. Several studies have shown an increased pulmonary and systemic inflammatory response following inhalation of O3. However, whether O3influences 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/6J mice (8-12 weeks old) were exposed to filtered air (FA) 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, CXCL1, CXCL2, TLR4, CCL2 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), CXCL1 (neutrophil recruitment), and CXCL2 (polymorphonuclear neutrophil recruitment) were all elevated 6-hours post-O3 in females. TNF-α (activated by macrophages) and TLR4 (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 Left Ventricular Cardiac Fibroblast Migration in Response to Wound and Proliferation In Vitro

Andrew M Kisling, Madaniah O Zakari, Deepthy M Thomas, Lillie Taylor, Musaad B Alsahly, Robert M Lust, Stefan Clemens, Laxmansa C Katwa

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 its function. We isolated, cultured, and characterized 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 WT and D3KO cell migration and proliferation. 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 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 10-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

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

Kadesha McIntyre1, Ahmad Aboaziza2, Samantha Poppenfuse3,Linda May4, Srikanth Ravisankar2, Devon Kuehn2, Kim Kew1

1Department of Biochemistry and Molecular Cell Biology, BSOM
2Department of Pediatrics, BSOM
3Department of Biology, East Carolina University
4Department of Foundational Sciences and Research, School of Dental Medicine

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 revealed 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 Rushing

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 recruitment of leukocytes and monocytes to target areas. 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 hallmarks 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 have identified compounds that bind directly to C1r. To visualize and definitively determine the binding site of our compounds, we are co-crystallizing lead 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.

GP75

The role of neuropilin-1 in cell-to-cell infection of T-cells by human T-cell leukemia virus type 1

Wesley Kendle, Kimson Hoang, Nicholas Polakowski, Isabelle Lemasson

Department of Microbiology and Immunology, Brody School of Medicine

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 5-10 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 proteoglycans (HSPG)/ neuropilin-1 (NRP-1)/ glucose transporter 1 (GLUT1) tri-receptor complex. Following provirus integration into the host's 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 NRP1 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

Parker L. Evans, BS; Luke A. Weyrauch, MS; Erin C. Stanley, BS; Shawna L. McMillin, MS; Carol A. Witczak, PhD; Depts. of Kinesiology, Biochemistry & Molecular Biology, and Physiology; East Carolina Diabetes & Obesity Institute; Brody School of Medicine; East Carolina University, Greenville, NC

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 transporter isoforms have been examined to determine 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 resistance exercise training/muscle overload. Male C57BL6/J mice (6 wks old) were fed either a 14%kcal low fat diet (LFD), or a 60%kcal high fat diet (HFD) to induce insulin resistance. After 12 wks, muscles were excised and processed for immunoblot analyses. In mice fed the high fat diet, GLUT6 protein levels were increased ~60% in glycolytic extensor digitorum longus muscles, and ~80% in oxidative soleus muscles compared to LFD controls, demonstrating that GLUT6 expression is stimulated by insulin resistance. To assess the effects of resistance exercise training/ muscle overload, overload was induced in plantaris muscles from LFD- and HFD-fed mice via unilateral synergist ablation of the distal two-thirds of the gastrocnemius and soleus. After 5 days, muscles were excised and processed for immunoblot analyses. Overload increased GLUT6 protein levels ~300% in muscles from LFD mice, and ~500% in muscles from HFD mice, demonstrating that GLUT6 expression is stimulated by overload and is enhanced via the combined metabolic stressors of insulin resistance and overload. Collectively, these data demonstrate that GLUT6 protein levels are increased in skeletal muscle that is metabolically challenged by insulin resistance and functional overload, and suggest a key role for GLUT6 in regulating muscle glucose uptake in response to these stimuli. Future studies will utilize a muscle-specific GLUT6 knockout mouse model to determine the role of GLUT6 in response to high fat diet-induced impairments and overload-induced increases in skeletal muscle glucose uptake.

GP77

Electrochemical detection of mutated DNA from Brca1-KO mice

Elizabeth R. LaFave, Michael D. Tarpey, Nicholas P. Balestrieri, Espen E. Spangenburg, Eli G. Hvastkovs

Breast cancer 1, early onset gene codes for the DNA repair enzyme, breast cancer type 1 susceptibility protein (Brca1). Brca1 is prone to DNA mutations, predisposing humans to the development of cancer and additionally impacting skeletal muscle function. Skeletal muscle specific Brca1 homozygote (Brca1KO) mice were generated to show that loss of muscle quality was associated with loss of Brca1. This was demonstrated through many phenotypic assays, notably, electron microscopy to visualize the appearance of swollen mitochondria coupled with qPCR, both indicating an increase in mitochondrial DNA (mtDNA) 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 assayed using square wave voltammetry (SWV). An electrocatalytic cycle arises by oxidation of ruthenium trisbipyridine (Ru(bpy)32+ to Ru(bpy)33+) 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 of the generated oxidative peak currents, providing insight into the genetic processes associated with an organism. Here, mtDNA from the Brca1KO 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 Brca1KO mtDNA 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 transversion 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 BrcalKO 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 Brca1KO mtDNA, 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
R. Martin Roop

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 holdfast and unipolar polysaccharide (UPP), respectively. In both cases, a polysaccharide is generated at one pole of the cells and aids in attachment of the bacteria to a solid surface. While B. abortus is also known to produce exopolysaccharides (EPS), the function of these EPS's 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 Δupp 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.

GP79

Using Two Sets of MRI Images to Create CT Images

Samuel Chen Leu

In radiation therapy, with increasing interests in using magnetic resonance imaging (MRI) only radiation therapy (RT) and the emergence of MRI-Linac, methods for creating pseudo-computed tomography (pCT) is needed. This is because only CT images contain electron density information that is needed for calculating dose distributions of treatment plans.

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.

GP80

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

Kayla DeOca
Dr. Mark Mannie

Interleukin-2 (IL-2) is a potent T cell growth factor that interacts with a high affinity heterotrimeric 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 cells (Tregs), which are absolutely required for immunological tolerance to self. IL-2 enables FOXP3+ CD25high Tregs to suppress pathogenic conventional T cells (Tcons) and thereby prevent autoimmune disease, allergic disease, transplant rejection, inflammation, and immunopathogenesis. IL-2 has preferential action on Tregs because this subset constitutively 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 further developments are needed to stabilize FOXP3+ Tregs during clonal expansion. In this study, a soluble fusion protein comprised of IL-2 and the IL-2 receptor α chain was derived and tested in Treg stability assays. This novel fusion protein was a low-efficacy ligand that inhibited the contribution of transmembrane CD25 and acted via engagement of the transmembrane β/γ receptor. In both in vitro and in vivo models, this fusion protein preferentially expanded Tregs due to the exquisite IL-2 sensitivity of this subset. This fusion protein stabilized Tregs and enabled preferential outgrowth 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.

GP81

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 Park1, Sam O'Rourke1,2, Myon-Hee Lee1

1Department of Medicine, Division of Hematology/Oncology, Brody School of Medicine at East Carolina University
2Department of Biochemistry, University of Richmond

PUMILIO/FBF (PUF) 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/MAPK 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 meiotic 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

GP82

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 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 Crispr-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 phenotypical 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.

GP83

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 [Pi] and increase in [uric acid] (UA), implying a decline in bioenenergetic 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 analysis on isolated liver mitochondria revealed an increase in the JO2 – ΔGATP slope in the presense 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 JO2 and JATP at three different rates of respiratory demand revealed a 50-80% decrease in the P/O ratio in the presense 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.

GP84

Production of Monomeric Fibrin the does not Polymerize

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:a and B:a knob-hole capabilities, 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

steps of rigorous molecular structure analysis. This would open the door for student training in the techniques of Small Angle X-ray Scattering (SAXS) and Hydrogen-Deuterium Exchange Mass Spectrometry (HXMS). The results of this project have the potential to promote accurate clinical diagnoses and treatments of thrombosis, hemophilia, stroke, cardiovascular disease, pulmonary embolism, myocardial infarction and fibrinogenemias. Preliminary results for this project will be presented.

GP85

Investigating the Role of Hyaluronan in Cortical Brain Development

Emily Sarah Wilson

Parent-reported diagnoses of neurodevelopmental disorders totaled nearly 15% of children in the U.S. ages 3 to 17 years in 2006-2008. Changes in the ratio of excitatory to inhibitory(E/I) synapses is a common underlying mechanism in many neurological diseases. Increased hyperexcitability of cortical neurons is characteristic of neurodevelopmental disorders such as epilepsy and autism spectrum disorders. Currently, we know little about how the E/I ratio is regulated. It is thought that alterations in spacing between neural cells and synapses and changes in cytoskeleton-dependent signaling are involved in the regulation of the E/I ratio. Changes in extracellular matrix (ECM) during neurodevelopment may alter formation of the brain and its function. Hyaluronan (HA), the major component of brain ECM, is a macromolecule that controls cellular spacing. Decreased HA levels in HA synthase (HAS1-3) knockout mice result in epileptic seizures. Many events relating to HA occur via interaction of HA with matrix receptor CD44. HA binding to CD44 is known to regulate Rac1 (an actin cytoskeleton-regulating RhoGTPase) signaling pathways in non-neuronal cells, including breast cancer and glia. Preliminary results indicate HA, HAS, and CD44 are present within or around neural cells. Because alterations in cytoskeleton remodeling can change synaptic morphology and overall excitatory synapse transmission in the brain, participation of HA provides a novel approach to analyze neurodevelopment, particularly synapse formation and signal transduction. RhoGTPases control the morphology of the synapse through regulation of the actin cytoskeleton. We hypothesize that HA, through interaction with receptor CD44, regulates neuronal RhoGTPases. We expect manipulation of HA to alter actin cytoskeleton, through RhoGTPase signaling, ultimately affecting synaptic development. We will test this hypothesis by removal or enhancement of extracellular HA in 3D human brain organoids derived from induced pluripotent stem cells. We expect experimental removal of HA to alter the E/I synaptic ratio in favor of excitatory synapses and lead to synaptic disorders like ASD and epilepsy. We hypothesize that ECM alterations, especially those related to HA, lead to disorders with characteristic imbalances in the E/I ratio. These results will provide valuable insight into an understudied aspect of neurodevelopment and establishes a new model of E/I imbalances associated with human neurodevelopmental disorders.

GP86

Metabolic and Cardiac Responses to Monocrotaline-Induced Pulmonary Hypertension in Sprague-Dawley Rats

Musaad B Alsahly, Alexander S Clark, Madaniah O Zakari, Laxmansa C Katwa, Kelsey F Wellman, Robert M Lust

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 studied longitudinally through echocardiography. After 21 days, animals was sacrificed, left ventricle and right ventricle mitochondria were isolated and mitochondrial function 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 injection and 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.

Preliminary observations: Early metabolic remodeling may not be adequate to support the evolving structural changes.

GP87

PPP1R2 Plays a Key Role in Regulation of Centrosome Function and Cell Division

Alan-Michael Bresch, Nadiya Yerich, Rong Wang, and Ann O. Sperry

Anatomy and Cell Biology, Brody School of Medicine, East Carolina University

The centrosome nucleates microtubules of the mitotic spindle necessary for accurate segregation of chromosomes at cell division. PPP1R2 (R2) is a negative regulator of protein phosphatase 1 (PP1) and an activator of Aurora A (AURKA). Both PP1 and AURKA play vital roles in cell division. AURKA regulates centrosome maturation, a stage of protein recruitment that prepares the centrosome for spindle assembly. AURKA also regulates cytokinesis through contractile component clearing from the cortex. PP1 regulates centrosome separation, chromosome alignment and segregation, and cytokinesis. Given that R2 interacts with PP1 and AURKA, both essential regulators of the centrosome, we hypothesized that disruption of R2 function would impact centrosome behavior and mitosis. We overexpressed R2 and measured centrosomal protein localization, microtubule nucleation, and nuclear size by indirect immunofluorescence. In these cells, γ-tubulin was redistributed from its primary location at the centrosome to a diffuse staining in the cytoplasm. We proposed that R2 overexpression interferes with the function of the percentriolar matrix (PCM), a complex network of proteins that supports microtubule nucleation. To test this, we examined the distribution of pericentrin, a scaffolding protein of the PCM, after R2 overexpression. Like γ-tubulin, pericentrin relocalized from the centrosome to the cytoplasm in cells overexpressing R2 suggesting instability of the PCM. Next, we investigated whether disruption of the PCM by R2 overexpression inhibited microtubule nucleation. R2 overexpression significantly reduced microtubule nucleation at the centrosome following depolymerization of microtubules with nocodazole. Inhibition of PP1 by R2 depends on phosphorylation at Thr72 on R2. Therefore, we overexpressed Thr72 mutants to investigate the importance of R2 phosphorylation on centrosome structure and function. Phosphorylation of R2 is necessary to disrupt γ-tubulin recruitment and microtubule nucleation at the centrosome. Cells overexpressing R2 also had significantly larger nuclei than control cells suggesting that R2 overexpression may interfere with cytokinesis. We found that R2 and PP1 localize to the midbody during cytokinesis as has been shown previously for AURKA. We conclude that R2 regulates PCM integrity and has roles in microtubule nucleation and cytokinesis.

GP88

Elucidating the Role of Trehalose in Acinetobacter baumannii's Stress Response

Samantha Palethorpe, John M. Farrow III, PhD., Greg Wells, Everett C. Pesci, PhD.

Bacteria have developed a remarkable stress response system to sense and adapt to various hostile conditions. Desiccation is one of the most common environmental stresses which bacteria endure, however relatively little is known about how non-spore formers are able to tolerate such pressures. One bacterium which has an extraordinary ability to survive on dry surfaces is Acinetobacter baumannii. A. baumannii is a Gram negative opportunistic pathogen which is a leading cause of hospital-acquired infections. Not only can A. baumannii survive for months on inanimate surfaces, it has also developed an overwhelming ability to resist antibiotics and hence is a serious threat to the healthcare system.

To understand the mechanisms allowing persistent nosocomial colonization by A. baumannii, our lab has recently developed a screening method to select for desiccation-sensitive mutants. These mutants are then analyzed to identify genes which may play an important role in the desiccation response of A. baumannii. From this preliminary data, we have shown that the two-component response regulator bfmR is essential for mediating desiccation resistance. Additionally, we have found that the drying sensitive ΔbfmR mutant has significantly decreased expression of otsBA, the genes required for trehalose synthesis. Trehalose is a very stable compatible solute known to provide protection against various stresses in bacteria and numerous other pathogenic organisms.

Our aim is to identify the role of trehalose during A. baumannii's stress response. Although we have shown that the more desiccation-resistant strains produce more trehalose, other preliminary data suggest that trehalose alone is not responsible for A. baumannii's surprising ability to tolerate drying. However, we believe that trehalose could be playing an important role in other virulence phenotypes, such as persistence in the host or during survival in other unfavorable environments.

GP89

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

Department of Physiology, Brody School of Medicine, East Carolina University, Greenville, NC, USA

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=8/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 intracavernosal 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. Relaxation to acetylcholine (ACh) and DEA NONOate was assessed. IPA non-adrenergic non-cholinergic (NANC) relaxation was evaluated by EFS + guanethidine + atropine. IPA androgen receptor protein expression was measured.

Results: CAST impaired erectile function and IPA ACh relaxation (CON: 60%, ADT: 31%; $p<0.05$); however, DEA NONOate relaxation was unchanged. Likewise, CAST impaired IPA NANC relaxation (CON: 40%, CAST: 30%; $p<0.05$). CAST did not impact IPA contraction. CAST decreased IPA androgen receptor expression (CON: 1±0.17, CAST: 0.39±0.03; $p<0.05$). CAST did not change vascular reactivity in aortas and mesenteric arteries. CAST+T recovered erections and improved ACh relaxation in IPA to values greater than CON (T: 69%: $p<0.05$). Similarly, CAST+T IPA NANC relaxation was enhanced greater than CON (T: 64%; $p<0.05$). T did not impact IPA contractions and had no effect on aortic or mesenteric vasoreactivity.

Conclusion: CAST leads to ED and impaired vasodilation in the IPA without evidence of systemic vascular dysfunction. T therapy remarkably recovered erections and improved IPA relaxation to greater levels than CON. T therapy to restore erectile function in prostate cancer survivors is warranted.

GP90

Identifying the Ideal Marker Placement for Lung Tumors

Wesley Andrew Belcher
Mentors: Jae Won Jung (ECU 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 every 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.

GP91

The Role of MAGL in a Mini Brain Model of ASD

Alexis R Papariello, Ken Soderstrom, David Taylor, Karen Litwa

Autism Spectrum Disorder (ASD) is a heterogenous developmental disorder that affects 3.5 million individuals in the United States of America. There are only two FDA approved pharmacotherapies on the market currently for ASD. The endocannabinoid system is a retrograde synaptic regulator that plays an important role in early, embryonic development; thus, this system represents a valuable, potential target for pharmacological intervention of autism. Changes to cannabinoid receptor density, metabolizing enzyme levels (monoacylglycerol lipase or MAGL), and signaling molecules (2-arachidonoylglycerol and anandamide) may underlie phenotypic neuronal abnormalities such as increased dendritic arborization and excitatory-inhibitory tone imbalance. With the recent development of human induced pluripotent stem cells (hIPSC), we can now culture 2D and 3D brain models of autism patients and typically developing individuals to better understand how altered endocannabinoid signaling affects human fetal brain development. Preliminary RNASeq and qRT-PCR studies indicate that MAGL, the enzyme responsible for metabolizing and terminating the effects of 2-arachidonoylglycerol (the principal endocannabinoid in CNS) is expressed at elevated levels in autism-derived reprogrammed neurons relative to typical controls. We hypothesize that an increase of intracellular MAGL is associated with increased neurite growth and increased excitatory tone.

GP92

AMP Deaminase 3 overexpression in C2C12 myotubes increases lactate production and alters the cellular metabolome

Spencer Miller, Jeffrey Brault.

East Carolina Diabetes and Obesity Institute, Human Performance Lab, Departments of Kinesiology, Physiology, and Biochemistry & Molecular Biology, East Carolina University.

Background: Intracellular [AMP]/[ATP] reflects cellular energy status and influences activation of AMP-activated protein Kinase (AMPK). Overexpression of the cytosolic enzyme AMP Deaminase 3 (AMPD3: AMPàIMP+NH3) can decrease the [AMP]/[ATP], which could be predicted to decrease AMPK activity. Furthermore, since AMPK is associated with increased oxidative metabolism (TCA, β-oxidation, OXPHOS), then AMPD3 overexpression could be sufficient to drive the use of non-oxidative pathways (glycolysis) for energy production. Hypothesis: AMPD3 overexpression in C2C12 myotubes will increase lactate production and changes to cellular metabolites indicative of reduced oxidative metabolism. Methods: C2C12 myotubes were transduced with adenovirus encoding AMPD3+GFP or GFP(control). Media samples were collected 12, 20, and 23 hours later. At 24 hours myotubes were pelleted and global non-targeted metabolomics were performed by Metabolon Inc. Media samples were treated with perchloric acid to remove serum proteins and [lactate] was measured by ELISA (BioVision). Statistical differences in lactate was determined using two-tailed T-test. ANOVA contrasts were used to identify metabolites that differed significantly between experimental groups ($p<0.05$, n=7/con). Results: Metabolomics analysis identified 639 known biochemical compounds, of which 163 significantly differed between AMPD3 vs. GFP. As expected, AMPD3 overexpression significantly decreased [ADP], [AMP], and increased [IMP]. AMPD3 increased glucose (57-fold), 3-phosphoglycerate (17-fold), PEP (32-fold), and pyruvate (3-fold) compared to GFP. The concentration of media lactate between 20 and 24 hr was higher in AMPD3 than GFP (1564±70 vs. 1296±99 μM, $p=0.01$). AMPD3 also increased diacylglycerol, BCAA's and their α-ketoacids, yet TCA metabolites were unchanged. Conclusions: The increase in pyruvate and lactate after AMPD3 overexpression suggests that oxidative metabolism of substrates was impaired. This could explain the increase in glycolytic intermediates, and accumulation of diacylgycerol. Furthermore, the unchanged TCA metabolites suggests anapleoritic fueling by BCAA catabolism.

Funded by NIH R01 AR070200

GP93

Structure-function studies of Borrelia turicatae fibronectin binding proteins

Charles Booth Jr. and Brandon Garcia

Borrelia is a genus of spirochetes that is known to be pathogenic in humans. One such pathogen is Borrelia burgdorferi, the causative agent of Lyme disease. B. burgdorferi synthesizes a surface-attached protein, BBK32, that can simultaneously bind to fibronectin of mammalian hosts and to the complement protease, C1r. BBK32-mediated fibronectin binding contributes to adherence of B. burgdorferi during infection and promotes spirochetal extravasation and colonization of secondary tissues, such as joints. BBK32 contributes to evasion of the host's innate immune system. Previously we have shown that the C-terminal domain of BBK32 binds with high-affinity to the C1r protease and traps the larger C1 complex in its zymogen form. Another disease caused by spirochetes of the Borrelia genus is relapsing fever (RF). Phylogenic analysis shows that there are three separate BBK32 orthologues denoted FbpA, FbpB, and FbpC. It has been shown that these proteins are able to bind to mammalian fibronectin, and preliminary research shows the ability to bind to C1r. Our hypothesis is that the RF spirochetes may evade the host immune system inhibiting the classical complement pathway (CP) like BBK32.

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 of specific 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 coordinately regulated by a common transcriptional and epigenetic mechanism that links mitochondrial biogenesis with lipid oxidative capacity. While limited published data support the role of CPT1Btranscriptional 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 Cataldo MSEH/MPH candidate
Dr. Stephanie Richards, MSEH, 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. Â 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 (Mosquitomistâ„¢ [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 phosphorotrithioate) 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 prior to their teachers' formally teaching the unit. The preassessment asks 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

The purpose of this study is to determine if there has been inequity in the science recommendations of underrepresented minors (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 URM students recommended for honors and AP-level sciences will increase after the teacher interventions.

GON5

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 discussions and are void of healthcare provider expertise; peer feedback is instantly accessible and more in-depth than what a treating physician can cover 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 led 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 to 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

PD1

The two-component response regulator BfmR is required for the survival of Acinetobacter baumannii on dry surfaces

John M. Farrow, III, Greg Wells, and Everett C. Pesci

Healthcare-associated infections continue to be a burden in the U.S., affecting approximately one in 25 hospital patients, and frequently more than 10% of patients in developing countries. These infections are often spread in the hospital environment by passage on dry surfaces such as gloves or medical equipment, but the molecular mechanisms used by many common bacterial pathogens to survive dry conditions are poorly understood. For the opportunistic pathogen Acinetobacter baumannii desiccation tolerance is a trait that allows these bacteria to persist in the healthcare environment, where A. baumannii is a major concern because of its propensity to develop antibiotic resistance. We observed that profoundly drying-resistant strains of A. baumannii could lose the ability to survive drying after multiple passages in broth culture, and through analyzing these spontaneous drying-sensitive isolates using whole-genome sequencing we have begun to identify specific genes that are necessary for drying survival. We found that multiple isolates had mutations in the gene encoding the two-component response regulator BfmR. This regulator, along with its cognate sensor kinase BfmS, was previously shown to be important for biofilm formation, antibiotic tolerance, and virulence. We found that in addition to being more sensitive to drying, a ΔbfmR mutant was more susceptible to treatment with hydrogen peroxide, osmotic shock, and nutrient starvation. Furthermore, we found that bfmR was necessary for the increased expression of stress-related proteins during the stationary phase of growth, and one of these proteins, the KatE catalase, was important for long-term drying survival. Together these results indicate that BfmR plays a role in controlling general stress responses in A. baumannii, including responses that are critical for the survival of A. baumannii on dry surfaces. They also show that the ability of A. baumannii to survive in the hospital environment, where it can come in contact with the individuals who are the most susceptible to infection, is linked to its ability to cause disease by a common regulatory pathway.

PD2

Small molecule screening reveals novel inhibitors of the classical pathway of the complement system.

Blake R. Rushing1, Denise Rohlik1, Ryan J. Garrigues1, Brandon L. Garcia1

1Department of Microbiology & Immunology, Brody School of Medicine, East Carolina University, Greenville, NC

The complement system is a component of innate immunity and is composed of a network of blood serine 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 91 compounds were then screened for their ability to inhibit CP. This led to the identification of two CP inhibitors named PPI24 and PPI26. Using SPR, PPI24 and PPI26 were found to bind to the CCP2-SP domain of C1r in a dose dependent manner. Further analysis showed that PPI26 could directly inhibit C1 in a peptide cleavage assay, and in silico molecular docking analysis determined the serine protease domain of C1r as the binding site of PPI24 and PPI26. These data indicate that PPI24 and PPI26 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-Marie Péloponèse Jr2, Nicholas Polakowski1, and Isabelle Lemasson1

1 Department of Microbiology and Immunology, Brody School of Medicine, East Carolina University, Greenville, North Carolina, USA
2 Institut de Recherche en Infectiologie de Montpellier, Centre National de la Recherche Scientifique, Université de Montpellier, Montpellier, France

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 (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. We have found that AMPD3 overexpression leads to decreases in [AMP] and AMPK (Thr172) phosphorylation. Purpose: As AMPK is known to regulate PGC-1α activity, we explored whether AMPD3 overexpression alone might lower PGC-1α activity and mitochondrial protein synthesis rates. Methods: To assess PGC-1α activity, C2C12 myoblasts were transfected with a 2 Kb PGC-1α promotor luciferase reporter prior to differentiation. Luciferase activity was measured in myotube homogenates 1 and 5 days after GFP (control) or AMPD3 viral transduction. To assess mitochondrial protein synthesis, C2C12 myotubes were infected with GFP or AMPD3 Adenovirus for 48 hrs, then pulsed for 2 hrs with L-[2,3,4,5,6-3H]-Phenylalanine. Myotubes were trypsinized, homogenized with Teflon® on glass, and centrifuged to remove nuclei (1500 x g) and isolate the mitochondrial pellet (14,600 x g). Radioactivity was measured in the crude homogenate and mitochondrial fractions using a scintillation counter. Data (± SEM) were analyzed using unpaired, 2-tailed t-tests. Results: AMPD3 overexpression lowered PGC-1α promotor activity by 43 ± 3 % ($p< 0.001$) and 40 ± 2 % ($p= 0.0012$) after 1 and 5 days, respectively. Total protein synthesis rates from the crude homogenate displayed a decreasing trend with AMPD3 overexpression (-50 ± 14 %, $p= 0.0967$), while mitochondrial protein synthesis rates significantly decreased by 60 ± 8 % ($p= 0.014$) with no measurable differences in total protein concentrations ($p= 0.53$ and $p= 0.76$, respectively). Conclusions: AMPD3 overexpression decreases PGC-1α activity and mitochondrial protein synthesis. Thus, increased AMPD3 expression in atrophic muscle may slow mitochondrial protein turnover and/or contribute to the muscle's diminished oxidative capacity. NIH R01AR070200

UO1

Google Helps Students Adapt to the Rapidly Growing World of E-Commerce

Kristen McKool
Dr. Tiffany Blanchflower

From shopping to chatting, it can now all be done via an app and by a click of a button. Retail businesses are a driving force behind this trend, as they continuously push out new apps that drive the convergence of e-commerce and social media. This topic has also captured the interest of researchers in the areas of social media and e-commerce (Pitta, Patino & Maddox, 2016), website analytics and consumer behavior (Szabo, Polatkan, Boykin & Chalkiopoulos, 2018), and e-commerce and web analytics (Karakaya & Shea, 2008). As such, it is important to prepare our students for a business environment driven by social media, e-commerce, and website analytics. As a means to achieve this goal, Google Digital Garage and Google Analytics were introduced into an e-commerce course to explore how the real-world application of these digital concepts benefited students entering into a digitally driven workforce. Google Garage and Google Analytics are free certificate programs that provide real-world lessons about e-commerce, social media, and analytics. An exploratory research method was employed, in which students were asked to reflect on their experiences and confidence with these topics relative to their completion of these Google certificates. Data was examined using Spiggle's (1994) analysis and interpretation of qualitative data, from which two themes emerged: (1) Preparing for the Future and (2) Interactive and Informative. The first theme, Preparing for the Future, captures students' belief that the lessons helped them gained a deeper understanding of these core topics. Moreover, students felt that regardless of their end goals after college (industry vs entrepreneurship), the knowledge they gained would benefit their future careers. Theme two, Interactive and Informative, highlights the certificates ability to deliver content and critical thinking activities in a fun and interactive way. Students often mentioned that they enjoyed learning the content, and specifically mentioned that the online activities, scenarios, and case-studies were fun and interesting. Along these lines, the instructor reported that students integrated what they learned during class discussions, and in general, were better prepared for class discussions. Overall, we had great success with Google certificates, it benefited students inside and outside the classroom. Moreover, we found that students confidence on these topics increased drastically (82%) after completing the certificate.

UO2

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-Chambliss, 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 nutrition information and skills needed to make appropriate nutrition decisions. With the use of infographic 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 calories and skills in reading 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.

UO3

Athletic Lifestyle: Is It Here to Stay?

Alexa Petrellese
Dr. Marina Alexander

The athleisure wear industry increased "17% to $9.6 billion

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 bout 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 18-65 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 at 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.
Juliann 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.

UO6

Environmental Risks for High Intensity Drinking Among Young Adults: A Qualitative Study

Madison Garrigues, Melissa Cox, PhD, MPH

Department of Health Education and Promotion, East Carolina University

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 2 weeks, 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 identify environments that place an individual at highest risk for HID. This study examined social and physical environmental factors that increase risk for high intensity drinking among young adults.

Methods: We conducted five focus groups consisting of a total of 34 participants from a four-year college. A trained facilitator led each session using a semi-structured interview guide. Questions regarding environmental characteristics such as location and composition of the people present at an event were based on Friesthler 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, composition, 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 influenced by specific environmental factors. These results represent modifiable environmental risk factors to be addressed by public health prevention and intervention efforts.

UO7

A lesson learned the hard way: USA Gymnastics Larry Nassar Sexual Abuse Crisis

Kaitlyn 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 crime is 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 and excellence of athletic performance should not be all about reputation in sports PR

UO8

Familial Impacts on Childhood Cancer Abstract: A Literature Review

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 on their family members. Three databases were used for the literature search, which were EBSCO, Google Scholar, and Proquest. The search term used were familial impacts from childhood cancer. Sixteen articles were used within the literature review, which ranged from the years 1990-2016. Studies were reviewed from each of the articles. The themes across the previous studies included impacts on siblings, lifestyle changes of parental figures, such as divorce and tension in the relationship, onset and prevalence of PTSD, and overall shifts in family dynamics, particularly dealing with increased stress levels. The studies were outdated and there were more qualitative findings within the reviewed literature. Previous studies show that familial figures are experiencing negative impacts from the childhood cancer diagnosis. To better understand, more studies are needed using quantitative approach, which helps us better understand on this topic. This topic is of utmost importance to medical social workers, as it provides further insight on common impacts this population faces. Furthermore, it can help social workers to advocate for support groups guided towards the needs of this population in the near future. These resources can be beneficial to community members, which may help decrease the issues that are often faced by family members.

UO9

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 their moral character. Their customer satisfaction survey scores decreased and ranked in the lowest among the top traditional airline carriers in 2018 (Lazar, 2018), although the United's stock market performance looks steady. Multiple crises not only harm business reputation, but also jeopardize brand equity, regarding that passenger safety, and quality services are the essence of the airlines business. This study analyzes various United Airlines' crises and provides lessons in public relations crisis management.

UO10

The Role of Gender in the Association Between Symptoms of Depression, Substance Use, and Experiential Avoidance

Hunter Marie Davis
Matthew Charles Whited, PhD.
Jordan M Ellis
Emily P Midgette
John Taylor Freeman
Ansley Taylor Corson

Introduction: It is widely known that college students have a higher tendency to experience depression and to use both licit and illicit substances than other populations and that women tend to experience depression more so than men. Despite this, there is still a lot that is unknown 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% Freshman) 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 frequency 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 are 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.

UO11

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

Big League Social Media: Cultivating Community Online

Ashley Weingartz1, Dr. Stacy Warner2

1Honors College, East Carolina University
2Department of Kinesiology, East Carolina University

Given the growing attention from researchers and practitioners, this case study addresses a timely problem many 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. The case outlines facts 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 certain 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 of over 125,000 hits. During the two tournaments (GLL's Tournament of State Champions), there was a significant amount of rain causing delay 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-profits 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.

UO12

Renewable Energy: Market Substitution and Potential Challenges

Owen Michael Reed VanRiper

As the problems of global climate change and sustainability become more urgent, more attention is being directed towards renewable sources of energy production. These renewable energy sources include technologies such as photovoltaic cells, wind turbines, biomass generation and geothermal to name a few. These technologies have great promise; energy production without harmful pollution and the need for finite resources. In addition, with increasing prosperity and concomitant increase in gross domestic product results in increasing carbon emissions per capita. However, the use of renewable energy sources help us break the link and reduce our carbon footprint. The question then arises, will renewable energy be able to fulfill current and future energy needs? If so, how quickly? What challenges will it face on the way to fully replacing traditional energy, such as fossil fuels(coal, oil, natural gas, etc)? My research focuses on using an analytical model to predict the rate of substitution of renewable energy, along with what obstacles renewable energy. These obstacles include legislative policy, infrastructure, culture and profitability. My preliminary results show that the rate of substitution of renewable energy will continue to grow, having almost 50% market share by 2025, but will also face many challenges before it reaches that point. These challenges must be met in order to ensure a sustainable and clean future for generations to come.

UO13

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 comes from, their end of life analysis, and its impact on the environment and human health.

Circular Economy engineers out waste to create a sustainable, zero-waste future. This aspect is strongly governed by design. Design here is defined by not just how a product looks like and feels like, rather how it works, end of life maintenance and repair. This can be accomplished through two distinct strategies for product design: where product losses are made compatible with biological systems within the "biological cycle"; whereas other materials (which can be considered technical nutrients) are completely recycled within a "technological cycle". When referring to an industry, such as the textile industry, economics plays a major role in its performance and potential for innovation. This research will analyze the impact that the textile industry has on the environment and emphasize the need for a Circular Economy rather than our current linear one (take, make, use, and dispose model) in order to move toward zero-waste.

From the beginning, we need to design products in such a way that they can be taken apart at their end of life to be used once again. It is incredibly difficult to separate the biological components (which enter the biosphere (nature) effortlessly) and the technological components (which would need to be repurposed or reused) with the current state of technology. This gives rise to the need for an entire redesign of how textiles are made. By redesigning the way we make products, we are implementing the ideals of the Circular Economy and taking strides towards our goal of a zero waste future.

UO14

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 larger 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.

UO15

Vehicle Routing Simulation for Greenville, NC

Emma Dava Kloth
Mariah Christina Mook
Jinkun 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 other 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 efficacy and efficiency of the proposed method.

UO16

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 coupled 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 length of the main cantilevers. The coupling ratio measurements will be made using laser Doppler vibrometry scans. This research will identify the range of validity for the purely geometry-based coupling ratio calculations.
[1]Y. T. Yang, C. Callegari, X. L. Feng, K. L. Ekinci, and M. L. Roukes, "Zeptogram-Scale Nanomechanical Mass Sensing," Nano Letters, vol. 6, no. 4, pp. 583–586, Apr. 2006.
[2]J. Chaste, A. Eichler, J. Moser, G. Ceballos, R. Rurali, and A. Bachtold, "A nanomechanical mass sensor with yoctogram resolution," Nat Nano, vol. 7, no. 5, pp. 301–304, May 2012.
[3]O. K. Kwon, K.-S. Kim, J. Park, and J. W. Kang, "Molecular dynamics modeling and simulations of graphene-nanoribbon-resonator-based nanobalance as yoctogram resolution detector," Computational Materials Science, vol. 67, pp. 329–333, Feb. 2013.
[4] Ryan, T. (2013). A Coupled Microresonator Array for Mass Detection. PhD Dissertation, Catholic University of America.

UO17

City of Mebane Improvement Plan

Reid Wyatt Butler
Jon B Pendergraph

For our process improvement project, Reid and I will be collecting data on the number of defective water meters that the City of Mebane has in the ground. Once the data is collected we will come up with a cost projection including the cost of the new meters and the estimated labor cost that will come from this project. Finally we will implement a system for replacing old meters and moving meters that are found to be defective to top priority. To do this we will use GIS mapping software, a pareto diagram, and a flow chart to come up with concentrated areas with the most defective water meters to be replaced. Those locations will be serviced first and from there the water meter replacement crews will move to other locations with high defects. The city has over six thousand water meters and over half of them are over ten years old.
Currently there are nine hundred and four meters that are defective and those will be replaced first. The older meters are called Neptune meters and that system is supposed to send a signal to a passing vehicle to collect the water usage for each month. The nine hundred and four meters that are defective are not sending the signal causing the workers to have to stop at each house and look at the number dials on the meter. This is a very time consuming process and has caused many delays and misreading's. When a meter is manually read, the workers have to go back out and read it again to make sure that their initial read is accurate if the water usage has not increased. With the new Metron water meters, they send a signal directly to the billing office and eliminate the need for workers to have to ride each road of the city. The Metron meters are also useful if the citizen believes they might have a leak. In this case the billing department can see in real time if water is constantly running. Overall this project will allow the city to collect the proper amount per household or business and save the city time and cost of workers having to make multiple trips to the same address. Also this will save the city with fuel cost and vehicle wear and tear. Finally at the end of this report we will give a total improvement cost and a timeline for this project. As of right now, the estimated overall cost of the project including employee wages, hours, equipment and other factors involved in replacing old and malfunctioning meters is $1,485,000.00.

UO18

Evaluation of UAV Atmospheric Sensor Configurations on Satellite Signal Acquisition

Julian Quintero, Teresa Ryan, PhD, Mariah Mook, Zacchaeus Adams

Acoustics and Vibrations Lab, Dept. of Engineering, East Carolina University, Greenville NC

Sound propagation 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 in 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 the terrain type, geometry, 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 when 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 Phantom3 Standard is desired, but requires design and testing of fixturing for optimal mounting of the i-Met-XQ sensors. This work will present test flight data evaluating various sensor mounting configurations.

UO19

Clean Up Your Health Intervention - Healthy Housekeepers Initiative Phase Two Social Media Intervention

Christina S. Larkins
Dr. Bhibha M. Das

Housekeepers may suffer numerous health disparities, including lack of health education and low access to adequate health care. Studies have demonstrated that housekeepers often are particularly vulnerable to occupational hazards and resultant health strains due to their socioeconomic status and lack of access to adequate healthcare. Studies suggest that one's occupation affects general well-being in terms of stress, income, and physical labor. However, it is not known how a health education intervention may affect one's health. An 8-week intervention is planned for this unique population through the social media platform Facebook, where each week will focus on a specific area of health. These areas include disease prevention, 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.

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: natural waist, umbilical, hip circumferences, BMI, workplace satisfaction, and diet. These measures will be assessed pre and post-intervention, through anthropometric measurements, online surveys, and focus groups.

This intervention will examine the effects of health education on housekeepers' physical activity and stress. It is hypothesized that the intervention will improve the participants' knowledge of nutrition, physical activity, and how to handle stress while increasing their physical activity levels. The results may be disseminated to other housekeeping populations around the country to improve overall workplace health, since many housekeepers experience similar health disparities and stereotypes, which affect workplace efficiency.

UO20

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 health care including understanding the type of information received by Hispanics. Approximately 79 percent of Latinos reported receiving health care information through social groups or media outlets such as television which can setback the overall health of this community by limiting the possibility of receiving reliable facts regarding their health. The reasons for this vary among the Latino community ranging from difficulty in deciphering the medical system to seeking alternative herbal medicines in place of traditional Western treatments (Machado 2014). Language also serves as a continuous barrier to this target population, and a lack of qualified interpreters can additionally diminish the experience and quality of care received by Latinos. Ever-present health concerns make understanding and receiving health care services vital for this minority population (Office of Minority Health). Not knowing how to access these services can cause serious problems for the Latino community, and which can be instilled in future Latino generations. This is a problem that should be addressed to create a more comfortable environment for Latinos seeking medical assistance. The long-term goal for this project will be to provide the necessary resource base that the Latino community can rely on to seek and receive information about different aspects in the health care system. The project will consist of initially conducting seminars on certain medical topics while receiving feedback in the form of surveys to assess the best method of getting information across. Another purpose for this project will be to create long-lasting partnership with the organization of AMEXCAN, which is a non-profit organization in Pitt County dedicated to serving the Latino community through advocacy, leadership, health, community, and education. This project will serve to initiate the conversation regarding how to improve Latino access to health care in order to lead to the establishment of an accessible outlet for information regarding services geared towards this population.

UO21

miRNA regulation of TLR4 pathogen receptor expression and cytokine response in macrophages

Erin Tucci1, Sara Bellamy1, Sherri Moore1,2, Michael Wheeler1

1Department of Nutrition, East Carolina University
2Interdisciplinary Program in Biomedical Sciences, Broady 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 noncoding RNAs, such as small interfering RNAs (siRNAs) 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 7p 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.

UO22

Newborn Drug Screening: Methadone and EDDP Quantitation using LC/MS

Samantha Poppenfuse1, Kadesha McIntyre2, Ahmad Aboaziza3, Linda May4, Srikanth Ravisankar3, Devon Kuehn3, and Kim Kew2

1Department of Biology, East Carolina University
2Department of Biochemistry and Molecular Cell Biology, BSOM
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 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,

with reproducibility and accuracy established for methadone and EDDP.

Results: The LOD and LOQ for methadone and EDDP were found to be 0.1 and 1 ng/mL and 1 and 5 ng/mL, respectively. Of the 52 umbilical cords obtained and analyzed, 8 umbilical cords tested positive for methadone and EDDP. The mean concentration for methadone was 600.75 ng/mL with a concentration range of 4.0-1098 ng/mL. The mean concentration for EDDP was found to be 91.13 ng/mL with a range of 26.3-285.4 ng/mL.

Conclusion: Our method for targeted screening of methadone utilizing umbilical cord is reliable and valid. With larger sample size, we will further validate the use of umbilical cords as a reliable tool for the detection of methadone screening.

UO23

Simulation of Patient Caregiver Counseling in Speech-Language Pathology

Leigh Renae 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 Mursion 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 conferencing 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 participants 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 Mursion technology may be beneficial on a wider scale for utilization by 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 competence level of our graduating clinicians.

UO24

Environmental Assessment of On-Premise Drinking Establishments in Uptown Greenville, NC

Meredith Rachel Moskwiak, Melissa Cox, PhD, MPH, Beth Chaney, PhD

Department of Health Education and Promotion, East Carolina University

Background: High-intensity alcohol use is generally defined as consuming twice the standard binge drinking amount of five or more drinks in a 2-hour period. Present research demonstrates that 35% of young adults report having engaged in a high-intensity drinking episode within the past 2 weeks. Consequences of this behavior are serious and include blackouts, alcohol poisoning, physical injury, and sexual assault. To deter this behavior, public health professionals must understand the environments that elevate risk for high-intensity alcohol consumption. The physical environment of a restaurant or bar can have both a direct and indirect impact on the prevalence of high-intensity drinking among youth and young adults. Risk factors in the physical environment include an establishment's policies and regulations on price, marketing and promotions, and age verification strategies. This study seeks to identify factors with the physical environment of on-premise drinking establishments that are associated with high-intensity drinking among young adults.

Methods: Data will be collected at all on-premise establishments located within the uptown Greenville district in Greenville, NC. We will utilize observational techniques in the natural setting of these bars on Friday and Saturday evenings. Trained researchers will collect data via a Qualtrics survey on factors such as the price of a drink (standard/double/pitcher), promotions used (merchandise, sponsored entertainment/events), special drink offers (buy 1, get 1/ all you can drink), modes of age verification (manually and/or with ID check device), as well as interior and exterior signage of alcohol warnings and promotions. Two independent researchers will collect data at each location. Data will be cleaned, merged, analyzed, and reported in aggregate form.

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.

UO25

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

Jay Tikekar1, Samantha Poppenfuse1, Lauren Bethune Scroggs3, Anan Islam1, Janet Benjamin2, Stephen Leierer2, Kimberly Kew4, and Vivek Anand2

1Department of Biology, East Carolina University, Greenville, NC, USA.
2Department of Psychiatry and Behavioral Medicine, Brody School of Medicine, Greenville, NC, USA.
3Department of Addictions and Rehabilitation Studies, College of Allied Health Sciences, Greenville, NC, USA.
4Department of Biochemistry and Molecular Biology, Brody School of Medicine, Greenville, NC, USA.

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 [NMR]) 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 NMR 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).

UO26

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 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 cells lacking 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 biological role for IL-6TS in vascular 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 ligation injury to the left common carotid 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/sIL-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.

UO27

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

William Guiler1, 2, Qun Lu2, Christi Boykin2

1Honors College, East Carolina University
2Department of Anatomy and Cell Biology, Brody School of Medicine, East Carolina University

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 microscopy 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 20~30 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 647 and 488 dyes 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 molecules within a 100 μm proximity to each 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 mean amount of protein colocalizations across the MDCK-II cells were 41.6. The images of PC3 cells were analyzed with N=225 data points. The overall mean computed was 59 nm with an SE of ± 0.96 nm. Significantly less amount of protein colocalizations were found in PC3 cells with an average of only 3.

Discussion: While both β-catenin and p120-catenin bind directly to E-cadherin in epithelial cells, their proximity as viewed by conventional microscopy is by no means a complete colocalization as demonstrated by N-STORM. This finding is more evident in PC3 cells indicating the positioning of these protein molecules is not the same in normal epithelial cells versus a metastatic carcinoma cell type. These findings will result in a new understanding of protein-protein interactions within cells. We anticipate that the N-STORM will have monumental effects in bridging molecular biology with cell function studies.

UO28

Trace metal elements in extracted and exfoliated teeth - The ECU Tooth Fairy Project.

Mohammad Kamal Sarsour; Mark E. Moss, DDS, PhD; Greg Kearney, DrPH; Qiang Wu, PhD; Jack E. Pender, PhD; Anne M. Spuches, PhD.

Due to polluting factors in the environment, many human populations are experiencing high rates of heavy metal exposure. In eastern North Carolina, there are a variety of areas in which both urbanization and industrialization are rapidly expanding, thus causing many to suffer from this chronic exposure to heavy metals. Preliminary studies have shown that farmworkers of Mexican descent, who live in the eastern North Carolina region, exceeded the National Health and Nutrition Examination Survey metal concentrations of lead (Pb) and arsenic (As) in their urine. Cadmium (Cd) exposure can also occur through tobacco smoke. Teeth serve as biomarkers for susceptibility to a broad range of oral and systematic chronic conditions and metals, such as Pb and Cd, have been shown to be stored in teeth. The goal of this study is to determine if heavy metal storage in human teeth correlates with the increasing health risk of tooth decay and adverse health effects. In collaboration with ECU's Dental School of Medicine, exfoliated teeth from donors who reside in various areas of North Carolina and across a broad range of racially diverse population groups will be collected and analyzed for Cd and Pb by Inductively Coupled Mass Spectrometry (ICP-MS). However, prior to analysis of study samples, a method for cleaning, digesting, and analyzing teeth by ICP-MS must be developed prior to analyzing patient samples. This presentation will provide 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.

UO29

Systematic Quantitation of Benzoic Acid Derived Preservatives in Beverages

Austin 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 seem 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 μmAgilent 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 Lighting (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.

UO30

Claudin-7 regulates the inflammatory signaling in intestinal epithelial cells

Lesley Jasmine Benderman and Yan-Hua Chen

Claudin-7 is a tight junction membrane protein located at the cell-cell junction of intestinal epithelial cells. Deletion of claudin-7 by gene-targeting leads to the inflammatory bowel disease (IBD)-like phenotype, which includes weight loss, diarrhea, mucosa ulceration, and severe inflammatory response in mice. We hypothesize that claudin-7 plays an important role in modulating the inflammation process in vivo. To investigate the underlying molecular mechanism of claudin-7 deletion-induced inflammatory response in intestines, we utilized the in vitro intestinal epithelial cell line. The claudin-7 gene was deleted by CRISPR-Cas9 technology in Caco-2 cells, a human intestinal epithelial cell line. After the cell sorting process, the individual clones were selected using 96-well plates. Deletion of claudin-7 was confirmed by western blotting and immunofluorescent staining methods. The control (with claudin-7) and claudin-7-null cells were then treated with lipopolysaccharide (LPS), a membrane component of bacteria, to induce inflammation to mimic the in vivo condition. Our data showed that focal adhesion kinase (FAK) and integrin β1 signals were significantly reduced in claudin-7-null cells compared to that of control cells after LPS treatments. FAK and integrin β1 are the major components for focal adhesion, a cell-matrix junction. Reduced FAK and integrin β1 expression will disrupt the normal cell-matrix interaction, which is crucial for many cellular functions. In addition, NFκB, a key regulator of inflammation, was upregulated in claudin-7-null Caco-2 cells after LPS treatments, suggesting a more severe inflammatory response in the absence of claudin-7, which mimics the phenotype of claudin-7 knockout mice. In summary, our study demonstrates that claudin-7 regulates the inflammatory signaling in intestinal epithelial cells and is essential for cell-matrix interactions. This work is supported by an Undergraduate Research and Creative Activity (URCA) award to Lesley Jasmine Benderman and a National Institutes of Health grant DK103166 to Yan-Hua Chen.

UO31

Pilot Project for Global Competency Education in Eastern North Carolina Schools

Taylor N Quinones
Lauren Piner

I am working with Ms. Lauren Piner at South Central High School in Greenville, NC on a pliot project for global competency education. Ms. Piner teaches a 9th grade World History an elective course on Genocide Studies. I have connected her 9th grade World History class with a class in Khazakstan to engage in virtual exchange and intercultural learning. For this first semester students will connect with the class in Khazakstan three times, with each exchange focusing on a particular topic. For the first exchange students will introduce themselves and bit about their cultures. For the second exchange students will discuss governments and policies. For the final encounter students will discuss issues facing their country. For the second semester (Fall 2019) the schedule will be the same just on a shortened timeframe, and potentially with a new foreign 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.

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 received a grant to implement global learning initiatives. The second goal it will achieve is developing global competency skills among students at South Central High School, and potentially creating a framework to implement global learning in other classrooms. This goal is particularly important considering the circumstances of many students at South Central, as well as those of many students in eastern North Carolina. Many of these students are from rural, lower-income, less educated areas and therefore may not otherwise have access to global learning opportunities. Knowledge is power, and schools can empower students by educating them about how their experiences relate to what is going on in the world. By empowering and educating students from eastern North Carolina we have the opportunity to improve their education and expand opportunities for them as they become adults.

UO32

Insects and Persisent Misconceptions

Emma Rae Wester

People begin to learn from a very young age how to cataloged 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?"

Jocelyn M Bayles, Sarah Burkholder, 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 positive dietary behaviors through an integrative 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 one or more 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 FV liking (1= super yummy, 5=super yucky), and level of child neophobia. Baseline and post-intervention data were collected from children: pictorial FV liking survey and skin carotenoids (Veggie Meter®). Descriptives 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=1.658), tomato (M=2.81, SD=1.637), cauliflower (M=3.05, SD=1.745), spinach (M=3.16, SD=1.689), 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.

UO35

A Computational Analysis of the Hydroacylation of Aldimines in the Presence of a Wilkinson's Catalyst

Alison E. Moller, Andrew T. Morehead, Jr., Andrew L. Sargent

Catalytic hydroacylation is a chemical reaction by which an aldehyde and an alkene form a ketone in the presence of a catalyst. This reaction is important for the synthesis of certain pharmaceutical compounds, for which reason Dr. Sargent's research group at ECU has spent years investigating its mechanism to minimize the impact of side reactions that poison or deactivate the catalyst. This group has recently expanded its program to investigate the mechanism behind the hydroacylation of aldimines, which differ from aldehydes in that they are not susceptible to the same sort of catalytic deactivation that arises from the carbon monoxide functionality in the structure of aldehydes. The Wilkinson's catalyst, a coordination complex of rhodium commonly used for organometallic reactions, is used for the hydroacylation of aldimines. This catalyst contains phosphine groups, one or more of which dissociate from the rhodium center to allow other groups react with and coordinate to rhodium. This makes the reaction so complex that special techniques are needed to elucidate its mechanism. Dr. Sargent has proposed the Nudged Elastic Band (NEB) method for this purpose. This method is used to calculate the reaction energy path between adjacent species and we are hoping that it can be applied to the hydroacylation of aldimines.

So far, energies from geometry optimizations for each thermodynamically stable species along the reaction path have been calculated using the Gaussian 09 software. To conduct NEB calculations, each optimized species has been re-ordered and re-numbered to match its adjacent species so that a set of interpolated structures can be created as an initial guess of the reaction path for calculations to be performed. The energy paths found using the NEB method will be compared to previously recorded paths that were calculated using less conventional software, and will be analyzed for significant differences.

UO36

Platinum Catalyzed Synthesis of Gamma-Keto Esters via C-H Bond Functionalization

Dylan Lee Hardee, Shouquan Huo

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 chlorides 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 carbon 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 amalgam 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.

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

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 estuaries in the western Atlantic, but much less is known about local movement patterns within populations. Because adult naked gobies are benthic and relatively sedentary, it is assumed that they do not travel far beyond areas with well-structured habitat, but this hypothesis has not yet been tested in the field. The goal of our study is to examine any possible differences in naked goby behavior as a result of the subcutaneous injection of a marking tag to ultimately use that information for future field-based mark-recapture studies. The marks used in the project are visual implant elastomer (VIE) tags, which have been shown useful for tagging small fish. However, prior to any field trials involving marked individuals, 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.

UO38

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.

UO39

Settling 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 variation in 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 natal 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 impacted 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.

Anan Islam1, Ryan Cotroneo2, Kimberly Kew3

1Department of Biology, East Carolina University, Greenville, NC, USA
2Department of Research and Development, U.N.X. Incorporated, Greenville, NC, USA.
3Department of Biochemistry and Molecular Biology, Brody School of Medicine, Greenville, NC, USA.

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 1.20%. 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 set to 50? 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 log[H+] change in pH, ±0.25 lbs/gallon change in specific gravity, and a ±50 cP change in viscosity. The MALDI/MS will be used to find the location that experienced oxidation. Through these test, enzymatic detergents will experience long shelf-life through simulation and be capable of evaluating quality of wash. Ensuring a successful enzymatic detergent formulation.

UO41

Investigating What Effect Flow Has on Fibrin Properties using Microfluidics

Miranda Lee

Fibrin 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 accumulate together to form protofibrils 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 fiber 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.

UO42

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

Jessica Norris, Tulsi Patel, and Robert M. Hughes, Ph.D*

Department of Chemistry, East Carolina University

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 (TEVp)-Streptavidin 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 protein fusion in the presence of a heterologously expressed protein containing the TEV protease target sequence (ENLYFQS). We also describe the time- and temperature-dependent activity of our fusion protein when bound to superparamagentic nanoparticles and its long-term 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.

UO43

Scleroderma Defiance: A Practical, Educational and Free Guide Characterizing the Binding of Ca(II) and Cd(II) to Wild Type and Mutant C35A and C84A hcTnC by ICP-OES and Isothermal Titration Calorimetry

Caitlin Diana Palmer; Amiya Cunningham; Dr. Anne M. Spuches, 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 (hcTnC), a native Ca(II) binding protein, at both the thermodynamic and structural levels. In this study we collected equilibrium dialysis data coupled to ICP-OES to determine the number of Cd(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 hcTnC to pin-point where Cd(II) is binding. Several novel features of Cd(II) binding includes tighter Cd(II) binding to the C-Domain of hcTnC are shown by step-wise binding with large Ka values, as well as Cd(II) stoichiometric ratios of n=2 and n=3; n=2 and n=2; and n=1 and n=2 for WT, C35A, and C84A hcTnC, respectively. These data suggest that Cd(II) binds tighter than natively-bound Ca(II) and with varied stoichiometries.

UO44

Mechanics Regulating the Dissolution of Fibrin in Blood Clots

Sean J. Cone, Andrew T. Fuquay, Nathan E. Hudson

Fibrin 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 in 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 labelled 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 behavioral pathways include lysis (fiber cleavage), 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, fiber bundling, etc.) and the rate of lysis is regulated by network density (measured in fibers/micron2) 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 elongate, bundle 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 of 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.

UO45

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 Envrionment

This project will analyze precipitation data collected across fifteen different farms in southwestern Jamaica during July 2014 to July 2015 as part of an NSF funded study on climate change, economic stress, and the role of water management. Assessing precipitation that occurred within that drought year can help rural communities better prepare for water management in similar situations. Most farmers in rural Jamaica do not have direct access to surface water or groundwater, so crop health is heavily dependent on the intermittency of precipitation on the farm. Tipping bucket rain gauges, which measure rainfall instantaneously and continuously, were placed on each farm to collect the data for this study. The main goal is to characterize the "when," "where," and "how often" of precipitation delivery in representative microclimates in the "bread basket" of Jamaica. Studying the intermittency of rainfall will give us insight into relationships among frequency, intensity, duration, and rainfall totals. Some of our findings include that during the fall and summer seasons are where the majority of intense rainfall periods are occurring. Our data showed that these rainfall periods are intermittently arising in the late afternoons around 4 pm to 6 pm. During the fall and summer seasons we found the average duration of rainfall to be 3 hours and 7 minutes and 3 hours and 22 minutes respectively. The fall and summer seasons also had the highest average intensities for each rainfall periods by far. Their average intensities were 17.24 mm/hours and 22.43 mm/hour respectively. Because the average durations and intensities for these rainfall periods were both high, these rainfall periods can cause flash floods that could potentially be detrimental to farms. We found that elevation also has an impact on the rainfall patterns; we concluded that as elevation increases, the average rainfall per event also increases. The correlation coefficient between elevation and the average rainfall per event was 0.698, which means that there is a strong positive relationship between those two variables. Information from this study will help us better assess the vulnerability and resilience of not only small holder farming in Jamaica, but across also other small island developing states (SIDS) in the Caribbean during drought. Thus, this research will help SIDS learn new adaption strategies as they experience environmental change in the future.

UO46

What Factors Maintain the Mixed Mating System of a Local Annual Plant, Triodanis perfoliata?

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 depression, a negative consequence of selfing, is present in 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

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 populations or 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 crosses between them will be heterozygous and show higher fitness. Since heterosis occurs through outcrossing, only CH flowers can benefit from this effect. Therefore, the advantage of heterosis might select for the maintenance of CH flowers.
We test this hypothesis in Triodanis perfoliata, a weedy annual plant 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 by the maternal plant was different 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.

UO47

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- their hardships, their humanity, their dreams- have only recently been welcome into the mainstream of storytelling. In my project, I hope to bring these two often ignored topics and marry them into a piece of work that does justice to both mediums.
Poetry film, while it may consists of actual readings of poetry or spoken word, is more accurately defined by the synthesis of visual and nonvisual story telling into a non-linear amalgam of 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, Mrigankasekhar Ganguly and Beyoncé 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 colonialization and imperialism.

This project follows Ala, the Igbo goddess of fertility and nature. She represents the modern black American (more specifically, the modern black woman) who lives in a world built on their backs but one that kills them senselessly. Her lover, Enbilulu, recognizes the atrocities committed against Ala, but urges her to turn a cheek and accept her fate. He represents the community of non-black men of color like myself who, although we are privy to the anxieties and oppression of black people, we truly do not understand what it looks like and are products of white oppression ourselves. Ala's daughters - Arayani, Menhit, and Shala- all express facets of the mindset of oppressed women of color, from contemplation to rage to the instability of self. Eventually, after Ala murders Enbilulu and then Menhit in a fit of rage, she accepts her fate but the fact remains: her crusade was equivalent to the crimes committed against her people.

UO48

Human: An Exploration of the Subjective and Objective Factors that Influence Our Understanding of What It Means to Be Human

Megan E Piggott

Theatre is a constantly evolving art form. Whereas two hundred years ago plays told the stories of the trials and tribulations of the elite ruling class, today's shows are moving toward a focus of telling truthful human stories. Pulling from the practice of verbatim theatre which uses recordings of real-life people to tell a story, this project is centered around the question of what it means to be human and what we believe to be our place or purpose in the world. I am exploring this question in a twofold manner by examining it from both an objective and subjective perspective. For the first, I am looking at the concept of humanity from a scientific perspective, looking at how physics, evolutionary biology, artificial psychology, and sociology shape our understanding of what makes a human uniquely human. I have conducted background research in the form of literature reviews to gain a general understanding of each field's views, and am currently following them up with interviews with an expert in each field in order to get a more in-depth understanding.

With this knowledge, I am then taking a more subjective approach, looking at how personal identities such as gender, religion, age, and country of origin shape how people understand their place in the world. This section will be conducted with a series of interviews for each category, exploring how differences in each of these categories affect individual views. Once all of this is complete I will synthesize the interviews into subject specific episodes that fit together to tell a multitude of stories that explore what it means to be human, and publish it as a publically accessible podcast. The goal of this project is not to answer this question, but instead to invite people to engage in the conversation and think about their own views in a new way.

UO49

Art: The Grand Illusion

Alexander McManus Stoehr

Visual art empowers artists to create illusions. Viewers are active participants in the illusion through the art object and its presentation. An audience can be transported to the peaks of Everest or the far reaches of the galaxies. Viewers perceive surroundings as real when they are nothing more than pixels or pigment. The strength of this perception is often connected to how relatable the faux experience is to the participant's real experience. Artists' ability to transport a viewer into an illusion is powerful.

This body of work will explore the origin of the value an audience places upon art. Art lacks value if the artist fails to get a participant to believe in it. Whether sculpture, film, painting, or animation, truly good examples of art cause the viewer to suspend disbelief and bring the object from representational to real. The sense of belief artists produce in their observers will be brought to a public forum for discussion with professionals in various disciplines. The exhibition focuses on the ability of various art forms to influence people, primarily through a manipulation of visual and auditory senses.

My presentation facilitates an understanding of everyday design choices and the potential influence it has on a viewer. From marketing designs to popular film I do my best to breakdown my understanding of the artist/audience relationship. I then attempt to provide examples of this potential influence. But whether this power is good, bad, or neutral, however, is up to my audience. I will carry this thought process with me through my career.

UO50

Unlikely Hero

Carrie Elizabeth Thompson

In the introductory design course, a narrative approach was used to convey social meaning through art. The play, Hamilton, was the focal point of the projects throughout the semester. Alexander Hamilton was an "unlikely" hero of the American Revolution. Hamilton was an immigrant of a poverty ridden country and because of the social standards at the time, he was seen as lesser than others because of his upbringing. Hamilton was captain of artillery, served as aid to General Washington, and played a vital role in winning the American Revolution.

Using symbols of the American Revolution, a 2D composition was created. The process started by hand tracing the figure of a soldier's head then turning it into a wallpaper tessellation. The full tessellation was hand rendered and then super imposed over a realistic painting of the American Revolution time period. The tessellation had cutouts to showcase the painting underneath and combines the two layered elements into one piece of art work. This specific technique of combining tessellation art and photo realism was derived by M.C. Escher.

This art work was made to tell a story about Hamilton's rise; of becoming an American hero from his humble childhood. The elements and principles of design were manipulated throughout the composition to show the reality of who performed heroic acts to win the American Revolution. The people who did not fit the "guidelines" of a normal hero, like Alexander Hamilton, were often the individuals who made the biggest impact.

UO51

Documenting a return to historical jazz through musical research and creation.

Thomas George Weybrecht

In 1985, Bill Hubbard, a prolific big band jazz arranger, died and left behind a horde of musical charts, as well as musical protégés in sons Glenn and Curt Hubbard and their friend Matt Vance. Much of the music Hubbard arranged had never seen the light of day since being written, and even less was heard within the context of a jazz ensemble. In 2017, Vance and the Hubbard brothers solidified plans to assemble a team of musicians to play and record a selection of Hubbard's music for an album. The main recording session took place in June of 2018 in Jacksonville, Florida. Using footage from this recording session and compiled from archives, I produced a documentary entitled The Legacy Sessions.

Production of the documentary had two purposes. Purpose No. 1 was to tell a story I believe was unique and worthy of telling, and was one I believed I could accurately convey through a video production. The history of the impact that Hubbard had on his contemporaries and successors is a powerful one, lush with family ties and memoirs of musical adventures. Through footage of the recording project and interviews with those involved, I combined visual and auditory content into a story that does justice to the Hubbard musical legacy. Two distinct themes are prevalent through the story: a subversion of the extinction of jazz music as popular music, and the importance of passing down experiences to preserve the Hubbard family's rich musical history.

Purpose No. 2 was to hone and utilize my video production skills by challenging myself to apply new and foreign editing techniques; employ a large array of cameras in the filming stage; dig deeper than I ever have into interviews and research to gather information about the story; and utilize proper journalistic strategy in producing an accurate and captivating rendition of the story of the Bill Hubbard Orchestra. The end result, then, is not only a piece of film which documents an interesting story, but also

an exercise in video production that reflects my own learnings throughout my career, and especially during this project.

UO52

Increasing Cultural Awareness through my Passion for the Arts

Bina Amin1, Tara Kermiet2, Dennis McCunney2

1Department of Biology, Department of Foreign Languages & Literatures, East Carolina University
2Center for Leadership and Civic Engagement, East Carolina University

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 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 Dil Se Naach Bollywood-Fusion charity dance competition every February, has engaged in multiple "Cultural Cuisine and Chats" through LWCC and has left a lasting impression at our university.

UP1

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

Kelly Kimble1 Walter J. Pories, MD2

1Honors College, East Carolina University
2Department of Surgery, Brody School of Medicine

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 that 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 participant's 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.

UP2

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 /hVd/ 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.

UP3

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, 1989; 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.

Participants include parents and IT specialists, all of which will be recruited using a convenience sampling technique. Eligible participants include parent participants (fathers and mothers) ≥ 18 years, who speak and read English, and had a child aged 0-18 years that has died within the last 24 months. Interviews will be conducted either individually and/or as focus groups using an interview guide. The questions will gather information about the web-based link features, what needs to be changed, added or deleted. Interviews will be analyzed using qualitative content analysis. The development of this bereavement support web-based link aims to address the individual needs of bereaved parents in order for them to have better overall health outcomes.

UP4

Marshmallow-Bagel Upper Gastrointestinal Study in Paraesophageal Hernia Patients

Coleman Ray Hayes1, Dr. James Edward Speicher2, Carlos Anciano Granadillo2, Dali Dante2, Amy Etheridge2

1Department of Public Health, East Carolina University
2Department of Cardiovascular Sciences, Brody School of Medicine

Paraesophageal hernias, hiatal hernias, and gastroesophageal reflux disease are first assessed through a preoperative evaluation. The traditional method used by a physician to evaluate how a patient's esophagus and foregut functions prior to surgical treatment, is an esophageal manometry. An esophageal manometry involves the insertion of a pressure sensitive catheter down through the nose and esophagus. During esophageal manometry patients are asked to perform swallowing maneuvers involving esophageal muscle function. Patient's muscle movement is reported precisely on a high-resolution plot. The esophageal manometry provides essential information on the status of esophageal muscle function, coordination, and contraction. The results establish which anti-reflux technique can be tolerated by the esophageal musculature. The anti-reflux technique is then incorporated into the final surgical procedure.

Many patients show great difficulty swallowing with the esophageal manometry technique. It has been found that the catheter can be lodged preventing it from passing through the hernia. An alternative method for monitoring esophageal muscle movement, is to have the patient swallow a barium-soaked marshmallow followed by a barium-soaked bagel portion. When the patient swallows the items, the surgeon tracks via x-ray the movement through the gastroesophageal junction. The ability to swallow the portions indicates to the surgical team that the patient can tolerate the strongest type of anti-reflux surgery.

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.

UP5

Using Heart Rate Variability to Assess Resident Stress During Central Venous Catheter Simulation

Adelaide Sarah Robbins1, Juan March2, Walter Robey2, Kori Brewer2, Carmen Russoniello3

1East Carolina University, Department of Health and Human Performance
2Department of Emergency Medicine, Brody School of Medicine
3East Carolina University, Center for Applied Psychophysiology

INTRODUCTION:
Simulation based central venous catheter (CVC) training has been shown to result in fewer needle passes and complications. Heart rate variability (HRV) has been shown to be effective in identifying stress and self-confidence in surgeons, but there is no data examining HRV during simulation based CVC training. The purpose of this study was to use heart rate variability to identify stress during CVC simulation training.

METHODS:
This was a prospective cohort study with a convenience sample of resident physicians who enrolled in a CVC simulation-training course. Participants were attached to an HRV monitoring device that measures heart rate variability.
A 12 step procedural standardized skills check list was used to measure psychomotor skill performance. Stress was analyzed in five-minute intervals using a software program that analyzes heart rate variability in terms of stress index (SI), standard deviation of normal-to-normal intervals (SDNN), and square root of the mean normal-to-normal interval (RMS-SD) during each CVC simulation. Data was analyzed using IBM SPSS with a logistic

regression model to determine the association between an individual's stress and each of the 12 procedural steps over time.

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

Eliza 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: The study included 40 second semester undergraduate nursing students divided into two groups. One group received supervised scenario-based exercises that highlight use of nursing judgment prior to the graded laboratory simulation exercise. The other group received the preparatory method the College of Nursing provides for all undergraduate nursing students. The State-Trait Anxiety Inventory Form Y and a Likert scale questionnaire was administered to acquire data on student learning preferences and anxiety during simulation.

Closure: Evaluating preparatory methods to increase comfort levels during simulation may help to promote the quality of the learning experience, which may also improve students' ability to use clinical judgment and critical thinking skills. This study will further the discussion on how to ensure students are appropriately prepared for evaluative simulations.

Gaba, D. (2004). The future vision of simulation in healthcare. BMJ Quality and Safety in Healthcare, 13(Suppl. 1), i2-i10. doi:10.1136/qshc.2004.009878.

Lasater, K. (2007). High-fidelity simulation and the development of clinical judgment: Students' experiences. Journal of Nursing Education, 46(6), 269.

UP7

Understanding What Factors Influence Mammography Follow Up Times

Kristin Coleman, BS(c)1; Deeonna Farr, DrPH, MPH, CHES1; Heather M. Brandt, PhD, CHES2, Daniela B. Friedman, PhD2; Cheryl A. Armstead, MS(R), PhD3; Swann A. Adams, PhD, MS4,5; Jeanette Fulton, MD6; Douglas Bull, MD6

1Department of Health Education and Promotion, College of Health and Human Performance, East Carolina University
2Department of Health Promotion, Education, and Behavior, University of South Carolina
3Department of Psychology, University of South Carolina
4Department of Epidemiology and Biostatistics, University of South Carolina
5College of Nursing, University of South Carolina
6Pitts Radiology

Breast cancer is the second highest cause of cancer death in women. Women who complete screening mammograms, but do not follow up within a timely manner after receiving an abnormal screening result, do not get the full benefits of screening. Black women are less likely to complete follow up testing after an abnormal mammography result. The purpose of this study is to understand the characteristics of longer time to complete follow up testing. This study had two phases. In phase one, 22,250 medical records of women aged 40 and older, breast cancer free, and completing a screening mammogram between January and August 2016 were analyzed. The main outcome variable that was examined was follow up time. The independent variables that

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

Madigan Raper, 1, Christy Isler2, Kelley Haven2, Ed Newton2, Linda E. May1,2
1Honors College, East Carolina University (ECU)
2Department of Obstetrics and Gynecology, ECU, Greenville, NC
3College of Health and Human Performance, ECU

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.

Purpose: The purpose of this study was to evaluate if supervised exercise training during gestation and nutrient levels have similar birth outcome measures in AA and Caucasian infants.

Methods: In this cross-sectional comparison study, women in the Greenville, North Carolina area are recruited at <16 weeks of pregnancy to participate in weekly exercise and complete a food questionnaire. Participants were randomized into 4 groups: aerobic only, combination (aerobic and resistance), resistance only, or non-exercise. Participants then completed 150 minutes of moderate intensity weekly exercises until delivery. At birth, measures were assessed, including gestational age, birth weight and length, Ponderal Index, length of hospital stay, and APGAR scores at 1 and 5 minutes. Standard ANOVAs and multiple t-tests were performed to detect differences in measures between the populations.

Results: Maternal exercise intervention had similar outcome measures between AA and Caucasians for birth metrics. Caucasian and AA infants exposed to maternal exercise had similar measures of gestational age at birth (p=0.333), birth weight (p=0.316), birth length (p=0.816), as well as 1-minute (p=0.432), and 5-minute APGAR scores (p=0.426). 20% (2/10) of AA had preterm births relative to 10% (8/77) of Caucasians. Of those compliant with exercise intervention, no (0/10) AA and only 6% (5/77) of Caucasians had preterm births.

Conclusions: These results suggest that maternal exercise has a similar maternal physiological response that benefits African American and Caucasian infants alike. Thus, maternal exercise may be a low cost non-pharmacological way to attenuate 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

Ethan 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 (46.0% 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 of supervised 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 /hVd/ 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.

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 asses 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 knee, 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 noncleft individuals.

UP12

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

Drew Elizabeth Corpening

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

this demand by embracing health information technology like patient portals with the goal of increasing patient knowledge and engagement. The purpose of this review is to examine the broad use of patient portals by patients, and more specifically the importance of its patient education function in improving patient outcomes. We hope to understand if there is a causal relationship between patient engagement and providing education materials via patient portals. A search was conducted in PubMed and Cinahl for articles published in English between 2008-2018. Articles meeting the initial search criteria were kept for further review. After identifying and removing duplicates, the titles and abstracts of each article were reviewed to further narrow the list. The researchers then performed an extensive review of the remaining articles to determine which ones contribute to a better understanding of how patient portals influence patient engagement and outcomes. We included 17 studies that described the relationship between patient portal use and patient engagement with emphasis on patient education. Whether prior health literacy improved engagement and subsequently outcomes remained ambiguous. Research showed that patient portals as an educational tool were accepted and gave patients a heightened sense of self efficacy. While these factors could lead to better health outcomes, research also supported the idea that health 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 does 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.

UP13

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, 2016). Physician recommendation is the single best predictor of adolescent vaccination against HPV (Ylitalo, Lee, & Mehta, 2013). The purpose of this research is 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 Listserv, the NC Family Medicine July and August 2018 e-newsletter and emailed to all pediatric and medicine physicians who are registered with the NC Medical Board. There are roughly 33,000 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 sexually 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 ordering the vaccine unless the parent objects. These results show the need for improvement in HPV knowledge, recommendation practice, and vaccination policy among NC physicians.

UP14

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

Dominique L. Bellardini, Katrina D. DuBose, PhD, Deirdre M. Dlugonski, PhD, Hannah E. Cooper

Introduction
Less than half of children ages 3 to 5 years met the physical activity (PA) guideline of roughly three hours of PA daily, 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 PA 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 mothers and fathers.

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 Healthy Dietary 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 paternal efficacy levels 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 paternal efficacy
and support were similar, which could indicate shared beliefs regarding the importance of child PA.

UP15

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.

UP16

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 occipitocervical junction (Bosco et al., 2018). Depending 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 vertebra. 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

is to compare the relationship between the cranial base angle and cervical vertebra angulation to determine if age appears to impact variations in the communication of the cranial base to cervical vertebra.

Methods: Magnetic resonance imaging (MRI) was used to analyze the cranial base angle (nasion-sella-basion) in two subjects from five age points (young children, preadolescents, post adolescents, young adult and adult). MRI data were imported into Amira 6.0 Visualization Modeling software. Using consecutive sagittal images, C1, C2, and the occipital condyles were segmented out manually. Angular measurements were obtained for the cranial base angle and angle of the C1. ANOVAs will be used to compare variables within groups.

Results:MRI images have been obtained from enrolled participants. Imaging analysis is ongoing and will be completed in Spring 2019.

Conclusions: The results of this study will provide insight into how age impacts the communication between the cranial base and the cervical vertebrae.

UP17

Contribution of the Palatoglossus Muscle to Speech Production: A Systematic Review of the Literature

Imani Gilbert; Ella Jordan; Katelyn J. Kotlarek, MS; Jamie L. Perry, PhD

The palatoglossus muscle contributes to the overall function of the velopharyngeal mechanism. It primarily functions to lower the velum during speech and project the bolus posteriorly during swallowing. The palatoglossus originates in the velum and courses through the anterior faucial pillars to insert on the lateral portion of the posterior tongue. The velopharyngeal mechanism is comprised of several structures in the oral and pharyngeal cavities. The most anterior structure is the posterior nasal spine of the hard palate; the most posterior structure is the posterior pharyngeal wall. The velopharyngeal mechanism consists of seven regional muscles, one of which is the palatoglossus. The velopharyngeal mechanism functions to create a barrier between the nasal and oral cavities during oral speech production and swallowing. In order to create this barrier, the velum is elevated via contraction of the levator veli palatini muscle. The only sounds for which the velum is not elevated is for the production of nasal sounds: /m/, /n/, and "ng." The palatoglossus muscle acts as an antagonist to this muscle by lowering the velum back to its relaxed state, especially during the production of nasal sounds. The palatoglossus muscle has also been shown to be active during oral sounds (Kuehn, 1982).

The purpose of this project was to perform a systematic review of the literature relative to the function of the palatoglossus muscle during speech production. PubMed and Medline were reviewed using the set criteria "palatoglossus AND speech." The review was limited to articles published in English or with an English translation available. All study age and subject age criteria were considered. Of the 17 articles identified. Two articles pertained to surgical repairs of the velum, ten pertained to velopharyngeal mechanism structure, three pertained to electromyographic study of the velum, and two pertained to velar position during the production of 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 Beingolea

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 vowel production (Clopper & 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 accurately categorize AAE and WAE. There is limited research on the interaction of regional variation and the socio-ethnic racial identity of a speaker. This study evaluated the effect of dialect variation on AAE and WAE listener's ability to accurately 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 dialect 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.

Baker, W., Eddington, D., & Nay, L. (2009). Dialect identification: The effects of region of origin and amount of experience. American Speech, 84(1), 48-71.

Childs, B., & Mallinson, C. (2004). African American English in Appalachia: Dialect accommodation and substrate influence. English World-Wide, 25(1), 27-50.

Holt, Y. F., Jacewicz, E., & Fox, R. A. (2015). Variation in vowel duration among southern African American English speakers. American journal of speech-language pathology, 24(3), 460-469.

Thomas, E. R., & Reaser, J. (2004). Delimiting perceptual cues used for the ethnic labeling of African American and European American voices. Journal of Sociolinguistics, 8(1), 54-87.

Wolfram,Walt. 2001. On constructing vernacular dialect norms. In Arika Okrent and John Boyle (eds.) Chicago Linguistic Society 36,The Panels. Chicago, Illinois: University of Chicago. 335-358.

UP19

Let's Talk About Sex!

Samantha Elizabeth Foster, Dawson Keith Wright, Kathryn Grace Cairns, Dr. Elizabeth Chaney

Background: East Carolina University (ECU) is located in Pitt County, NC, which has some of the highest rates of sexually transmitted infections (STIs), particularly chlamydia, gonorrhea and syphilis, in North Carolina. According to the 2016 NC Surveillance Report, there was a 17.4% increase in the number of STI cases and a 12.4% increase in annual chlamydia rates during 2012-2016. Furthermore, the annual chlamydia rate in Pitt County is approximately 88% higher than the rate in the state. Therefore, it is apparent that protective behaviors, such as STI testing, are important to improve the student population. In addition, reducing barriers, such as anxiety and stigma associated with STI testing, should be addressed. The primary purpose of this project is to design, implement and evaluate health communication messaging on ECU's campus regarding STI testing via video development in order to normalize student's testing behavior.

Methods: 130 students were interviewed during the spring 2018 semester regarding STI testing resources and needs on ECU's campus. The interview data informed the creation of an idea for a fun and informational video depicting the need to be STI-tested by ECU students. The goal is to provide them the information needed to access free testing at Pitt County Health Department, and to access convenient testing at the Student Health Center. Similar to the video on sexual consent shown at East Carolina's student orientation, "Tea and Consent," the goal of this team's video is to raise awareness of the necessity of being tested through the use of humor and entertaining animation. IRB was sought and approval received for focus groups of ECU students to be conducted in February 2019 to gather input on the creation of this video, so that it would capture student interest and share relevant information. The research group met with an animator to determine what would be feasible in the creation of this type of video. Concept boards were developed and introduced to student focus groups that narrowed down these options.

Results: The focus group data and process for using the qualitative data to inform the video creation will be discussed during the presentation. Ultimately, the research team aims to roll out the video on-campus, as a crucial step towards a solution to ECU's STI epidemic. Once the video is developed, the team will work with ECU to promote its visibility and ensure that the most possible students gain awareness on STI testing.

UP20

Parenting Styles and Their Relationship to the Physical Activity Levels of Preschool-aged Children

Hannah E Cooper1, Katrina D. DuBose, PhD1, Deirdre Dlugonski, PhD1,2, Dominique Bellardini1

1Department of Kinesiology, East Carolina University
2Sports Medicine Research Institute, University of Kentucky

Introduction:
Young children spend a significant amount of time with their parents. This makes it important to investigate parent and child physical activity levels and the relationship that parenting styles have with child physical activity levels.

Purpose:
The purposes of this study were threefold: (1) to compare maternal and paternal parenting styles, (2) examine relationships between parent physical activity and parenting styles, and (3) examine relationships among maternal and paternal parenting styles and child physical activity.

Methods:
Nine family triads consisting of a mother, father, and child between the ages of 2-5 years old were recruited from the Greenville area. The mothers and fathers separately completed the Parenting Dimensions Inventory-Short and a physical activity parenting style questionnaire. Actigraph (GT3X) accelerometers were worn by each member of the triads for seven days to objectively measure physical activity and time spent in moderate-to-vigorous physical activity (MVPA) was calculated.

Results:
Mothers and fathers exhibited similarities in all parenting styles, authoritarian (3.47±0.61, 3.39±0.38, respectively), authoritative (3.74±0.51, 3.81±0.50, respectively), and permissive (3.91± 0.5, 3.5 ±0.33, respectively) ($p>.05$). For mothers, the strongest

relationship between maternal MVPA and parenting style was found for the permissive style (r.68), whereas no relationship was observed between maternal MVPA and authoritative (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 style 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 Rudiak

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 from 2 to 4 years of age. The educational level of the majority of the mothers was 12th grade or less. Water consumption of the children ranged from a few sips to four cups/day, and most families drank bottled water. Seven of the ten children were in the care of a dentist, and three children reported cavities. Sugar sweetened beverages consumed included milk, Gatorade, soda, juice, atol, Nesquik, Caprisun, sweet tea, and HI-C. There was an overconsumption of these beverages by six children. One extreme case of overconsumption was a 3-year-old with a daily intake of 2 cups of sweet tea, one Caprisun, and 3 cups of whole milk. In another case, a 2-year-old consumed 1 cup of sweet tea, 1 cup of KoolAid, 1 cup of whole milk, and 3-4 cups of juice daily, with soda consumption twice a week. Overall, most children drank 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/hid; heyed/head; whod; hood. These pairs are differentiated in part by the vowel's 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 vowel 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)1; Deeonna Farr, DrPH, MPH, CHES1; Heather M. Brandt, PhD, CHES2, Daniela B. Friedman, PhD2; Cheryl A. Armstead, MS(R), PhD3; Swann A. Adams, PhD, MS4,5; Jeanette Fulton, MD6; Douglas Bull, MD6

1Department of Health Education and Promotion, College of Health and Human Performance, East Carolina University
2Department of Health Promotion, Education, and Behavior, University of South Carolina
3Department of Psychology, University of South Carolina
4Department of Epidemiology and Biostatistics, University of South Carolina
5College of Nursing, University of South Carolina
6Pitts Radiology

Breast cancer is the second highest cause of cancer death in women. Women who complete screening mammograms, but do not follow up within a timely manner after receiving an abnormal screening result, do not get the full benefits of screening. Black women are less likely to complete follow up testing after an abnormal mammography result. The purpose of this study is to understand the characteristics of longer time to complete follow up testing. This study had two phases. In phase one, 22,250 medical records of women aged 40 and older, breast cancer free, and completing a screening mammogram between January and August 2016 were analyzed. The main outcome variable that was examined was follow up time. The independent variables that 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.

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

1Department of Kinesiology, East Carolina University
2Department of Physical Therapy, East Carolina University

Youth physical activity participation is a critical determinant of long-term bone and joint health. Unfortunately, adolescents and young adults appear to be at unique risk for physical activity related musculoskeletal injury due to dramatic musculoskeletal growth and development. Over 27 million youth in the United States are reported to participate in organized sport activities, the rate of overuse injury is alarmingly high with more than 50% experiencing a participation limiting injury in a given year. Additionally, nearly 50% of adolescents experience bone injury by the age of 18 with daily vigorous activity participation increasing fracture risk two-fold compared to less active peers. Furthermore, youth who participate in more than 8 hours of weekly physical activity have a twofold increased risk of overuse injury.

The above mentioned statistics suggest that youth who are meeting or exceeding national physical activity recommendations 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

Regent C. Perez1, Linda P. Bolin, PhD1
1College of Nursing, East Carolina University

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 a limited amount of research that has processed the pursuit of biofeedback and the cumulative impact it may have on CVD. Although research suggests the benefits of biofeedback in many areas including improvement for pain, asthma, anxiety, depression, chronic obstructive pulmonary disease (COPD), food cravings, and hypertension (HTN), there are not many conclusive studies (Lehrer, et al., 2013). Biofeedback is defined as "a process whereby electronic monitoring of a normally automatic bodily function is used to train someone to acquire voluntary control of that function." (Biofeedback, 2018) The goal of biofeedback as an intervention for patients with HTN is to identify how specific bodily functions can be controlled in order to regulate or better control HTN.

In this phenomenological qualitative study, participants of paced breathing biofeedback exercises are being interviewed to discuss how their thoughts and feelings towards biofeedback were impacted throughout the course of their participation. Interviews are being conducted now. Participants are young adults between the age of 18 and 35, with a family history of CVD. This research will be used to identify participants' perceptions towards biofeedback on their physical health prior to, during, and after biofeedback participation. While understanding the ability of biofeedback to treat HTN is important, it is also important to know what participant's thoughts and feelings are towards biofeedback therapy and how their thoughts and feelings affect biofeedback's impact on their bodies.

UP26

Examining Depression Scores and Cardiovascular Risk in a Community Sample

Alexandria Ruth Stephens, Patricia B. Crane

Depression is a comorbid condition that is related to myocardial infarction (MI) risk, is prevalent post MI, and is associated with poorer cardiovascular outcomes. Depression also affects healthy behaviors to prevent a recurrent MI such as participation in physical activity. We do not know how depression in adults who are 3 to 6 years post MI compare with community dwelling adults without heart disease. Thus, the purpose of this study was to examine depression in a community sample of adults and compare depression to adults 3 to 6 years post MI.

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 (CESD). 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 Reoccurence of Myocardial Infarction (ROMI) study. Data will be entered into SPSS and analyzed using descriptive statistics and chi-square and t-tests.

To date, we have recruited 21 people. We are projected to collect data from 19 more individuals, for a total of 40 participants by February 5, 2019. No data are available at the time of abstract submission.

Understanding how depression differs in an adult community sample from those who are post MI is important in developing interventions to address depression and cardiovascular risk. Results will inform clinical practice and strategies for primary and secondary prevention of coronary heart disease.

UP27

South Asian Cancer Cross-Sectional Study

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 have 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. Data collected may inform an intervention examining the impact of a lifestyle-based intervention for South Asian women who are post-cancer treatment.

UP28

Use of Ecological Momentary Assessment to Assess Sedentary Behavior among Children ages 2-5 years

Ashlyn Hyde1, Katrina D. DuBose1, PhD, Deirdre M. Dlugonski, PhD1,2

1Department of Kinesiology, East Carolina University
2Sports Medicine Research Institute, University of Kentucky

Background: The physical activity habits that are developed at a young age may continue through all stages of life. Past research shows that preschool age children spend a large part of the day in sedentary activities. However, it is unknown what activities children are doing during the sedentary time. The purpose of this study was to gather information about the types of sedentary activities that children ages 2-5 years engaged in during the day. The duration of these activities was also a point of interest along with the co-participants.

Methods: 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 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.

UP29

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

Avery Marie Apperson1
Michael Stellefson, PhD1
1Department of Health Education and Promotion, East Carolina University

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? Initially, the 30 largest COPD-related Facebook Groups have been identified and descriptively coded. Subsequently, 20 of the most recent wall posts within the 15 largest COPD Facebook Groups were coded to determine the type of content (i.e., medications, comorbidities, physical activity) being shared in Group wall posts. In addition, COPD Facebook Group reach (i.e., number of Group members), activity (i.e., number of members lost/gained in the last 30 days, number of posts made in the last 30 days), and engagement (i.e., number of posts, reactions, and comments) metrics are being recorded using a codebook developed for this study. SPSS v24.0 is being used to calculate frequency and descriptive statistics that will determine the purposes and quantify member activity of COPD Facebook Groups. Inferential data analyses are also exploring associations between posted Facebook Group wall content and recorded reach/engagement wall post metrics. This study fills a gap in the literature by systematically describing how a popular social media tool (Facebook Groups) are being used to inform, educate and empower patients living with COPD to engage in chronic disease self-management.

UP30

Examining the Relationship between Food Consumption Motives and Tourist Characteristics

Mitchell S. Carstens
Alexandra K. Kirk
Taryn L. Sutton
Dr. Clifton Watts

Increasingly, tourism efforts are relying on the marketing of food and beverages from locally-owned restaurants and taverns. The prospect of local foods is attractive to many visitors, and often linked to the social and cultural desirability of a destination (Chang & Yuan, 2011). Furthermore, consumption of food accounts for approximately one-third of tourists' expenditures (Chen, 2016; Hall & Sharples, 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= .30, 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.

UP31

U.S.-Russian Foreign Relations: Strategic Nuclear Forces and Arms Control Agreements

Christa Hope Gordon

Nuclear arms control is a topic of recently growing interest in the realm of international relations. Using two prominent theories of foreign relations, we will evaluate the functionality of the strategic nuclear arms control agreements in place between the United States and the Russian Federation, and the effect they have on the evolving relationship between these two global powers. We will review the historical background of this relationship which is important to understand the purpose for implementing these arms control agreements and the significance they have had on the communication between these nations. Conversations surrounding arms control suggest that these agreements emphasize the interdependence among previously existing issues in U.S.-Russian relations, and might either improve or aggravate tensions. These agreements might by now be considered side effects of an already contaminated relationship. In our analysis, we will support the hypothesis that the strategic nuclear arms control agreements in place have, since at least 2008, exacerbated the tensions between the United States and Russia. Further, this research will develop the argument that the U.S. is potentially misallocating resources by considering an extension of the active arms control agreements. Subsequently, we suggest an alternative method of interaction and cooperation with the Russian Federation, which could alleviate the tensions that have heightened under the continuation of arms control interactions between these nations.

UP32

Future Faculty Role Intent of North Carolina Associate Degree Nursing Students

Casey Rae Powell
Dr. Diana Bond

College of Nursing, East Carolina University
Honors College, East Carolina University

Meeting global health care needs is one of the top four priorities from the scientific community of nurses convened by the American Academy of Nursing (Eckardt et al., 2017). Yet, a global shortage of nurses and the faculty needed to educate them remains (Nardi & Gyurko, 2013). The nursing shortage is detrimental to the world of health care, and with the deficit of nursing faculty continuing to rise, there has been a push to find recruitment and retainment strategies to combat this concern. Although a direct correlation between nursing and faculty shortages exists, the nursing faculty shortage is often an overlooked aspect of current healthcare concerns, and research is limited in comparison to that of the nursing shortage (National League for Nursing, 2013). The current literature acknowledges the nursing faculty shortage; however, there is little on the perceptions of the role through the eyes of groups other than current nursing faculty. With the deficit expected to increase, it is important to understand the perceptions of current nursing students toward a future faculty role so they might fill those future roles. Current nursing students are composed of those from two-year associate and four-year baccalaureate degree nursing programs prior to their becoming registered nurses. Since 45% of registered nurses in the United States hold an associate degree (American Association of Colleges of Nursing, 2017), looking at the perceptions of this population is important in determining the future of the nursing faculty shortage.

The purpose of this senior honors project is to determine: (1) the proportion of ADN nursing students who intend to pursue a future faculty role and the requisite graduate nursing education, and (2) the differences between ADN students who indicate high intent and those who indicate low intent for a future nursing faculty role among the measures of faculty role modeling and encouragement. The survey results will be analyzed to determine the number of respondents who intend to pursue a nursing faculty role, the number of years they intend to work prior to a pursuit of this role, whether they intend to pursue the requisite graduate education, and the number of years prior to pursuit of graduate education. Chi-square analysis will be used to compare the two groups of students: ADN students with high intent and those with low intent for a future faculty role. The results will then be compared to previous studies completed by Bond (2017).

UP33

Understanding Sexual Assault Victimization Among College Men: A Mixed Methods Approach

Emily Madison Downs1, Heather L. Littleton2

1Department of Psychology, Honors College, East Carolina University
2Department of Psychology, East Carolina University

Sexual assault is a major concern on college campuses, but most research has focused on women as victims and men as perpetrators. Despite this, there is evidence that men also experience sexual assault, albeit less frequently than women (Banyard et al., 2007). Unfortunately, there is little research available that focuses on men's experiences with sexual assault, likely due to multiple factors including the smaller victim pool, low disclosure frequency, rape myths regarding men and sexual assault, and a lack of inclusion of certain assault experiences pertaining to men in sexual assault screening measures (Cantor et al., 2015; Navarro & Clevenger, 2017; Struckman-Johnson & Struckman-Johnson, 1992). Prior studies attempting to assess the prevalence of sexual assault in college men vary greatly in their findings—from 3-28% of men surveyed—largely due to differing sexual assault criteria, methodology, and time frames assessed (Forsman, 2017). Furthermore, to fully understand men's experiences, there is a need for qualitative research examining men's descriptions of their assaults. Currently, the literature is severely lacking in qualitative data from men, with only a few relatively outdated studies focusing on men's experiences with sexual coercion, rather than sexual assault (Struckman-Johnson & Struckman-Johnson, 1994).

The current study involves evaluating the responses of men who participated in a large study of sexual assault among college students. Participants completed a sexual assault screening measure and an assault characteristics measure, which assessed multiple aspects of the assault (e.g. tactics used by the perpetrator, resistance by the victim, alcohol use). Participants were also asked to provide a written description, including their thoughts and feelings before, during, and after the assault experience. Finally, participants completed measures of depression, PTSD, and hazardous alcohol use. Frequency of rape, attempted rape, and unwanted sexual contact among men will be evaluated along with the characteristics of their assault experiences. Proportions of men scoring above the cutoff on the depression, PTSD, and hazardous alcohol use scales will also be reported. Lastly, thematic analysis will be conducted on men's assault descriptions to gain a deeper understanding of context and how men conceptualize and respond to their assault experiences. Implications of the findings for understanding sexual assault among college men will be discussed.

UP34

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

Laura Ashley Whittington; Dr. Nancy Dias

In 2017, there were approximately 9,376 deaths of children aged 1-14 years (Centers for Disease Control and Prevention, 2017). Family members experience immense grief as they transition to a life without their child. Bereaved parents have sleep deprivation, along with other related health concerns within 6 months of their child's death (Dias, Docherty & Brandon, 2017). Parents report that the support by health care workers after their child's death impacted their healing indefinitely (Jost & Haase, 1989).

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 health care providers best efforts, communication is lacking, and there is a gap between parents and health care providers regarding the role 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 effective care since the grieving process is a personal and unique experience for parents. Individualized interventions have the potential to improve the effectiveness of 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. I. 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

Kaleb Davis1, Michael Baker2

1Department of Psychology, East Carolina University
2Department of Psychology, East Carolina University

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 & Ingledew, 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 cross-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 Fleishman, Dr. Marie Olson Lounsbery

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 (Abrisketa 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 (Abrisketa 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 lengthens conflict duration through substitution, stealing, disproportional deliverance, 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 method 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.

UP40

Family Matters: The Relationship between Eating Family Meals, Attachment, and Eating Behaviors.

Amanda Marie Lionelli
Tori Blanchette
Andrew Brimhall

Obesity is a worldwide epidemic and its prevalence continues to rise (Kosti & 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 (Daniels et al., 2009), hypertension, cardiovascular health risks (Lavie, Milani, & 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 meals 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 significant population because most obesity literature relies solely on one individual's report. This sample, however, had data from 3 different family members.

UP41

Association between HRV and Social Anxiety in a College Population

Eliza V Varju
Dr. Matthew C Whited1, PhD
Jordan M Ellis, Emily P Midgette, John Taylor Freeman, Ansley Taylor Corson

1 Department of Psychology, East Carolina University

Social anxiety is a condition marked by avoidance of social situations and marked stress when engaging in social interactions. In college populations, the prevalence rate has been observed as high as 33% and considering the newly independent circumstances freshman students face it would be advantageous to understand possible correlates in the form of HRV (Strahan, 2003). Heart rate variability (HRV) is a means of measuring the variance in heart rate that is attributed to the parasympathetic processes of the body. It has been found that in those with impaired functioning in regards to emotional regulation, a lowered HRV is present (Alvarez, 2013; Thayer, 2000).

The study examined the association between HRV and symptoms of social anxiety measured by the Social Interaction Anxiety Scale (SIAS) among 68 students (mean age = 18.84, male = 52.9%), including possible confounding variables in the form of age, gender, and BMI. The SIAS scale used in the study is a twenty item questionnaire which provides a cutoff score for social phobia and at a higher value, social anxiety. HRV was measured using the Lead-II ECG technique with electrodes attached to the insides of both ankles and the right wrist. Baseline HRV was recorded for 10 minutes while participants watched a neutral stimulus video.

Though we found no association between HRV and social anxiety ($p = 0.608$), our sample was impaired by data collection issues that resulted in a sample of 68 students from an original sample of 88. Additionally, our measure of social anxiety may not have captured the sub-clinical levels of social anxiety that impair college students more frequently than levels of social anxiety at the level of Social Anxiety Disorder. With less than one-third of the participants scoring above the threshold for social anxiety, the possibility of an analysis detecting a correlation between social anxiety and HRV would be affected.
At ECU's Research and Creative Activities Week, we'd like to present our findings regarding the hypothesis that with higher levels of social anxiety HRV will be reduced during baseline.

UP42

The "Good Death": An ethnographic case study of rezadoras in Guatemala

Graziella Delariarte Dominado
Kim L. Larson, PhD, MPH, RN, FNAP
Maria Fernanda Maldonado

One cultural practice that influences palliative care among rural Guatemalans is the work of the rezadora, a lay spiritual community member (Traister, Larson, & Hagwood, 2016). In the United States, Guatemalans are now the sixth largest Hispanic/Latino subgroup (Pew Research Center, 2015), yet clinicians know very little about the work of the rezadora.

In 2018, an ethnographic case study was conducted to learn about the role and work of the rezadora 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 rezadoras to participate in the study. The participants were Spanish-speaking, married, adult women between 65 and 70 years of age. The interviews were audiotaped and transcribed verbatim into Spanish by a native Guatemalan, then back-translated 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 rezadoras. 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 rezadoras 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 rezadoras. First, one rezadora 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 rezadora visited only sick people, while rezadoras working in tandem visited persons going through other major life events, such as baptism and communion. All rezadoras 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.

UP43

Objective Measurement of Physical Activity Over Time in Older Adults with Heart Failure

Catherine Lee Taylor

Older adults with heart failure are at a greater risk for mortality, hospitalizations, and poorer health when their physical function and movement is limited. However, little objective data is available identifying functional decline or functional trajectory over time in this population. This limits the ability to develop (e.g. identify critical time periods for intervention) or evaluate nursing interventions (e.g. identify norms with which to compare) aimed at improving or maintaining function. Daily step activity, measured by accelerometry, has been used to quantify physical activity (PA) and has been shown to be associated with physical function level. We explored the use of objective accelerometry to measure PA over time in a sample of community-dwelling older adults with heart failure who had a recent hospitalization for their condition.

We used a longitudinal design to measure bi-weekly steps for 4 months. Steps were measured using the Fitbit Alta affixed to the ankle with a nylon band. Participants wore the device at all times, with the exception of bathing.

Preliminary data includes results from six participants with New York Heart Association (NYHA) class III heart failure. They were 76.1 ± 4.1 years, BMI range 21.5 to 38.8 kg/m2, and mean ejection fraction of 38.3% ± 8.2%. The sample was 16.7% female (n=1) and 33.3% African American (n=2). Participants had 82.1% recorded step data across the study. Reasons for missing data were device not worn for a period of time or user initialization issue. During the first week, participants had an average recorded step count of 1586 ± 868 steps per day. At week 16, participants took an average of 1831 ± 1712 steps a day. Five out of six participants had at least one week of less than 2000 average daily recorded steps. The highest recorded "stepper" averaged 6159 daily steps during week 8, while the lowest averaged only 280 recorded steps a day during week 8.

These preliminary findings provide support for long term use of accelerometry to capture PA in older adults with heart failure. Findings from the larger trial will explore the association of stepping activity and physical function. The use of accelerometry has the potential to quantify daily function without the need of physical assessment or use of invasive measures. These findings will support development of nursing interventions to improve or maintain physical function after hospital discharge.

UP44

Creation of Radar Imagery to Study Seasonal Changes in Precipitation Regimes in the S.E. United States

Christopher Jarrett, Robert Young, Thomas Rickenbach

Department of Geography, Planning and Environment, East Carolina University

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 come from extratropical cyclones (ET), while about 80% of that come 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's (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.

UP45

Behavioral Assessment of Wandering Spiders

Radha R. Patel, T. Jeffrey Cole, and Michael S. Brewer

Wandering spiders of the RTA clade exist in a variety of species, and are still being discovered today. This group of spiders does not trap prey within webs, but rather catch and forage prey along the ground releasing venom when biting. Given their ability, trials were conducted on five different species of spiders to gather insight on their capacity to capture prey. Spiders were enclosed in acrylic containers while being filmed and paired with crickets of proportionate mass to consume. Recordings of each individual spider's interactions with the cricket were recorded and analyzed including location of attack, amount of time to make contact, and time for paralysis. For successful feeding attempts, data was obtained for location of attack, time for spider to make contact with cricket, and time it took for paralysis to occur. Using chi-square tests and statistical analysis an attack bias could be investigated. Spiders of different species showed significantly different preferences for attacking the thoracic region. These results may shed light into how these spiders subdue their prey.

UP46

Influence of Ethics on Evolution

Mohammad Walid Farah
Kristine Callis-Duehl
Emma Rae Wester
Kate Whitley Blinka
Susan Leigh Kennedy

Students have preconceived notions about the connection of evolution and natural selection to religion, ethics and morals that make teaching these subjects especially challenging. Understanding how students' ethical beliefs shape their understanding of evolution and natural selection will help us better address these topics. This study sought to draw connections between students' ethical stance and their understanding of the influence of disease treatment on natural selection and disease prevalence. In this study we asked if students were in a class about evolution, did they respond more often that natural selection should not be disrupted by medical treatments. Students were first asked one of five variations on a question about treating sickle cell disease with a life-saving drug. We developed a rubric using the emerging themes method where the most commonly seen themes in students' answers are coded. Each student's answer was reviewed and the themes that appeared in their answers were recorded to see any patterns in which themes appeared the most. To validate the question, we re-worded the question and

gave different versions to groups of students in an evolution-based and non-evolution based class. In the evolution class students are primed to think in terms of evolution as the "correct" answer. Different versions of the questions included changes to the disease, area affected, and wording (ex. patient/individual). Students were asked one of five versions of this question that differed based on one of these categories. Preliminary results show that contrary to what was expected, the distribution of students that would not treat the individuals is higher than expected. In classes where the students are biology majors and most of them plan on going through the pre-med route, a surprising number went against medical ethics to treating the patients. The next step is to introduce an online survey where information about the students' demographics could be answered along with the questions. The reason for this is to confirm any assumptions on why students are answering this way. Along with students at the university, it will likely be open to other students at other universities as this will give us a larger range of data and determine whether it is the course topic influencing students' decisions or other factors.

UP47

"A Comparison of Fitness Benefits of Two Flower T?ypes in Triodanis perfoliate"

Anna O' Brien1, Carol Goodwillie1 , Franklin Dao Xiong2

1Department of Biology, East Carolina University
2Department of Chemistry, East Carolina University

Dimorphic cleistogamy is the production of open (chasmogamous-CH) and closed (cleistogamous-CL) floral forms. This type of mating system occurs in over 400 species of angiosperms. The CL flowers reproduced exclusively by autogamy or self-fertilization, while the CH flowers allow for a means for outcrossing. The relative advantage of reproducing by each type of flower is studied in this experiment. Inbreeding depression, reduced fitness due to breeding of related individuals, may be a disadvantage of CL reproduction; however, CL flowers have the benefit of requiring fewer resources to produce seeds. Triodanis perfoliata, a local annual plant species that produces both CH and CL flowers, is the plant of interest. In a greenhouse experiment, seeds were collected from CH flowers that were outcrossed with CH flowers of other plants, CH flowers that were self-fertilized and CL flowers. On the offspring of these crosses, the CH and CL flowers were counted, and biomass was weighed. By comparing biomass and flower count data for each cross treatment, we will be determine whether CH flowers present an advantage in avoiding inbreeding depression. We will also explore the relationship between biomass and flower production. These data will contribute to a larger study of dimorphic cleistogamy in T. perfoliata to gain more insight into why these species produce both CH and CL flowers.

UP48

The Generation of an Antibody to the Bearded-Ear Protein in Maize Plants

Jessica Leigh Bland and Beth Thompson

Flowers are essential for plants to reproduce and also produce seeds and fruits that are consumed as food. The Thompson Lab studies floral development in Zea mays (maize), which is both a staple crop and serves as a model for other grass species. In maize, male and female flowers are present on separate inflorescences; the ear holds the female flowers and the tassel holds the male flowers. To understand the normal function of genes in maize development, we study mutants that affect development of one or both inflorescences. My project focuses on the bearded-ear (bde) gene. bde mutants have multiple floral defects and are female sterile. The ears of bde mutants make extra floral organs and flowers in the tassel often contain silks. bde encodes a MADS-box transcription factor; MADS-box transcription factors have well-known roles in floral development in diverse species.

To investigate the function of the BDE protein, I am taking both a biochemical and genetic approach. First, I am working to develop a BDE-specific antibody, which could then be used in a number of downstream applications. Currently, I am working on making a His-tagged recombinant protein in E. coli, which can be used as an antigen to generate anti-BDE antibodies.

In addition, I am investigating a potential genetic interaction between bde and another transcription factor, zfl2. zfl2 single mutants do not have a mutant phenotype, however bde;zfl2 double mutants have a more severe phenotype than bde single mutants. By confirming and characterizing the phenotype of this double mutant, I will be able to understand more about how bde interacts with other genes to control floral development in maize.

UP49

Protocol Development for Extracting Microbial DNA from Agarose

Allison K. Fisk, Emma Richards, Regina B. Bledsoe, Ariane L. Peralta

Increases in nitrogen and phosphorus deposition due to fertilization and burning of fossil fuels can lead to nutrient enrichment of historically low-nutrient ecosystems. Ongoing work at the long-term fertilization and disturbance experiment

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 know 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% agarose 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: DNeasy 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 procedure 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 higher quantities than 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 Luczkovich

The State of North Carolina is concerned about the loss of submerged aquatic vegetation (SAV), which comprises significant fish and wildlife habitat 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 (6.8% 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 11 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 PEBP1 Interactions Implicated in Acute Renal Failure

Katherine Anne Ray

15-Lipoxygenase-2 (15-LOX-2) is one of six lipoxygenase enzymes that catalyze the (per)oxidation 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 (PEBP1) 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-PE's that feed into ferroptosis pathways when they are not adequately reduced. Interactions between 15-LOX-2, PEBP1, 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- to the nanodisc prep 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 flesh fly genera—Fletcherimyia, and a second, single species of Sarcophaga (S. sarraceniae)—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. Is 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 Litofsky

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¬¬mβ2 on their surface, which directly binds to iC3b, thereby initiating the phagocytotic process. In this project, we will measure the bond strength between iC3b and α¬¬mβ2 to further the understanding of this very important immunological response. Previous studies focused on iC3b- α¬¬mβ2 binding under static conditions, and showed, based on allosteric inhibitors, that iC3b may present multiple binding sites for α¬¬mβ2. 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¬¬mβ2 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. Sën at the University of Houston will be providing the iC3b and the α-I domain (bonding portion of α¬¬mβ2). In the chamber of the centrifuge the DNA will attach to the centrifuge on one end and attach to a bead on the other. The α-I 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 leaving you thinking "Will I get breakfast or will I 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 rDNA 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 were 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 (II) 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.
aforementioned parameters. After conducting the systematic review, it is clear that more research is required in this area, specifically using standardized outcome measures and measures of inter- and intra-rater reliability.

UP57

Time for Tea: Consequences of long-term fertilization on wetland microbial community structure and decomposition

Megan E Koceja, Regina B Bledsoe, and Ariane L Peralta

Department of Biology, East Carolina University

Anthropogenic disturbances have led to increased deposition of nitrogen (N) and phosphorus (P) into soils. Nutrient enrichment of soils increases rates of microbial litter decomposition. Through decomposition, microorganisms release carbon previously stored in soils into the atmosphere as carbon dioxide, a greenhouse gas. As these carbon emissions increase, global warming potential increases along with them. Understanding soil-microbe-plant interactions and their influence on decomposition rates is essential for understanding the causes of climate change and its mitigation. This study explores how long-term nutrient enrichment and litter-type composition influence decomposition rates and soil microbial composition. It is hypothesized that long-term nutrient enrichment cause shifts in soil microbial community structure that lead to higher rates of litter decomposition. Further, tea litter with a lower carbon (C) to nitrogen (N) ratio (compared to high C:N ratio litter) is expected to decompose faster due to an available N source provided to nutrient-starved microbes. This study began at the long-term experimental fertilization and mowing experiment at East Carolina University's West Research Campus. In each of eight replicate mowed/fertilized and mowed/unfertilized plots, replicate bags of two different teas (high C:N ratio rooibos tea and low C:N ratio green tea) were buried. After 90 days, teas were retrieved and two of the three replicate bags at each plot were weighed to measure decomposition rates, and the third bag was stored at -20°C to later characterize microbial community composition by using targeted Illumina sequencing of the 16S rRNA gene. Preliminary results revealed that soil microbes are capable of decomposing rooibos tea litter (higher C:N ratio) more quickly in fertilized compared to unfertilized plots due to fertilization. However, green tea litter (lower C:N ratio) decomposition rates were similar between fertilized and unfertilized plots. Overall, as predicted, the green tea litter decomposed faster than the rooibos tea litter. The outcomes of this study will provide insight into long-term effects of nutrient additions on soil microbial diversity and composition, related rates of decomposition, and the potential for climate change mitigation as nutrient enrichment continues to increase.

UP58

Effects of Hurricane Florence on marine carbon cycle processes

Sara Roozbehi, Cody E. Garrison, Erin K. Field

Department of Biology, East Carolina University

Rainfall from hurricanes Florence and Michael have washed large amounts of freshwater, organic carbon, and microbes through the Outer Banks inlets 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 microorganisms vary widely due to salinity preferences. We collected 2L 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 rRNA 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 freshwater or saline environments to determine if an influx of microbes from terrestrial sources occurred. 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 cycle with 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 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.

UP60

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 (per)oxidation of fatty acids to produce both pro- and anti-inflammatory cellular signaling molecules. Despite its importance, current anti-inflammatories 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/protein-membrane interactions. Hydrogen-deuterium

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 Bisphenol A in Vervet Monkey, Chlorocebus spp., Hair Using Liquid-Chromatography/Mass Spectrometry and Liquid-Chromatography/Ultraviolet-Visible Spectroscopy

Samuel Joseph Lindsay1, James Loudon2, Jack Pender1

1Department of Chemistry, East Carolina University
2Department of Anthropology, East Carolina University

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 bisphenol A (BPA) in hair samples of NHPs. Hair samples were collected from wild populations of vervet monkeys (Chlorocebus spp.) from St. Kitts 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 larvae will be determined using morphometric measurements in relation to environmental factors. Temperature and zooplankton abundance are two important environmental conditions that could affect 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 Premiere 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 larvae 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 larvae 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. p. dubius, and P. youngi) is based mostly on structural color differences corresponding to distinct geographic regions (i.e., dune ridges). Herein, we provide the first molecular phylogeny of the genus Peltotrupes and highlight the lack of monophyly of the currently recognized species (i.e., color morphs). We also analyze the color of four body regions of individuals of both sexes representing the full geographic and color phenotypic breadth of the genus. While significant color differences are recovered between the currently recognized species, given their lack of monophyly, our results suggest an ecological role in maintaining these distinct morphs. Additionally, we compared museum samples collected as far back as the 1920s, including paratypes, to our recently collected material. While distinct differences are still detectable between the color morphs, these samples cannot reliably be compared to freshly collected beetles.

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 exposing 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 Peanuts 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 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. Based on the results of these studies, introduction to peanuts before 12 months of age was shown to reduce the risk of developing a peanut allergy. Further studies are needed to test the prevention of a peanut allergy later in life than just this age range. Since further research is needed to test the age of introduction that is most effective in reducing a peanut allergy, it currently stands that introduction of peanuts before 12 months is the most safe and effective time.

UP65

Androgen and progesterone receptor knockouts in zebrafish affect aggression and social dominance

Julia N. Brown, Matt Chilton, Fadi A. Issa, and Yong Zhu

Department of Biology, East Carolina University, Greenville, NC

There is circumstantial evidence that steroids, such as androgens and progesterone, play roles in aggression and social behaviors in vertebrates. However, the genetic basis for these behaviors needs to be further elucidated. We generated zebrafish hormone receptor knockouts to examine aggression and social hierarchy in male zebrafish. Wild Type (WT), androgen receptor knockout (ARKO), and progesterone receptor knockout (PGRKO) males were isolated for one week before being paired to match for age. Five pairing types, WT-WT, WT-ARKO, WT-PGRKO, ARKO-ARKO, and PGRKO-PGKRO were observed for two weeks. Each pair was observed for 5 minutes per day during this pairing period, where aggressive behaviors (attacks) and submissive behaviors (retreats) were recorded. Filming of pairs occurred on the first and last day of pairing to determine the divergence of social roles over time and the quality of aggressive encounters. Motion tracking analysis of non-interaction frames was used to generate heat maps of the swimming patterns and localization of each fish independently in the tank. Further analysis of the pair interactions (encounters) showed further detail on the quality of attacks that occurred, including average encounter/min, average encounter duration, and average attacks/encounter.
It was found that ARKO-ARKO pairings 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 an underdeveloped social hierarchy in the 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.

UP66

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

Caleb Alexander Collins
Ryan Stack

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 ranking many commercially-available columns in regards to degree of hydrophobicity, steric interaction, hydrogen bond donating and accepting capacity, as well as cation selectivity at both acidic and neutral pH. The test compounds utilized were carefully chosen to selectively evaluate the various retention mechanisms.

Additional variables commonly evaluated during development of a new HPLC separation procedure are the elution solvents, solvent strength, pH buffer systems, and column temperature. Varying these conditions can take advantage of different retention mechanisms to achieve the desired separation.
The hypothesis is that trends observed by chromatographing this series of test 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.

UP67

Development of novel tryptophan analogues to study and expand protein function

Kristin Janell 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.

UP68

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

Kelvin L. Macklin, Erin K. Field, Gwendolyn J.B. Jones

Department of Biology, East Carolina University

The MinION Oxford Nano-pore sequencer is among one of the newer technologies in DNA sequencing. The technology utilizes protein nano-pores embedded into an electrically resistant membrane. The protein nano-pores are stabilized by a micro scaffold array cartridge known as a flow cell from which the MinION sequencer employs to initiate reads of DNA or RNA. The advantage of using this technology allows for real time sequencing of DNA or RNA, long read lengths into the hundreds of Kb, and embodies a compact unencumbered form factor. The device excels when limited when lab space is limited.

To optimize the MinION's potential, mastery of its use is the first step. Further sequences of DNA and RNA will paint a better picture of its capabilities and shortfalls. The expected data gathered from running more specimens on the MinION device. The goal in using the MinION sequencer is to utilize the device in the field for onsite DNA sequencing. The organism used to help accomplish this goal is an environmental microbe sampled from Fisher's Landing, a national forest in North Carolina. ECU's very own graduate student, Chiquita Brooks graciously provided the cultured organism sample whose DNA was extracted for this experiment. The organism identified as shewanella oneidensis MR-1 will be sequenced in the lab, and its genome will be compared to other sequences using other technologies such as the Ion Proton sequencer.

Abstracts | Undergraduate Poster Presentations

UP69

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

Dominance hierarchies is an evolutionary mechanism to ensure the stability of animal groups by enabling the division of resources like food and mates according to social rank. Once dominance is established, the behavior pattern of individual group members shifts according to their social rank. We are motived to better understand the neural bases of social behavior and how social activity influence nervous system function particularly the role of neuromodulators in regulating spinal motor circuits. Using zebrafish as a model organism, we tested the importance of the dopamine type 1 receptor (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 subordinates 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.

UP70

Parasites as Indicators of Biodiversity in Coastal Shoreline Habitats

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

Department of Biology, East Carolina University

Digenetic trematodes (parasitic flatworms) are trophically-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.

UP71

MEASURING SOIL SULFATE REACTIONS RATES AND REDOX POTENTIAL UNDER NUTRIENT MANIPULATIONS IN A POCOSIN WETLAND

Brent Douglas Williamson1, Christopher B. Rogers2, Sydni Law2, Dr. Enrique Reyes2

Department of Engineering, East Carolina University
Department of Biology, East Carolina University

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.3These massive carbon storage pools have contributed to global cooling over millions of years1and 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.2Recent biogeochemical 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.3Anthropogenic activities constitute a substantial threat to peatlands as development for agriculture and other uses have significantly altered critical biogeochemical 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.4Groundwater 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 biogeochemical consequences of anthropogenically-induced pocosin degradation and assist in predicting the impact this will have on hydrologically connected systems.

UP72

ECharacterizing 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
Cameron Taylor
Eshita Karnik
Dr. Anne M Spuches

EF-hand proteins are a subset of calcium binding proteins that are ubiquitous in nature and play important roles from cell signaling to regulation of cardiac and striated muscle. These proteins contain side chains such as aspartic acid and glutamic acid which promote firm calcium binding as well as flexibility of the protein. Alongside calcium, cadmium is well known for its mimicking capability of calcium binding to such proteins although cadmium is a well-known biochemical hazard. The Spuches lab is interested in comparing the thermodynamic and structural data obtained from binding cadmium and calcium to EF-hand motifs by methods of Isothermal Titration Calorimetry (ITC) and Circular Dichroism (CD) instrumentation. One protein of interest, Calbindin D28k, is an EF hand containing protein that is responsible for regulating calcium ions in neve cells. The focus of this study was to synthesize loop five of the 33-mer EF-hand as a control and use ITC and CD to determine the thermodynamics and structural changes that occur upon binding Ca2+. Further studies will involve the synthesis of human cardiac Troponin C (HcTnC), another EF-hand protein which is responsible for cardiac muscle contraction. Upon synthesizing the EF-hand peptides found in HcTnC, ITC and CD will be used to study Ca2+ and Cd2+ binding. These data will be compared to data acquired from the Calbindin study.

UP73

Fluorescent Protein Cell Sorting as a Method to Isolate a Stable Cell Line

Elizabeth Grace Viverette

Isolating stable mammalian cell lines that express high amounts of protein is a slow and labor-intensive task that often takes 4-6 months to complete. The time and effort it takes to complete a stable cell line can be greatly reduced using fluorescent reporters, where the plasmid that encodes the cDNA for the desired protein also encodes the cDNA to express a specific fluorescent protein (FP). FPs, once excited by light within a certain wavelength range, emits light within a different wavelength range. These fluorescent cells can be sorted using devices such as the AriaFusion Cell sorter, which is a device that sorts cells based upon whether they fluoresce at certain wavelengths. Therefore, in conjunction with the AriaFusion Cell Sorter, FPs can be used to categorize cells based on proteins expressed.

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 mAmetrine, 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 mAmetrine.

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 AriaFusion 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.

UP74

Conversation Dynamics and Building Connections through Conversations

Marshall Joseph Adkins

Humans are social creatures, and therefore, conversations are the medium whereby ideas are shared and understanding is constructed. In this study, we describe the behaviors of learning assistants engaged in preparing for class. Learning Assistants are undergraduate students who work with course faculty to enhance active learning pedagogies. There are two models of conversation, static and dynamic. The static conversation model sees sentences as information encoded within them. Always a proposition encodes for information. The other model, the dynamic conversation model, sees conversations as instructions, and conversations as a back and forth of instructions. Through studying group conversations, we will characterize and evaluate with model more correctly corresponds with the Learning Assistant style classroom. By knowing how the preparation conversations flow and dynamics, and the map it makes, better steps can be implemented to the preparation phase of using 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 'igraph' and 'sna' 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.

UP75

Describing Collaborative Exams Using Random Graphs

Aaron M. Bain
Timothy M. Sault
Antoni Aguilar Mogas
Steven F. Wolf

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.

UP76

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 building a platform with which to do that here at East Carolina University (ECU).

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 stdents 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, Ph.D., RN

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. Research questions: 1) Did Microsystems Framework provide teaching methods to conduct a change project? and 2) Were the students able to apply QI principles/tools application leading to a successful change project?

Methods: Descriptive design included a student survey to evaluate self-reflection of their learning outcomes. The volunteer alumni completed a standalone QI course in which they completed a change project within a health system. The assessment of student knowledge and skills were recorded by analyzing the survey data from 54-item Qualtrics, Likert survey, Preparation and Usefulness of QI Topics from Nursing Education Program (Kovner, Brewer, Yingrengreung, & Fairchild, 2010).
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

Nicholas Mork1,2,6, Molly Moseley3,6, Sara Ellen Poston4,6, Danielle St. Onge5,6
1Department of Biology, East Carolina University
2Department of Chemistry, East Carolina University
3Department of Public Health, East Carolina University
4Department of Education, East Carolina University
5College of Business, East Carolina University
6Honors College, East Carolina University

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 development in students seeking training to learn more about a topic surrounded by stigma, and use this education to better campus relations.

UP79

Using Dialogic Reading to Foster a Growth Mindset in Early 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

More PEAS Please! Assessing the Implementation of a Hands-on Nutrition Education Curriculum in Head Start

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 (October-January) in 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 Mursion technology in pre-service science education courses. The author describes the concept of Mursion technology, using Virtual Reality in a classroom setting, and benefits of constructivist teaching practices. Case study findings focus on outcomes obtained with

a selection of 5 pre-service teachers. The Mursion experiences resulted in a higher sense of self-efficacy in the pre-service teachers. Students were able to support their interview question answers with evidence from the Mursion experiences using specific changes in mindset and classroom management. When comparing pre-interview and post-interview data, the Mursion experiences resulted in improved confidence, as well as stronger understanding of leading classroom discussions. Study limitations and time constraints are detailed and followed by a description of how this research experience impacted the researcher as a future educator.

UP82

Improving Student Understanding of Mitochondrial Bioenergetics with Teaching Tool

Jessica N. Brush, Basel A. Abdelfattah, Patricia J. Malcolm, William B. Blake, William C. Guptill, Department of Kinesiology, Department of Engineering, Dr. Ronald Cortright, 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 in a university setting, such as mitochondrial bioenergetics in the Department of Kinesiology at East Carolina University. Mitochondrial bioenergetics refers to the production of adenine 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 proof-of-concept prototype 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 improved 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.

KEYWORDS: VARK, mitochondrial bioenergetics, electron transport chain, oxidative phosphorylation

UP83

And the Band Played On: A Case in the Consequences of Student Activism

Amber Sturdivant
Chloe Pearson
Jayla Cofield

Cole and Heinecke (2018) advance that the demands by contemporary student protestors nationwide "show an optimistic, creative imagination that could serve educators well as we grapple with our first steps down a new road" (p. 1). While the critical discourse analysis of Cole and Heinecke point to a nirvana, a new plateau of an inclusive, integrated, racially, ethnically, gendered, alternatively abled and LGBTQIA campus, the ephemeral glaze of a post-neoliberalist campus reimagined renders hazy the experiences of students at the battle fronts. In this paper we will analyze the narratives of participants in the October 1, 2016 campus protest. On that date the, East Carolina University (ECU) Marching Band demonstrated during their rendition of the national anthem. They were met by verbal and physical violence as they exited the field. This violence was disproportionately borne by the 19 Black band members. While reaction from the crowd was anticipated by students, what was not anticipated was the withdrawal of previously pledged support from administration. Using Critical Race Theory we interrogate the post-neoliberalist optimism of Cole and Heinecke in light of Black student pain and the costs of change. To begin we explore historical reaction to student campus movements, campus environments and sense of internal community, and the effects of protests on students.

UP84

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

Glenesha D Berryman

Black feminist theorist Christina Sharpe poses a crucial question to Black artists: how do we materially and aesthetically disrupt the spectre of death haunting 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 violences 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 experimental 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 spectre of death) haunting Black queer women in the South. In addition to the collage series, essays like "Interviews with a Black Girl Soldier" and "A 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 21stcentury.

UP86

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

Katie 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 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 Romeo Vanya Juliet", which I attended in New York in October of 2018. This experimental performance remixed two well-known plays together, intermingling the scenes of Shakespeare's "Romeo and Juliet" into the Chekhov's "Uncle Vanya" by dividing the roles of "Romeo and Juliet" among the five major characters in "Uncle Vanya", using each role as a mirror to the other author's character. I define how these two canonical texts can be used as "keys" to one another, 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 Criscitiello, Aalyha Giles, Kirie Cheek, Cierra Ford, Madalyn Beale
Mentor: Dr. Jin-Ae Kang

This case study investigates the importance of cultural sensitivity and diversity that are required in product design and strategic communication in a global market. The chosen case features one of the world's largest fashion retailers, H&M, and their consequential public relations crisis after releasing racially insensitive products for their children's clothing line. Our investigation of this crisis revealed that H&M's misstep is only one in a myriad of organizations who have failed to positively represent diversity; which is due to both narrow perspectives of organization leaders and insensitivity to global variances in culture. These two components proved detrimental to the brand's public image, resulting in massive financial and customer loyalty loss.

Thus, the current study offers communication solutions to the H&M crisis using the essential functions of public relations practice. Enhancing cultural sensitivity of corporate members and broadening the scope of perspectives in executive positions are the two mainstays of our strategy, in efforts to repair damaged reputation and ensure stakeholders that this mistake will not be repeated. The H&M's crisis demonstrates why proactive guidance from a public relations professional is as crucial in every phase of an organization's business practice as reactive crisis responses.

UP88

Role of Dopamine-3 Receptors in left ventricular cardiac fibroblasts proliferation

Deepthy Melit Thomas, Andrew M Kisling, Lillie G Taylor, Madaniah O Zakari, Musaad B Alsahly, Robert M Lust, Stefan Clemens, Laxmansa C Katwa

Department of Physiology, East Carolina University, Brody School of Medicine, Greenville, NC

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 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 2-month-old D3KO mice showed comparable cardiac function to 2 yr old WT mice. By the aging comparability in this study, the cells were isolated from 23-week old WT and 5 week old D3KO mice and cultured and characterized from LV of WT and D3KO. Thus, this study primarily investigated the role of D3R in cell proliferation of cardiac fibroblasts (CFb), i.e. if the loss of function in the D3R causes a shift in the rate of proliferation when compared to WT. The proliferation technique was measured over the time points of 6hr, 12hr, 24hr, and 36hr, the presence and absence of a D3 receptor agonist and combination of agonist and antagonist. The time-dependent cell proliferation rate in 23-week old untreated WT was compared with 5 week old D3KO cells, the rate of proliferation was shifted downward at 6 and 12 hours and upward at 24 and 36 hrs. To further confirm, we used a D3R agonist Pramipexole and combination of agonist pramipexole and antagonist SB-277011-A in this study with CFb isolated from WT and D3KO. In the WT, the agonist pramipexole and the combination of pramipexole and antagonist SB both had a spiked increase in proliferation rate at 6 and 12 hrs and remained constant. In D3KO group the proliferation rate gradually increased with agonist pramipexole between the 6hr and 12hr time points, then decreased at a constant rate, while the combination of agonist and antagonist increased the proliferation. The observations indicate that there is a differential shift in the proliferation rate of D3KO as compared to WT and D3R plays a role in proliferation.

UP89

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

Todd Cameron Hylton
Rebecca Ann Nickle
Mark D. Mannie

Multiple Sclerosis (MS) is an inflammatory demyelinating disease of the central nervous system that afflicts 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 are unknown. Preclinical studies in mouse models of MS showed that IFN-β elicits an immunosuppressive subset of FOXP3+ regulatory T cells (Tregs), 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 IFN-β expression systems to support studies assessing whether human IFN-β elicits or stabilizes human Tregs.

Two human IFN-β expression systems were derived based on the pIRES2-AcGFP1 plasmid backbone. One expression plasmid encoded human IFN-β fused to a C-terminal linker and an 8-histidine affinity chromatography tag. A second expression

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 transfectants 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-8his 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.

UP90

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, Guadalupe Alvarado, Kenneth Soderstrom

Affiliations: Department of Pharmacology and Toxicology, Brody School of Medicine

Effective drug therapies for the treatment vocal impairments do not presently exist. This is a neuroscience problem as substrates underlying learned vocalizations are not well understood. To begin to address this problem a vocal learning animal model is required. As songbirds are among few groups of vocal learning of animals, we have employed zebra finches to begin to address this problem.

Learned zebra finch vocalizations are temporarily impaired through partial electrolytic destruction of a region of vocal motor cortex called HVC. These lesions result in reduced quality of both syntax and phonology and in the amount that birds sing that recovers over about seven days. Temporarily altered song provides an opportunity to assess potential drug effects to mitigate damage and/or improve recovery. We are beginning with cannabidiol, a noneuphorigenic cannabinoid with positive efficacy in stroke and seizure models.

In moving forward with this project, the importance of creating a standard method of applying the complicated songbird system as a pre-clinical model became evident. This is the part of the project in which I am focusing. The focus of my portion of the project is creating a comprehensive manual for the lab procedures. The manual is creative, image-intensive, with step-by-step instructions on how to complete the project in a standard way in order to most accurately evaluate drug effects on vocal learning and recovery.

UP91

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

Deryn Marissa Smith, Stephanie L. Richards1, Avian V. White1

1Department of Health Education and Promotion, East Carolina University

Environmental security is a large part of public health and includes keeping individuals and the setting they live in as safe as possible. While an abundance of research has been done on insecticide resistance in adult mosquitoes, there is a lack of research on mosquito larvae and potential effects of insecticide exposure. Chemical control and reducing the number of larval habitats are two of the most successful ways to keep mosquito populations under control. In this project, we investigated whether exposure to sub-lethal doses of insecticides at the larval stage impacted insecticide resistance in mosquitoes at the adult stage using a colony of susceptible Culex quinquefasciatus mosquitoes obtained from the Centers for Disease Control and Prevention (CDC). Approximately 10 larvae/well were placed into a six well plate. Ten six well plates were used for each group (total of 30 plates) and filled with water that had been inoculated with insecticide. Two different types of insecticides were used: Fyfanon (organophosphate) and Biomist (pyrethroid). A control group not exposed to any insecticides was also included. Once the larvae had grown to adults, a CDC bottle assay was completed to determine the extent to which mosquitoes were resistant or susceptible to the insecticides. The bottle bioassay consisted of bottles being coated with a dose of the insecticide being used for that group before exposing the mosquitoes to it. At each time point, the number of dead mosquitoes was recorded. This was done for all three groups. After the bottle bioassay was completed, a graph was made for visual interpretation of data. For the mosquito population tested here, mosquitoes exposed to insecticides as larvae were more likely to be susceptible to the insecticides as adults.

UP92

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

Taylor A. Leposa1,2,3, Yi Zhu3, Kyle Fulk3, Qun Lu3
1Honors College, East Carolina University
2College of Arts and Sciences, East Carolina University
3Department of Anatomy and Cell Biology, Brody School of Medicine, East Carolina University

Background: Degeneration of synaptic plasticity plays a critical role in Alzheimer's disease (AD) pathogenesis. Recent studies have suggested that neuroinflammation may contribute to this degeneration by disrupting the amyloid metabolism and by microglial overgrowth. This study aims to investigate the pathological progression of AD hippocampal and cortical tissues of human and an AD mouse model.

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 microglial proliferation contribute to the progression of AD. Future directions of this study aim to further illuminate the regulation of microglial activation in AD and the potential roles of Rho GTPase 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.

UP93

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

William Paul Biggers1, Kevin Williams1, Teresa Nicolson2,3, and Timothy Erickson1,2
1Department of Biology, East Carolina University, Greenville NC.
2Former address: Oregon Hearing Research Center, Oregon Health & Science University, Portland OR.
3Current address: Otolaryngology-Head & Neck Surgery, Stanford School of Medicine, Stanford CA.

Our senses of hearing and balance rely on the function of sensory receptors in our ear called hair cells. Sensory hair cells are distinguished by hair-like projections from their apical surface that are 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 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.

UP94

Molecular chaperone Tetratricopeptide repeat protein 2 (Tpr2) is essential for germline stem cell self-renewal and timely cyst divisions in Drosophila melanogaster oogenesis

Morgan Phillips, Elizabeth Ables

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 Hsp90 and Hsp70 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 RNAi 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 suggests 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.

UP95

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

Rachel Ivey Grantham, Dr. J.C. Mizelle, Dr. C. Habeeb

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 activation 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.

UP96

The Effect of Downstream Resistance in a CABG

Anup P. Sanghvi1, Bryent Tucker2, Dr. T. Bruce Ferguson1,2, Dr. Stephanie George1
1Department of Engineering, East Carolina University
2RFPi, Inc.

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 (Ghista 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 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 phantom model. The objective of this project is to compare experimental iCertainty™ data with results from computational fluid dynamics (CFD) simulations. SolidWorks models of a CABG will be designed to match the phantom model's dimensions and resistance mechanisms. ANSYS Workbench will be used to mesh the geometries. The governing fluid dynamics equations will then be numerically solved using CFD to generate flow simulations and determine shear stress, velocity, and output pressure. These data will be qualitatively compared against the iCertainty™ observations. In addition, the impact of downstream resistance will be quantitatively compared between the CFD simulations. Finally, since the downstream resistance of the current phantom is dependent on the flow rate, a new design will be constructed that utilizes the concepts of the Windkessel model to alter resistance. The same comparisons will be done with the new phantom model and the CFD models.

UP97

Targeting Enzymes of Sphingolipid Metabolism in Treatment of Colorectal Cancer

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 elicits 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 glycosylation, 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 Eliglustat. AC inhibitors included DM-102 and SACLAC, whereas the SPHK1 inhibitors tested were FTY-720 and SK1-i. 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 7.0 μM. GCS was another enzyme that was effectively suppressed, in this instance by introduction of PPMP (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.

UP98

Influence of Modified Starches on Mental Performance and Physical Endurance Following Exhaustive Exercise

Callie Herman, Rachel Dodson, Jacyln Farrior, Alex 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 Electroencephalogram (EEG) cap. Go-no-Go 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 over time during MAL use. Reaction times for Go-no-Go 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.

UP99

SCI-Induced Morphine Tolerance is Associated with Dopamine Pathway Expression

Ryan Patton1, Helen Rodgers1, Jacob Yow1, Stefan Clemens2, Kori Brewer1,2

1Department of Emergency Medicine, Brody School of Medicine
2Department of Physiology, Brody School of Medicine

Background: Opioids are commonly prescribed to relieve neuropathic pain after a spinal cord injury (SCI), but often fail to be effective due to an injury-induced state that mimics opioid tolerance. Previous studies have shown that the analgesic effects of morphine can be restored if morphine is administered in combination with a dopamine 3 receptor agonist or a dopamine 1 receptor antagonist, demonstrating that dopamine receptor activity modulates the response to opioids after SCI. Therefore, we hypothesized that SCI alters levels of dopamine and expression of its receptors in the brain and spinal cord and that these changes are associated with injury-induced morphine tolerance.

Methods: Baseline nociceptive (pain) thresholds were measured in 8 uninjured and 16 spinal cord injured rats before and after injection of morphine (2mg/kg) or saline (control). Rats were then randomized to have thresholds re-assessed after injection of morphine + pramipexole (PPX, D3 agonist), morphine + SCH 39166 (SCH, D1 antagonist), pramipexole, or SCH. Lumbar spinal cord and striatal brain tissue were collected from each animal and processed for metabolomics, targeted mass spectrometry or Western blot to identify, quantify and compare levels of dopamine, its metabolites and receptors across groups.

Results: Morphine alone increased sensory thresholds in all uninjured but only 33% of injured rats. Based on this, animals were categorized as morphine responders (n=5) or non-responders (n=10). Morphine + PPX and morphine + SCH increased sensory thresholds in all injured animals, while PPX and SCH alone had no effect. Striatal dopamine levels in injured morphine non-responders were significantly decreased compared to uninjured animals. Dopamine levels in injured morphine responders compared to injured morphine non-responders are currently being analyzed. Metabolomics principal component analysis of lumbar cord identified three clusters that corresponded to injured morphine responders, injured morphine non-responders, and uninjured animals. Preliminary pathway analysis suggests differences in phenylalanine, tyrosine, and tryptophan biosynthesis between these groups. Full pathway analysis is ongoing.

Conclusions: Differential dopaminergic pathway expression in the CNS following SCI is associated with morphine responsiveness. This provides early evidence that the dopamine system may provide a target for intervention for opioid resistant pain states.

UP100

The role of N6-methyladenosine (m6A) mRNA modification in regulating tumor cell progression

Kristin Victoria Chesnutt. Kyle Mansfield.

Despite the improved methods for both detection and treatment in the United States each year, advanced cases of cancer still claim too many lives. Thus, the need to find new approaches to treat advanced disease, and better understand disease progression. Previous work from our lab has implicated the mRNA modification N6-methyladenosine (m6A) in the regulation of breast cancer phenotypes. m6A exerts its effects by impacting posttranscriptional regulation including splicing, translation, nuclear export, and RNA stability. We are now expanding those findings to include other models of breast cancer progression as well as human mammary tumors representing different stages of disease. Efforts are underway to develop a tetracycline inducible shRNA against the main cellular m6A methyltransferase, Mettl3. Then by utilizing an MCF10-based model of breast cancer, we will determine the impact of Mettl3 (and hence m6A) depletion on breast cancer phenotypes, including proliferation, migration, and invasion. We have also begun identifying changes in the expression of Mettl3 and other m6A cellular machinery in human mammary tumors representing different stages of disease, including normal breast epithelium, ductal carcinoma in situ (DCIS), and invasive ductal carcinoma. Future studies will expand our research into the role of m6A in other types of cancer cells, including lung and colon. By systematically exploring the role of m6A in tumorigenesis, we will greatly expand our understanding of the forces driving cancer progression. This information will be critical for the development of effective cancer therapies targeting the tumor cell progression that underlies aggressive disease, and could potentially identify novel and innovative avenues of cancer treatment.

UP101

Do Prenatal Supplements Protect the Placenta from Environmental Contaminates

Ariel A Fricke, Abby Malmborg, and Krista McCoy

Endocrine disrupting chemicals (EDCs) are pollutants that alter endocrine system function. Sulforaphane has been proposed to be an ideal trans-placental prenatal supplement that protects the fetus from pollutants via Nrf2, a transcription

factor that upregulates detoxifying and antioxidant enzymes. Fetal vinclozolin 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 vinclozolin exposed embryos. Specifically, we tested the hypotheses that sulforaphane reduces vinclozolin-induced placenta malformations, and increases placental proteins associated with detoxification and the blood placenta barrier via Nrf2. To test this hypothesis, we exposed wild type and mutant (Nrf2 KO) fetuses (via maternal gavage) to vinclozolin, vinclozolin and sulforaphane, sulforaphane alone, or corn oil the solvent control from embryonic day (E) 13.5 to 16.5. On E16.5 we humanly 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.

UP102

Factors Leading to DKA Readmissions: A Qualitative Content Analysis Study

Mattie Grace Parrott and Thompson Forbes

Diabetic patients readmitted with diabetic ketoacidosis account for more than 130,000 hospital readmissions per year at an annualized cost of $2.4 billion (Langley et al., 2015). The purpose of this study was to understand the social determinants of health (SDoH) that may lead to hospital readmissions for diabetic ketoacidosis (DKA). Social Determinants of Health included "socioeconomic factors, psychosocial factors, neighborhood environment, and political/ economic/ cultural drivers (Walker, Williams, & Egede, 2016, p.368)."

Social determinants of health are major contributors to diabetes patients' health. Social support and socioeconomic status play a major role in the health of diabetics that readmit frequently for diabetic ketoacidosis. Further, they have direct impacts on glycemic control and the compliance rates of diabetic medications that can lead to higher readmission rates if not taken as prescribed. Understanding the SDoH that lead to readmissions informs the development of interventions that improve the health of patients with diabetes, reduces readmission rates, and decreases the cost burden for patients and healthcare organizations.

From a parent study investigating factors that lead to patients with diabetes readmission in diabetic ketoacidosis, I conducted a secondary analysis through the new lens of the social determinants of health. A qualitative content analysis method was used to describe the SDoH that contribute to patients with diabetes readmission in DKA. Preliminary findings suggest that the social factors that contribute to DKA readmissions are social support, spirituality, and psychosocial stressors. Implications for practice may include education development and counseling sessions to assist patients with identifying support systems to mitigate these social contributors to their readmissions. Furthermore, healthcare professionals can assist patients with identifying support systems that will facilitate alterations in health maintenance behaviors that may also prevent repeated readmissions.

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 contribute to the study of cell transplantation and regenerative medicine therapies.

References:

1. Poly(ethylene Oxide)/β-lactoglobulin Electrospun Nanofibers: Chemical Crosslinking Assessment and Thymosin-β4 Functionalization, MS Thesis, Daniel E. Vargas 2016
2. Gao L, et al. Circ Res. 2017;120:1318-1325.

Abstracts | Undergraduate Poster Presentations

UP104

PThe Role of PGRMC1 in Hormone Metabolism in Zebrafish

Pujan Rameshkumar Patel1, Zhu, Yong1

1Department of Biology, East Carolina University

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 its paralog Pgrmc2 is still largely unclear. To determine physiologic function(s) of Pgrmc2, we generated zebrafish mutant line (pgrmc2-/-). We found reduction in both spawning frequencies and the number of embryos in female pgrmc2-/-. This subfertility is caused by reduced oocyte maturation (germinal vesicle breakdown, GVBD) in pgrmc2-/- in vivo.
Nonetheless, oocytes from pgrmc2-/- 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 pgrmc2-/-. 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 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 Pelvic Neuron Survival is Improved by Testosterone Supplementation

Jennifer C. McMains1, Shelby A. Powers2, Michael R. Odom2, Elena S. Pak2, Johanna L. Hannan2

1Department of Health Education and Promotion, East Carolina University
2Department of Physiology, Brody School of Medicine

Prostate cancer is often treated surgically with radical prostatectomy (RP). Following RP, erectile dysfunction (ED) occurs in 25-100% of men. RP induced ED is attributed to injury of the cavernous nerves branching from the major pelvic ganglia (MPG). Frequently men are 65+ when diagnosed and have low circulating testosterone (T) levels. T is essential to maintaining and recovering nerve function. The objective of this study is to examine 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+BCNI (C+B), 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 nerve and measurement of intracavernosal to mean arterial pressure (ICP/MAP). Bilateral MPGs were collected, dissociated and cultured. Neurons were fixed and stained to measure axonal branching and length and then co-stained to identify apoptotic neurons. Additional neurons were stained with sympathetic or nitrergic markers.

Overall, CAST, BCNI and C+B decreased ICP/MAP, neurite 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 was still elevated above CON ($p<0.05$). T restored neuron 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 neuritogenesis 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.

UP106

The Relationship Between Speech Recognition in Noise and Reading Abilities

Hannah Rae Moore, Dr. Andrew Vermiglio, Elizabeth Bonilla, Elizabeth Sabatelli, Ella Jordan, Ivey Emmert

Objectives: The first objective of this study was to investigate the

relationship between speech recognition in noise and reading abilities. Speech recognition in noise ability was evaluated using the Hearing in Noise Test (HINT; Nilsson et al., 1994; Vermiglio, 2008). Reading ability was evaluated using the Test of Silent Contextual Reading Fluency-Second Edition (TOSCRF-2; Hammill et al., 2006). It was hypothesized that there would be a negative relationship found between speech recognition in noise ability and reading ability, where a better reading score would be associated with a more negative HINT threshold. The second objective was to investigate the relationship between the binaural advantage for speech recognition in noise ability vs. the binocular advantage for reading ability. It was hypothesized that there would be a significant positive correlation between the two advantages. Rationale: Anderson et al. (2010) reported a weak but statistically significant correlation between speech recognition in noise ability (HINT Noise Front thresholds) vs. reading ability (Test of Word Reading Efficiency [TOWRE]; Torgesen et al., 1999). The TOWRE is an assessment of sight word recognition. In contrast to Anderson et al. (2010), reading ability in the present study was evaluated using the TOSCRF-2, which is a measure of word identification in a sentence context.

Design: Thirty-eight native English-speaking young adults (mean age: 20.4 years) with normal pure-tone thresholds (≤ 25 dB HL) from 250-4000 Hz participated in the study. Participants underwent HINT and TOSCRF-2 testing. The HINT target speech was always presented at 0° in steady-state noise presented from 0°, 90°, and 270° at 65 dBA. The HINT was evaluated binaurally and monaurally for the Noise Side conditions, enabling the calculation of the binaural advantage or the improvement in speech recognition in noise ability with two ears vs. one ear. The TOSCRF-2 was tested binocularly and monocularly. The binocular advantage was calculated by subtracting the monocular reading performance from the binocular reading performance.

Results: A comparison between HINT thresholds vs. TOSCRF-2 results revealed no significant correlations between speech recognition in noise and reading abilities for the binaural/binocular results or for the advantages.

Conclusion: The results indicate that for a group of young adults, the HINT and the TOSCRF-2 protocols measure unrelated abilities.

UP107

Platinum Catalyzed Synthesis of Alpha-Keto Esters via C-H Bond Functionalization

Christopher B Rogers, Erman Javed, Jacob D. Guthrie, George S. Chirayath, Shaima S. Alamari, and Shouquan Huo*

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. Ethyl-chlorooxoacetate, 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 using various solvents and catalyst. To investigate the effect of various substituents on compound 1a, a series of substituted 2-arloxy 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.

UP108

The voltage-gated Ca2+ channel Cav1.3 regulates gene expression in zebrafish.

Cameron Smith1, Teresa Nicolson2,3, and Timothy Erickson1,2

1Department of Biology, East Carolina University, Greenville NC.
2Former address: Oregon Hearing Research Center, Oregon Health & Science University, Portland OR.
3Current address: Otolaryngology-Head & Neck Surgery, Stanford School of Medicine, Stanford CA.

Excitation-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). Cav1.3 (Cacna1d) is a 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 Cav1.3 channels signal the release of neurotransmitter so that sound information can be communicated to the brain. As such,

Abstracts | Undergraduate Poster Presentations

Cav1.3 is required for auditory sensitivity in humans, mice and zebrafish. However, the specific role of Cav1.3 in E-T coupling in hair cells and other neural tissues during development has not been investigated.

To determine whether Cav1.3 channels regulates gene expression in zebrafish, we performed RNA-seq experiments to compare transcript abundance between wild type larvae and those where the Cav1.3 channel was inactivated either genetically (cav1.3mutants) 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 cav1.3a mutant larval zebrafish. Determining which genes are regulated by Cav1.3 channel activity will help us to understand how E-T coupling contributes to the development of vertebrate neurosensory systems.

UP109

Influence of Intrinsic Aerobic Running Capacity on Cardiac Adaptive Responses to Stress

Alexander Samuel Clark
Dalton McGee
Sneha Amaresh
Musaad Alsahly
Dianne Walters
Lax Katwa
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 also will 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 reproduceable. Without pulmonary hypertension, studies of mitochondrial oxygen consumption suggest a hierarchy HCR LV > LCR LV = LCR RV = HCR RV. This is interesting because it doesn't match the structural profile. Additional measurements will be needed to resolve the differences.

UP110

High fat diet impairs detrusor mitochondrial fatty acid oxidation in male but not female mice

Hanna L. Kosnik1, Kelsey Fisher-Wellman2,3, Michael R. Odom3, Elena S. Pak3, and Johanna L. Hannan3

1Departments of Biology and Chemistry, East Carolina University
2East Carolina Diabetes and Obesity Institute, East Carolina University
3Department of Physiology, Brody School of Medicine, East Carolina University

Obesity increases the prevalence of bladder dysfunction. Mitochondrial dysfunction-induced by high fat diet (HFD) is common in the heart, liver and skeletal muscle; however, its effects in the bladder are unknown. The bladder's mucosal and smooth muscle layers are involved in bladder signaling and contraction, respectively. This study will characterize sex differences in mitochondrial respiration in the bladder's mucosal and smooth muscle layers. Additionally, the impact of HFD on bladder mitochondrial respiration in both sexes will be assessed. Male and female mice (n=7/group, 20-24 wks) were used to assess bladder mitochondrial sex differences. A second group of male and female mice (10 wks, n=5-7/group) were fed a control (10% kcal fat) or HFD (45% kcal fat) for 24 weeks. Bladders were collected, weighed and separated into mucosal and detrusor layers. Tissues were cut into strips, permeabilized, and placed in an oxygraphs to measure respiration. Substrates (pyruvate/malate, glutamate, L-octanoylcarnitine/malate, or succinate/rotenone) were added followed by increasing concentrations of phosphocreatine to allow substrate-specific bioenergetic and respiratory sensitivity analyses. Bladder respiration and respiratory conductance with L-octanoylcarnitine/malate in mucosal and detrusor tissue were significantly decreased in males. Respiration and respiratory conductance remained unchanged between sexes with the other substrates. Chronic HFD increased body weight and decreased the bladder to body weight ratio in both sexes. In HFD males, mucosal respiration and respiratory conductance were decreased with L-octanoylcarnitine/malate. In contrast, the other substrates did not change HFD male respiration and respiratory conductance. In HFD females, respiration and respiratory conductance were unchanged with the other substrates. However, HFD female mucosal layer had decreased respiration with succinate/rotenone but no change

in respiratory conductance. Male mice have lower fatty acid metabolism within the bladder's detrusor smooth muscle layer that is further lowered within the mucosal and detrusor muscle layers after chronic HFD whereas female mice are protected. Future studies will determine if excess lipids collect within the bladder and if the fatty acid metabolism can be rescued with 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

Quantitation of Benzoate Preservatives in Drinks Commonly Consumed by NC's Pediatric Population

Nolan Michael Davis, Jack E Pender, Natalie Taft, David Collier, Allison S Danell

Introduction
Beverage manufacturers commonly use sodium benzoate (NaC7H5O2) and potassium benzoate, (C7H5KO2,) 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 examined samples, carbonated soft drinks (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
Tuan Tran - Multidisciplinary Studies in Neuroscience / Department of Psychology
Kori Brewer - Department of Emergency Medicine
William Meggs - Department of Emergency Medicine

Accidental poisoning with organopesticides 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 show 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 sequela from organophosphate poisoning.

UP113

An ECG analysis determining the impact of mother's metabolic equivalent value in pregnancy on infant heart rate variability

Alexandra Williams1, Colby Jolly2, Dr. Christy Isler3, Dr. Kelly Haven4, Dr. Ed Newton3, Dr. Linda May5, and Dr. Stephanie George1

1Department of Engineering, East Carolina University
2Department of Kinesiology, East Carolina University
3Department of Obstetrics and Gynecology, Brody School of Medicine
4Department of Family Medicine, Brody School of Medicine
5School of Dental Medicine, Brody School of Medicine

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 able 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 smartshirt. 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 higher standard deviation of normal-to-normal intervals (SDNN), root mean square of successive differences (RMSSD), 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 level, maternal resting HR, maternal age, gestational weight gain, or infant sex were not considered. Overall, infants born to women who participated in a form of 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 Jaimes, Ian N Hines

Background: Liver fibrosis is the accumulation of the extracellular matrix (ECM). It is known that macrophages (Mf) play a significant role in promoting hepatic collagen production. Intriguingly, the ECM itself may influence Mf function with evidence that the ECM can signal through integrin linked kinase (ILK) to promote inflammation and further fibrogenesis. Matrix metalloproteases (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 fibrotic liver, can alter the inflammatory phenotype of Mf. The purpose of this study is to better understand how the ECM can affect expression of MMPs in Mf, a potential key regulator of the tissue remodeling process. Hypothesis: Interactions between the ECM, specifically Type I collagen, and Mf will inhibit the expression of MMPs in an ILK dependent manner. Methods: Bone marrow derived Mf (BMDMs) from WT or ILK knockout (ILK-/-) mice were cultured in the presence and absence of collagen typre-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 were assessed by quantitative polymerase chain reaction. Results: WT BMDM showed differential expression of MMPs upon activation with

inflammatory stimuli (either LPS/IFNg) when grown on plastic. Specifically, IFNg/LPS promoted MMP-13 expression by Mf when grown on plastic, a response which was inhibited when cells were grown on Type I collagen. Deletion of ILK restored MMP13 expression in the presence of collagen. Conclusion: ECM composition may influence macrophage phenotype and matrix remodeling capacity, altering the resolution of fibrosis in various tissues including in the liver. Therapies directed at altering ILK signaling may prove useful to improve scar clearance and tissue function.

UP115

Prostatic radiation increases cholinergic gene expression leading to enhanced nerve-mediated contractions.

Alexander Christopher Turner, Shelby A. Powers, Elena S. Pak, Kathleen Ashcraft, Bridget Koontz, Johanna L. Hannan
1Department of Physiology, Brody School of Medicine, East Carolina University, Greenville, NC; 2Department of Radiation Oncology, Duke Cancer Institute, Durham, NC

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 assessed by qPCR for protein gene product 9.5 (PGP9.5; non-specific neuronal marker) and choline acetyltransferase (ChAT; 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 neutral 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

UP116

Brain iron deficiency alters sleep performance in a mouse model of Restless Legs Syndrome

Joseph Basco1, Heidi Kloefkorn-Adams2, Bill Goolsby2, Shawn Hochman2, Stefan Clemens1

1 Department of Physiology and Brody School of Medicine, East Carolina University, Greenville, NC
2 Department of Physiology, Emory University School of Medicine, Atlanta, GA.

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 to date no 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 diets (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 w), 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.

UP117

Design, Expression, and Characterization of a Bifunctional Protein Chimera for Applications in Molecular Biology

William M. Taylor, Oluwatosin Ayinde and Robert M. Hughes Ph.D.

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.

UP118

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, spotted 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 electrophoresis to check that amplification worked. We then cleaned the PCR products and sequenced them with an automated sequencer. Sequences were aligned in the program Geneious 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.

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 N. Chanakira, Sambuddha Banerjee, Anne M. Spuches, R. M. Roop. East Carolina University Department of Chemistry and Department of Microbiology and Immunology.

Brucella spp. is a Gram-negative pathogen that can infect its

natural hosts; cattle, sheep, and dogs, causing abortions as well as infect humans zoonotically, causing undulant fever. Brucella spp. like most bacteria, require iron for its survival and virulence. In order to uptake iron from its surroundings, Brucella spp. uses a specialized four-component ferrous iron-transport system. The periplasmic component of this system is called FtrA and it facilitates the transport of iron across the periplasmic space. X-Ray crystal structures of homologous of FtrA show Cu2+ and Mn2+ directly coordinated to these proteins using conserved amino acid residues. Sequence alignment of Brucella FtrA with these homologous have shown that these metal-binding amino acids are conserved in FtrA. These conserved residues on Brucella FtrA include H65, E67/M111, H118, and H151, which are able to bind Cu2+ as well as E67, and D115which are able to bind Fe2+.

In this study we mutated four of these residues (H65A, H118A, H151A, and E67A.) Each mutant's ability to bind metal 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.

UP120

Electrospinning Synthetic Extracellular Matrix

Anuj Pranav Sanghvi

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 protein 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.

References

Vargas, "Poly(ethylene Oxide)/β-lactoglobulin Electrospun Nanofibers: Chemical Crosslinking Assessment and Thymosin-β4 Functionalization," MS Thesis, 2016.

Gao, M. E. Kupfer, J. P. Jung, L. Yang, P. Zhang, Y. D. Sie, Q. Tran, V. Ajeti, B. T. Freeman, V. G. Fast, P. J. Campagnola, B. M. Ogle, and J. Zhang, "Myocardial Tissue Engineering With Cells Derived From Human-Induced Pluripotent Stem Cells and a Native-Like, High-Resolution, 3-Dimensionally Printed Scaffold," Circulation Research, vol. 120, no. 8, pp. 1318–1325, 2017.

UP121

The effect of different optic flow speeds on cognitive performance in sitting and standing

BinKai Hsu1, Lin, Chia-Cheng2

1 Department of Engineering, East Carolina University
2 Department of Physical Therapy, ECU College of Allied Health Sciences

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 optical flow stimulus affects the processing of additional sensory information. In order to simulate the high-speed optical 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.

UP122

Investigating the Impact of Mettl16 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, we and others have also identified Mettl16 as an RNA m6A methyltransferase that can methylate both coding and noncoding RNAs, but its biological role remains unclear. Mettl16's RNA targets have been identified and include the long noncoding RNA MALAT1, the snRNA U6, as well as a number of mRNAs including MAT2A, HIF1, and SEMA4F. To investigate the functional role of Mettl16 we knocked out Mettl16 via CRISPR but were unable to obtain viable clones suggesting that it may be essential for cell growth; a finding supported by the literature. Transient knockdown via siRNA was successful, but no effect on RNA target expression or translation was observed. We are currently developing a tetracycline inducible METTL16 knockdown system to examine the effects of more long-term depletion. We have been successful at overexpressing METTL16 and identifying additional RNA targets by immunoprecipitation. Interestingly, when overexpressing exogenous Mettl16 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 Mettl16 cellular localization on its RNA binding preferences using nuclear import and export inhibitors to direct the endogenous protein to one compartment or the other. Future experiments will explore the physiological importance of Mettl16 localization by investigating the presence of nuclear localization and export signals and their impacts on METTL16's RNA targets. Through these studies we hope to better understand the biological role of this understudied m6A methyltransferase.

UP123

Understanding conformational dynamics of Transglutaminase 2 (TG2) using denaturant-induced unfolding studies

Alexander D. Hondros1, Anita Desantis1, Tonya N. Zeczycki1

1Department 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 GTPase activity. The believed allosterically regulated action of TG2's conformational changes are caused by currently unresolved changes in the protein's structure.

To better understand the dynamic nature of TG2, denaturant based unfolding studies were employed. Through studying unfolding behavior, structural changes within the TG2 apoenzyme were revealed. Size-exclusion gel chromatography offered additional affirmation to the presence of multiple conformations in the presence of varying denaturants (i.e. urea and GuHCl). Functional mutants displaying different

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.

Danish Hasan1, Ketan Joglekar1, L.E.N. Ferreria1, J. Cope Meyer1,2, R.M Murata1,3

East Carolina University
1School of Dental Medicine, Dept. of Foundational Sciences
2School of Dental Medicine, Office of Research
3Brody School of Medicine, Dept. of Microbiology and Immunology

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 staphylococcus 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 350µM. 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 treatments of Berberine (300-6000µM) were added. 10 µL from the wells were plated onto blood agar plates at certain time intervals (0-24 hours) and allowed to grow for 48 hours before counting the CFU. For Biofilms Quantification, an inoculum of 10^6 C. albicans (MYA-2876) cells was prepared and incubated in a 24 well plate for 24 hours at 37°C in 5% CO2. Then the wells were treated with various concentrations of Berberine (300-6000µM) and Fluconazole(500µM) every 24 hours for 3 days. After that, the biofilm was separated from the media using a centrifuge and dried using a speed vacuum. Finally, the dry weight was taken to determine how much of the fungal cells are still present. When running the time-kill experiment, Berberine chloride seemed to be on par with fluconazole in terms of treatment over a 24-hour period. Finally, in Biofilms Quantification, Berberine Chloride seemed to be more effective than Fluconazole.

UP125

Garlic bioactives influence macrophage associated matrix remodeling enzyme expression in vitro

Thais Gaia Oliveira and Briceida Osborne.
Mentor: Ian N Hines

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 (Mf) in response to lipopolysaccharide (LPS). In addition to promoting inflammation, Mf 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 Mf in response to inflammatory stimuli. To test this hypothesis, bone marrow derived macrophages (BMDMs) were exposed to vehicle or DADS (5-10mM) for 24 hours and then activate with lipopolysaccharide and interferon gamma (LPS/IFNg) for an additional 4 hours. Expression patterns of more than 15 matrix remodeling enzymes were then evaluated by quantitative PCR. Exposure of BMDMs to LPS/IFNg 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 Mf 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 function can lead to 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 present in garlic which can finely control MMP expression patterns could prevent or stabilize atherosclerotic plaque thus decrease cardiovascular incidents.

UP126

Biomecahnical Alterations in the Snatch during a Bout of 30 Repetitions

Hannah E. Black, Ryann E. Womble, Robyn N. Speranza, 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 61kgs 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 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.

UP127

Effective Recruitment Strategies for Community-Based Health Initiatives in At-Risk Communities

Michael Denning1, Sharon Paynter2

1Department of Health Education and Promotion, East Carolina University
2Office of Community Engagement and Research, East Carolina University

Chronic health issues, such as diabetes, heart disease, and cancer are preventable. In areas, such as eastern North Carolina where these diseases are more prevalent, it is incumbent upon the public health community to actively engage with patient populations. Information about relevant nutritional, lifestyle alteration, and wellness information should be effectively distributed and taught to communities at-risk for these conditions. County health departments serve as the hubs for this knowledge and courses. However, due to limited funding, scarce staff, and multitude of health issues, marketing and recruitment for courses and programs has been difficult, cost ineffective, and, often, unsuccessful. To address these critical issues, one public health program offered its prevention workshops in the community, with recruitment and marketing assistance from the community. Participants completed surveys and a focus group to inform public health marketing and dissemination plans for similar programs in the future. Results from this study suggest that active engagement through relationship-based publicity is more effective than passive, traditional marketing efforts.

UP128

All Hands on Deck

Ashley Elwell, Caitlin Cartwright, Emily Patton, Morgan Nobles
Honors College

Diane Majewski, Ed. D., Tim Christensen, Ph.D.
Honors College

At the beginning of our freshman year, we were assigned the project of addressing a "wicked" problem, or a problem that is insoluble. Being tasked with this, we decided to address an issue that directly affected us, and thousands of others: stress on college campuses. With this in mind, we set out to cure the stress of an everyday college student. From here, we decided to host events that would be helpful for students in stress relief. Our idea was to hold events to help reduce stress. After conducting more than 200 interviews, we learned that students felt that these events would be more of a distraction from their stress, than a solution. We

then decided that we should produce a more permanent solution to stress through mentorship. We decided to create a program in which incoming freshmen could participate to help relieve the stress of the transition.The program would be optional, yet highly encouraged. For the program, an upperclassman would be paired with a freshmen based off their major. We planned to work with an Honors 2000 group, who would be our control group, unfortunately we had very few responses. Left with no participants and what seemed to be a lack of interest, our group decided to pivot once again. We decided to create a Facebook page for Honors students, similar to "Rate my Professor". Several people joined the Facebook page, however, no one besides our group posted. We were at another dead end, and we had no more ideas to turn to. With no idea how to proceed, we meet with Dr. Majewski and learned her ideas for a mentoring program. The program would be implemented inside of Gateway. All incoming Honors freshmen, and all returning upperclassmen, would be required to participate. Freshmen would be paired with upperclassmen and they would be required to meet a couple times a semester. This program would serve to help freshmen with their stress by providing them with a mentor that can answer any question they may have. We are currently working on coming up with requirements for the program and a way track success. As of now, the program will be mandatory for the fall semester, and optional for the spring semester. Our ultimate goal of "All Hands on Deck" is to provide freshmen with a less stressful first semester, and also provide an opportunity to develop lasting friendships within the Honors College.

UP129

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 we decided the best solution for this was to create an 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 with the ECU officiation problem, keeping 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 prepping 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 their 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.

UP130

Factors Influencing Community Collaboration in Public Health Initiatives in Developing Countries

Claudia Josephine Woznichak
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 counties. 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 five 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.

UP131

Sustainable Success: Motives & Charity Sport Events

Bailey Cooper

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.

UP132

Quiz of Student Interest (QSI)

Stephanie Nicole Goodman, Madison Nicole Dahlren, Elizabeth Marie Majette, Abigail Rose Squires

In a small survey of 57 students done by this group at ECU, it was found that 73.6% of respondents reported having experienced symptoms associated with depression, and 88.7% reported having experienced symptoms associated with anxiety. Although this was done with a small sample size, and therefore not significant on a statistical basis, there have been other studies done with students both at ECU and across the country. These studies all have yielded similar results; the rate of students struggling from mental health issues is alarming, which has been in part due to issues of student isolation on campus. With an increasingly saturated number of students attending public universities. Of that same survey done at ECU, 81.8% of respondents reported that a questionnaire designed to connect to clubs and organizations based on interest would benefit them in combatting that issue of isolation. This is the idea that this abstract has been created upon.

The Quiz of Student Interest is designed to integrate students into the extracurricular life at ECU. Comprised of roughly 26 personal questions pertaining to preferences in both academic and non-academic settings, the Quiz of Student Interest was created to take student isolation head on, to facilitate healthy and productive social interaction between freshman and transfer students, as well as increasing over all on-campus involvement.

UP133

Health4PINE: Our Health Our Responsibility Course Effectiveness

Pranaya Pakala, Keith Richards, Mary Farwell

Health4PINE (People in Need Everywhere) is a non-profit organization that spreads health awareness. Health4PINE places an emphasis on mental, social, and physical fitness along with tips of how to achieve improved health without expensive measures. Adolescents are more prone to depression during the ages of puberty, with potential lasting effects (Maughan 2013). In 2018, more than 3.1 million teenagers (12-17) in the United Stated reported some type of depression with 15 million reporting social anxiety (National Institute of Mental Health 2016).

The first part of the project was as an eight-week course based around six interactive presentations with fourth and fifth graders at a local Boys and Girls Club. The course was approved by the faculty and director of the Boys and Girls club. Students

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.

UP134

Beaufort County Regional Park Site

Samuel Patrick Hunter, Randal Allen Mills, Sheighla Temple, Samantha Harrell

Partnered with the Mid-East Commission, we conducted a park plan/design for the Beaufort County. The Beaufort County Regional park site is located in Belhaven, NC along the waterfront and has great potential for growth. Beaufort County Regional Park site was selected by the county to be redeveloped so that it may serve a better purpose to the community. The county selected the site because it a regional park, meaning that it offers a place for leisure to everyone in Beaufort and surrounding areas. This site offers a stunning view of the intercostal waterway and Belhaven's historical rich culture. Our project aims to build a healthy community by providing a place where patrons can go get their daily exercise and enjoy a beautiful view of the Intercostal waterway that runs through Beaufort County. We conducted survey research with the help from 20 residents to understand what the needs and wants of the community in Beaufort County for their regional park site. We sent our surveys via email to residents in the community and with their help; we got more responses from other citizens that we were not able to reach. The survey included questions like "is you plan on going to the park, what tine of the day you would most likely visit?" With responses from that question we were able to determine what was going to be most popular time of the day that the park would be populated and could determine what time events would need to happen in order for maximum attendance. We also asked open-ended questions such as, "what would you like to see in the park?" "What are some events that you like to take place in the park?" Respondents gave us a lot of feedback on what they would like to see in the park such as a carousel or some sort of amusement theme. Citizens also responded that the park offer concessions. Majority of respondents answered that would utilize the most in the morning because the temperature will not be too hot and the can start their day with a nice walk along the waterway. The goal of this park is to build a more healthy community and provide the county of Beaufort with a sense of place. While creating park design for our site with the help from the public officials and the mid-east commission, along with the citizens, giving us great feedback there is a lot of potential for growth in this area and for the park itself. The Beaufort County site is a unique location, and hopes to generate a lot of usage throughout the region.

UP135

An Exploratory Study of Early Childhood STEAM Parenting Workshop Development in Pitt County Community

Nikita Rajan Revankar1, Lyndsey Graham1, Jenny Bolton1, Kiersten Mahaffy2, Tracy Chamberlain2

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 implementation in Pitt County. Utilizing the collaborative action research methodology, the research team partnered with Martin-Pitt Partnership for Children in Pitt County to develop two stages of a five-week series of Early Childhood STEAM parenting workshop curriculum. During the workshop, the research team will provide instructional support and hands-on material to encourage parents' involvement in early childhood STEAM activities and provide examples of ways to support their children's STEAM exploration at home. The two stages of workshop series will encourage parents with children aged 2-5 years to heighten their child's curiosity, analysis, and critical thinking skills through implementation of STEAM in routine/daily activities. The research team will collect feedback and comments from parents through pre/post interviews, questionnaires, and satisfaction surveys. Data received will be analyzed based on the convergent parallel design (Creswell & Clark, 2011). For quantitative data, a repeated measure ANOVA will be applied to analyze if there is any significant difference in the mean scores of parents' attitudes, concerns and their STEAM knowledge between their pre-and post-questionnaire surveys. In addition, all interview recordings will be transcribed and will be coded through emergent themes to support and strengthen the quantitative data. This study will serve as a preliminary model for parents, teachers, and policymakers who are striving to promote early childhood STEAM education in our state/region.

UP136

Ending Drunk Driving at East Carolina University

Amber Bryant, Michael Crumpler, Anna Seguin, Emily Seguin, Lauren Traflet
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 drinking and driving. We hope to make the Greenville community a safer environment by providing a wide array of educational opportunities to 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 to 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.

UP137

Healthy Pals

Hannah Butler1
Camille Whitlock1
Madeleine Rector1
Morgan Agner1
Ross Judd1
Sydney Johnson1
Sydney Johnson1

1Honors 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 that our implementation could be successful.

UP138

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 negatives 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.

UP139

Hog Slat Process Improvement Capstone

Houston Alexander Beasley
Dylan Rodger Scheck

Hog Slat, Inc. manufactures a complete line of equipment systems and components used in modern pork and poultry production facilities. Their equipment is used on pig farms, chicken farms, turkey farms and other livestock farming operations across the USA and abroad. In their plant, they have the problem of an unorganized Bill of Materials kitting workstation not meeting the production standards of 500 kits a week for an 8-hour shift. This workstation has no processes implemented to keep stock of high running kits and no system to distribute kits around the plant. The operations manager, Tim Taylor, at Hog Slat has asked us (Houston Beasley and Dylan Scheck) to design a new workstation and implement new processes that will allow them to meet the production standards. We plan to implement a Kanban system that will organize the assembly and distribution of the kits. We also plan to redesign the workstation in a way that will make the production of the kits more efficient. The process improvement project will be completed by using six sigma and lean manufacturing principles. Define, measure, analyze, implement, and control as the steps we will be working through. We plan to use pareto diagrams and workstation layouts as tools to help us complete the project. The pareto diagram will allow us to see the highest running parts and we can base our workstation layout from this information. We plan to use AutoCAD to design a workbench that will allow all parts to be in reach of the associate working in the cell. After finishing the project, we are projecting that the production standards will be met and there will be a stock of the highest running kits. The project sponsor is completely onboard and agreed to fully cooperate and provide us with the materials we need to succeed. The profile of this project is low risk with a high reward and will streamline how kits are assembled for shipment in the plant. We roughly estimated we will save Hog Slat a total of $50,000 annually.

UP140

Gregory Poole Abstract

Jarrett John-Vincent DePizzol
Kaleb Paul Spencer
Project Abstract
Company: Gregory Poole
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 shelving process is inefficient 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 shelve 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 Rich, 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

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 diabetic, 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 compared observationally and 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.

UP143

Design of a Sensor-Based Anxiety Monitoring System

Riley Neil Dumm, Griffin Charles Steinbaker, Gunnar Scott Price
Dr. Ricky Castles

Departmernt of Engineering

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 discreet 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 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:
1. "Facts & Statistics," Anxiety and Depression Association of America, ADAA. [Online]. Available: https://adaa.org/about-adaa/press-room/facts-statistics. [Accessed: 31-Jan-2019].

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 forklifts. 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, %VAT, 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 layouts.

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 while 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
Jinkun 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, nonintrusive patient monitoring system. The system developed includes three aspects: measurement of patient orientation, data transmission, and data processing. Body orientation is measured 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, how much time the patient has been in the current position, and an audible and visual notification is raised for when the time limit has been reached.

UP148

Pressure Evaluation of Tracheal Suction Catheters to Reduce Damage to Respiratory Airways

Marcus Moody1, Dr. Veeranna Maddipati2, Dr. Stephanie George1

Department 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 simulating 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.

UP149

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 a change in equipment and standards and is in need of an organizational pattern that best utilizes the equiment 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.

UP150

3D Printing Patient-Specific Images for Diagnostics and Perioperative Planning

Joshua Ryan Butler1, Andrew Ray2, Barbara Muller-Borer1, Wayne Godwin3

1Department of Engineering, East Carolina Carolina University
2Brody 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 Materialize Mimics. Further model processing was completed with Meshmixer. Refined 3D models were imported into MakerBot Print and printed using polylactic acid (PLA) filament.

Three patients with unique medical conditions requiring surgery are 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. During follow-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.

UP151

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. The education system plays an important role in molding the thought processes of the next generation, it must undergo continuous improvement, evaluation, and revision 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 select 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.

UP152

Detection of Skin Hydration Levels Using a Novel Air Puff Device

Antonia Dingeman1, Keith Williams1, Jason Yao1, 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 RepOrting. 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 t-test was performed with the current collected data, the Vaseline lotion results has 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.

UP153

Mestek's Replacement Parts

Steven Anthony McKinney and Alexander Roten

Currently Mestek, an HVAC manufacturing company, is having trouble picking orders of replacement parts. The bins and shelves these parts are stored in are not labeled and workers are unable to identify the parts. Mestek needs to implement the five S method to better organize and speed up the process of picking orders of these parts. Alexander Roten and Steven McKinney are creating a system for project champion, Joshua Adams, to improve Mestek's process for picking orders of the replacement parts. Mestek's employees are unable to identify what the parts are. Since there is a broken labeling system and employees do not know what the parts are, sometimes workers hide the parts in random places when stocking the parts. In order to solve this problem, a spreadsheet will be made with part names, their part numbers, the sequence of their new shelving locations. Research will be done to determine all the correct part names and part numbers. The parts will be relocated in proper bins and storage areas as well. Fixing this broken system for Mestek will allow for a more efficient process of picking orders and will also make the job easier for employees.

UP154

System for Elopement Prevention in At-Risk Populations

Chelsea L. Carter1
Morgan D. Roberson1
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 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,

or photographs; and aromatherapy by motion-detecting air fresheners. One specific proposed device was the Glo-and-Arrow. This device is a vinyl arrow with attached motion-activated lights intended to be placed near exits to redirect at-risk individuals from elopement opportunities. Caregivers can be alerted of elopement attempts through the IDEAL Security Motion Sensor and Alarm System (Model SK602X) and physically prevented through the installation of a Lockey 2835DC double-sided mechanical password-protected door lock. This solution will cost caregivers no more than $450. If successful, this system would reduce risks of elopement and adverse outcomes associated with wandering.

UP155

Capstone Project for IENG 4900

Patrick Thompson, Nicholas Clarke

Company: KCST is a leader in the manufacture of Engine Control Units by combining advanced robotics and automated manufacturing technology to provide world-class products. They are a 7 time Honda supplier performance award winner. Some of their certifications include IATF-16949, ISO-14001, CT-PAT, F-SUS-002 Energy Policy, and ISO-50001.

Present State: The ECU's (Electronic Control Units) that are manufactured at KCST have a process where they enclose 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 bonding must meet that criteria. If the bonding criterion is met, the ECU will also go through leak testing to try to identify any leaks in the bonding. If the ECU fails the visual criteria or the Leak Test, it will be considered scrap.

Present State issues: The problem is there is no approved process to repair an ECU with defective bonding.
Tools: ETRS (Engineering Test Results Summary), Flow Chart, Quality Tools (Company Software), Unit History (Company Software)

Future State: To develop and qualify an approved process that will successfully repair ECU's 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: The cost of scrapping a single ECU costs KCST $65.80. Every ECU that can be repaired will be direct savings to the company. Over time this can cause huge savings for the company. This project will be beneficial to the company goals as KCST is always striving to continuously improve their product and eliminate waste to satisfy the customer.

UP156

Winterville Metal Works

Cody Allen Blackburn
Lauren Rusak

Winterville Metal Works is a metal fabrication company that excels in special machine assemblies and parts that other metal shops cannot produce. Through the Spring of 2019, a plan to improve 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.

UP157

Detection of the Freshness of Fish Using A Novel Air Puff Device

Antonia Dingeman, Grace Krell, Keith Williams, Dr. Stephanie George, Dr. Carlyle Rogers, Dr. Jason Yao

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 eat. The second involved fish that had been spoiled for about two to 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.

UP158

Weyerhauser Capstone

Gregory DeDecker
Conner Briley
Clay Wagner

The name of our company is Weyerhauser located in Jamesville, North Carolina. The present state of the company is that there are two strappers 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 matrixes will be needed to complete this as well. The anticipated future state is to re-arrange plant layout by putting stackers and strappers in a line thus reducing cycle time. Improvement events will be actually rearranging 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.

UP159

Analytical Model of Ocean Energy: Determining Peak Energy Level Potential

Angela Colette Krebs, Shanyue Guan, Zhen Zhu

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 relieve the stress of traditional fuel energy in the coastal regions. The oceanic energy under consideration in this work includes 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.

UP160

Size Inclusivity

Ronicka Lanise Evans

The aim of this capstone project was to develop an inclusive fashion brand 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 body image, and the business model of Universal Standard, a successful inclusive fashion brand. Inclusivity is no matter how you look—short, tall, big, athletic, curvy, flat, plus size—you will not be 'discriminated' against based on you size. Currently, the fashion industry is struggling with size inclusivity illustrated by the big gap between plus-size population (50%) and plus-size

apparel sales (18%). This means that up to 32% of the women who wear size 14 and above are underserved with a limited range of fashion choices. Inclusivity matters because a market worth $21 billion is being ignored, full-figured women spend more than straight size women, and the ideal body has been the same for the past 50 years. Retailers in the industry are hesitant to join the market because it adds manufacturing costs, they don't want to be associated with full-figures. In history, true sizing didn't develop until 1941 by the US Department of Agriculture. Ideal body and beauty standards have evolved through time. Before the 1900s, curvy and voluptuous bodies were popular, and clothing items were created to accentuate these features. However, at the start of the 1900s, there was a shift from full-figured to slim bodies, which created problems because people were doing anything to have the look. Today, there has been a positive shift to celebrate diverse body types, but it doesn't mean that fashion will be made for them. Katie Sturino, a social media influencer, created the #makemysize movement to express her frustration of being an average size woman in the US. The movement calls for the fashion industry to recognize and represent the average to full-figure woman. One company responding to the call is Universal Standard. Established in 2015, the company provides high quality clothing to women of all sizes with affordable prices. With all the above information and market research, I developed my own fashion line "Curvaceous". The inspiration behind my designs is a celebration of women, all shapes and sizes.

UP161

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 concept these two major concepts share, is building relationships. In regards to Brand Attachment, through the application the company has to build a relationship with the user to retain the users business. Social presence builds relationships through the app, it gives the user a sense of warmth and comfort. Two main ideals come up with Brand Attachment, continuance intention and repurchase intention. When it comes down to it, the main purpose of branded mobile applications is customer retention, the business wants to keep the customer, in better words "continuance intention" and they want the customer to keep buying their product thus they would want "repurchase intention." The hypotheses that are going to be examined by a of 200 participants through an online survey on an online platform "Qualtrics" are interactivity is positively associated with brand attachment, brand attachment is positively associated with continuance intention, and brand attachment is positively associated with repurchase intention.

UP162

Investigation of Effects of Social Factors of Apps on Customer Continuance Intention

Katherine McKenzie May

It has been shown through previous research that there can be a bond that exists between an individual and a product, and also 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 to to out of his or her way for that someone and to try to be close to him or her. This bond can create an attachment, which is an emotional tie that is directed toward a particular object. Attachment is unique to other emotions because in a human's lifetime, he or she only gets attached to a miniscule amount of objects that are on the market, despite the amount of things he or she purchases. For the purposes of this paper, we will be discussing brand attachment, which is the attachment that lies between an individual and an object. The level of attachment someone has to an item can be a predictor of their commitment to it. The commitment will come in the form of the person habitually repurchasing the item long-term and not selecting a replacement for it. Commitment can be measured in terms of how loyal the individual stays with the brand. If the emotional attachment an individual has is predicted with an accurate model, it will possibly forecast his or her willingness to continue to choose the brand. This may also forecast the amount of money the consumer is willing to spend on the product in order to continue to use it, which can be extremely useful information to marketers and companies. In this paper, we will demonstrate how we create and test a 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. The survey will feature terms that will indicate emotion to further predict the amount of attachment the consumers have to a particular brand. Furthermore, we will differentiate the model by showing that it is not synonymous with other similar concepts, such as brand attitude and brand loyalty. While these terms are somewhat interrelated, they are different in terms of the model created. In conclusion, we will demonstrate how the scale is able to predict consumers' brand loyalty and likelihood of continuing to purchase it long-term despite possibly higher price variants.

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 the company's inaction to deal with the mortgage backed securities failure, reasons The Federal Reserve and Treasury did not help, and actions that leaders in the company failed to make. This study can help in the understanding of what happened at Lehman Brothers and why it failed.

UP164

Preparing the Future Accounting Professional for a Rapidly Changing World

Marianna 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 environmet. 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 examine the skills accountants will need in this new age of technology. The study will also develop some guideline regarding the training accounting students will need to be successful. CPAs and accounting professionals in both public accounting and industry were surveyed regarding their knowledge and use of these changing technologies. They were also asked to share how they are currently addressing these technologies in their current work environment. In addition, these professionals have provided guidance regarding the skills that future students will need as they enter the accounting profession and confront these different technologies. The results show that while new skills are definitely needed, many of the current skills that students learn are still required.

UP165

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, Nutrition Science, East Carolina University, Greenville, NC; Marti Van Scott, Office of Technology Transfer, East Carolina University, Greenville, NC; Alexis Briley, MS, RDN, School of Interdisciplinary Health Professions, Northern Illinois University, Dekalb, IL; Melani Duffrin PhD, RDN, chool of Interdisciplinary Health Professions, Northern Illinois University, Dekalb, IL; Crisianee Berry Ed.D., Nerd Clutch, Greenville, NC.

INTRODUCTION
Dialysis patients face numerous education, behavioral, and emotional challenges in managing chronic kidney disease (CKD). Patient knowledge of dialysis, awareness of what to expect, and understanding of necessary behavioral changes will better equip patients to manage the progression of CKD. The challenge is the time and cost that is required to deliver the education, ensure patient understanding, and ultimately achieve patient compliance. Technology has the potential to revolutionize the way patients are educated about dialysis while addressing some of the time and cost barriers. This project aimed 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.

METHODS
Using the lean launchpad method, our team conducted 50 interviews with patients, healthcare providers, game developers, and other stakeholders. Interview questions focused on disease management, patient education needs, interactive digital media structure, clinical delivery, and business model structure.

RESULTS
Our focus shifted from dialysis patients to CKD patients as healthcare providers thought education should start earlier in the disease process. Healthcare providers suggested phosphorus as a starting place because it is often a new dietary concept and challenge for CKD patients.

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.

UP166

Ameratrail Boat Trailers

Campbell Patrick Locke
Luke Spach

Nick Frances

Currently Ameratrial, a boat trailer manufacturing company, is having trouble getting trailers out on time due to the assembly line not having the parts they need. The company does not do a good job of bringing the parts to assembly once they have been received and once they are where they need to be they do not do a good job of correctly labeling them. We plan to implement the Five S method to better organize and speed up the process of getting parts where they need to be so trailers are going out on time. My team Luke Spach, Nick Frances, and I are creating a system for project champion, Scott Locke, to improve their process of receiving and distributing parts. Many of the nuts and bolts look very similar and can be hard to distinguish between if not labeled correctly, which causes a lot of confusion and frustration on the plant floor. To solve this problem, we first plan to implement the Five S method and then prepare a spreadsheet of the incoming ordered parts. On the spreadsheet we plan to have the name of the part, part location in warehouse and on 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 Ameratrail will allow them to continue to produce trailers in a timelier manner.

UP167

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 Malali,
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 usually seen in commercial buildings, industrial installations, residential units, warehouses, parks and recreational facilities. By performing an energy audit, energy wastage 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 (CSE3) 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.

UP168

HMF Express Process Improvement Project

Theotokis Kostadino Mavroidis
Tristen 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 up 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 share 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.

UP169

Real-time Augmented Reality Data Visualization Based On External Sensors

Dean Murray, Dr. Rui Wu, Dr. Zhen Zhu
Department of Computer Science, East Carolina University

Mixed reality or augmented reality is well-suited for providing immersive data visualization in medical research and education. However, the quality of the immersive reality visualization heavily relies on the accuracy of spatial measurement in these applications. Currently, the sensors housed in popular mixed reality systems are designed to estimate 3D visual maps in the surroundings. They are not focused on precisely tracking the location of objects, which results in limited accuracy in positioning of 3D models. External sensors may have to be used to improve the accuracy of biomedical models visualized in an augmented reality system. For example, infrared sensors in Virtual Reality systems can be used to track the position of target objects.

The positioning accuracy faces a bigger challenge when we visualize a sequence of 3D models or a 3D Hologram movie. Traditionally, these movies were precompiled from recorded 3D models in computer graphics software. However, this approach has limitations in medical applications. It is difficult to visualize a model that is constantly moving between regular and at times irregular states and a variable pace, for example, moving lungs and heart, in a synchronous way. In order to precisely localize the model with the actual organ at any given moment, the 3D models have to synchronize with the organ motion in real time.

In this work, we designed a real-time data visualization solution using the cross-platform game engine Unity. Instead of using precompiled movies, we will create a Claymation movie a series of pre-recorded 3D models that are controlled in Unity. It allows for synchronization between the movie and an external sensor input (for example, the current state of a patient heart during the cardiac cycle). We will investigate the capability of the augmented reality device, Microsoft Hololens, in handling large-sized models and movies.

UP170

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 manufacturing facilities of many 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 of 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 have them participate in filling out a Pareto diagram with us. Our anticipated future state 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

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 Pond1, Jason Loria1

1Department of Technologly Systems, East Carolina University

Green Office Certification is a program administered by SustainECU. As one of the 17 constituent institutions that comprise the UNC system, ECU requires major resources to sustain its mission. SustainECU exists to facilitate the reduction of wasteful practices and to improve efficiency. 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

Presenter's Name — Presentation Number — Page Numbers

The list below is in alphabetical order by last name. To the right of the name is the presentation number and the page numbers on which the presenter can be found. The page numbers are hyperlinked to the appropriate page. After clicking on the page number, it may be necessary to scroll up or down to find the presentation number.

Adams, Danielle	UP129	41, 194
Adkins, Marshall	UP74	37, 171
Alexander, Caroline	GO65	21, 70
Allen, Austin	UO29	30, 130
Alsahly, Musaad	GP86	26, 106
Amin, Bina	UO52	32, 139
Amin, Kirtan	UP27	34, 152
Amoiroglou, Anastasia	GO33	19, 59
Anthony, Scarlett	UO5	29, 119
Apperson, Avery	UP29	34, 152
Ashayer, Alireza	GP43	23, 89
Atkinson, Bradley	UP76	37, 171
Bain, Aaron	UP75	37, 171
Baker, Kellie	GP38	23, 87
Baran, Tara	GO9	17, 51
Barnes, Kristen	UP13	33, 145
Bartlett, Brian	GP48	24, 90
Basco, Joseph	UP116	40, 188
Bayles, Jocelyn	UO33	31, 132
Beasley, Houston	UP139	41, 198
Beattie-Sergio, Gabriel	GP32	23, 84
Beingolea, Monica	UP18	34, 147
Belcher, Wesley	GP90	26, 108
Bell, Natalie	UP146	42, 201
Bellardini, Dominique	UP14	33, 146
Benderman, Lesley	UO30	30, 131
Berryman, Glenesha	UP84	38, 174
Biggers, William	UP93	38, 178
Bishop, Victoria	UP163	42, 207
Black, Hannah	UP126	40, 193
Blackburn, Cody	UP156	42, 205
Bland, Jessica	UP48	36, 161
Booth, Charles	GP93	26, 109
Borsay, Peter	GO51	20, 66
Boykin, Timothy	UP35	35, 155
Bradley, Allison	GP22	22, 81
Bresch, Alan-Michael	GP87	26, 106
Brooks, Chequita	GP49	24, 91
Brown, Julia	UP65	37, 167
Brown, Samantha	GO12	17, 52
Brunet, Cole	UP144	41, 200
Brush, Jessica	UP82	38, 174
Bryan, Avery	UP15	34, 146
Buddo, Katherine	GP83	26, 104
Bunner, Wyatt	GO42	19, 63
Burch, Adam	UP56	36, 163
Bush, Dominic	GP5	21, 74
Butler, Hannah	UP137	41, 198
Butler, Joshua	UP150	42, 202
Butler, Reid	UO17	29, 124
Byers, Kijay	UP72	37, 170
Byrnes, Kimberly	GO23	18, 56
Campbell, Matthew	UO9	29, 121
Carstens, Mitchell	UP30	35, 153
Carter, Chelsea	UP154	42, 204
Carter, Danielle	GP40	23, 88
Carter, Kerry	UP37	35, 156
Carter, Robin	GO46	20, 65
Cartwright, Caitlin	UP128	41, 194
Cataldo, Natalie	GON2	27, 114
Cavenaugh, Sean	GO34	19, 59
Chanakira, Mina	UP119	40, 190
Chesnutt, Kristin	UP100	39, 181
Childers, Thomas	GP39	23, 87
Chipiwalt, Kara	GO61	20, 69
Christensen, Timothy	GO49	20, 66
Clark, Alexander	UP109	39, 185
Clark, Eric	UP149	42, 202
Cohen, Christopher	GO17	18, 54
Cole, Timothy	GO18	18, 54
Coleman, Katherine	UP7	33, 142
Coleman, Kristin	UP23	34, 150
Collins, Caleb	UP66	37, 167
Collins, Katie	UP86	38, 175
Conder, Lauren	GP10	21, 76
Cone, Sean	UO44	31, 136
Cooper, Bailey	UP131	41, 195
Cooper, Hannah	UP20	34, 148
Corpening, Drew	UP12	33, 145
Cox, Jeremy	UP80	38, 173
Criscitiello, Ava	UP87	38, 175
Crumpler, Michael	UP136	41, 197
Darcey, Catherine	GO3	17, 49
Daugherty, Kayla	GO63	21, 70
Daughtridge, Sarah	GP26	22, 82
Davis, Eliza	UP6	33, 142
Davis, Hunter	UO10	29, 121
Davis, Kaleb	UP36	35, 156
Davis, Nicole	GP33	23, 85
Davis, Nolan	UP111	40, 186
DeDecker, Gregory	UP158	42, 205
Dement, Taylor	GO19	18, 54
Denning, Michael	UP127	41, 193
Dennis, Troy	UO26	30, 129
DeOca, Kayla	GP80	26, 103
DePizzol, Jarrett	UP140	41, 199
Desiderio-Segovia, Erika	UP63	36, 166
Deville, Phillip	GP62	24, 96
Dingeman, Antonia	UP152	42, 203
Dominado, Graziella	UP42	35, 158
Donahue, Abigail	UP24	34, 150
Dorgham, Mohammed	GP82	26, 104
Downs, Emily	UP33	35, 154
Dragulski, Michael	UP60	36, 165
Driver, Robert	GO14	18, 53
Dumm, Riley	UP143	41, 200
Edmonds, Emily	UP70	37, 169
Edwards, Emily	GP21	22, 80
Ellis, Dillon	GO38	19, 61
Enoch, Khaleb	UP50	36, 161
Escalona Berbetty, Boris	GP17	22, 79
Evans, Parker	GP76	25, 101
Evans, Ronicka	UP160	42, 206
Farah, Mohammad	UP46	35, 160
Farrow, John	PD1	28, 116
Fisher, Richard	UP161	42, 206
Fisk, Allison	UP49	36, 161
Fleishman, Madeline	UP39	35, 157
Foster, Samantha	UP19	34, 148
Fox, Keely	GP15	22, 78
Franks, Cheyenne	GP23	22, 81
Fricke, Ariel	UP101	39, 181
Garland McKinney, Jasmine	GO60	20, 68
Garrigues, Madison	UO6	29, 120
Gemelli, Victoria	GP28	22, 83
Gibbons, Seth	GP61	24, 95
Gilbert, Imani	UP17	34, 147
Gokturk, Esra	GP60	24, 95
Gold, Anna	GO2	17, 48
Goldberg, Emma	GO43	19, 63
Goodman, Stephanie	UP132	41, 195
Goodrich, Samson	UO14	29, 123
Gordon, Christa	UP31	35, 153
Graden, Kaitlyn	UO7	29, 120
Grantham, Rachel	UP95	39, 179
Griffith, Rachel	GO20	18, 55
Guan, Yichen	GO54	20, 67
Guard, Kaitlin	UP38	35, 156
Gudivada, Akhil	GO29	19, 58
Guiler, William	UO27	30, 129
Gunn, Amy	GO56	20, 67
Gwyn, Mairin	GO53	20, 67
Gwynn, Noah	UP51	36, 162
Hafen, Paul	PD4	28, 117
Haley, Erin	GP3	21, 73
Han, Junghoon	GO52	20, 66
Haney, Laura	GP1	21, 73
Hardee, Dylan	UO36	31, 133
Harper, Leigh	UO23	30, 127
Harrup, Matthew	GP9	21, 76
Hasan, Danish	UP124	40, 192
Hayes, Alexandra	GP70	25, 99
Hayes, Coleman	UP4	33, 141
Hein, Krista	GP19	22, 80
Hemgen, Calie	UO45	31, 136
Hempenius, Nicholas	GP44	23, 89
Herman, Callie	UP98	39, 180
Hilliard, Taylor	GP25	22, 81
Hogel, Maranda	GO13	17, 52
Holland, Ethan	UP9	33, 143
Holsinger, Jourdyn	GO5	17, 49
Hondros, Alexander	UP123	40, 192
Hopersberger, Dariel	GP78	26, 102
Horrell, Sarah	UP138	41, 198
Hsu, Binkai	UP121	40, 191
Huber, Nichelle	GP6	21, 75
Huda, Fatama	GP45	23, 90
Hunter, Samuel	UP134	41, 196
Huynh, Toan	GP42	23, 89
Hyde, Ashlyn	UP28	34, 152
Hylton, Todd	UP89	38, 176
Islam, Anan	UO40	31, 134
Ives, Leslie	GON5	27, 115
Jackson, Megan	UP22	34, 149
Jaimes, Felicia	UP114	40, 187
Jarrett, Christopher	UP44	35, 159
Jimenez-Garrido, Corichi	GO22	18, 55
Johnson, Jeremiah	UP151	42, 203
Johnsrude, Matthew	GP69	25, 98
Judd, Carly	UP90	38, 177
Jung, Andrew	GP34	23, 85
Kautz, Sarah	UO4	29, 119
Kendle, Wesley	GP75	25, 101
Khademorezaian, Kasra	GO30	19, 58
Kim, Youngjae	GO47	20, 65
Kimble, Kelly	UP1	33, 140
Kisling, Andrew	GP72	25, 100
Kloth, Emma	UO15	29, 123
Knecht, Heidi	GP51	24, 92
Knedler, Epiphany	GO57	20, 67
Koceja, Megan	UP57	36, 164
Kosnik, Hanna	UP110	39, 185
Kowalski, Nicholas	UO38	31, 134
Krebs, Angela	UP159	42, 206
Krell, Grace	UP157	42, 205
Lafave, Elizabeth	GP77	25, 102
Lakshminarayana, Deepthi	GP46	23, 90
Landry, Taylor	GO39	19, 62
Larkins, Christina	UO19	30, 125
Lee, Aaron	GP65	25, 97
Lee, Miranda	UO41	31, 135
Lee, Timothy	GP50	24, 91
Leon, Becky	UO20	30, 126
Leposa, Taylor	UP92	38, 177
Leu, Samuel	GP79	26, 103
Li, Andrew	UO47	32, 137
Lindsay, Samuel	UP62	36, 166
Lionelli, Amanda	UP40	35, 157
Litofsky, Justin	UP54	36, 163
Locke, Campbell	UP166	43, 208
Long, Kelli	GP16	22, 79
Long, Madison	GP24	22, 81
Love, Carmen	UP2	33, 140
Lower, Meghan	UO34	31, 132
Lowery, Rachel	GON1	27, 114
Ludwick, Jacob	GO26	18, 57
Maccarelli, Brian	GON3	27, 114
Macklin, Kelvin	UP68	37, 168
Makkia, Rasha	GO45	20, 64
Malcolm, Patricia	UP103	39, 182
Maleki Shoja, Babak	GO25	18, 56
Martin, Davis	GP29	28, 111
Martin, Justin	UP112	40, 186
Mavroidis, Theotokis	UP168	43, 209
May, Katherine	UP162	42, 207
Mcadams, Ellen	GO58	20, 68
McCauley, Madison	UP77	37, 171
McCusker, Shana	UP16	34, 147
McIntyre, Kadesha	GP73	25, 100
McKinney, Steven	UP153	42, 204
McKool, Kristen	UO1	29, 118
McLelland, Heather	GO48	20, 66
McMains, Jennifer	UP105	39, 183
McMillin, Shawna	GO36	19, 60
Meier, Emily	GP12	21, 77
Melit Thomas, Deepthy	UP88	38, 176
Mendenhall, Todd	GP55	24, 93
Midgette, Willa	GO64	21, 70
Miller, Ashley	UO13	29, 122
Miller, Spencer	GP92	26, 108
Mirabelli, Karlie	GP7	21, 75
Mitchell, Nicole	GO6	17, 50
Moller, Alison	UO35	31, 133
Moody, Marcus	UP148	42, 202
Mook, Mariah	UO16	29, 124
Moore, Christopher	GO15	18, 53
Moore, Hannah	UP106	39, 184
Morrison, Theodore	GO8	17, 51
Morton, Caroline	UO8	29, 120
Moser, Amanda	GO59	20, 68
Moskwiak, Meredith	UO24	30, 128
Murdock, Jenna	UP79	37, 173
Murray, Dean	UP169	43, 209
Musgrave, Amy	UP61	36, 165
Nance, Daniel	UP122	40, 191
Neequaye, Nicole	GO37	19, 61
Neese, Chase	UP85	38, 175
Neice, Amberly	GO32	19, 59
Nimmo, Wesley	GP20	22, 80
Norris, Jessica	UO42	31, 135
O'Brien, Anna	UO46	31, 137
Odom, Michael	GP89	26, 107
Oliveira, Thais	UP125	40, 192
Osunkwor, Offormata	GP53	24, 92
Pahl, Matthew	UP118	40, 189
Pakala, Pranaya	UP133	41, 196
Palethorpe, Samantha	GP88	26, 107
Palmer, Caitlin	UO43	31, 135
Papariello, Alexis	GP91	26, 108
Park, Youngyong	GP81	26, 103
Parker, Joshua	UP53	36, 162
Parrott, Mattie	UP102	39, 182
Patel, Bhavin	GP94	26, 109
Patel, Priya	UP165	42, 208
Patel, Pujan	UP104	39, 183
Patel, Radha	UP45	35, 160
Patel, Vishwa	GO28	18, 57
Patton, Ryan	UP99	39, 181
Paul, Elliot	UP173	43, 210
Pearce, Daniel	UP142	41, 199
Pearce, Sophia	UP55	36, 163
Perez, Regent	UP25	34, 151
Petrellese, Alexa	UO3	29, 118
Petritsch, Amanda	GO44	20, 64
Philips, James	UP171	43, 210
Phillips, Morgan	UP94	38, 178
Piggott, Megan	UO48	32, 138
Pinaire, Alexander	GP84	26, 105
Pogue, Joel	GP47	24, 90
Pond, Leanna	UP172	43, 210
Poppenfuse, Samantha	UO22	30, 126
Powell, Casey	UP32	35, 154
Price, Kyra	GO35	19, 60
Proctor, Kristen	GO1	17, 48
Pumphrey, Conor	UP97	39, 180
Purcell, Lauren	GO55	20, 67
Quainoo, Ruth	GP14	21, 78
Quinones, Taylor	UO31	31, 131
Quintero-Rivera, Julian	UO18	30, 124
Rahman, Mizanur	GP59	24, 94
Rajaei, Afarin	GO62	20, 69
Raper, Madigan	UP8	33, 143
Ray, Katherine	UP52	36, 162
Reed, Angelica	UO39	31, 134
Reeves, Kelsey	GP36	23, 86
Revankar, Nikita	UP135	41, 197
Ricks, Tyla	GO11	17, 52
Robbins, Adelaide	UP5	33, 141
Rogers, Christopher	UP107	39, 184
Rogers, Kimberly	GO10	17, 51
Rohlik, Denise	GP74	25, 101
Roozbehi, Sara	UP58	36, 164
Rudiak, Gabby	UP21	34, 149
Rushing, Amanda	PD3	28, 116
Rushing, Blake	PD2	28, 116
Safa, Dunya	GO4	17, 49
Sanghvi, Anuj	UP120	40, 190
Sanghvi, Anup	UP96	39, 179
Sarsour, Mohammad	UO28	30, 130
Satterley, Christopher	UP147	42, 201
Saul, Amelia	GP8	21, 75
Sault, Timothy	GP58	24, 94
Sawyer, Everett	UP170	43, 210
Scales, Autumn	GP35	23, 86
Schmitz, Kelsey	GO21	18, 55
Scott, Emily	UP64	37, 166
Seip, Robert	GP63	28, 113
Semon, Kelly	GP27	22, 82
Sesemann, Erin	GP13	21, 78
Shaw, Anne	GP18	22, 80
Shurina, Marianna	UP164	42, 207
Smessaert, Dana	GO50	20, 66
Smith, Cameron	UP108	39, 184
Smith, Deryn	UP91	38, 177
Spragley, Kelsey	GO7	17, 50
Springer, Catherine	GP37	23, 86
St. Onge, Danielle	UP78	37, 172
Stafford, Christopher	GP31	22, 84
Stephens, Alexandria	UP26	34, 151
Stoehr, Alexander	UO49	32, 138
Sturdivant, Amber	UP83	38, 174
Sutton, Seth	GP57	24, 94
Swain, Brianna	UP11	33, 144
Swanson, Kyle	GP66	25, 97
Taghikhani, Shahin	GO27	18, 57
Taylor, Catherine	UP43	35, 159
Taylor, Erin	GO68	21, 72
Taylor, William	UP117	40, 189
Teller, Jacek	GO16	18, 53
Thomas, Andrew	UP145	41, 201
Thompson, Carrie	UO50	32, 138
Thompson, Chelsea	UO2	29, 118
Thompson, Patrick	UP155	42, 204
Thornton, Shelly	GP11	21, 77
Tikekar, Jay	UO25	30, 128
Tucci, Erin	UO21	30, 126
Turner, Alexander	UP115	40, 188
Tyson, Jacqueline	UP3	33, 140
Tyson, Kristin	UP67	37, 168
Van Niekerk, Tara	GP4	21, 74
VanHoy, Carley	UP81	38, 173
VanRiper, Owen	UO12	29, 122
Varju, Eliza	UP41	35, 158
Venuto, Alexandra	GP64	25, 96
Viverette, Elizabeth	UP73	37, 170
Vogel, Thomas	GP52	24, 92

Presenters' Index

Presenter's Name — Presentation Number — Page Numbers

The list below is in alphabetical order by last name. To the right of the name is the presentation number and the page numbers on which the presenter can be found. The page numbers are hyperlinked to the appropriate page. After clicking on the page number, it may be necessary to scroll up or down to find the presentation number.

Presenters' Index

Presenter's Name — Presentation Number — Page Numbers

The list below is in alphabetical order by last name. To the right of the name is the presentation number and the page numbers on which the presenter can be found. The page numbers are hyperlinked to the appropriate page. After clicking on the page number, it may be necessary to scroll up or down to find the presentation number.

Wambui, David	*GP41*	*23, 88*
Ward, Joseph	*UP69*	*37, 168*
Weingartz, Ashley	*UO11*	*29, 122*
Welsh, Zoe	*GON4*	*27, 115*
Wester, Emma Rae	*UO32*	*31, 131*
Weybrecht, Thomas	*UO51*	*32, 139*
Weyrauch, Luke	*GO41*	*19, 62*
White, Avian	*GP54*	*24, 93*
White, Laura	*GP71*	*25, 99*
Whittington, Laura	*UP34*	*35, 155*
Widdowson, Morgan	*UP10*	*33, 144*
Williams, Alexandra	*UP113*	*40, 187*
Williams, Keith	*UP141*	*41, 199*
Williams, Rachel	*GP2*	*21, 73*
Williamson, Brent	*UP71*	*37, 169*
Wilson, Colon	*GP30*	*22, 84*
Wilson, Danielle	*GO24*	*18, 56*
Wilson, Emily	*GP85*	*26, 105*
Wilson, Thomas	*GO67*	*21, 71*
Winkler, Corey	*UO37*	*31, 133*
Wiser, Hannah	*GO66*	*21, 71*
Woodlief, Matthew	*UP59*	*36, 165*
Woolard, Hannah	*GP68*	*25, 98*
Woznichak, Claudia	*UP130*	*41, 195*
Xiong, Franklin	*UP47*	*35, 160*
Yaeger, Matthew	*UP167*	*43, 208*
Yang, Hailong	*GP56*	*24, 93*
Yuvan, Steven	*GO40*	*19, 62*
Zangwill, Denise	*GP67*	*25, 97*
Zapanta, Jules	*GO31*	*19, 58*

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!

FOLLOW US!

ECUGradSchool

@ECUGradSchool