



# RUN WITH NEW IDEAS

12<sup>th</sup> ANNUAL  
**RESEARCH &  
CREATIVE  
ACHIEVEMENT  
WEEK**




---

MARCH 26 –  
APRIL 2 2018

---

MENDENHALL  
GREAT ROOMS

---

 #RCAW2018  
 ECU.EDU/GRADSCHOOL  
 ECUGRADSCHOOL







# Research & Creative Achievement Week 2018

We would like to give a special thanks to ECU School of Art and Design graphic design undergraduate student John Hargrove, 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.





*Run with  
new ideas*



# Table of Contents

---

<a href="#">06</a>	Letter from Provost <a href="#">Ronald Mitchelson</a> , Vice Chancellor for Health Sciences <a href="#">Phyllis Horns</a> , and Interim Vice Chancellor, Division of Research, Economic Development and Engagement <a href="#">Michael Van Scott</a>
<a href="#">07</a>	Program Sponsors
<a href="#">08</a>	Research and Creative Achievement Week Committees
<a href="#">09</a>	Event Schedule
<a href="#">10</a>	Lectures and Symposia
<a href="#">18</a>	Mentor Listing
<a href="#">19</a>	Student Presenter Schedule
<a href="#">19</a>	Graduate Oral Presentations
<a href="#">24</a>	Graduate Poster Presentations
<a href="#">33</a>	Graduate Online Presentations
<a href="#">34</a>	Post Doctoral Scholar Presentations
<a href="#">35</a>	Undergraduate Oral Presentations
<a href="#">38</a>	Undergraduate Poster Presentations
<a href="#">48</a>	Undergraduate Online Presentations
<a href="#">51</a>	Graduate Abstracts
<a href="#">51</a>	Oral Presentations
<a href="#">77</a>	Poster Presentations
<a href="#">129</a>	Online Presentations
<a href="#">132</a>	Post Doctoral Scholar Abstracts
<a href="#">136</a>	Undergraduate Abstracts
<a href="#">136</a>	Oral Presentations
<a href="#">153</a>	Poster Presentations
<a href="#">215</a>	Online Presentations
<a href="#">219</a>	Presenter Index



## ACADEMIC COUNCIL

**Ron L. Mitchelson**, PhD, Provost & Senior Vice Chancellor for Academic Affairs | [mitchelsonr@ecu.edu](mailto:mitchelsonr@ecu.edu)

**Phyllis N. Horns**, RN, DSN, FAAN | Vice Chancellor for Health Sciences | [hornsp@ecu.edu](mailto:hornsp@ecu.edu)

**Jay S. Golden**, PhD, Vice Chancellor for Research, Economic Development, & Engagement | [goldenj17@ecu.edu](mailto:goldenj17@ecu.edu)  
Greenville, NC 27858-4353 | [www.ecu.edu](http://www.ecu.edu)

March 2018

We are pleased to invite you to participate in the East Carolina University Research and Creative Achievement Week (RCAW). The week of March 26–April 2, 2018, 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. The event is sponsored by a partnership of these entities: 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.

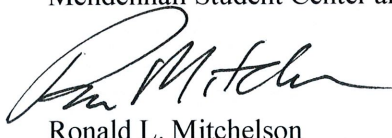
Research and Creative Achievement Week is a showcase of graduate and undergraduate student research and creative activities that are taking place here at ECU. There will be over 440 student presentations, a new record and an impressive number that reflects the continuing growth of research and creative activities at ECU in a variety of fields and disciplines. We will host our very first student-initiated, student-organized Opening Plenary Session on Monday, March 26, at noon. Graduate student oral and poster presentations and the Postdoctoral Scholar poster presentations will take place on Monday, March 26. Undergraduate student oral and poster presentations will take place on Wednesday, March 28. In addition, we have online presentations for both undergraduate and graduate students.

As part of our continuing emphasis on student and student-faculty collaborative work, the International Scholars' and Students' Symposium will take place on Tuesday, March 27<sup>th</sup>. The Intersection of Arts and Sciences event will take place on Wednesday, March 27. The College of Education Faculty and Student Research Showcase will be on Wednesday afternoon. The entire week is capped off with the announcement of the student and postdoctoral RCAW award winners, Graduate Faculty Mentor Award winners, Thesis and Dissertation Award winners, and other award winners at noon on Monday, April 2.


Please consider encouraging your classes to attend specific discipline-related oral student presentations on Monday, Tuesday, and Wednesday, or to view the poster presentations Monday through Thursday.

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 Mendenhall Student Center and participating in these events.



Ronald L. Mitchelson



Phyllis N. Horns



Jay S. 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: Biology, Assistant Vice Chancellor, Interim, Division of Research, Economic Development, and Engagement, Director of Undergraduate Research, RCAW Co-Chair

Caitlin Bullock: Nutrition Science, College of Allied Health Sciences

Bob Chin: Technology Systems, College of Engineering and Technology

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 and Microbiology & Immunology, Brody School of Medicine

Derrick Isler: The Graduate School

Donna Kain: English, Thomas Harriot College of Arts and Sciences

Marquerite Latham: The Graduate School

Margaret Macready: Division of Research, Economic Development, and Engagement

Cameron Schmidt: Graduate & Professional Student Association & Physiology, ECDOI

Shona Smith: MBA Student, College of Business

Virginia Stage: Nutrition Science, College of Allied Health Sciences

Gabby Whitlock: Communications Student, School of Medicine

Guili Zhang: Special Education, Foundations & Research, College of Education

## Technical Committee

---

Wendy Creasey

Charles Elton

Laurie Godwin

Derrick Isler

Marilyn Linton

Monica Moore

Mike Myles

Matthew Powell

Ginny Sconiers

John Southworth

Eric Williams



# Research Week Daily Schedule

---

March 26 — April 2

---

Monday

MARCH 26

8:00 am – 5:15 pm | Graduate Student Presentations

Oral sessions in MSC Great Rooms (GR1, GR2, GR3)

Postdoctoral Scholar Posters in Social Room

Graduate Posters in MSC Social Room

Graduate Posters in MSC Room 221

Graduate Posters in MSC Room Gallery

12:00 pm – 1:30 pm | Plenary Session

Tuesday

MARCH 27

7:30 pm – 12:00 pm | Graduate Posters | Posters taken down by noon

2:30 pm – 5:00 pm | International Scholars' Symposium | MSC Room 244

Wednesday

MARCH 28

8:15 am – 3:30 pm | Undergraduate Student Presentations

Oral Sessions | MSC Great Rooms (GR1, GR2, GR3)

Undergraduate Posters | MSC Social Room

Undergraduate Posters | MSC 221

Undergraduate Posters | MSC Gallery

9:00 am – 11:30am | Intersection of Arts and Sciences | MSC Room 244

Thursday

MARCH 29

7:30 pm – 12:00 pm | Undergraduate Posters | Posters taken down by noon

Monday

APRIL 2

12:00 pm – 1:30 pm | Student Awards Luncheon (Invitation Only) | MSC Great Rooms 1+2+3

RCAW Awards

Thesis/Dissertation Awards

ECU Distinguished Graduate Faculty Mentor Awards

Carol F. Volkman Awards

## Lectures & Symposia

---

Intersection of Arts and Sciences

International Scholars and Student Symposium

College of Education - Faculty and Student Research Showcase



# INTERSECTION: Arts@Science

HOSTED BY THE COLLEGE OF FINE ARTS AND COMMUNICATION

Welcome to the intersection, an eclectic collection of eight-minute talks that illuminate scientific research in the service of art, unveil creative activity that inspires breakthrough and/or showcases novel solutions found through interdisciplinary conversations.

Wednesday, March 28  
Mendenhall Student Center 244  
9:00 - 11:30 a.m.

Audience members are welcome to enter and exit between presentations.  
Questions? Email [artscomm@ecu.edu](mailto:artscomm@ecu.edu)

INTERNATIONAL SCHOLARS' & STUDENTS' SYMPOSIUM- EAST CAROLINA UNIVERSITY

Tuesday March 27th, 2018  
Mendenhall Student Center #244 (2:30- 5:00PM)

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- 3:00

**Building Net Zero Energy Sustainable Communities.** Ranjeet Agarwala, Department of Technology Systems, College of Engineering and Technology, East Carolina University and Tarek Abdel-Salam, Department of Engineering, College of Engineering and Technology, East Carolina University, Greenville, NC-27858

3:00-3:15

**Improving the Safety of Autonomous Operations of Small Unmanned Vehicles in Urban Areas.** Zhen Zhu, Department of Engineering, East Carolina University, Greenville, NC, 27858

3:15-3:30

**Predictors of Viral Load Suppression in HIV-infected Patient in Rural Eastern North Carolina.** Mouada Fadul and Nada Fadul, Division of Infectious Disease Department, Brody School of Medicine, Greenville, NC and Peyton Taylor, Gregory Kearney, Department of Public Health, Brody School of Medicine, Greenville, NC, 27858

---

3:30 PM-3:45 PM  
BREAK

---

Session 2:

Session Chair Dr. Nehad Elsawaf

3:45- 4:00

**An artificial intelligence based sensor for multilevel converter connected solar farms.** Faete Filho, Tyler Laurange and Praveen Malali, Engineering Department, East Carolina University, Greenville, NC, 27858

4:00-4:15

**Process Scale-up for A Complete Valorization of Wine- Making By-products Using Supercritical CO<sub>2</sub>.** Kurabachew Duba, College of Engineering and Technology, East Carolina University, Greenville, NC 27858 and Luca Fiori, Department of Civil, Environmental and Mechanical Engineering (DICAM), University of Trento, via Mesiano 77, 38123 Trento (TN), Italy

4:15-4:30

**The Global Egyptian Museum.** Amin K. Akhnouk, Ph.D., P.E. Construction Management Department, East Carolina University, Greenville, North Carolina, 27858

4:30-4:45

**An Historical and Ethnographic Study of Cultural Change and Continuity in the Use and Construction of Dhows and Outriggers in the Tanga Region, Tanzania.** Ryan D. Marr, Department of Maritime Studies, East Carolina University, Greenville, N.C. 27858

4:45- 5:00 Concluding remarks- Dr. Nehad Elsawaf

# College of Education Faculty and Student Research Showcase

## Invited Lecturers

Lecturers	Presentation
<b>Christina Tschida, Ph.D. and Kristen Cuthrell, Ed.D.</b>	<i>Partnering Principal and Teacher Candidates: Exploring a Virtual Coaching Model in Teacher Education</i>

## Invited Roundtable Presenters

Roundtable Presenter	Presentation
<b>Ya-Huei Lu, Ph.D.</b>	<i>Experienced iPad-using Early Childhood Teachers: Practices in the One-to-One iPad Classroom</i>
<b>Christopher J. Rivera, Ph.D.</b>	<i>A Culturally and Linguistically Responsive Framework for Improving Academic and Postsecondary Outcomes of Students with Moderate or Severe Intellectual Disability</i>
<b>Anne Ticknor, Ph.D.</b>	<i>Critical Considerations in Becoming Literacy Educators: Pre-service Teachers Rehearsing Agency and Negotiating Risk</i>

## Student Roundtable Presentations

Math Instruction/Achievement	Assessment/Feedback/Grading	Reading Instruction/Achievement
Candice Jarman	Emily Best	Jennifer Gribble
Jazmine Jones	Paige Hart	Rebecca Stuckey
Carla Matthews	Sydney Paladino	Corinne West
Morgan Willis	Brittany Smith	Danyel White
	Lauren Stott	Ashley Wilkins

Classroom Management and Classroom/Instructional Design	Learning/Grouping Structures and Instructional Contexts	Varied Topics
Lacie Anglim	Kara Cayton	Autumn Ginn
Tara Bagwell	Paige Hults	Samantha Gorham
Elizabeth Mendez	Summer Lee	Sarah Jones
Rebekah Swain	Necho Williams	Michael Song

Virtual Student Presenters	
Amy Aycock	Amy Pearce
Jasmyne Brooks	Linda Pettigrew
Alyssa Overton	Kelsie Yohe













# Mentor List

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

Abdel-Salam, Tarek	Elliott, Daniel Wayne	Manda, Alex Kapolo	Spangenburg, Espen Eric
Ables, Elizabeth Tweedie	Ellison, Lisa Marie	Mannie, Ann Elizabeth	Sprague, Mark William
Acheampong, Cassandra Dixon	Eppler, Marion A	Mansfield, Kyle David	Spuches, Anne M
Anderson, Eric Shawn	Etheridge, James Randall	Mathews, Holly F	Stage, Virginia Carraway
Asch, Rebecca G	Evans, Guyla C	May, Linda Elizabeth	Su, Hong-Bing
Aziz, Shahnaz	Ewen, Charles R	Mazow, Laura B	Summers, Kyle
Babatunde, Oyinlola Toyin	Falasca, Mauro	McConnell, Ann C	Sung, Sangwoo
Bailey, George	Feder, Helena M	McCoy, Krista Ann-Marie	Sutton, Jill Marie
Baker, Michael Drew	Ferreira, Rosana Nieto	McCoy, Michael W	Swanson, Gunnar
Balakrishnan, Christopher	Field, Erin Kirby	McRae, Susan B	Sylcott, Brian
Balanay, Jo Anne Goot	Fish, Matthew Taft	Meardon, Stacey Augusta	Thomassen, Mary J
Banerjee, Sambuddha	Floegel, Theresa Ann	Meggs, Susan Martin	Thompson, Angela T
Bauer, Margaret D	George, Stephanie	Mehta, Merwan B	Thompson, Beth
Baugh, Eboni Jacanne	Geyer, Christopher	Mendes, Michele Annette	Thomson, Deborah
Becker, Craig M	Golden, Jay Stuart	Mendez, Lucia I	Thornton, Kendall C
Bee, Beth Anne	Goodwillie, Carol	Mitra, Siddhartha	Tisnado, James R
Beierlein, Jaclyn J	Gowdy, Kymberly Mae	Mitra, Siddhartha	Torres, Essie Talina
Bier, Martin	Grace-McCaskey, Cynthia A	Mizelle, John Christopher	Tran, Tuan D
Blakeslee, April Monica Houghton	Hannan, Johanna	Moore, Mark E	Tulis, David Anthony
Blanchard, Sheresa Boone	Harcourt, Kate Taylor	Muller-Borer, Barbara J	Tyndall, Deborah Eastwood
Bova, Kenneth Paul	Hegde, Archana	Murenina, Elena Konstantinovna	Van Dross, Rukiyah
Bowler, Mark C	Heimann Rios, Adriana	Murray, Nicholas P	Verbanac, Kathryn
Brault, Jeffrey John	Hellweg, Joseph Raymond	Nassehzadeh-Tabrizi, Moha	Vermiglio, Andrew J
Brimhall, Andrew S	Hines, Ian Neil	Neil, Janice A	Vilkomir, Sergiy
Brooks, Benjamin Blakely	Hodson, Patricia A	Pan, Xiaoping	Virag, Jitka L
Cabot, Myles Clayton	Holt, Yolanda Feimster	Pawlak, Roman M	Walker, Joi Phelps
Callis-Duehl, Kristine L	Horne, Carolyn Ervin	Peralta, Ariane Legaspi	Walker, Marianna M
Campbell, Lisa	Horsman, Eric	Perry, Jamie L	Wang, George
Carels, Robert A	Houmar, Joseph A	Perry, Megan A	Wasklewicz, Thad A
Carolan, Christopher A	Howard, John W	Perry, Megan A	Watts, Clifton
Carpenter-Aeby, Tracy	Howard, William	Polakowski, Nicholas	Wells, Angela Franks
Castles, Ricky Thomas	Huang, Jinling	Quick, Linda Ann	Whited, Matthew Charles
Chalovich, Joseph M	Hudson, Nathan E	Radics, Aimee Christine	Witczak, Carol
Chen, Yan-Hua	Hughes, Robert Murray	Radloff, Jennifer Claire	Xu, Yanping
Chin, Robert A	Humphrey, Charles Pittman	Reis, Pamela Jones	Yang, Yu
Chou, Te-Shun	Hur, Misun	Richards, Stephanie Lynn	Yao, Jianchu
Clemens, Stefan	Issa, Fadi Aziz	Richman, Alice Rose	Zeczycki, Tonya N
Corbett, David R	Jacobs, Edward	Rickenbach, Thomas M	Zhu, Yong
Corra, Mamadi K	Jarrett, Lee Ann	Rider, Patrick Michael	Zhu, Zhen
Cortright, Ronald N	Jensen, Jakob F	Rider, Patrick Michael	Zipf, Karin LM
Covey, Burrell Montz	Johnson, Lee A	Ringler, Marjorie C	
Cox, Matthew Byron	Jolls, Claudia L	Roberson, Donna W	
Crane Mitchell, Linda	Jubran, Hanna	Roop, Roy M	
Crane, Patricia Ann	Jung, Jae Won	Roper, Rachel L	
Culver, Stephen J	Kane, Melinda D	Roper, Rachel L	
Curtis, Walter Robert S	Kang, Jin-Ae	Rowe, William Jason	
Danell, Allison S	Keene, Keith L	Rudel, David James	
Daneri, Juan Jose	Keiper, Brett	Rulifson, Roger A	
Daniel, Isaac Randolph	Kennedy, Joy Leigh	Russoniello, Carmen Vincent	
Das, Bhibha Mayee	Kim, Juhee	Ryan, Caitlin Law	
de Castro Bras, Lisandra E	Knox, David H	Ryan, Teresa Jean	
DeVita, Paul	Kulas, Anthony	Saidel, Benjamin A	
DeWitt, Regina	Lamson, Angela Lynn Smith	Sargent, Andrew	
Dickerson, Anne	Larson, Kim L	Sartipi, Kamran	
Didericksen, Katharine Wickel	Lee, Seung Hyun	Scemama, Jean-Luc	
Ding, Junhua	Leorri Soriano, Eduardo	Schoemann, Alexander Mirandy	
Dingfelder, Michael	Lin, Ziwei	Schreier, Ann M	
Dlugonski, Deirdre Marie	Littleton, Heather	Schwalbe, Ruth	
Dolbier, Christyn	Litwa, Karen Ann	Schwartz, Abby	
Domire, Zachary J	Litwa, Karen Ann	Sears, Samuel F	
Donica, Denise	Love, Brian	Shearman, Sachiyo M	
DuBose, Katrina D	Loy, David P	Shewchuk, Brian M	
Dudley, Wade Glendon	Lu, Qun	Shinpaugh, Jefferson	
Eble, Michelle F	Luchtenberg, Kimberly Fowler	Smith, Sarah E	
Egan, Matthew J	Mallinson, David J	Soderstrom, Kennth M	

# Graduate Oral Presentations

MONDAY 3.26.18

## Great Room 1 | Engineering

8:00 AM - 9:00 AM

- GO1 8:00 - 8:15 Performance Analysis of Hadoop Cluster for User Behavior Analysis
- GO2 8:15 - 8:30 Identifying a Cross-Correlation Between Heart Rate Variability and Skin Conductance Using Pain Intensity on Healthy College Students
- GO3 8:30-8:45 Passive Micromixers for DNA analysis using CFD modelling
- GO4 8:45-9:00 Experimental Demonstration of the Relationship of Coupling Stiffness and Sensitivity to Disorder in a Fabricated Cantilever Array
- 9:00-9:15 BREAK

## Great Room 1 | Biomedical Sciences

9:15 AM - 4:00 PM

- GO5 9:15-9:30 Specialized pro-resolving lipid mediators regulate bone marrow and splenic B cell populations in obesity in a sex-specific manner
- GO6 9:30-9:45 Ca<sup>2+</sup>/calmodulin-dependent protein kinase kinase  $\alpha$  (CaMKK $\alpha$ ) is not necessary for functional overload induced increases in glucose uptake or muscle mass in mouse skeletal muscle
- GO7 9:45-10:00 SR-BI Expression protective against IL-17-dependent neutrophilic asthma
- GO8 10:00-10:15 Cardiolipin microdomains form in the presence of cytochrome c and are dependent on cardiolipin concentration and acyl chain composition
- GO9 10:15-10:30 Prohibitin-1 and -2 have diverse cell-autonomous effects on inflammatory signaling
- GO10 10:30-10:45 Glycolytic and oxidative muscles exhibit differential changes in insulin sensitivity and glucometabolic enzymes in response to long-term denervation in mice
- GO11 10:45-11:00 Sperm or oocyte? Protein synthesis acts to control cell fate decisions.
- GO12 11:00-11:15 Epigenome-wide association study of the previous number of strokes in participants from the Vitamin Intervention for Stroke Prevention clinical trial identifies two novel associations.
- GO13 11:15-11:30 Identification of Galectin-1 Overexpression in Murine Primary and Metastatic Triple Negative Breast Tumors
- 11:45-1:15 BREAK
- GO14 1:30-1:45 Quantitative Method for Simultaneous analysis of Drugs of Abuse in Umbilical Cords using Liquid Chromatography/Mass Spectrometry
- GO15 1:45-2:00 Testosterone replacement reverses erectile dysfunction following androgen deprivation therapy by restoring internal pudendal artery vasodilation



# Graduate Oral Presentations

MONDAY 3.26.18

- GO16 2:00-2:15 The C-terminus of Troponin T Sets the Limits of Contractile Activity
- GO17 2:15-2:30 Critical role of claudin-7 in maintaining intestinal crypt stem cell functions
- GO18 2:30-2:45 Modeling correlation of T1 and T2 Weighted MRI to CT Intensity
- 2:45-3:00 BREAK
- GO19 3:00-3:15 Relationship of N-glycans to neuroblastoma
- GO20 3:15-3:30 Prostatic radiation therapy induces pelvic neuron apoptosis and bladder dysfunction with no impact on penile function
- GO21 3:30-3:45 The Development of beta-actin mutants with altered binding affinities for ATP and ADP
- GO22 3:45-4:00 Social regulation of the endocannabinoid system and modulation of the escape and swim circuits in zebrafish (*Danio rerio*)
- 4:00-4:15 BREAK

## Great Room 1 | Humanities

4:15 PM - 5:15 PM

- GO23 4:15-4:30 The Need for a New Approach in Technical and Professional Communication: The Black Male Gaze Theory
- GO24 4:30-4:45 Technofeminism: A Close Look at Literacy Center Components
- GO25 4:45-5:00 Writing Studies Research: Genre-fluid Writers, Queer Feminist Rhetorics, and Social
- GO26 5:00-5:15 From One Woman to Another: How Spanish Women Used Education to Spur Change in New Spain in the Sixteenth Century

## Great Room 2 | Technology and Computers

8:00 AM - 9:15 AM

- GO27 8:00-8:15 Adversarial Machine Learning: A Literature Review
- GO28 8:15-8:30 MC/DC coverage for requirement specifications
- GO29 8:30-8:45 Big Data Infrastructure for Analyzing Handwritten Documents
- GO30 8:45-9:00 Recommender Systems: A systematic Review on methodologies and applications
- GO31 9:00-9:15 Big Data Analytics on Twitter: A systematic review of data analytic methods
- 9:15-9:30 BREAK

# Graduate Oral Presentations

9:30 AM - 4:45 PM

MONDAY 3.26.18

## Great Room 2 | Fine Arts

- GO32 9:30-9:45 The Proletariat Muse
- GO33 9:45-10:00 The Puzzle of Global Warming
- GO34 10:00-10:15 Revitalize: Documenting Gentrification in Contemporary America
- GO35 10:15-10:30 Family Topographics
- GO36 10:30-10:45 It's Art...it's Science...it's Design Thinking!
- GO37 10:45-11:00 YK Korean in America
- GO38 11:00-11:15 Salty Napa Power!
- GO39 11:15-11:30 Depressed Six-Figure
- 11:45-1:15 PLENARY SESSION
- GO40 1:30-1:45 Fake Agates and Fused Glass
- GO41 1:45-2:00 Ancient photons: Deep Space Photography
- GO42 2:00-2:15 Unmasking Sweetness
- GO43 2:15-2:30 Adverse
- GO44 2:30-2:45 The Alternative Facts of Waste Culture
- GO45 2:45-3:00 Skinned
- 3:00-3:15 BREAK
- GO46 3:15-3:30 Tribalism
- GO47 3:30-3:45 Resonating Experience
- GO48 3:45-4:00 Stand-In, a surrogate spokesperson provider
- GO49 4:00-4:15 Creating Sound with Movement: The Body as an Instrument
- GO50 4:15-4:30 The Astronaut's Instagram: A Social Media Record of a Life Without a World
- GO51 4:30-4:45 Herbalism as a Contemporary Home Practice

## Great Room 3 | Social Sciences

8:00 AM - 3:15 PM

- GO52 8:00-8:15 The Relationship between Health Literacy and Cigarette Smoking Behavior of Undergraduates
- GO53 8:15-8:30 Sexual Risk Behaviors, Sexual Satisfaction, and Sexual Functioning among Rape Survivors
- GO54 8:30 - 8:45 Predictors and Moderators of Sexual Satisfaction in Dating Individuals
- 8:45 -9:00 BREAK

# Graduate Oral Presentations

MONDAY 3.26.18

- GO56 9:00-9:15 A Solar Farm in My Backyard? Resident Perspectives of Utility-Scale Solar in Eastern North Carolina
- GO57 9:15-9:30 What is the impact of incorporating culturally diverse literature in an organized classroom library on Kindergarteners' cultural tolerance?
- GO58 9:30-9:45 International Students' Dating Relationships in the United States
- GO59 9:45-10:00 The Untold Aftershocks: The Impact of Nepal's 2015 Earthquakes on Human Trafficking
- GO60 10:00-10:15 Carolina Sunset, Cuban Sunrise - A Comparative Study of Race, Class, and Gender in the Reconstructed South and Colonial Cuba, 1867 – 1869
- GO61 10:15-10:30 Examining Barriers and Health Literacy as a Facilitator to MyChart Practicality among Latino Caregivers: A Mixed-Method Study
- GO62 10:30-10:45 Exploring Effective Teaching Strategies at the University Level that Impact Low Socioeconomic
- GO63 10:45-11:00 Toxic Confinement: Increased Exposure to Airborne Toxins in Prison Facilities
- GO64 11:00-11:15 Undergraduate Apathy: What Faculty Can Do
- 11:45-1:15 PLENARY SESSION
- GO65 1:30-1:45 Emotions, Identity, and Sustainable Behaviors: A Study of Environmental Involvement in a Campus Community
- GO66 1:45-2:00 Analyzing Factors Contributing to Repeated Disaster Vulnerability and their Impact on Community Recovery
- GO67 2:00-2:15 WHO'S GETTING THE BEST SEX?: A Comparison by Sexual Identity
- GO68 2:15-2:30 A Systematic Review of Racial Biases in Healthcare Workers and Healthcare Disparities
- GO69 2:30-2:45 Nike Store Las Ramblas; Behind The "Shoe Wall"
- GO70 2:45-3:00 A Post-Race Society? A Content Analysis of Race during the Obama and Trump Inaugurations
- GO71 3:00-3:15 Exploring Pre-Service Early Childhood Education Teachers' Experience with Nutrition Education
- 3:15-3:30 BREAK

## Great Room 3 | Natural Sciences

3:30 PM - 5:00 PM

- GO72 3:30-3:45 Effects of temperature, salinity, and steel type on microbiologically influenced corrosion in

## Abstracts | Graduate Oral Presentations

North Carolina estuarine river systems

- GO73 3:45-4:00 Evolution of fast muscle movement in New World manakins (Pipridae)
- GO74 4:00-4:15 Generate and Characterize Adamts9 Knockout Mutants
- GO75 4:15-4:30 A Biophysical Approach to Understanding Fibrin's Extensibility
- GO76 4:30-4:45 Using Parasite Diversity in a Common Host Fish to Evaluate Anthropogenic Impact
- GO77 4:45-5:00 Effects of nutrient addition and disturbance on plant community assembly: a functional trait analysis in a long-term experiment

# Graduate Poster Presentations

MONDAY 3.26.18

## MSC 221 | Engineering

8:00 AM - 10:00 AM

- GP1 Engineering a Novel Dysfunctional High-Density Lipoprotein Mimetic Peptide
- GP2 Incorporation of Fibronectin on Electrospun Scaffolds to increase Biocompatibility and hMSC proliferation
- GP3 Effect of inhibitors of sphingolipid metabolism on colon cancer tumor spheroid formation
- GP4 Relationship Between Muscle Volume And Tibial Stress

## MSC 221 | Technology and Computer Sciences

8:00 AM - 10:00 AM

- GP5 Additive Manufacturing in Military Applications
- GP6 Use Recycled Concrete Aggregate as an Aggregate in Concrete – A Global Review and Current Status in America
- GP7 Generating Knowledgebase of Common Behavior and Workflow Patterns for Secure Healthcare Systems
- GP8 Knowledge Discovery in EHR System for Decision Support System
- GP9 Automatic Segmentation of LVP Muscle using Optical Flow Algorithm
- GP10 The Importance of Cybersecurity Education in the Society
- GP11 Simulated Environment for User-Behavior Pattern Matching in Distributed Systems

## MSC 211 | Natural Sciences

10:00 AM - 12:00 PM

- GP12 Diversity of Parasites in the Eastern Mud Snail *Ilyanassa obsoleta* associated with an Invasive Alga *Gracilaria vermiculophylla*
- GP13 Nassau Grouper Larval Distribution in Response to a Changing Climate and its Potential Fisheries Impact
- GP14 Genetic analysis of miRNA translation control in maize
- GP15 Will you be my neighbor? Exploring the relationship between iron-oxidizing and sulfate-reducing bacteria in coastal systems
- GP16 Design of an MeV Range Particle Accelerator Beamline for the Purpose of Optically Stimulated Luminescence
- GP17 Evaluation of the Ecological Services of Stormwater Control Measures in a Nutrient Sensitive



# Graduate Poster Presentations

MONDAY 3.26.18

- Watershed
- GP18 Infinity, human consciousness, and string theory.
- GP19 A Study of Impurities in Emerald and Beryl as Indicators for Color
- GP20 Constraints on incremental assembly of upper crustal igneous intrusions, Henry Mountains, Utah
- GP21 Passive acoustic monitoring for estuarine fish in very-shallow water using multi-channel hydrophone arrays
- GP22 Geophysical survey of a buried Triassic rift basin, Bertie County, North Carolina
- GP23 Development of a material analysis system using proton induced x-ray emission
- GP24 Impact of the insect growth regulator pyriproxyfen on life table characteristics of *Aedes albopictus*
- GP25 The effects of climate variability on ichthyoplankton ingress phenology through Beaufort Inlet, NC, USA
- GP26 Defining the Late Pleistocene Stratigraphy of a Low Gradient Coastal System in Beaufort and Hyde Counties, North Carolina.

2:00 PM - 4:00PM

- GP27 Simulating Transient Flow on Barrier Islands in Response to Predicted Climate and Sea-level Rise
- GP28 Could Viral Co-infection of Mosquitoes Impact Current Vector Control?
- GP29 Biophysical studies of Platelet-Fibrin Interactions
- GP30 Simon Says Help Me Procreate! Testing Behavioral Differences in two Non-Native Crabs after Exposure to a Microphallid Trematode
- GP31 Investigating Incrementally Assembled Intrusions in the Upper Crust, Henry Mountains, Utah
- GP32 Response of groundwater systems to changes in predicted climate
- GP33 The Geological Constraints of Blue Carbon Sequestration in Salt Marshes
- GP34 Simulating the Seasonal Change of Precipitation in the Southeast United States
- GP35 Stabilizing Commercial Starch Based Emulsions
- GP36 Dynamic and Thermodynamic Mechanisms for the Onset of the Southeastern United States Convective Season

# Graduate Poster Presentations

MONDAY 3.26.18

- GP37 Hickory Shad Stock Identification Using Multiple Methods
- GP38 Genetic Analysis of miR319-regulated TCPs in Maize Development
- GP39 Landscaping for Pollinators with Native Plants on Solar Panel Farms
- GP40 Potential for sublethal insecticide exposure to impact vector competence of *Aedes albopictus* (Diptera: Culicidae) for Zika virus
- GP41 Effects of Mechanical Manipulation on Cancer Cell Motility and Proliferation
- GP42 Sediment, Water-Quality, and SAV Interactions in Currituck Sound, NC
- GP43 Characterization of Polytipic1 Expression in Inflorescence Development
- GP44 The Coloring Effect of Chemical Impurities in Emerald and Beryl

## Social Room | Biomedical Sciences

8:00 AM - 10:00 AM

- GP45 The impact of mobile HRV training on depression in military personnel with posttraumatic stress disorder
- GP46 The effects of zinc oxide nanoparticles on the pharyngeal pumping and neurological behavior of *Caenorhabditis elegans*
- GP47 EphrinA1-Fc-Induced Phosphorylation and Nuclear Translocation of STAT3 Mitigates I/R Injury in Mouse Heart
- GP48 Cognitive Motor Control: The Event Related Potential of Tool-use
- GP49 Defining Synaptic Circuitry in Autism Spectrum Disorders
- GP50 The Effect of Poxvirus Virulence Genes on Host Immune Response
- GP51 Comparisons of Tumor Movement with Fiducial Movement Using 4D CT for Cyberknife Treatment for Lung Cancer Patients
- GP52 Film dosimetry in dose delivery to mice for clinical trials
- GP53 Generation of Transgenic Models to Isolate Mammalian Spermatogonia

10:00 AM - 12:00PM

- GP54 The Effect of Ca<sup>2+</sup> on  $\alpha$ -synuclein Binding to Transglutaminase 2
- GP55 Pharmacological Regulation of Neural Circuit Formation in hiPSC-derived Neurons and 'Mini-brains'

# Graduate Poster Presentations

MONDAY 3.26.18

- GP56 Using MALDI-MSI to determine relative quantitation of ephrin-A1 in murine cardiac tissue
- GP57 Presentation Assessing Damage-Associated Molecular Patterns (DAMPs) activation by Cannabinoids and Prostaglandins
- GP58 Do Lymphocytes from the Mediastinal Lymph Nodes of Carbon Nanotube + EAST-6 Instilled Mice Produce an Adaptive Immune Response?
- GP59 The manganese exporter EmfA is a critical virulence determinant for Brucella abortus 2308
- GP60 AMP Deaminase 3 Knockout Does Not Reduce Mitochondrial Content Loss in Denervation Induced Inactivity
- GP61 A Smad3/FoxO3 Transcriptional Relationship in the Regulation of Vascular Growth
- GP62 Chronological Expression of Matrix Metalloproteinase-12 in Granulomatous Disease
- GP63 Sensitization of malignant cells by nanoparticles to proton radiation
- GP64 Construction of Realistic Hybrid Computational Fetus Models for Radiotherapy Applications
- GP65 Examination of immune cell-mediated cell death as a new approach to selectively eliminate non-melanoma skin cancer
- GP66 Developmental manipulation of endocannabinoid signaling persistently alters reinforcing properties of abused drugs
- GP67 Coordinated Regulation of the Chkb and Cpt1b Genes in a Unitary Epigenetic Domain
- GP68 Determining the Mechanism of how Increased mRNA Modification N6-methyladenosine (m6A) Increases Proliferation, Migration and Invasion of Breast Cancer Cells.
- GP69 Electron Emission from Fast Ion Interactions with Gold and Amorphous Solid Water

2:00 PM - 4:00 PM

- GP70 Dynamic Posture in University Student
- GP71 Feasibility of using mesenchymal stem cell-derived skeletal myotubes to study skeletal muscle biology in vitro
- GP72 Effects of Cannabidiol (CBD) on Vocal Learning and Recovery from CNS Damage
- GP73 TConstruction and Calibration of a Micro-PIXE Line
- GP74 Proton and Carbon-Ion induced Secondary Electron Emission from Gold and Condensed-Phase Biological Targets

# Graduate Poster Presentations

MONDAY 3.26.18

- GP75 Hyaluronan and Hyaluronan Synthase Expression in Cortical Brain Development
- GP76 Real Time Imaging of GFP Tagged XRCC1 Repair Protein Responding to DNA Strand Breaks
- GP77 Accelerator Driven Proton Microbeam System for Radiation Biophysics Studies
- GP78 A regulatory role for the proton-sensing G protein-coupled receptor GPR68 in abnormal growth of vascular smooth muscle
- GP79 AMP Deaminase 3 Overexpression Reduces Mitochondrial Content in C2C12 Myotubes by Decreasing PGC-1 $\alpha$  Promotor Activation
- GP80 Elevated Skeletal Muscle Glucose Transporter 6 Levels May Attenuate High Fat Diet-Induced Insulin Resistance in Female Mice
- GP81 Dopamine Receptor D3 Has Sex-specific Roles in Age-dependent Left Ventricular Remodeling
- GP82 A neutron microbeam irradiator at ECU radiological research accelerator facility

## Social Room | Human Health

8:00 AM - 10:00 AM

- GP83 The Effectiveness of Battlefield Acupuncture in Reducing Pain
- GP84 The comparison of two assessments in measuring keyboarding skills of elementary students.
- GP85 Comparing Physical Activity Barriers in Adolescents With and Without Autism Spectrum Disorder
- GP86 Effects of Music on Driving Performance in Individuals with Autism Spectrum Disorder Compared to Neurotypical Individuals
- GP87 Chronic Pediatric Health Disorders in Economically Disadvantaged Families: Assessment of Stress and Coping in Children and Parents.
- GP88 Anxiety and College Students: The Benefits of Mindfulness-Based Meditation
- GP89 Ground Reaction Force And Kinematic Differences In The Kicking Leg During Accurate And Maximal Effort Soccer Kicking
- GP90 How Strength and Motion Training Effect Quadriceps Strength and WOMAC Score in Adults with Knee Osteoarthritis

# Graduate Poster Presentations

10:00 AM - 12:00 PM

MONDAY 3.26.18

- GP91 Development of Narratives in Kindergarten Latino Children
- GP92 Increases in insulin signaling following electrical pulse stimulation are blunted in myotubes derived from severely obese individuals with or without type 2 diabetes
- GP93 Risk Assessment of Forester Exposure to Hymenoptera
- GP94 Analysis of the Impact of Cranial Base Abnormalities on Cerebellar Volume and Velopharyngeal Variables Related to Speech in 22q11.2 Deletion Syndrome
- GP95 Secondary Post-Traumatic Stress and Its Treatment in Children of PTSD Veterans
- GP96 Maintaining a sense of identity across the caregiving trajectory
- GP97 The Variation in Strength Decrement of Lower Extremity Muscle Groups and Biomechanical Plasticity in Older Adults; A Research Proposal
- GP98 Maternal Aerobic Exercise and DHA Levels during Pregnancy Influences Infant Heart Outcomes

2:00 PM - 4:00 PM

- GP99 Barriers to Healthy Eating in North Carolina-based Head Start Programs: Examination of Food and Beverage Practices
- GP100 A Case Study of Virtual Reality Graded Exposure Therapy (VRGET) in Military Personnel with Post-Traumatic Stress Symptoms
- GP101 Effects of Visual Rehabilitation on Occupational Performance and Participation
- GP102 The Isolation and Quantification of Metabolically Active Pharmaceutical Compounds in Drinking Water
- GP103 The Relationship of Physical Activity and Motor Skills in Children Ages 3 – 5 Years Old: National Youth Fitness Survey
- GP104 CIIt's not only your classroom, learning is chaotic
- GP105 Understanding Influences of Preschool Children's Fruit and Vegetable Liking in a Low-Resource Population



# Graduate Poster Presentations

MONDAY 3.26.18

## MSC Gallery | Education

8:00 AM - 10:00 AM

- GP106 Outcomes of a Formal Keyboarding Instruction Program on Keyboarding Skills of Kindergarten Through Fifth Grade Students With Disabilities
- GP107 Do Head Start Teachers in North Carolina Use Supportive Feeding Practices at Mealtimes with 3-5-year-old Low-Resource Children?
- GP108 Factors that Influence Rural Head Start Parental Engagement in Preventing Childhood Obesity
- GP109 Public Education, Health, and Positive Citizenship Behavior: A Scoping Review

## MSC Gallery | Social Sciences

8:00 AM - 10:00 AM

- GP110 An Analysis of Beach Nourishment Projects Conducted by Local Governments in North Carolina
- GP111 Exploring Social Inequality at Petra through Dental Pathology
- GP112 Why Won't You Leave: An Evaluation of Employees' Willingness to Take Time Off
- GP113 Examining the Relationships Between Supports for Youth Development and School Connectedness in a Police Athletic League After School Program
- GP114 Workaholism and Affect: The Moderating Role of Mindfulness
- GP115 Together We Can: Increase Couple Functioning for Low-SES Families
- GP116 An Investigation of the Impact of a Sustainability Coordinator
- GP117 Does Interpersonal Conflict Management Influence the Current Relationship

10:00 AM - 12:00 PM

- GP118 "Sure I'll do that but the joke's on you." Trait Aggression and Malicious Compliance in the Workplace
- GP119 Early Literacy Within Pitt County: Perspectives From Community Stakeholders
- GP120 IA prospective cohort study of patient portal use among primary caregivers of children with comorbidities
- GP121 Using dental metric analysis to understand prehistoric population variability on the north carolina coastal plain
- GP122 Future Flood Risk Perceptions Following Hurricane Matthew: A Study of Eastern North Carolinians
- GP123 Outer Banks Tourists' Preferences, Sensitivities, and Environmental Perceptions: A Case Study of Cape Hatteras National Seashore
- GP124 Stable Isotope Analysis of Childhood Diet at 1st Century B.C./A.D. Petra, Jordan

\*Co-Presenter

# Graduate Poster Presentations

MONDAY 3.26.18

- GP125 Responses of NFL Owners to Players' Protests of Social Injustice
- GP126 Site formation processes and assigning significance to submerged cultural sites
- GP127 Focus groups with parents: What does it mean to be "healthy?"
- GP128 Let's Talk About Stress: Exploring Physiological Arousal While Discussing Relationship Problems
- GP129 The Association between Poor Quality Sleep, Daytime Sleepiness, and Eating Behaviors among
- GP130 College Students: An Ecological Momentary Assessment
- GP131 Mindfulness and Self-Compassion as Protective Factors in Psychological Well-being

2:00 PM - 4:00 PM

- GP132 A Reaction-Diffusion Model for Market Fluctuations - A Relation between Price Change and Traded Volumes
- GP133 Sea-Level Rise: Risks to Cultural Heritage Sites
- GP134 The Impact of the Multiethnic Placement Agreement (MEPA) on Foster Families and Their Communication Environment
- GP135 An Evaluation of Assessment Center Exercise Order Effects
- GP136 A Grounded Theory Examination of the Experiences of Families of Individuals with Intellectual Disability across the Lifespan

# Graduate Online Presentations

## Online Presentations | General

- GON1 Wake Kids Move!: An Advocacy Plan for Increasing Physical Activity in Wake County Schools
- GON2 Combating Food Deserts with Corner Stores in Eastern North Carolina: An Exploratory Study
- GON3 Student-Teacher Book-Talks and Reading Motivation
- GON4 Examining the Impact of the Hidden Curriculum on First Year Medical Students: a quantitative approach

ONLINE

## Postdoctoral Poster Presentations

Social Room | General

2:00 PM - 4:00 PM

MONDAY 3.26.18

- PD1 Interleukin-6 Trans-Signaling in Response to Acute Myocardial Infarction in Male BALB/c Mice
- PD2 Predicting the effects of predator diversity on prey populations
- PD3 Dietary DHA mitigates ozone induced pulmonary inflammation and reductions in specialized pro-resolving mediators
- PD4 The dihydroartemisinin oxime dimer (NSC735847) displays a selective toxicity in colon cancer cells which is potentially mediated by endoplasmic reticulum stress

# Undergraduate Oral Presentations

Great Room 1 | Biomedical Sciences

8:15 AM - 11:30 AM

- UO1 8:15-8:30 Using LC/MS to Quantify Metabolites in Urine Samples Post Clinical Exposure to Benzoates in Beverages
- UO2 8:30 - 8:45 Folic Acid: Friend or Foe?
- UO3 8:45 - 9:00 Impacts of Metal Oxide nanoparticles ZnO, CuO, and TiO<sub>2</sub> on reproductive function and gene expression in *Caenorhabditis elegans*
- UO4 9:00-9:15 Select hnRNPs facilitate the establishment and maintenance of germline stem cells in *Drosophila melanogaster*
- UO5 9:15-9:30 Radical prostatectomy and androgen deprivation cause a negative cumulative impact on neuron survival in the major pelvic ganglia
- UO6 9:30-9:45 Studying the Effects of Aerobic Physical Activity on the Cognitive Performance of a Type 2 Diabetic Population
- 9:45-10:00 BREAK
- UO7 10:00-10:15 Control of vascular growth by protease-activated receptors
- UO8 10:15-10:30 Linking Tev to Maltose-Binding Protein to Promote Gene Expression
- UO9 10:30-10:45 Molecular Evolution of Genes Associated with Preeclampsia: Gene Conflict
- UO10 10:45-11:00 Purifying Antarease from *E. coli*
- UO11 11:00-11:15 Unraveling the Mechanism of Action of the Immunoregulatory Poxvirus A35 Gene
- UO12 11:15-11:30 Optimization of an optogenetic switch for “one-click” light-mediated initiation of apoptosis
- 11:30-1:45 BREAK

Great Room 1 | Humanities

1:45 PM - 3:30 PM

- UO13 1:45-2:00 “I sing of words and the man”: Thwarting Obsolescence in Digital Humanities Software Through Test-Focused Design
- UO14 2:00-2:15 Critiquing New Iterations of Hegemonic Vision in Cuban Cultural Tourism
- UO15 2:15-2:30 A comparison of Aristotle’s guidelines for Tragedy in ancient literature to modern day video games.
- UO16 2:30-2:45 Wilmington Coup 1898 Literary Tour
- UO17 2:45-3:00 An Analysis of Existentialism and the Ontological Possibility of Authentic Love



# Undergraduate Oral Presentations

WEDNESDAY 3.28.18

UO18 3:00-3:15 From the Temple of God to the Temple of the Proletariat: Iconography and the Soviet Aesthetic

UO19 3:15-3:30 "Reading" Fashion in A. Pushkin's Eugene Onegin: 'Word' as 'Image' in 1820s Imperial Russia

## Great Room 2 | Engineering/Technology

8:15 AM - 11:00 AM

UO20 8:15-8:30 Gregory Poole Process Improvement

UO21 8:30 - 8:45 Comparison of UAV-mounted atmospheric sensors

UO22 8:45 - 9:00 Material Usage Variance Project (MUV)

UO23 9:00-9:15 Contributing to ECU's Sustainability Efforts: Gateway Residence Hall

UO24 9:15-9:30 Analyzing Sound Profiles of Unmanned Aerial Vehicles

9:30-9:45 BREAK

UO25 9:45-10:00 Microphone Mount System for Unmanned Aerial Vehicles

UO26 10:00-10:15 PAS Process Improvement in Line Balancing

UO27 10:15-10:30 Are there Temporal Shifts in the Perception of Cheating?

UO28 10:30-10:45 Modeling impulse response of a complex coupled system.

UO29 10:45-11:00 Hammer Reduction Project

11:00-12:00 BREAK

## Great Room 3 | Social Sciences

12:00 PM - 3:15 PM

UO30 12:00-12:15 Changing the Mindset of Students on Academic Warning: A Comparison of Face-to-Face and Online Mentoring

UO31 12:15-12:30 The Emotional Effect of Musical Underscoring in the Play columbinus

UO32 12:30-12:45 Social Stress and the Health of Women in the Andean Highlands: An Explorative Study

UO33 12:45-1:00 The Effect of Art Therapy On the Mental Health and Overall Well-Being of Medical Students in Eastern North Carolina

UO34 1:00-1:15 The Effect of NFL protests for TV Viewership

UO35 1:15-1:30 The Effects of Fine Arts on Language and Literacy Skills in Children

1:30-1:45 BREAK

UO36 1:45-2:00 Breast Cancer Survivors (BCS) experience and management of musculoskeletal symptoms

# Undergraduate Oral Presentations

WEDNESDAY 3.28.18

when receiving aromatase inhibitor therapy.

UO37 2:00-2:15 The Impact of British Fire Control Doctrine on the Loss of the Battlecruisers at the Battle of Jutland

UO38 2:15-2:30 Examining the Outcomes of a Community Academic Partnership

UO39 2:30-2:45 Whats Cooking in the Beersheba Valley?

UO40 2:45-3:00 Examination of Disclosure After Adverse Childbirth

UO41 3:00-3:15 Observational Play Assessment in Recreational Therapy (OPART): Applications for the Validation of Assessment in Recreational Therapy

## Great Room 3 | Human Health

8:15 AM - 12:45 PM

UO42 8:15-8:30 The Rural Prosperity Initiative: Public Health Disparities between Rural and Urban North Carolina

UO43 8:30 - 8:45 Scleroderma Defiance: A Practical, Educational and Free Guide for Self-Management of Scleroderma

UO44 8:45 - 9:00 Head Start Teachers' Experiences with Healthy Eating and Physical Activity

UO45 9:00-9:15 "Eugenics in (and against) the Mix: Tracing Race as a Marker of Extralegal Governmentality in the Historical and Contemporary United States"

UO46 9:15-9:30 Making the Invisibles Visible: A Health Literacy Campaign for Eastern North Carolina Migrant Farmworkers

9:30-9:45 BREAK

UO47 9:45-10:00 Public Health Discourse as Healing Dialogue: Responding to Obeah as an Etiology of Suicide in Contemporary Guyana

UO48 10:00-10:15 Community-Based Care as a Context for Addressing the Social Drivers of HIV Transmission: Charting Progress in Ghana

UO49 10:15-10:30 Healing Body, Spirit, and Society during Post-Earthquake Recovery: Vaudou and Public Health in Haiti

UO50 10:30-10:45 Pain perceptions of amputees with diabetes, their family and healthcare providers: A qualitative study

UO51 10:45-11:00 An Inventory of Waste: The Politics of Public Health and Race on Hog Farms in Eastern North

# Undergraduate Oral Presentations

WEDNESDAY 3.28.18

Carolina

11:00-11:15 BREAK

U052 11:15-11:30 Volatile Organic Compound (VOC) Emission in a University Printing Press Facility in Eastern North Carolina

U053 11:30-11:45 The Kinematic and Kinetic Changes During Distracted Landing and Focused Landing Tasks in College-aged, Female Soccer Athletes

U054 11:45-12:00 The Effects of Using Music to Decrease Screen Time in Preschool Aged Children

U055 12:00-12:15 Fiber's Doody: A Whimsical Tale of Fiber's Role in Digestive Health

U056 12:15-12:30 Homosexuality as a Vector of Morbidity in Africa: Tracing the Public Health Implication of Colonial and Neo-Colonial Practices

U057 12:30-12:45 "Biomedicine and Indigenous Healing in Africa: Steps toward Collaboration for Better Public Health"

12:45-1:45 BREAK

## Great Room 3 | Human Health

1:45 PM - 3:15 PM

U058 1:45-2:00 Thermal stress in artificial cavity-nesting Eastern Bluebirds: killing them with kindness?

U059 2:00-2:15 Lithological and Foraminiferal Characteristics of Shoreface and Shallow Shelf Facies off Bogue Banks, North Carolina

U060 2:15-2:30 Can an invasive species help save a threatened population of King Rails?

U061 2:30-2:45 Fibrinolysis and the Affects of Cross-Linking Within a Network

U062 2:45-3:00 Developing procedures for OSL dating of halite deposits

U063 3:00-3:15 Graviton Theory: Using Quantum and Classical Mechanics to Describe the Nature and Mechanics of Graviton Particles

# Undergraduate Poster Presentations

## Social Room | Technology and Computer Sciences

8:15 AM - 10:15 AM

- UP1 Design of a Graphic User Interface for InfoSec Learning Network Environment
- UP2 Improvements in Process Monitoring for Defect Reduction
- UP3 Water Reclamation system for Hyster-Yale manufacturing plant
- UP4 Dissecting Convolutional Neural Networks for Automatically Classifying Biomedical Images
- UP5 Increasing Slot Time Availability in Product Thaw
- UP6 Interior Design: Technological Marketing Strategies for the Profession
- UP7 The accurate computational evaluation of ionization potentials in the geometric isomers of phenylenediamine

## Social Room | Biomedical Sciences

8:15 AM - 10:15 AM

- UP8 SR-BI Expression protective against IL-17-dependent neutrophilic asthma
- UP9 EphrinA1-Fc Attenuates the Progression of Ischemic Cardiomyopathy in Chronically Non-reperfused WT mice but not EphA2-R-M
- UP10 The role of the viral protein HBZ in formation of Human T-cell Leukemia Virus Type 1 Biofilms
- UP11 Therapeutic effects of Y-27632 in chemotherapy-induced peripheral neuropathy from cisplatin
- UP12 Using Elastography to Examine Material Properties of the Interosseous Membrane
- UP13 A Computational Analysis of the Hydroacylation of Aldimines in the Presence of a Wilkinson's Catalyst
- UP14 Objective Quantification and Diagnosis of Edema through Air Edema Reporting (AERO)
- UP15 The Effects of ZCL278 on Cerebellar Cell Number in a Mouse Model of Alzheimer's Disease

10:15 AM - 12:15 PM

- UP16 High Fat Diet-Induced Insulin Resistance Negatively Impacts Cardiac Structure and Function in Mice
- UP17 Claudin-7 Plays a Critical Role in Maintaining the Number of Intestinal Stem Cells
- UP18 Functional Outcomes of Different Semitendinosus Tendon Insertion Sites
- UP19 Cloning, Expression, and Characterization of a Biocatalyst in *P. Pastoris* and *E. coli*

# Undergraduate Poster Presentations

WEDNESDAY 3.28.18

- UP20 Examining Factors Associated with Physical Activity During Cardiac Rehabilitation
- UP21 Investigating the role of Tnpo-SR and its cargo in germline stem cell function
- UP22 How fibrin fiber transection during fibrinolysis affects the rate of further degradation
- UP23 Claudin-7 is Required for the Epithelial differentiation of Mouse Intestinal Organoids

12:15 PM - 2:15 PM

- UP24 Reducing EDC Induced Birth Defects with Prenatal Supplementation
- UP25 Expression of a Protein Kinase A-Streptavidin Fusion Protein
- UP26 3D Visualization of Biomedical Systems
- UP27 Cortical Brain Organoids Model the Development of Autism Pathology
- UP28 Alterations in respiration kinetics of skeletal muscle mitochondria from offspring of mothers with polycystic ovarian syndrome (PCOS).
- UP29 Recombinant FtrA binds Cu<sup>2+</sup>
- UP30 Estrogen receptor alpha does not influence skeletal muscle fiber type, but has nominal effects on muscle size in female mice.
- UP31 Dopamine Receptor D3 Participates in Age-dependent Left-Ventricular Hypertrophy and Fibrosis and This Effect is Sex-Specific
- UP32 Changes in Cardiac Function and Mitochondrial Respiratory Capacity in B6 I/R Treated Mice
- UP33 Rho GTPase Modulators ZCL278 and ZCL279 Impact Neurobehavioral Outcomes in a Mouse Model of Alzheimer's Disease
- UP34 Methodology for the extraction, sectioning, and antibody staining of dorsal root ganglia (DRGs) in animal models of RLS
- UP35 Benzoic Acid: A Food Preservative's Hidden Role in Obesity
- UP36 A Role for Interleukin-6 Trans-Signaling in Cardiac Ischemia/Reperfusion
- UP37 Synaptic Circuitry in a 3-D Mini-Brain Model of Autism
- UP38 Macrophage Activation by TNF-alpha is Attenuated by EphrinA1-Fc
- UP39 Field Measure to Estimate Vertical and Leg Stiffness



# Undergraduate Poster Presentations

Social Room | Human Health

8:15 AM - 10:15 AM

- UP40 Understanding HPV-related Content in Schools of Medicine and Osteopathic Medicine Curricula
- UP41 Under Fire: Understanding the Associations between Stress, Communication, and Relationship Satisfaction in Law Enforcement Officers and their Romantic Partners
- UP42 Current State of Research in Anatomical Causes of Hearing Loss: A Review of the Literature
- UP43 Stroke Survivors' Dietary Compliance and Recommendations- Racial/Ethnic Differences
- UP44 Morphology of the Orbicularis Oris Muscle in Adults Using MRI
- UP45 Comparison of Slow-Releasing vs. High Glycemic Carbohydrate Supplementation to Improve Mental Performance Following Exhaustive Exercise
- UP46 The Effect of Previous Hamstring Injuries on ACL Injury Risk
- UP47 Development of a Clinical Tool for the Self-Assessment of Anxiety in Non-Sedated Pediatric Magnetic Resonance Imaging
- UP48 The Incidence and Outcomes of Electronic Cigarette use in Pregnant Patients at Brody School of Medicine

10:15 AM - 12:15 PM

- UP49 Comparison of Bacterial Contamination of Organic Versus Conventionally Produced Leafy Vegetables
- UP50 Assessing Content of Food Boxes Provided to Patrons at an Eastern North Carolina Food Pantry: A Nutrient Analysis
- UP51 Prevention of HPV-related Oral Cancer: A review of dental school curricula
- UP52 Influence of dialect and stimulus audibility on LiSN-S performances
- UP53 Examining the Relationship Between Reading Comprehension Level and Keyboarding Ability
- UP54 Effects of Family Influence on the Patient Planning to Undergo Bariatric Surgery
- UP55 Fashion Trends and Communications--The Royal Family
- UP56 Acceptability of Activity Monitor Use During and After Hospitalization in Older Patients with Heart Failure
- UP57 The Effect of Speech Bulb Usage During Speech Therapy to Improve Velopharyngeal Function: A Systematic Review
- UP58 Exploring the Use of Integrative Therapies During Pregnancy

WEDNESDAY 3.28.18

# Undergraduate Poster Presentations

WEDNESDAY 3.28.18

- UP59 The Use of Adipose Tissue in Reconstructive Surgery Related to Cleft Palate: A Review of the Literature
- UP60 Progressive loads in the tibia during exercise related activity
- UP61 Risks and Prevention of Bacterial Contamination on Cosmetics
- UP62 Environmental Hospital Sampling
- UP63 Assessing medical providers HPV-related health literacy
- UP64 Early Peanut Introduction for High-Risk Infants: A Narrative Review
- UP65 The Effectiveness of Battlefield Acupuncture in Reducing Pain

## Social Room | Education

12:15 PM - 2:15 PM

- UP66 Argument Driven Inquiry: A Chemistry Laboratory Implementation
- UP67 Do Head Start Parents Encourage Young Children to Practice Healthy Behaviors? Examination of Self-Report Parenting Practices related to Diet and Physical Activity
- UP68 Insects and Persistent Misconceptions
- UP69 Acquisition of Financial Education Among College Students: How Attitudes and Future Expectations Shape Desire for Personal Finance Education
- UP70 Using Universal Design for Learning Principles to Renovate Cellular Physiology Course Curriculum

## MSC 221 | Engineering

8:15 AM - 10:15 AM

- UP71 Using an affordable cellphone attachable microscope in identifying molds.
- UP72 Embedded computer system integrated within autonomous vehical.
- UP73 Improving Public Safety by Measuring Bacteria Levels in Real Time
- UP74 Mod Tech Utilization
- UP75 Simple Quality Control Test for 3D Printed Materials
- UP76 Evaluating Psychosomatic Response of Education Students Conducting Virtual Classroom Sessions
- UP77 The Best Foot Forward: How Design Representation Affects Consumer Judgment

# Undergraduate Poster Presentations

WEDNESDAY 3.28.18

- UP78 Best Practices for Printing a PCB using a Squink
- UP79 Capstone Abstract
- UP80 Pressure Evaluation of Tracheal Suction Catheters to Reduce Damage to Respiratory Airways
- UP81 Lean Six Sigma Improvements at Spirit AeroSystems
- UP82 Improving Clinical Diagnostic Methods for Group 1 Pulmonary Hypertension with ECHO and MRI-Derived Parameters

## MSC 221 | Social Sciences

8:15 AM - 10:15 AM

- UP83 Pain in Inpatient Hospice
- UP84 Object Stories Through Visual Prints
- UP85 College Students' Personal Finance Skills and the Role of External Influences
- UP86 Efficiency Analysis of Women's Collegiate Athletics
- UP87 Effects of Physical Characteristics on Initial Listing Price, Time On Market, and Ultimate Selling Price
- UP88 Disorders Undergraduate Social Sciences Poster Presentation
- UP89 The Tense/Lax Ratio in Read Speech of African American English

10:15 AM - 12:15 PM

- UP90 Adapting to Changing Resources: A Petrographic Analysis of Iron I Pottery from Tel Mique-Ekron
- UP91 Identifying Subjective Value in Women's College Golf Recruiting Regardless of Socio-economic Class
- UP92 Understanding health literacy in the context of preventative cancer screening among female college students.
- UP93 The Fundulus diaphanus Species Complex: Convergent Evolution?
- UP94 The Impact of Climate Change on Interbasin Transfers in North Carolina
- UP95 In Lead and Bone: The Battle of Fort Neoheroka
- UP96 Koru: A Mindfulness-Based Program for College Students

# Undergraduate Poster Presentations

WEDNESDAY 3.28.18

- UP97 Dietary Acculturation: a likely factor in the risk of Type 2 Diabetes among the Gullah tribe
- UP98 Effects of Observers on Athletic Performance: an Investigation of Male Sexual Displays
- UP99 One session of mindfulness meditation and reported anxiety, stress and depression.
- UP100 The Intersections of Oral Language and Spelling: A Literature Review
- UP101 Effect of Biophilic Design in the Lodging Industry
- UP102 Mastering Branding Application: The Relationship Between University Branding and MBA Program Enrollment
- UP103 Examining Health Related Experiences of Adolescents with Sickle Cell Disease
- UP104 Public Perception of Tax Avoidance

12:15 PM - 2:15 PM

- UP105 Fat Talk and Internalized Weight Bias
- UP106 An Examination of Infant Feeding Practices of Latina Immigrants
- UP107 Factor models for ordinal data: Comparing categorical and continuous approaches
- UP108 An Examination of Nursing's Contribution to Global Health
- UP109 Sex Differences in ICD Patients: Do Cardiac Self-Care and Shock Anxiety Predict the Adoption of Smartphone-ECG Technology?
- UP110 Secondary analysis of the effects of mobility on bariatric patients having weight loss surgery
- UP111 Identifying Disparities in Family Centered Care, Care Coordination, and Financial Strain for Parents of Children with Special Health Care Needs

## MSC 221 | Sustainability

12:15 PM - 2:15 PM

- UP112 Perceptions and Opinions of Sustainability in North Carolina Wineries
- UP113 Why Not West Greenville: Stories towards Sustainability
- UP114 Purple to Green: Stormwater, Green Infrastructure, and Retrofitting
- UP115 Visual Design in Modern Structures

# Undergraduate Poster Presentations

MSC Gallery | Natural Sciences

8:15 AM - 10:15 AM

- UP116 Characterization of tcp38 in Maize
- UP117 In Situ Meteorological Observations of Atmospheric Responses to the 2017 Solar Eclipse in Easter North Carolina Tori Barefoot
- UP118 Zooplankton community composition and size structure throughout river herring nursery areas in the Chowan River, North Carolina
- UP119 The Effects of Pharmaceuticals on Mosquitoes Oviposition Site Choice and Predator Detection
- UP120 Does variation in nest weight predict parental condition in Eastern Bluebirds?
- UP121 Hickory Shad Stock Identification: X-ray Analysis
- UP122 Ecological Role of *Gobiosoma bosc* on Biodiversity
- UP123 Impacts of exposure to Talstar insecticide on measures of *Aedes albopictus* (Diptera: Culicidae) vector competence for Zika virus
- UP124 Microbiologically Influenced Corrosion (MIC) of Pappy's Lane Shipwreck

10:15 AM - 12:15 PM

- UP125 Influence of Ethics on Evolution
- UP126 Optimizing the Synthesis of Diquinones
- UP127 Undergraduate Natural Sciences Poster Presentation
- UP128 Bogue Banks, North Carolina shoreface and inner shelf foraminiferal assemblages
- UP129 Creating an Effective Cultural Competency Program for Health Characterization of a Particle Microbeam by Confocal Imaging of Fluorescent Nuclear Tracks
- UP130 Early Ontogeny of *Alosa mediocris* from Egg to first-feeding Larva.
- UP131 Genes that Determine Nickel Susceptibility in *Caenorhabditis Elegans*
- UP132 Evaluating Wash Performance of Laundry Detergents Using Reflectance
- UP133 Examination of Supercritical CO<sub>2</sub>-Rock Interactions in Sequestration
- UP134 Synthesis of Biembelin
- UP135 The effects of mowing and fertilization on the clonal growth of switchcane
- UP136 A Climatology Analysis of Monsoonal Impacts on the Ganges-Brahmaputra-Meghna Region
- UP137 Fibrin Network Alignment Within Different Flow Rates

WEDNESDAY 3.28.18

# Undergraduate Poster Presentations

WEDNESDAY 3.28.18

- UP138 Androgen and progesterone receptor knockouts in zebrafish affect aggression and social dominance
- UP139 Applying data science to a dense network of precipitation observations in rural Jamaica: 2014-2015
- UP140 Influence of Parasites on Predator-Prey Relationships in NC Estuaries

12:15 PM - 2:15 PM

- UP141 Larval river herring abundance and morphological characteristics at five sites on the Chowan River
- UP142 Hickory Shad *Alosa mediocris* Pilot Study on Gill Raker Analysis and Natal Stream Fidelity  
Hickory Shad *Alosa mediocris* Gill Raker Analysis and Natal Stream Fidelity
- UP143 Shaking It Up: Optimizing Mechanical Cell Lysis to Improve DNA Extraction from Iron-Oxidizing Bacteria
- UP144 Testing the correlation between mechanical properties measured in fibrin and the repeating amino acid sequence in the  $\alpha$ C region of fibrinogen
- UP145 Mycorrhizal fungi and horizontal gene transfer: A look into the importance of transferred genes in a symbiosis
- UP146 Correlation Between Organophosphate Pesticide Accumulation in ENC Porcine Tissues and Type II Diabetes
- UP147 Yeast Antibody-Antigen Bond Engineering Using Centrifuge Force Microscopy
- UP148 Simulation of the Formation of a Washover Fan at Pea Island, North Carolina

# Undergraduate Online Presentations

## Online Presentations | General

UON1	A Comparison of Elementary Student Curriculum Satisfaction to Performance
UON2	The Effects of Sustainable Design Principles on the Engineering Industry
UON3	Infographics: The power of visual communication to improve health literacy of cancer patients.
UON4	UNC Coastal Studies Institute's Sustainable Design
UON5	Pirate Union
UON6	Minges Auxiliary Gymnasium: LEED Certified
UON7	A Novel Teaching Tool for Understanding Mammalian Mitochondrial Bioenergetics and the Electron Transport Chain
UON8	Southern Asian Post-Breast Cancer Patient Natural Treatment Plans

ONLINE





# **ABSTRACTS**

# Abstracts | Graduate Oral Presentations

GO1

Performance Analysis of Hadoop Cluster for User Behavior Analysis

Alireza Ashayer, Seyedfaraz Yasrobi  
Department of Computer Science, East Carolina University

User activities produce an enormous amount of data when using popular devices such as smartphones. These data can be used to develop behavioral models in several areas including fraud detection, finance, recommendation systems and marketing. However, enabling fast analysis of such a large volume of data using traditional data analytics tools may not be applicable. As a result, many organizations who are seeking to collect, process, and analyze big data have adopted a new class of technologies that includes Apache Hadoop and related tools such as YARN, MapReduce, Spark, Hive, and Pig as well as NoSQL databases.

This research reports on the feasibility and the performance of using a Hadoop cluster for user behavior analytics based on their activities in applications with a large number of users while using in-memory processing in the cluster. In-memory analytics is a technology for faster querying and processing of data stored in computers memory rather than disk storage. This paper includes performance analysis in two different areas: the performance of the cluster in data ingestion and its performance in analyzing the data.

User behavior analysis is used as a base model for performance analysis because of its unique features and similarity with current problems in academia and industry.

GO2

IDENTIFYING A CROSS-CORRELATION BETWEEN HEART RATE VARIABILITY AND SKIN CONDUCTANCE USING PAIN INTENSITY ON HEALTHY COLLEGE STUDENTS

Genesis R. Cruz-Molina

Chronic pain affects approximately 100 million Americans annually. Heart rate variability and skin conductance have been used separately as measures of pain intensity. Current methods of assessing pain intensity have some limitations as they completely rely on subjective pain scales, require the patient's cooperation, and completely fail in unconscious patients. Therefore, there is a need for an objective method of measuring pain to improve the quality of pain management. Understanding the relationship between heart rate variability and skin conductance can be beneficial for non-pharmacological treatments of pain such as

biofeedback training, as combining both signals can be used to create a more powerful tool to measure pain. To identify a relationship between skin conductance and heart rate variability, we propose a cross-correlation analysis. Such approach necessitates collection of baseline data on healthy college students, administration of a thermal stimuli, and collection of data during and after the stimuli.

GO3

Passive Micromixers for DNA analysis using CFD modelling

Tarek Abdel-Salam, Ritesh Agarwal  
Department of Engineering, East Carolina University  
Ritesh Agarwal

Mixing efficiency is an important issue in the design of micromixers, since effective mixing is required between DNA sample and restriction enzyme for a fast digestion process. Mixing is improved by chaotic advection through serpentine mixing channels. This leads to the desired reduction in the fluid diffusion path while at the same time increasing the fluid contact areas. The purpose of this research is to evaluate mixing efficiency in microchannel mixers, through a theoretical as well as a numerical study of different micromixing configuration. To accomplish this, we are conducting a numerical study using computational fluid dynamics (CFD) approach using ANSYS Fluent Software for different structures we designed. The different geometric configuration proposed here are: bottleneck near the inlet and along the zig zag and curved shaped rectangular zig zag model. Mixing analysis is done for different condition such as Reynold's number, various velocities, different diffusion coefficients, and exchanging the flow of fluid through the inlet by evaluating mixing index of the flow. Results have shown better and faster mixing index around bottleneck region compared to other. This design can be used to model passive micromixers and other microfluidic devices which requires faster mixing between reagents.

GO4

Experimental Demonstration of the Relationship of Coupling Stiffness and Sensitivity to Disorder in a Fabricated Cantilever Array

Jules Zapanta, Teresa Ryan, PhD

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

In recent years, research has pushed the development of

## Abstracts | Graduate Oral Presentations

increasingly more sensitive mass sensors. Many of these sensors use mechanical cantilevers as the sensing element. These sensors can be designed for use in liquid or gas environments and can be used to detect a variety of target analytes, such as

pesticides, chemical vapors, or other biomarkers<sup>1-4</sup>. Generally, a periodic system consists of a feature that repeats in space. The amount of disorder in the elements of a periodic system affects transfer and distribution of vibration energy into, out of, and within the system. One type of disorder is the imperfection resulting from variability in manufacturing processes or variability in type of material used. Such imperfections are inevitable, particularly as the size of the manufactured devices grows smaller and smaller. These disorders lead to an uneven propagation of vibration energy in the structure. The structures used in this work consist of a primary mass with an array of substantially smaller cantilevers protruding off it. In this array design, the nearest neighbor cantilevers are coupled using a beam of the same material which acts as a coupling spring.

Previous numerical simulations demonstrate a relationship between coupling stiffness and sensitivity to disorder. The aim of this work is to fabricate and measure a set of physical arrays to provide experimental demonstration of the previous numerical result. Microcantilever arrays with differing designs will be manufactured and tested for agreement with simulations. The location of the coupling beam varies per design and provides the range of coupling stiffnesses for this experiment.

### References

- [1] N. V. Lavrik, M. J. Sepaniak and P. G. Datskos, "Cantilever transducers as a platform for chemical and biological sensors," *Review of Scientific Instruments*, vol. 75, (7), pp. 2229-2253, 2004.
- [2] A. R. Kadam, G. P. Nordin and M. A. George, "Use of thermally induced higher order modes of a microcantilever for mercury vapor detection," *Journal of Applied Physics*, vol. 99, (9), pp. 94905, 2006.
- [3] B. Rogers et al, "Mercury vapor detection with a self-sensing, resonating piezoelectric cantilever," *Review of Scientific Instruments*, vol. 74, (11), pp. 4899-4901, 2003.
- [4] D. Chen et al, "A thin film electro-acoustic enzyme biosensor allowing the detection of trace organophosphorus pesticides," *Analytical Biochemistry*, vol. 429, (1), pp. 42-44, 2012.

### G05

Specialized pro-resolving lipid mediators regulate bone marrow and splenic B cell populations in obesity in a sex-specific manner

Miranda J. Crouch\*‡, Rasagna Kosaraju\*, William Guesdon\*, Michael Armstrong, Nichole Reisdorph, and Saame Raza Shaikh‡

\*Department of Biochemistry & Molecular Biology, Brody School of Medicine, East Carolina University, Greenville, NC; East Carolina Diabetes & Obesity Institute, East Carolina University, Greenville, NC; Department of Pharmaceutical Sciences, University of Colorado, Denver, Colorado;

‡Department of Nutrition, Gillings School of Global Public Health and School of Medicine, University of North Carolina at Chapel Hill, Chapel Hill, NC.

Obesity is associated with poor immunological outcomes including an impaired B cell response. However, the mechanism by which obesity dysregulates B cell activity and whether this impairment is sex-specific is not clear. Recent data suggests that specialized pro-resolving lipid mediator (SPM) precursors and SPMs synthesized from docosahexaenoic acid (DHA) regulate select B cell populations upon antigen exposure. To address if SPMs regulate B cell populations in the context of obesity in a sex-specific manner, both male and female mice were fed a control or lard based diet for 15 weeks. Furthermore, lean and obese male mice were administered a cocktail of SPM precursors and SPMs for four consecutive days. Flow cytometry was used to analyze splenic and bone marrow B cell subsets. Targeted metabolipidomics were used to quantify SPMs. Our results revealed that obese male mice had decreased percentages and frequencies of select B cell subsets in the bone marrow and spleen. Furthermore, metabolipidomic analyses showed obese mice had reduced levels of the D-series SPM precursors, 14-HDHA and 17-HDHA as well as the SPM, Protectin DX (PDX). Administration of these deficient SPM precursors and SPMs over the course of four consecutive days resulted in the rescue of specific B cell subsets in the bone marrow and spleen of obese male mice. On the contrary, obese female mice showed modest modifications in the percentages and frequencies of B cell subsets in the bone marrow and spleen. Obese female mice displayed no SPM deficiencies and had elevated levels of ex vivo IL-10 suggesting a protective B cell phenotype. In conclusion, our results reveal that B cell phenotypes differ among male and female mice, which could be driven by the availability of SPMs to regulate the development of B cell phenotypes.

## Abstracts | Graduate Oral Presentations

GO6

Ca<sup>2+</sup>/calmodulin-dependent protein kinase kinase  $\alpha$  (CaMKK $\alpha$ ) is not necessary for functional overload induced increases in glucose uptake or muscle mass in mouse skeletal muscle

Luke Weyrauch<sup>1</sup>, Shawna McMillin<sup>1</sup>, Carol Witzcak<sup>1</sup>

<sup>1</sup>Department of Kinesiology, East Carolina University

The Ca<sup>2+</sup>/calmodulin-dependent protein kinase kinase  $\alpha$  (CaMKK $\alpha$ ) is a Ca<sup>2+</sup>-activated serine/threonine kinase, and previous work from our lab has shown that expression of a constitutively active form of CaMKK $\alpha$  in skeletal muscle is sufficient to increase muscle mass ~10% and glucose uptake ~100%. In addition, we have shown that 5 days of functional overload, a model that mimics resistance exercise training adaptations in muscle, increases muscle glucose uptake ~80% and CaMKK $\alpha$  protein levels ~250%. Thus, collectively these findings suggest that CaMKK $\alpha$  regulates overload-induced muscle glucose uptake and growth. However, to date no studies have examined whether CaMKK $\alpha$  is essential for either of these processes. Thus, the purpose of this study was to determine if CaMKK $\alpha$  is necessary for overload-induced increases in skeletal muscle mass and/or glucose uptake. Male and female, muscle-specific CaMKK $\alpha$  knockout (mCaMKK $\alpha$  KO) mice and their wild-type/control (WT/CON) littermates (~12 wks old) underwent unilateral synergist muscle ablation surgery to induce plantaris muscle overload. The contralateral leg was sham operated as control. Five days later, muscles were weighed. Overload increased muscle mass ~40% in male and female, WT/CON and mCaMKK $\alpha$  KO mice, demonstrating that CaMKK $\alpha$  is not necessary for overload-induced muscle hypertrophy. To determine if CaMKK $\alpha$  is necessary for overload-induced

glucose uptake, muscles were incubated in [<sup>3</sup>H]-2-deoxyglucose. Overload increased glucose uptake ~150% in both WT/CON and mCaMKK $\alpha$  KO female mice. In contrast, overload increased glucose uptake ~70% in male WT/CON, and ~130% in male mCaMKK $\alpha$  KO mice. Thus, collectively these results demonstrate that CaMKK $\alpha$  is not necessary for overload-induced muscle glucose uptake, and instead surprisingly show that loss of CaMKK $\alpha$  expression can enhance glucose uptake. Low muscle glycogen content can enhance glucose uptake. To determine if low glycogen levels were part of the mechanism underlying these effects, muscle glycogen content was measured using a hexokinase-based assay. Overload increased muscle glycogen content ~25-35% in both WT/CON and mCaMKK $\alpha$  KO male mice, suggesting that low glycogen does not explain the higher glucose uptake in the mCaMKK $\alpha$  KO male mice. Collectively, these results demonstrate that CaMKK $\alpha$  is not necessary for functional overload-induced increases in glucose uptake or

muscle mass, and suggest a more complicated regulation of muscle glucose uptake by CaMKK $\alpha$ .

GO7

SR-BI Expression protective against IL-17-dependent neutrophilic asthma

Andrea Gilliard<sup>1</sup>, Sky W. Reece<sup>2</sup>, Brita Kilburg-Basnyat<sup>2</sup>, Myles Hodge<sup>2</sup>, Bin Luo<sup>2</sup>, Kimberly M. Gowdy<sup>2</sup>

1. Department of Biomedical Engineering, East Carolina University, Greenville, NC 2. Department of Pharmacology & Toxicology, Brody School of Medicine, East Carolina University, Greenville, NC

In the United States, approximately 26 million people have asthma. Asthma is a heterogeneous disease characterized by airway obstruction and various phenotypes. Nearly 50% of patients have a neutrophilic phenotype and are resistant to current therapeutics. In asthma, neutrophils accumulate in the airways resulting in potentially fatal exacerbations. Potential mechanisms underlying neutrophilic asthma remains limited. Initially, our laboratory identified the role of scavenger receptor class B type I (SR-BI) in pulmonary innate immune response during bacterial pneumonia. SR-BI is a cholesterol receptor, albeit the primary role of SR-BI within asthma remains unknown. Interleukin-17A (IL-17A) producing cells also play important roles in allergic asthma. Studies suggest that higher levels in the lung have been associated with severe asthma and increased neutrophils. Our preliminary data indicated a lack of SR-BI results in significant increase in airway neutrophilia and IL-17 in a house dust mite (HDM) induced allergic asthma mouse model.

We hypothesize that SR-BI expression on pulmonary macrophages is protective against HDM-induced IL-17-dependent neutrophilic asthma. To

further investigate, SR-BI<sup>+/+</sup> and SR-BI<sup>-/-</sup> mice were sensitized through the airways on days 0 and 7 by oropharyngeal aspiration of 10  $\mu$ g HDM. They were challenged on days 14, 15, and 16 with oropharyngeal aspiration of 2  $\mu$ g HDM. Airway inflammation and cytokine production were quantified on day 17. Cellular sources of pulmonary IL-17 were identified by flow cytometry. After HDM challenge, SR-BI<sup>-/-</sup> mice had increased neutrophils in

BAL and decreased eosinophils compared to SR-BI<sup>+/+</sup> mice. Additionally, SR-BI<sup>-/-</sup> mice presented increased pulmonary IL-17A production and decreased IL-5 production. IL-17A was secreted by neutrophils and alveolar macrophages. However, IL-17A was not secreted by Th17 cells. These data indicate that

## Abstracts | Graduate Oral Presentations

SR-BI expression on pulmonary macrophages is protective against HDM-induced IL-17 dependent neutrophilic asthma.

GO8

Cardiolipin microdomains form in the presence of cytochrome c and are dependent on cardiolipin concentration and acyl chain composition

Edward Ross Pennington<sup>a,b</sup>, E. Madison Sullivan<sup>a,b</sup>, Tonya N. Zeczycka<sup>a,b</sup>, David A. Brown<sup>c</sup>, Saame Raza Shaikha<sup>a,b,d</sup>  
<sup>a</sup>Department of Biochemistry & Molecular Biology, <sup>b</sup>East Carolina Diabetes & Obesity Institute, Brody School of Medicine, East Carolina University, 115 Heart Drive, 4101 ECHI, Greenville, NC 27834, USA

<sup>c</sup>Department of Human Nutrition, Foods, and Exercise, Virginia Tech Corporate Research Center, 1981 Kraft Drive, 1035 ILSB, Blacksburg, VA 24060, USA

<sup>d</sup>Department of Nutrition, Gillings School of Public Health and School of Medicine, University of North Carolina at Chapel Hill, 135 Dauer Drive, 2203 McGavran-Greenberg, Chapel Hill, NC 27599, USA

Cardiolipin (CL), one of the hallmark phospholipids of the mitochondria, is fundamental for inner mitochondrial membrane (IMM) biophysical organization and protein activity. More specifically, research has suggested that regions of CL exist within the IMM to organize respiratory proteins into supercomplexes for enhanced electron channeling. However, it is poorly understood how mitochondrial CL microdomains regulate IMM structure-function. To address this, we used a combination of biochemical and biophysical techniques to study CL microdomains. First, we used classical detergent extraction to isolate CL microdomains. Studies with three different detergents, at varying concentrations, showed increased non-specific solubilization of all mitochondrial phospholipids and protein. Results from detergent extraction experiments demonstrate that the use of detergent may be artifactual and ineffective for the extraction of CL-enriched microdomains; however, this does not reflect the potential for CL microdomains to form within native mitochondrial membranes. Subsequently, we studied CL microdomains by quantitatively imaging biomimetic giant unilamellar vesicles (GUVs) and giant mitochondrial vesicles (GMVs), which are constructed from isolated murine cardiac mitochondrial phospholipids. Results from imaging experiments indicate that in the absence of protein, the physicochemical properties of lipid-lipid interactions are not sufficient for CL microdomain formation. However, reconstitution of cytochrome c at differing concentrations induced strong morphological changes

concomitant with formation of distinct lipid microdomains. Langmuir monolayer studies suggested that these effects were driven by a decrease in phospholipid packing and an increase in the membrane elasticity modulus. Lastly, we studied the role of CL concentration and acyl chain composition on membrane domain organization and phase separation with cytochrome c. Decreased CL concentration, as observed in several metabolic diseases, impaired membrane morphological phase separation. Similarly, the incorporation of docosahexaenoic acid (DHA) into CL prevented phase separation due to differences in cytochrome c-acyl chain cofactor interactions. Altogether, our data demonstrate that CL microdomain organization is driven by lipid-protein interactions and likely exist in specific regions of high membrane curvature and protein concentration.

GO9

Prohibitin-1 and -2 have diverse cell-autonomous effects on inflammatory signaling

Christine Psaltis<sup>1</sup>, Jim Aloor<sup>2</sup>, Sky Reece<sup>1</sup>, Brita Kilburg-Basnyat<sup>1</sup>, Jacques Robidoux<sup>1</sup>, Michael Fessler<sup>3</sup>, Ethan Anderson<sup>4</sup>, Kymberly Gowdy<sup>1</sup>

<sup>1</sup>Department of Pharmacology & Toxicology, Brody School of Medicine, East Carolina University, Greenville, NC

<sup>2</sup>Diabetes and Obesity Institute, East Carolina University, Greenville, NC

<sup>3</sup>National Institute of Environmental Health Sciences, National Institutes of Health, Research Triangle Park, NC

<sup>4</sup>Department of Pharmaceutical Sciences and Experimental Therapeutics, University of Iowa, Iowa City, IA

Background: Sepsis, a systemic inflammatory response to infection, is a leading cause of mortality worldwide. Prohibitins (PHB1 and PHB2) are proteins that assemble in hetero-oligomeric complexes within the mitochondrial inner membrane and in the plasma membrane lipid rafts where they are at the nexus of metabolic and pro-survival decisions including inflammation. We have recently observed that mice intraperitoneal (i.p.) injected with lipopolysaccharide (LPS) have increased serum prohibitin (PHB), and injection of recombinant PHB1 (rPHB1) post LPS rescues cardiac function. However, the role of PHB in the inflammatory response to LPS is currently unknown.

Methods: Using an in vivo model of sepsis, we injected C57Bl/6J mice i.p. with LPS and 3 subsequent doses of rPHB1. Serum was tested for lactate dehydrogenase (LDH). Blood was analyzed for



## Abstracts | Graduate Oral Presentations

immune cell characterization by flow cytometry, and liver, kidney and lung tissue were harvested for pro-inflammatory cytokine expression. RAW264.7 cells (mouse macrophage lineage) deficient in PHB1 or PHB2 were stimulated with LPS, and cell supernatant and lysate were collected for cytokine production.

Results: Systemic LPS increased serum LDH, number of blood neutrophils (PMNs) (CD45+Ly6G+), PMN expression of the adhesion molecule CD11b, and tissue expression of pro-inflammatory cytokines TNF- $\alpha$ , IL-6, and IL-1 $\beta$ . Treatment with rPHB1 decreased serum LDH, blood PMN CD11b expression and expression of IL-6 in liver, kidney and lung tissues. Cell lines deficient in PHB2 had decreased TNF- $\alpha$  compared to macrophages sufficient in PHBs.

Conclusions: We found that rPHB1 decreases inflammatory signaling, neutrophil maturation/recruitment, and tissue/organ injury. However, in vitro experiments displayed an important role for PHB2 in pro-inflammatory signaling. These data suggest PHB1 and -2 have differential and complex effects on the innate immune response. Cell-associated PHB is required for acute pro-inflammatory signaling responses to LPS that initiate the sepsis response, but extracellular PHB, released in the later phase of sepsis, may feedback to dampen the response.

### GO10

Glycolytic and oxidative muscles exhibit differential changes in insulin sensitivity and glucometabolic enzymes in response to long-term denervation in mice

Shawna Lynn McMillin, Luke Weyrauch, Erin Stanley, Carol Witzczak

Spinal cord injury results in a rapid loss of nerve impulses to skeletal muscle, which in the long-term causes muscle atrophy and an increased risk for the development of type 2 diabetes. Skeletal muscle mass is a key regulator of glucose homeostasis, and lower muscle mass is associated with higher rates of type 2 diabetes. Despite this association, it is unknown whether type 2 diabetes following denervation is due to a decrease in muscle mass or an intrinsic maladaptation in skeletal muscle. The goal of this study was to determine if long-term denervation impairs skeletal muscle insulin sensitivity independent of changes in muscle mass, and if so whether alterations in muscle glycogen, insulin signaling proteins and/or glucose transporter (GLUT) levels are responsible for those effects. Mouse hindlimb muscles were denervated via unilateral surgical resection of a 0.5 cm portion of the sciatic nerve. The contralateral limb received a sham surgery as control. After 28 days, when muscle atrophy had plateaued at ~40%, oxidative soleus and glycolytic extensor digitorum longus (EDL) muscles were

excised and [3H]-2-deoxy-D-glucose uptake assessed  $\pm$  insulin. Compared to innervated controls, denervation impaired insulin-stimulated glucose uptake ~40% independent of muscle mass in the soleus, but surprisingly enhanced insulin-stimulated glucose uptake ~55% in the EDL. Thus long-term denervation differentially alters muscle insulin sensitivity in a fiber type-dependent manner. To assess whether this was due to changes in muscle glycogen, glycogen levels were measured via a hexokinase-based assay. Denervation decreased glycogen ~30% in the soleus, but increased glycogen ~40% in the EDL, indicating that glycogen levels are not the cause of the changes in glucose uptake. To determine if these effects were caused by alterations in insulin-responsive signaling proteins or GLUTs, immunoblots were performed. In both the soleus and EDL, denervation enhanced the insulin-stimulated phosphorylation and expression of Akt. In contrast, in the soleus denervation decreased GLUT4 ~65% and hexokinase II ~45%, while in the EDL it increased GLUT4 ~90% and hexokinase II ~70%. Collectively these findings demonstrate that long-term denervation differentially alters skeletal muscle insulin sensitivity dependent on fiber type, and suggest that this is due to changes in GLUT4 and hexokinase II protein levels.

### GO11

Sperm or oocyte? Protein synthesis acts to control cell fate decisions.

Hayden P. Huggins, Jacob Subash, Jenna Hoffman, and Brett D. Keiper

The last step of gene expression, protein synthesis, converts biological information into function. Thus, protein synthesis drives cellular function and fate. The spatial and temporal translation of select mRNAs is determined by a combination of RNA binding proteins (RBPs), micro RNAs (miRNAs), and translation initiation factors (eIFs). Modulation of gene expression via mRNA translational control is especially important in meiotic cells and early embryos. Here, we focus on germ cell sex determination in the hermaphroditic nematode *Caenorhabditis elegans*. During larval stages, *C. elegans* hermaphrodites generate a defined number of sperm from germline stem cells. Then, upon maturation, spermatogenesis stops and oogenesis begins. This germ cell fate switch is accomplished through translational control of two mRNAs, *tra-2* and *fem-3*. *TRA-2* drives oogenesis by inhibiting *FEM-3*, which drives spermatogenesis. We find that an eIF4E isoform (mRNA cap-binding protein), *IFE-3*, is critical for the germ cell switch in hermaphrodites. Animals homozygous for an *ife-3* genomic lesion produce only sperm. Furthermore, maternal *ife-3* is required for embryogenesis. Interestingly, the requirement for *ife-3* in the germ line is temperature-dependent. Our hypothesis is that *ife-3*



## Abstracts | Graduate Oral Presentations

induces translational control cascades in the germ line and early embryo for proper development. We are using combination of reverse genetics, epistasis, protein biochemistry, CRISPR/cas9 genomic editing, and bioinformatics to determine how ife-3 controls germline stem cell fate.

G012

Epigenome-wide association study of the previous number of strokes in participants from the Vitamin Intervention for Stroke Prevention clinical trial identifies two novel associations.

Nicole M. Davis Armstrong<sup>1</sup>, Wei-Min Chen<sup>2,3</sup>, Michael S. Brewer<sup>1</sup>, Stephen R. Williams<sup>4</sup>, Michele M. Sale<sup>2,3</sup>, Bradford B. Worrall<sup>3,4</sup>, Keith L. Keene<sup>1,5</sup>

1.) Department of Biology, East Carolina University, Greenville, NC.

2.) Center for Public Health Genomics, University of Virginia, Charlottesville, VA.

3.) Department of Public Health Science, University of Virginia, Charlottesville, VA.

4.) Department of Neurology, University of Virginia, Charlottesville, VA.

5.) Center for Health Disparities, East Carolina University, Greenville, NC.

To assess epigenetic influences associated with recurrent stroke and related traits, we performed an epigenome-wide association analysis (eWAS). We evaluated differential methylation analyses using DNA extracted from whole blood and Illumina HumanMethylation450 BeadChip arrays in 180 ischemic stroke patients from the Vitamin Intervention for Stroke Prevention (VISP) clinical trial. VISP was a multi-center, double-blind, randomized, controlled clinical trial designed to determine whether daily supplementation of folic acid, vitamin B6, and vitamin B12 reduced recurrent cerebral infarction. Following quantile normalization, filtering, and quality control, a total of 479,864 autosomal CpG sites were analyzed. A multiple linear regression was used to assess the association between the number of strokes prior to VISP enrollment and the degree of methylation, stratified by race

(European descent, EA n=104; African descent, AA n=76). Two differentially methylated CpG sites exceeded genome-wide significance ( $p < 1.055 \times 10^{-7}$ ) in the EA stratum. A locus, cg22812874, in the ankyrin repeat and SOCS box containing 10, gene ASB10 demonstrated the most significant difference

in methylation ( $\beta = -0.0308$ ; 95%CI= -0.040,-0.002;  $p = 3.4 \times 10^{-9}$ ). The second significantly associated CpG site, cg00340919, was located in

intron 4 of the tetratricopeptide repeat domain 37, gene TTC37 ( $\beta = -0.0517$ ; 95%CI= -0.069,-0.034;  $p = 8.74 \times 10^{-8}$ ). In addition, it was observed that a lower number of prior strokes were associated with higher degrees of methylation for both CpG sites.

ASB10 is upregulated by tumor necrosis factor alpha and interleukin-1 beta cytokines, both of which are primary inflammation markers and risk factors of ischemic stroke in humans, as well as being shown to contribute to neurotoxicity in rats following an ischemic event. The TTC37 gene product is highly expressed in vascular tissues and has been implicated in trichosheptoenteric (THE) syndrome. Platelet abnormalities, including large platelet size and thrombocytosis are commonly observed in THE syndrome patients and have been implicated as risk factors for stroke. In this study, we have identified two novel epigenetic modifications that influence stroke recurrence frequency.

G013

Identification of Galectin-1 Overexpression in Murine Primary and Metastatic Triple Negative Breast Tumors

Kassondra Balestrieri, Kim Kew, Moses McDaniel, Mohamed Ramez, Keith Pittman, Nasreen Vohra, Kathryn Verbanac

Department of Surgery, Brody School of Medicine

Department of Chemistry, East Carolina University

Triple negative breast cancer (TNBC) is a breast cancer subtype that does not express estrogen or progesterone receptors and has reduced expression of human epidermal growth factor receptor type 2. Metastases and mortality among TNBC patients remain high due to less effective, highly toxic therapies compared to other breast cancer subtypes, indicating an urgent need for targeted molecular therapies. Our long-term goal is to identify proteins associated with TNBC metastases to gain insight into pathways and mechanisms that could help identify biomarkers or targets for intervention. For the present studies, we used the T11 transplantable mouse tumor, which displays molecular gene expression profiles that mirror human claudin-low TNBC. Claudin-low tumors are characterized by low gene expression of tight junction and epithelial cell-cell adhesion proteins and high expression of mesenchymal and cancer-stem-like markers. Nano-liquid chromatography/mass spectrometry analysis of cultured T11 cells and lysates from T11 lung metastases detected high

## Abstracts | Graduate Oral Presentations

levels of the  $\beta$ -galactoside binding protein Galectin-1 (Gal-1) with >95% confidence. In tumor cells, ten distinct Gal-1 peptides were identified with protein coverage of 88%. Two consistent Gal-1 peptides with 28% protein coverage were detected in metastatic lungs, but not in naïve lungs. Matrix-assisted laser desorption ionization/mass spectrometry (MALDI/MS) imaging of T11 primary orthotopic tumors identified five Gal-1 tryptic peptides, homogeneously distributed throughout the tissue. Distinct Gal-1 peptides were also detected by MALDI/MS imaging within tumor regions of metastatic lung tissue, but were not found in naïve lung tissue sections. Western blot and immunohistochemistry (IHC) analysis showed higher Gal-1 expression in orthotopic T11 primary tumors compared to naïve mammary fat pad, and higher Gal-1 expression in T11 lung metastases compared to naïve lung. Furthermore, IHC confirmed MALDI/MS imaging Gal-1 tissue-wide distribution in primary tumors and localized expression within metastatic tumor foci of lung tissue. These findings are supported by our analysis of both murine and human genomic data sets, which show Gal-1 overexpression in TNBC compared to other breast cancer subtypes and normal breast tissue. Our future studies will investigate the role of tumor-derived Gal-1 in the regulation of immune function and TNBC progression.

GO14

Quantitative Method for Simultaneous analysis of Drugs of Abuse in Umbilical Cords using Liquid Chromatography/Mass Spectrometry

Srivalli Swathi Mamillapalli, Annalisa Smith-Joyner, Lauren Forbes, Blake Rushing, Cody Strom, Allison Danell, Linda May, 5, Devon Kuehn, Kimberly Kew, and Srikanth Ravisankar

1Department of Chemistry, College of Arts and Sciences, East Carolina University, Greenville, North Carolina

2Department of Pediatrics, Brody School of Medicine at East Carolina University, Greenville, North Carolina

3Department of Pharmacology and Toxicology, Brody School of Medicine, East Carolina University, Greenville, North Carolina

4Department of Kinesiology, College of Health and Human Performance, East Carolina University, Greenville, North Carolina

5School of Dental Medicine, East Carolina University, Greenville, North Carolina

Neonatal abstinence syndrome (NAS) is an array of signs and symptoms experienced by the newborn that occur after birth due

to abrupt discontinuation of intrauterine exposure to substances, primarily opioids, taken by the mother. Incidence of NAS in the United States has tripled over the last decade. Current standard of care for drug testing involves radioimmunoassay of urine and meconium samples collected from babies after birth. Positive screens are confirmed using mass spectrometry. It takes an average of 4-5 days for results and an additional 4-6 days for confirmation. Umbilical cord tissue has emerged as a convenient, rapid alternative due to its universal availability.

From this work, a validated analytical method was developed using liquid-chromatography/mass spectrometry (LC/MS) to simultaneously analyze multiple drugs of abuse in umbilical cord samples. This comprehensive method targeted the common drug classes observed in the patient population: stimulants, psychotropic cannabinoid, and opioids. The results reported from twenty-one umbilical cords found three tested positive for cocaine exposure, sixteen for nicotine, one for methadone, and five for acetyl nor fentanyl. The LC/MS method developed was found to be sensitive and specific with detection limits in the sub nanogram/mL range.

Our research is a prospective methodology development study using a hypothesis driven, targeted metabolite approach to characterize steady-state metabolite levels in the umbilical cord matrix at time of delivery. By characterizing drug type and concentration, we anticipate using this data to develop a reliable alternative testing method to meconium toxicology screens.

GO15

Testosterone replacement reverses erectile dysfunction following androgen deprivation therapy by restoring internal pudendal artery vasodilation

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

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

Introduction: Many men undergo androgen deprivation therapy (ADT) to manage their prostate cancer; however, erectile dysfunction (ED) and cardiovascular disease are common side effects. The internal pudendal arteries (IPA) supply blood to the penis and IPA vascular injury leads to ED. A previous study showed that 4 weeks post-castration IPA relaxation was impaired. Our study will determine if vascular function is impaired post-castration in systemic vasculature (aorta and mesenteric arteries), and if testosterone (T) can restore erectile and vascular function. We hypothesize that the IPA will develop severely impaired relaxation compared

## Abstracts | Graduate Oral Presentations

to systemic arteries following ADT, and T therapy will recover function.

**Methods:** Male Sprague Dawley rats were divided into 3 groups (12 wks, n=8/group): control (CON), ADT (6 wks castration), and ADT+T (6 wks castration + T (1.5 mg/kg) last 2 wks). Erections were assessed via cavernous nerve stimulation and measurement of intracavernosal to mean arterial pressures (ICP/MAP). Aortas, mesenteric arteries, and IPA were excised, cut into 2 mm segments and mounted into tissue baths. Contractility to high potassium solution (KCl), electrical field stimulation (EFS), phenylephrine (PE) and endothelin-1 (ET-1) were measured. Endothelial dependent

acetylcholine (ACh) relaxation and endothelial independent relaxation to DEA NONOate were assessed. Non-adrenergic non-cholinergic (NANC) relaxation was evaluated by EFS in the presence of guanethidine and atropine.

**Results:** ADT significantly impaired erectile function and IPA ACh relaxation (CON: 60%, ADT: 31%;  $p < 0.05$ ); however, DEA NONOate relaxation was unchanged. Likewise, ADT impaired IPA NANC relaxation (CON: 40%, ADT: 30%;  $p < 0.05$ ). ADT did not impact IPA contraction to KCl, PE, ET-1, and EFS. Interestingly, ADT did not change vascular reactivity in aortas and mesenteric arteries. ADT+T recovered erections and improved ACh relaxation in IPA to values greater than CON (T: 69%;  $p < 0.05$ ). Similarly, ADT+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:** ADT lead 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. Consideration of T replacement therapy for prostate cancer survivors to restore erectile function is warranted.

GO16

The C-terminus of Troponin T Sets the Limits of Contractile Activity

Dylan Johnson

Hypertrophic cardiomyopathy is the leading cause of sudden cardiac death with an estimated one in every five hundred people exhibiting characteristics of the disease. This cardiomyopathy is a genetic disease of the sarcomere that results in disrupted regulation of muscle contraction. Contraction requires regulated, cyclic interaction of thin actin and thick myosin filaments. Calcium regulates the

actin filament via the actin binding proteins troponin and tropomyosin. At low and saturating calcium concentrations, troponin places tropomyosin in an inhibitory and activating position respectively.

Mutations in troponin subunits often alter the response of the muscle to calcium; that altered response may trigger other events that lead to sudden death. A hypertrophic cardiomyopathy associated mutation, removal of the C-terminal 14 residues of troponin T, increases contractile activity two-fold at saturating calcium concentrations and increases the basal activity at low calcium. We propose that the C-terminal 14 residues of troponin T are required for full inhibition and they also modulate the extent of activation with calcium. Understanding this mechanism could lead to new therapies for normalizing cardiac performance.

We have studied the effect of stepwise truncation of residues from the C-terminal region of troponin T using rapid kinetics and assays of the ability of actin filaments to stimulate the ATPase activity of myosin. We conclude that the four C-terminal residues of troponin T have the most significant impact on forming an inactive state at low calcium and in inhibiting the active state at saturating calcium. The remaining 10 residues of the C-terminal region have more modest effects on both activities. These results reflect a novel mechanism of modulating contractile function. Our results also advocate for redefining the generally accepted model of myosin interaction with each state of actin. That observation will substantially alter our understanding of the regulation of cardiac and skeletal muscle contraction.

GO17

Critical role of claudin-7 in maintaining intestinal crypt stem cell functions

Tiaosi Xing, Yan-Hua Chen

The epithelial integrity and self-renewal are two main features that maintain intestinal homeostasis. Intercellular tight junctions control epithelial integrity while intestinal crypt stem cells (ICSCs) fuel epithelial self-renewal. Claudin-7 is a tight junction membrane protein localized along the entire epithelium of intestines. Our previous studies have shown that the intestinal epithelial integrity was severely disrupted after deletion of claudin-7 in the mouse. Moreover, microarray analysis showed alternation of intestinal epithelial differentiation and proliferation related genes, but little is known about the role of claudin-7 in the intestinal epithelial self-renewal. From the postnatal day 4 global (gCldn7<sup>-/-</sup>)

## Abstracts | Graduate Oral Presentations

and 2-months old intestinal-specific (cCldn7<sup>-/-</sup>) claudin-7 knockout mice, we found that claudin-7 deletion induced ICSCs loss and increased cell proliferation. We hypothesized that claudin-7 plays a critical role in regulating intestinal epithelial self-renewal. Histological analysis showed that epithelial differentiation was significantly altered in the gCldn7<sup>-/-</sup> and cCldn7<sup>-/-</sup> mouse intestines. Using ex vivo organoid culture, the ICSCs from Cldn7<sup>+/+</sup> and gCldn7<sup>-/-</sup> small intestines were grown to a “mini gut”. We found that claudin-7 deletion not only decreases the survival of organoids, but also induces the formation of spheroids without villi compared to organoids with villi derived from Cldn7<sup>+/+</sup> ICSCs. In addition, claudin-7 deletion increases the proliferative epithelial cells and decreases the number of enterocytes, Paneth cells, enteroendocrine cells and tuft cells in the organoids. Interestingly, the number of goblet cells was unaffected which comports with our in vivo findings. More importantly, we found that activation of the Wnt signaling pathway increases the size of the claudin-7-deficient spheroids compared to claudin-7-positive organoids. Western blotting analysis revealed that  $\beta$ -catenin (a key molecule in the Wnt signaling pathway) was upregulated in gCldn7<sup>-/-</sup> small intestines. Immunostaining revealed that instead of localized at cell-cell junctions,  $\beta$ -catenin localizes predominately to the epithelial cell cytoplasm in gCldn7<sup>-/-</sup> small intestines. These findings suggest that claudin-7 plays a novel, but yet unidentified function in the regulation of intestinal epithelial cell renewal. Claudin-7 is required for regeneration of intestinal epithelium, survival of crypt stem cells and differentiation of intestinal epithelial cells.

GO18

Modeling correlation of T1 and T2 Weighted MRI to CT Intensity

Samuel Chen Leu, Ziwei Lin

In radiation therapy, tumor volume targeting and treatment dose calculation is of utmost importance and requires acquisition of patient data including delineation of patient anatomy, location of target volume, and electron density. Acquisition of these data is mainly by the imaging modalities: computed tomography (CT) and magnetic resonance imaging (MRI).

Computed tomography is used for radiation treatment planning and dose calculation due to the close relation between CT Hounsfield Unit (HU) and electron density. Magnetic resonance imaging (MRI) with its superior soft tissue contrast is used to delineate gross target volume or patient anatomy. Using multiple image modalities require registration of the images to ensure matching anatomical structures.

However, if electron density or HU can be determined directly

from MRI, this would remove the image registration uncertainty, simplify logistics, and eliminate X-ray dose to patients from CT. With better delineation of soft tissues, it is also possible to create highly conformal treatment plans, applying high dose to tumor volume while sparing surrounding tissue.

This project is to model the correlation between T1-weighted (T1W) and T2-weighted (T2W) MRI signal intensity to CT number (Hounsfield Unit) and then generate a pseudo-CT (pCT). Generated pCT is evaluated by comparing to the reference/“real” CT.

GO19

Relationship of N-glycans to neuroblastoma

Austin Alexander Whitman

Kristen Hall

Dr. Douglas Weidner

Dr. Ruth Schwalbe

Cell development, maintenance, and signaling pathways are influenced by N-glycosylation. Changes in branching of N-glycans are linked to tumor development and progression. All N-glycans share a common core sugar sequence and are classified as three general types: oligomannose, complex, and hybrid. Previously, we showed that cell structure and function was modified by altering the type of N-glycan. We hypothesize that modifying the

levels of complex N-glycans will alter aberrant cell behavior in neuroblastoma (NB). CRISPR/Cas9 technology was used to create a N-glycosylation mutant cell line HuNB(-Mgat2) by silencing Mgat2 (encodes for GnT-II) in the human neuroblastoma BE(2)C cell line, called HuNB. The action of GnT-II is to convert hybrid type glycans to complex. As such, cells are incapable of synthesizing complex type N-glycans when Mgat2 is silenced.

Two independent lectin binding assays supported the presence and lack of complex N-glycans in HuNB and HuNB(-Mgat2) cell lines, respectively. Further, western blotting of total cell membranes was used to show that an N-glycosylated voltage-gated K<sup>+</sup> channel (Kv3.1b) protein has hybrid type N-glycans and complex type in the HuNB(-Mgat2) and HuNB cell lines, respectively. Lectin binding studies also showed that the N-glycosylation pathway in HuNB(-Mgat2) cells could be recovered by ectopic expression of GnT-II. Soft agar assays showed that elimination of complex N-glycans lessens the transformed phenotype. Thus, our results revealed that the malignant transformation phenotype in NB cells ameliorates by lowering the levels of complex type N-glycans.



## Abstracts | Graduate Oral Presentations

### GO20

Prostatic radiation therapy induces pelvic neuron apoptosis and bladder dysfunction with no impact on penile function

Shelby A. Powers, Michael R. Odom, Elena S. Pak, Megan A. Moomaw, Kathleen Ashcroft, Bridget F. Koontz, Johanna L. Hannan

<sup>1</sup>Department of Physiology, Brody School of Medicine, East Carolina University, Greenville, NC

<sup>2</sup>Department of Radiation Oncology, Duke Cancer Institute, Durham, NC

**Introduction:** During prostatic radiation therapy (RT) for high-risk prostate cancer, the dose to the penis and bladder is minimal; however, erectile dysfunction and urinary incontinence are common sequelae. The impact of RT on the health of the ganglia and nerves controlling erectile and bladder function have not been explored. This study aimed to determine the impact of RT on major pelvic ganglia (MPG) neuron growth and apoptosis, as well as penile and bladder smooth muscle function in a rat model of prostatic RT.

**Methods:** Male 8-week-old Sprague-Dawley rats underwent CT imaging and RT planning for delivery of a 25 Gy radiation fraction or sham treatment via conformal arc. MPGs, penises and bladders were excised 2 and 10 weeks post-RT (n=10/grp). MPG neurons were dissociated and cultured. Axon length and branching, and neuronal nitric oxide synthase (nNOS), tyrosine hydroxylase (TH) and TUNEL expression were measured at 72h. Penises and intact or denuded bladder strips were mounted in tissue baths. Concentration response curves to carbachol (CCH) and electrical field stimulated (EFS) contractions were assessed.

**Results:** At 2 weeks post-RT, irradiated MPG neurons had fewer branches, but longer neurites (p<0.05) and 2-fold increase in apoptotic neurons (2wk-RT: 5.0%; Sham: 2.1%; p<0.001). Additionally, nNOS positive neurons were decreased (p<0.05). Bladder contractions to CCH and EFS were reduced in denuded strips (p<0.05) while there was no change in penile contractility. After 10 weeks, branching was still decreased (p<0.0001), but length was also reduced in RT neurons (p<0.0001). The percentage of apoptotic neurons were again doubled (10wk-RT: 9.7%; Sham: 4.0%; p<0.001), and both nNOS and TH positive neurons were decreased (p<0.05). Interestingly, bladder contraction to CCH normalized, but EFS contraction was elevated in both intact and denuded strips (p<0.05). There were no changes in penile strip function at 2 or 10 weeks post-RT.

**Conclusions:** Prostatic RT impaired neurite branching, outgrowth and increased apoptosis in a temporal manner. Nitroergic positive neurons were decreased; however, with little impact on penile function. Temporal changes in bladder contractility was also evident with early decreased and late increased nerve-mediated contractions. These data support that preservation of the pelvic ganglia during prostatic RT is critical to maintaining bladder physiology.

### GO21

The Development of beta-actin mutants with altered binding affinities for ATP and ADP

Abu-Bakarr Kuyateh

A number of neurodegenerative diseases are accompanied by the formation of cofilin-actin rods in neural cells. These rods can cause synaptic dysfunction and block transport within neurites. The overall goal of this project is to create an optogenetic switch that incorporates both cofilin (an actin-binding protein) and actin for the study of cofilin-actin rod formation in neural cells undergoing oxidative stress. In order to accomplish this, we first need to develop an actin mutant with altered nucleotide binding affinities for ATP and ADP. In order to accomplish this goal, we will pursue the following aims: (i) Develop a robust expression and purification protocol for  $\beta$ -actin; (ii) Develop an assay for actin-nucleotide binding based on literature precedent; (iii) Create actin mutants designed to have different affinities for ATP and ADP & study them by spectroscopic and calorimetric methods.

### GO22

Social regulation of the endocannabinoid system and modulation of the escape and swim circuits in zebrafish (*Danio rerio*)

Stephen Anderson Orr

Social status-dependent modulation of neural circuits has been investigated extensively in vertebrate and invertebrate systems. However, the effect of social status on shifting the activation between competing neural circuits is poorly understood. Zebrafish (*Danio rerio*) form stable social relationships that consist of socially dominant and subordinate animals. Once the social hierarchy is formed, social status-dependent differences in behavior patterns emerge. Here, we investigated the role of the endocannabinoid system (ECS) in regulating the activation of the swim and escape circuits. Our aim was to investigate how the ECS facilitates the transition between swim and escape circuits in socially dominant and subordinate animals. Endocannabinoids act as retrograde signaling molecules between neurons, and

## Abstracts | Graduate Oral Presentations

are implicated in inhibition of both excitatory and inhibitory neurotransmission via retrograde binding of the cannabinoid 1 receptor (CB1R). A previous study revealed a novel role for the endocannabinoid 2-Arachidonoylglycerol (2-AG) in modulating the switch in activation between the swim and startle circuits in zebrafish. The ECS can be easily up- or down-regulated by targeting CB1R function. To better understand how social status regulates the ECS and its effects on circuit activation, we studied the effects of two drugs on the regulation of status-dependent differences in swim and escape behavior. AM-251 blocks endocannabinoid signaling by binding to CB1R, while JZL184 increases endocannabinoid signaling by inhibiting MAGL, the degradative enzyme for 2-AG. First, we show that dominant and subordinate animals display significant differences in locomotor behavior as dominance is established. Subordinate animals startle more readily in response to auditory stimuli, while dominants swim at a higher frequency than subordinates. Second, we show that modulation of the ECS by AM-251 and JZL184 differentially affects swim and escape behavior according to social status. Our results support the notion that the ECS is socially regulated and involved in mediated changes in relevant social behaviors.

GO23

The Need for a New Approach in Technical and Professional Communication: The Black Male Gaze Theory

Alicia K. Hatcher

This presentation discusses the need for a black male gaze theory, an approach unexplored by modern technical rhetorics. The black male gaze theory provides a new framework for exploring technical rhetorics that addresses historical and current social trends that render(ed) the black male perspective inconsequential in this country. This theory aligns with and draws from existing methodologies that focus on the marginalization of historically oppressed peoples in America, including critical race studies, womanism, queer studies, apparent feminism, postcolonial studies, etc.; however, the black male gaze theory seeks to create a new and specific rhetorical space that will allow for 1) both the acknowledgement and examination of the black male perspective and the black male experience as prescribed by technical rhetorics in this country, and 2) an exploration of the contributions of black men to the field of Technical and Professional Communication (TPC). Based on Rude's description of TPC as "a field of study and practice that contributes not just to self-perpetuation and best practices in its own area but also to the good of society," I contend that embracing a black male gaze theory will provide the field with an opportunity to broaden its scope by allowing the actions of Technical and Professional Communication scholars and rhetors to become the physical manifestations of the previously espoused rhetoric of social justice (201)

GO24

Technofeminism: A Close Look at Literacy Center Components

LaKela C Atkinson

Abstract

This paper focuses on the role of technofeminist theory, particularly regarding its value in community literacy. It has been nearly 70 years after the Brown v. Board of Education ruling, which proved inequity in educational instruction based on race and declared its employment unconstitutional. Yet, educational and professional opportunities continue to be denied to individuals in minority populations. Since minorities, like their counterparts, need access to these opportunities for their livelihood, I seek to understand how a technofeminist approach might benefit discussions about literacy opportunities, provide information about who gets these opportunities, and demonstrate how such opportunities aim to bridge professional achievement gaps. My research will focus on the role of technofeminism in gauging how website components of one North Carolina literacy center, Durham Literacy Center (DLC) in Durham, North Carolina (also provides writing assistance) distinguishes target audience, advocates for marginalized populations, and offers resources and support for these populations.

GO25

Writing Studies Research: Genre-fluid Writers, Queer Feminist Rhetorics, and Social

Justice Ruby Nancy

Discursive practices of feminist and queer rhetorics often involve reworking conventional genre forms to make use of them in powerful and unconventional ways. Writers from these and other traditions have remixed, hybridized, merged, exploded, and ignored standard conventions of writing and common genre forms. This presentation is about doctoral research focused on genre-fluid writers who employ multiple genre actions by shifting easily from one format to another as contexts change, or by rejecting or remaking genre forms generally used in recurring contexts.

Building on work in rhetorical genre studies, which differentiates between genre as action and genre forms, this project seeks to highlight the work of iconic and contemporary writer-activists in ways that examine closely the queer and feminist strategies employed by genre-fluid writers. These strategies have been and can be employed in the creations of highly situational texts, and

## Abstracts | Graduate Oral Presentations

study of these strategies requires transdisciplinary scholarship from cultural rhetorics, queer theory, technical writing, intersectional feminism, and genre theory.

The presentation outlines in-progress doctoral research by the presenter, who will be working with writers in a community writing group and in an on-campus writing group, seeking to learn about writers who are creating self-generated texts as part of their engagement with social justice projects. The project explicitly seeks to encourage the use of genre-fluid writing strategies to amplify the power and reach of collective activism. This results of this scholarly work may have implications for multi-modality, digital rhetorics, and other related fields, as well as for composition pedagogy.

GO26

From One Woman to Another: How Spanish Women Used Education to Spur Change in New Spain in the Sixteenth Century

Kayla Elizabeth Green

Department of History, East Carolina University

When thinking about the Age of Exploration and the early colonial period, the pictures that come to mind tend to be of men – men such as Christopher Columbus and the conquerors like Hernando Cortes. However, men were not alone in their conquest, nor was the conquest solely physical. In order to be successful in a spiritual conquest of the western hemisphere, specific educational practices were adopted by the Spanish. The purpose of my research is to demonstrate that the role of women in the beginnings of exploration and Spanish imperial expansion goes well beyond Isabel's sponsorship of Christopher Columbus. Queen Isabel, and later her granddaughter Isabella of Portugal, wife of King Charles I of Spain, envisioned a world Iberianized and Christianized through a cooperative venture of the Crown and the Catholic Church. These Spanish queens, along with members of the Franciscan Order of the Catholic Church, used not only men to wield education as a weapon of cultural change, but also women. In fact, Isabella of Portugal and the Church understood that Spanish women were absolutely necessary, for women could more effectively reach the female part of the indigenous population and bring their vision of change of the New World more quickly to fruition. This research to be presented at Research and Creative Achievement Week brings to light how women used education to change the world in the sixteenth century; a main goal is to bring the names of women to the forefront of discussion of the collision of the "Old" and "New Worlds" – Isabella herself, as well as the Spanish teachers, such as Catalina de Bustamante. Analyses of letters written by Isabella reveals the Crown's support of religious women partaking

in religious education and conversion of indigenous girls in New Spain. The interaction of Spanish queens, religious Spanish women, and indigenous girls has yet to be explored – until now.

GO27

Adversarial Machine Learning: A Literature Review

Samuel Harold Thomas

Machine learning is becoming more and more utilized as a tool for businesses and governments to aid in decision making and automation processes. These systems are also susceptible to attacks by an adversary, who may try evading or corrupting the system. In this paper, we survey the current

landscape of research in this field, and provide analysis of the overall results and of the trends in research. We also identify several topics which can better define the categorization.

GO28

MC/DC coverage for requirement specifications.

Gourav Das

In the early 1990s, the Modified Condition/Decision Coverage (MC/DC) criterion was suggested as a structural white-box testing approach, but it also can be used for black-box specification-based testing. Practical application of MC/DC for specification-based testing has its own unique features and sometimes is quite different from code-based applications. However, MC/DC as a black-box approach has not been studied sufficiently, and thus, the application of MC/DC for specification coverage was the main research problem considered in this presentation. The goal of this study was to analyze MC/DC as a black-box technique, investigate factors that distinguish black- and white-box applications of this approach, provide proper definitions and rules to evaluate the MC/DC level during black-box testing, and develop an MC/DC coverage measuring tool using Java Swing and techniques commonly used in Agile development.

GO29

Big Data Infrastructure for Analyzing Handwritten Documents

David Hoffman, Akhil Gudivada

Historical documents are contain many thousands of pages of unstructured data, often not easily searchable. If this unstructured handwritten data is transcribed and stored in textual



## Abstracts | Graduate Oral Presentations

computerized form, searching through would be much more efficient. Digitization of documents allows for visually impaired persons to stay connected with history as the transcribed text can be sent through assistive technology. Furthermore, digitized text can be translated into worldwide languages allowing for greater accessibility. The problem is apparent and end-goal solution is clear, but the steps to achieve the solution are not. Some museums and libraries have resorted to group, or volunteer transcription via the web. A more logical means would be to utilize computer-based handwriting recognition to help achieve the goal. In this research we present Big Data approaches towards handwriting recognition. High resolution document scans consume a large amount of disk space, and computer processing of the images with advanced algorithms require a lot of operations. Sharing the load of the data storage and parallel processing over a scalable cluster of machines is the logical next step, and has not been reported on in depth in this domain. This paper does not seek to completely solve the problem of a full-edged handwriting recognition system. Rather, it describes and demonstrates how using a cluster in a Hadoop environment can assist the research by processing in parallel in order to speed up processing time. Another large issue is the size of the sets of data that need to be processed, a sustainable mechanism that efficiently and accurately processes large HWR data sets is yet to be found.

GO30

Recommender Systems: A systematic Review on methodologies and applications

Babak Maleki Shoja, Mohammad Nassehzadeh-Tabrizi  
Department of Computer Science

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. Recently, there is an increasing trend on employing this approach to various areas including music, book, social tags and products. Typically, 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 different recommender systems and investigated what areas are getting more attention and where the trends are increasing. Last but not least, we provide insights regarding future research directions in the area of recommendation systems.

GO31

Big Data Analytics on Twitter: A systematic review of data analytic methods

Mudit Pradyumn

As the amount of digital data is growing at an exponential rate during past few years, a great emphasis is being put on forming insights out of this data. New fields of research including Twitter data analytics are proven to be very fruitful. Even though a lot of research is being conducted in this field, there seems to be lack of literature review and classification of the research. In this paper we have reviewed 29 research papers on Twitter data analytics from 2011 to 2017 from 20 Journals and then classified them based on year of publication, the title of journals, methodologies, and their applications. This paper is written with the intent of providing insights to the reader to better understand the trend of research in this field.

GO32

The Proletariat Muse

Dana Smessaert

The white male artist has an infatuation that needs addressing, one that deals with the working class. For the male artist, the working class functions, in the same way, the nude does for them, an entry point to the primitive. Using primitivism to make sense of what is not modern, the artist colonizes aspects of working-class symbols to create a non-direct experience from the context in which these symbols exist. My aim for this body of work is to show a working-class environment, through the construction of still lifes and tableaux. Avoiding the use of humans in the images to prevent an empathic or an excuse for the viewer to disregard the symbols inside the photograph. These symbols are derived from status symbols, used to determine class. By using soft glances at the social issues that hide beyond what the public eye wants to see the images will provoke a sublime moment that reflects our nations social priorities.

GO33

The Puzzle of Global Warming

Margaret C White

I've turned my work from prints into interactive pieces like puzzles and paper folding. These games let the viewer join in the

## Abstracts | Graduate Oral Presentations

idea and respond to the work, like I am responding to scientific research. My idea with these cooperative pieces is to give the viewer the information without giving too much instruction. Letting the viewer play with the work and the idea helps them come to their own conclusions. Some studies show, children learn better through doing than through instruction. They're able to come to their own conclusions and understand the material on their own. My audience, while adults, can benefit from this kind of teaching as well. I see my drawings as sharing and replying to information about conservational research. Joining in the work can prompt/represent participating in protecting the environment.

My hope is to spark interest in renewable energies through interactive work. A highly politicized issue, a study from Alexander Severson and Eric Coleman of Florida State University, showed that subjects reacted more positively to scientific information regarding global warming than moral ideals. With this, and similar studies in mind, I've kept my work focused on facts to create a bridge between the divide of global warming. As this is a serious topic, I chose a lighter, more inviting approach to show people an option for dealing with environmental damage. If we look forward, we see a frightening future, but we can take hold of that and use technological advances to help our planet.

GO34

Revitalize: Documenting Gentrification in Contemporary America

Epiphany Sandra Knedler

Economic inequality in America is at the highest point since before the Stock Market Crash of 1929. Today's economies and communities are changing with consideration for the desires of the upper class. Poor and middle-classes are often ignored and displaced. This occurrence creates the trend of gentrification.

My research examines the contemporary world through a socioeconomic lens. By using documentary photography, emphasis is placed on the environment, values, and political issues in the context of small-town America. These documents focus on the progression of economic adjustments in Greenville, North Carolina. With high poverty and advanced economic industries, a schism has occurred between meeting community needs and growth. The West Greenville Revitalization Plan strives to revive neighborhoods in states of decline without clearly articulated plans for people who could be displaced through eminent domain or increased rent. This leaves room for echoing thoughts of gentrification. This photographic series documents this community in its current state, as redevelopment and inequality approach.

GO35

Family Topographics

Luke Christiansen

After a successful run as an athletic administrator and coach I transitioned to a career in photography. I began by attending the photography program at a local community college, and free-lancing at a variety of commercial studios. During this time my wife and sons were often test subjects as I brought home new photographic techniques. My research is an extension of those initial experimentations diving into a variety of topics associated with family.

My current series, Family Topographics, brings together narrative imagery from family outings and poetry I have produced over the years since becoming a father. The objective of this research is to examine our nuanced relationship between place and family identity. Every individual has their own connection with place, and my intent for this series is to provide the viewer with an opportunity to further examine that relationship.

"I was going round the world searching for an interesting place, when I realized that the place that I was in was already interesting." – Emmet

GO36

It's Art...it's Science...it's Design Thinking!

Kayla Nicole Clark

Design thinking is an experiment-based process designers use to address gaps in specific markets resulting in functional solutions. When applied across disciplines, design thinking has the power to transform how information is experienced. Poetry expresses the feelings or ideas of the creator through spoken word or printed literature rather than an immersive approach. Mental-phenomena are regularly misunderstood or unbeknownst to the general public. Scientific research is typically presented in a technical publication resulting in an understanding gap. My applications of design thinking connect information and viewers through combinations of visual and physical interaction.

## Abstracts | Graduate Oral Presentations

G037

YK Korean in America

Youngjae Kim

My name is Youngjae Kim, and I am originally from South Korea. The accessibility of worldwide pop culture has informed my knowledge of American and Korean cultures. This brought me to a realization that Korean culture is viewed through a westernized perspective.

My work is based on historical and current events related to South Korea and directly responds to filtered information about South Korea found on Internet news sites and blogs about social and political issues. The importance of information gathered in this manner is to have the same information as the common people in South Korea. The website I visit for this purpose is Naver.com, which includes several different news sources that have different points of view on the same event or issue. By combining these different views of a subject and exploring these issues through the duality of my cultural background, my work results in having contradictions and ultimately contains symbols of fear and sarcasm in a social critique of given issues. These issues include North Korean nuclear threat, elderly society, and public welfare.

The goal of my work is to explore issues from different points of view that represent the dualism of my culture. The results are images that represent both western and eastern points of view. The resulting traditional prints and drawings read differently for audiences from various cultural backgrounds. One of my specific goals is to introduce the long and venerable history of Korea to audiences unfamiliar with my culture. Another aim is to have a constructive visualized voice about the social and political problems South Korea currently faces. I utilize printmaking to create two-dimensional space unbound by the physical laws of nature. This mutilation, illusion of space and borrowed symbolic icons from both history and internet memes combines to develop a visual language; a language I openly use to preach to the public.

G038

Salty Napa Power!

Heather Lee McLelland

Fermentation is a process that has been used over thousands of years all over the world as a way to preserve food for long periods of time. Historically, it helped people not waste the crops that were harvested over the summer and fall and could last through the winter and longer.

At its simplest, the fermentation of vegetables works as follows: vegetables are soaked in salt water or preferably their own juice; this allows for the growth of bacteria; these bacteria eat the vegetable's sugars; as a result, they produce lactic acid which has a sour/tart/funky taste, depending on pH levels and palate.

Paul Greening, head Chef at Aqua Kyoto in London.

My work is inspired by kimchi and its significance in South Korea. Traditionally, large earthenware jars were specifically made to ferment kimchi. These jars will be the inspiration for my work and how I make kimchi. This progression will influence the imagery used to decorate these jars. I will use a variety of different techniques, such as silk screening and paper transfer, sgraffito, and painting with slip to show my process of kimchi making and why it is important to me.

G039

Depressed Six-Figure

Junghoon Han

Hanna Jubran

Sculpture MFA Candidate

29th January 2018

Depressed Six-Figures

Growing up in the metropolitan area of Seoul, one of the largest cities in the world, has had significant influence on my art making and research. My work and research are focused on the social context of the modern capitalist society and its labor force. During the past several decades, the rapid economic growth in East Asian countries has resulted in exponential growth in GDP per capita. The economy has been steadily growing due to their governments' investment on large corporations which have given them disproportionate wealth and power. In result, the corporations have created millions of jobs, effectively revolutionizing the landscape of the labor environment. Ironically, citizens of East Asian countries face an idiosyncratic challenge that was never have been seen at this rate before. Depression and suicide rate have grown at an exponential rate in past few decades among developed eastern Asian countries such as Japan, South Korea, and China.

This research will focus on the negative impact of the rapid urbanization and evolving capitalist economy among the eastern Asian countries, especially on their labor forces. It will closely examine the reason and the stimulant behind the

## Abstracts | Graduate Oral Presentations

unprecedented growth in depression and suicide rate despite of increasing GDP per capita. This research will heavily focus on its culture and norms within their society and labor environments that are created and enforced by the large corporations.

GO40

Fake Agates and Fused Glass

Lauren Nicole Purcell

Enameling is the process of fusing glass to metal. Historically, in jewelry, glass has been used to mimic the color and vitreous texture of precious stones like rubies and sapphires. This presentation will discuss taking the process a step further. Agates are developed by depositing layers of silicate mixtures inside the walls of a host rock void. My research mimics the layering process by firing multiple layers of enamel glass fused to a metal base. Not only does this process allow the artist to control the aesthetic qualities of the pseudo agate for commercial purposes, it also gives potential insight to how agates form at varying temperatures and chemical compositions. This presentation will show my successes, failures, and conclusions on this new enameling process and the works resulting from it.

GO41

Ancient photons: Deep Space Photography

Timothy W Christensen

We live in a small corner of one galaxy in a universe containing 1 trillion galaxies. Standing on a sphere spinning at more than 1000 miles per hour. The night skies are full of vistas unseen by the naked eye. The clash of energy and matter create displays of glowing gas and the dust of dead stars. Trained as a scientist I spend nights collecting "data" as images of objects in deep space. I then take what the computer and camera can "see" and transform it into a image that the human eye can discern and the mind can contemplate. I am amazed at how small we are. Feeling that smallness inspires me to think about what we are in the larger context of the universe.

GO42

Unmasking Sweetness

Mairin Faith Gwyn

I am exploring aspects of feminism dealing with the power

dynamics established during certain conversations between males and females. In particular when a woman is put down using demeaning language to identify her, such as sweetie, honey, and baby. This is an issue even more so when the male is a stranger. This kind of language, although perhaps not thought at the time to be patronizing to the female, does in fact belittle her. My work explores how this language is normalized and how using these terms to address females affects them.

GO43

Adverse

Brian James Culbertson

The role of the photograph in the conversation of mental illness is fraught with misrepresentation. Since its infancy the photographic image has been used as a means of portraying those living with mental illness as frail, or violent. My photographs question this history and, the use of prescription medications in contemporary treatment of mental illness without considering the physical and chemical makeup of the individual being treated. The incorporation of medications used to alter the chemistry of the mind into the salted paper print process produces images that are unsettling and, in some cases, unstable. They exist as secondhand accounts of what mental instability and adverse reactions to medication might look like.  
dopaminergic pathway

GO44

The Alternative Facts of Waste Culture

Timothy Jason Rickett

We live in a day and age where "alternative facts" and "fake news" are believed to hold some type of authority when it comes to scientific fact and documented accuracy (by some people). These alternative facts have lead me to create a series of work that expresses global issues with the industrial human and the waste culture that ensues with capitalism. This lack of awareness or care for environmental protection causes our planet and all its inhabitants (that includes you) to suffer in some form or another. The work and research I have created will enlighten the viewer on methodologies of waste disposal, the truths about capitalism, address alternative facts and fake news through satire and educational work, and offer solutions to our wasteful ways with the intent of saving planet earth from ourselves. Remember, its called garbage can, not garbage cannot.

# Abstracts | Graduate Oral Presentations

GO45

Skinned

Adam James Atkinson

Examples of human and animal relationships range in their use from food, clothing, and adornment to companionship, protection and symbols of

power. They are an integral part of our existence. This presentation will discuss the cultural significance of taxidermy from the 19th-21st century as an act of preservation and artistic practice. Through material, historical, and theoretical perspectives, the relationship between humans, animals, and art objects will be explored.

GO46

Tribalism

Ronson Lee Shultz

A person's world is not made up of thousands of miles, millions of people and a billion experiences. A personal world is often times small, numbering more in the hundreds of miles, the tens of people, and the limited new experiences we can handle. There are exceptions, numerous ones. Most of us prefer ours rituals, our comfort foods, familiar smiles, known roads, and something passed down. This trend, this urge is universal. The drive to find something familiar is not unique to mountain regions tucking away her inhabitants like a mother hen. But it is also in the world of skyscrapers cutting away any natural horizon line. It is a not a pull but the pushing away of everything new that crosses borders, religions, generations, and race, And I

am certainly no exception. My presentation will discuss how my work deals with tribalism: how we are affected by it, how it helps govern our behavior, our beliefs, and our character.

GO47

Resonating Experience

Lacey Michelle Hargroder

Every interaction, shared experience, or connection with other people influences our personal ongoing transformation. Through collecting clothing and fabrics from friends and family, I am procuring a residual fragment of their individual transformative experiences. These exchanges resonate with my own experiences,

even though I may or may not be closely connected to the person or the experience. This conversive process is correlatable with cycles in nature, much like the water cycle or the process of a bee.

The independent bee, *Osmia avoetia*, tediously makes each of its' larva a protective nest from collected flower petals and mud. I am much like this bee in my efforts. My work is a visual landscape of my personal transformation. Through collecting shared experiences from my community and preserving the fabrics which resonant impactful memories, I am sensibly connecting these fragments into the continuity of exchange

GO48

Stand-In, a surrogate spokesperson provider

Robin Carter

In today's society, we need a better platform for political engagement. What if there was a way for citizens to connect with their respective leaders outside of the ballot box? What if those leaders were able to make an appearance—answering questions, noting concerns, and voicing their intent— without physically being present?

That's why I have developed Stand-In, a surrogate spokesperson provider. Stand-In offers our clients the ability to engage with people without actually being present. By providing a surrogate for our client, we create an opportunity for "face-to-face" dialogue, written-letter collection, and literature distribution. Each surrogate spokesperson is carefully handcrafted to have the likeness of our client. Our event management team develops a personalized strategic plan of action to best suit our client's needs while maintaining optimal event participation. At Stand-In we believe that re-Presentation is everything.

"We Stand-In, so you can Stand Out!"

GO49

Creating Sound with Movement: The Body as an Instrument

Brittany J Green

The investigation I am undertaking is concerned with creating and processing sound through the use of movement. The investigation is set out in four steps:

Step 1. Identify hardware that track motion through gyroscopic, accelerometer, EMG, or other forms of data. Though I've discovered several objects that track motion, I've narrowed the



## Abstracts | Graduate Oral Presentations

focus of this investigation on to three motion-tracking devices- Smartphone, Leap Motion Controller, and Myo Armband.

Step 2. Identify software that can a) connect with the above-mentioned motion-tracking hardware and b) translate the hardware's output data into midi, frequency, and/or other numerical formats necessary to c) create and/or process sound.

Four software programs have been identified and explored. MaxMSP is used with each device to convert incoming motion data into data that can be used for sound creation and processing. The remaining three software programs convert motion data into Open Sound Control (OSC) or keystroke data-data formats recognizable in MaxMSP. Touch OSC is used to convert motion data from the Smartphone into OSC data and send it to MaxMSP. Keyboard Mapper and Myo Mapper are used to convert motion data from the Myo Armband into keystroke and OSC data, respectively.

Step 3. Identify which types of sounds are to be created, which types of sounds are to be processed, and how, and which types of movements are to be associated with each. It is important to be aware of how each device tracks motion so that gestures can be selected accordingly. Though the options are limitless, for this investigation I've narrowed this down to six sounds (three created, three processed from pre-existing sounds). Each sound has a specific physical gesture associated with it.

Step 4. Lastly, the final step is to program MaxMSP to emit the correct sound when it's associated movement is executed.

GO50

The Astronaut's Instagram: A Social Media Record of a Life Without a World  
Carolyn Adda Buss

Imagine if you will, dear reader, a life off-planet. What does it look like? Feel like? How do we have fun in a hostile environment? What do we do to cope when we feel out of place and alone? What if we aren't alone? Follow the adventures of the first human to live without the Earth, and the astronaut's friend, a space-faring nudibranch. The images you see were taken by their robot buddy—who is at once a sophisticated scientific instrument, and also an iPhone. These are their selfies: images sent back to Earth from a place we cannot yet see ourselves.

GO51

Herbalism as a Contemporary Home Practice

Carolina Sephra Reyes

This presentation will touch on the practice of using plants and herbs to heal alongside, and sometimes more effectively than, western medicine. The idea behind herbalism, or healing with plants, is that one heals the body and the mind at the same time, instead of just treating symptoms. My research entails delving into the history of healing and medicine and investigates herbalism's use as a contemporary home practice. This historical information is the base that I use to create functional tools and instruments that can be used in herbalism.

GO52

The Relationship between Health Literacy and Cigarette Smoking Behavior of Undergraduates

Juliann Stalls, MA East Carolina University, Department of Psychology  
Lisa Campbell, PhD East Carolina University, Department of Psychology

Cigarette smoking is among the most detrimental of risky health behaviors. Smoking is initiated and maintained through individual (e.g., psychological factors), environmental (e.g., peer smoking behavior), structural (e.g., local policy) and sociodemographic factors (e.g., economic status) and is associated with multiple poor health outcomes. The relationship between one individual factor, health literacy (HL), and cigarette smoking has not been previously studied. In this study, HL was operationalized as a combination of health knowledge, risk perception, self-efficacy, and healthy action. The levels of HL and the relationships between these factors and smoking behavior were assessed among a sample of undergraduate students (N = 491). A logistic regression model conducted to examine the contribution of HL components to predicting smoking behavior was statistically

significant,  $\chi^2(7, N = 92) = 37.307, p = .000$ . The model explained 45% (Nagelkerke R<sup>2</sup>) of the variance in smoking status and correctly classified 77% of cases. Among the four model components, only health action and risk perception significantly contributed to the prediction of smoking group membership. Those with more engagement in positive health behaviors were 7.1 times more likely to be non-smokers (Wald = 6.0,  $p = .01$ ). Additionally, those with a greater degree of risk perception were 1.9 times more likely to be smokers (Wald = 7.2,  $p < .01$ ). Neither self-efficacy nor health knowledge significantly contributed to the prediction of smoking group membership. The findings suggested

## Abstracts | Graduate Oral Presentations

that smoking cessation programs may become more effective by addressing engagement in positive health behaviors and heightening risk perception, rather than focusing on increasing health knowledge associated with smoking or self-efficacy to quit smoking.

GO53

Sexual Risk Behaviors, Sexual Satisfaction, and Sexual Functioning among Rape Survivors

Marlee Layh, M.A., Heather Littleton, Ph.D

Department of Psychology, East Carolina University

College women are at an increased risk for unwanted and nonconsensual sexual experiences, including both rape and attempted rape (Fisher, Cullen, Turner, 2000). These experiences are often associated with widespread disruptions in sexual behaviors including total avoidance of sexual activities as well as increased engagement in certain risky sexual behaviors, such as having more uncommitted sexual partners (e.g., sex with someone with whom you have no prior relationship; Garneau-Fournier et al., 2015). In addition, research has found that victims of sexual assault are more likely than non-victims to experience poor sexual health, including disruptions in their sexual functioning and reduced sexual satisfaction in their intimate relationships

(Turchik & Hassija, 2014). Despite these findings, very little research has examined how sexual behaviors are related to sexual health among victims of rape. It is possible that victims who engage in risky sexual behavior experience greater sexual dysfunction and lower satisfaction from these casual sexual relationships; however, no research to date has examined this possibility. Therefore, the current study aimed to examine sexual risk behaviors as mediators of the relationship between having a history of rape and experiencing greater sexual dysfunction and lower sexual satisfaction. For the study, a sample of 1,566 undergraduate women completed an online survey assessing their recent sexual risk behavior, current sexual satisfaction and sexual dysfunction, and prior unwanted sexual experiences. The sample was predominantly heterosexual (90.2%), European American (73.0%) women in their freshman year of college (83.8%). Of those women, 334 (19.1%) reported a completed rape since the age of 14. To achieve the stated aims, mediation analyses with bootstrapping will be conducted evaluating if two types of sexual risk behavior, sex with uncommitted partners (e.g., having multiple sexual partners) and impulsive sexual behaviors (e.g., having regretted sexual encounters), as mediators

of the relationship between a history of rape and greater sexual dysfunction, as well as lower sexual satisfaction. Implications of these findings include developing a better understanding of the aspects of victims' sexual behavior that made lead to reduced sexual functioning and satisfaction, and the development of targeted intervention programming for rape survivors that address specific aspects of sexual health.

GO54

Predictors and Moderators of Sexual Satisfaction in Dating Individuals

Ozlem Kose1, Jakob Jensen1

1Department of Human Development & Family Science, East Carolina University

Sexuality is an essential element of adult romantic relationships. The positive association between sexual wellbeing and relationship quality has been well demonstrated both in newly married and long-term married couples (Schmiedeberg & Schröder, 2016). Consistent with some theoretical perspectives on the subject, previous research consistently conceptualized sexual satisfaction as a contributing factor to relationship satisfaction (Apt, Hurlbert, Pierce, & White, 1996; Carpenter, Nathanson, & Kim, 2009). However, there is a bidirectional link found between relationship and sexual satisfaction suggesting that relationship quality may predict sexual satisfaction in some cases (Byers, 2005; Carvalheira, & Costa, 2015). Existing research exploring this causal link between relationship satisfaction and sexual satisfaction was conducted with married couples (Fisher et al., 2015). There is surprisingly little research on how relationship satisfaction leads to sexual satisfaction in dating couples (MacNeil, & Byers, 2005; Peck, Shaffer, & Williamson, 2004). In order to fill this gap, the current study was conducted to examine if relationship satisfaction is a predictor of sexual satisfaction in young dating individuals. The goal of the present research was to clarify the associations among relationship satisfaction, sexual satisfaction, length of the relationship, and the frequency of sexual activity in dating individuals. It was hypothesized that relationship satisfaction, relationship length, depression diagnosis, and sexual frequency would predict if one was sexually satisfied with their current partner or not. Our second hypothesis was that age and gender would moderate the link between relationship satisfaction and sexual satisfaction. The sample consisted of 2568 dating individuals. Our findings have revealed important information on relationship and sexual dynamics of dating couples for both researchers and mental health clinicians who work with young couples. Specifically, we found a positive association between relationship satisfaction and sexual satisfaction, but gender and age did not moderate this relationship. As hypothesized,



## Abstracts | Graduate Oral Presentations

there was a negative association between length of relationship, depression, and sexual satisfaction. Contradicting past research, sexual frequency was not associated with sexual satisfaction. Implications of these findings for researchers and practitioners will be discussed.

GO56

A Solar Farm in My Backyard? Resident Perspectives of Utility-Scale Solar in Eastern North Carolina

Zachary P Dickerson

North Carolina leads the charge on the East Coast for solar energy production (SEIA, 2016). Given the swaths of rural land, particularly in Eastern North Carolina, developers line up to purchase land and develop it for large-scale solar energy facilities. Known as solar farms, these large-scale energy facilities are often located next to residential areas. This research sought to uncover whether there are different factors that affect resident attitudes (preference & satisfaction) in regard to solar farms, and whether environmental, economic, social, aesthetic and demographic aspects can explain variations in said attitudes. It also compares the different geographic settings (inland and coastal) to ascertain if these are correlated to any of the said variations. This study conducted surveys of residents in four areas in Eastern North Carolina: two in coastal and the others in inland regions. Residents were located within a mile radius of each solar farm. For each location, residents could either see the facility from their home or passed it on the road to get to their home. Research also involved interviews with officials on the planning boards of the jurisdictions in which the residential areas and the solar farms were located, in order to gain a deeper understanding of the land use planning process and permits the solar developers must use. Survey data were analyzed through factor and regression analyses to determine the relationships between the opinions residents hold towards solar farms and the aforementioned factors. The research proposes to find correlations between geographic regions and either positive or negative opinions of the solar facilities.

GO57

What is the impact of incorporating culturally diverse literature in an organized classroom library on Kindergarteners' cultural tolerance?

Jennifer Garland Gardner

This project explores the impact of culturally diverse literature in an organized classroom library on the cultural tolerance of a Kindergarten class. There are twenty Kindergarten students

which includes two African American students and one Latino student. The other seventeen students are Caucasian. The setting is a public charter school that includes grades K-12 in a rural area. Age appropriate culturally diverse literature will be organized into the classroom library and a different book will be read each day for four weeks. The four book topics include Socio-Economic status, African American Heroes, Diverse Families, and Gender Roles. After read aloud, students will write about the literature in their journals. Before the research began, students were given an interview based on cultural acceptance. The same interview will be given at the end of the research and the two interviews will be compared. A reading survey was also given at the beginning of the research project and the same one will be given at the end and results will be compared. Quantitative and qualitative data will both be used during this research stemming from the researcher journal, observations, interviews, surveys and student journals.

I believe that the impact of my project will be that students understand more about different cultures and the environment of the classroom will move beyond the dominant, white middle class culture. I also believe that students will be more motivated to pick the diverse literature out of the organized library after read aloud. I believe that the organized library will help the books become more accessible. I anticipate that the journal entries will develop over the intervention to show critical thinking and a new understanding of diverse cultures.

It is possible that the interview responses will not change after the books are introduced and the journal entries will show know growth toward cultural acceptance. It is possible the students will not have increased knowledge of other cultures after the four week period.

GO58

International Students' Dating Relationships in the United States

Taylor Hilliard<sup>1</sup>, David Knox<sup>1</sup>, Michelle Stoner<sup>2</sup>, Cindy Aamlid<sup>2</sup>

<sup>1</sup>Department of Sociology, East Carolina University

<sup>2</sup>Southwest Minnesota State University

International Students' Dating Relationships in the United States Abstract

Approximately 975,000 collegiate international students are currently studying in the United States (Zong & Batalova, 2016). Majority of these students come from conservative countries with conservative parents and experience the more liberal American culture for the first time. There has been research on the experiences of international students including factors that

## Abstracts | Graduate Oral Presentations

influence their decision to study in the United States (Austin & Shen, 2016), the roommates of the international students (Yao, 2016), and international student's mental health (Forbes-Mewett & Sawyer, 2016). There are also two qualitative studies that have taken a focus on international students dating behavior including a focus on the racial hierarchy of dating Asian students studying in the United States (Ritter, 2015) and cultural barriers that exist for international students (Leong, 2015). Few studies have focused on the overall experiences with dating and romantic relationships for international students in the United States. The present study is guided by two questions. First, to what extent do perceptions and challenges in dating vary by gender, year in college, and home country for international students. Second, to what extent do international students experience conflict in sharing their romantic relationships with their parents back home. Using Symbolic Interaction theory as the framework, we will present our conclusions on the overall findings about dating and disclosure to parents. We will also reveal our findings about the gender differences about dating by international students and the gender differences among international students in living a double life. Finally, we will present our findings from the undergraduate and graduate differences about dating and hiding information from their parents. With a sample of 111 completed web-based surveys by international students (average age: 23, undergraduates= 70%, females=55%), we will use symbolic interaction theory to present five key conclusions from the data to contribute to the overall scarcity of data in existing research.

### GO59

The Untold Aftershocks: The Impact of Nepal's 2015 Earthquakes on Human Trafficking

Krista Danielle Nixon (Student)

Dr. Holly Mathews (Mentor)

Nepal is ranked as a Tier 2 country by the 2017 Trafficking in Persons Report and is a source, transit, and destination country for men, women and children who are exposed to forced labor and sex trafficking. Home ministry data reports that human trafficking from Nepal saw a threefold jump in the wake of the devastating April 2015 earthquake and subsequent aftershocks. The 7.8 magnitude earthquake affected 59 out of Nepal's 75 districts, affecting 11 districts severely. In the four months before the earthquake, 47 children were rescued by guards while traffickers were trying to smuggle them across the India-Nepal border. This number rose by over three times after the earthquake; between April 25th and October 10th, guards rescued 159 children from the hill districts of Nepal. Border officials report that such incidents have caused border security to increase as frequency of cross-border trafficking of minors

has reached unprecedented levels. Two years later, my research in Nepal indicates that agencies working in earthquake-affected districts have almost entirely discontinued their work largely due to lack of funding, despite the continued existence of increased trafficking rates. A lack of adequate laws, policies, and reporting systems further exacerbate the problem following disasters. In these circumstances and in the wake of all disasters, both natural and otherwise, is crucial for a framework to be incorporated into disaster planning to take into account the issues of increased vulnerability and opportunity for trafficking to occur.

### GO60

Carolina Sunset, Cuban Sunrise - A Comparative Study of Race, Class, and Gender in the Reconstructed South and Colonial Cuba, 1867 - 1869

Eric Andro Walls

The loss of the American Civil War and the consequence of Reconstruction literally turned the South on its head, profoundly altering the dynamics of race, class, and gender that previously defined antebellum Southern society. The letters of Harriet Rutledge Elliott Gonzales reveal one formerly elite South Carolina family's struggle as they faced a new social landscape that forced them to adapt to new challenges, particularly surrounding emancipation and the drastic reversal of the norms that previously characterized Southern society. Harriet Rutledge Elliot Gonzales never abandoned a sense of her "aristocratic" origins and "good blood," despite the hardships and poverty the family experienced that was so earth shattering to her sense of identity within a Southern social hierarchy defined by white supremacy and strict notions of "proper" race relations. Her perceptions of this new situation reveal the way that elite Southerners, particularly elite Southern women, viewed and interpreted the myriad changes their world was undergoing. Hers is a story of the way one woman and her family personally responded to these changes, ultimately leading them to abandon the South completely as they sought to reaffirm their status and identity in a place that seemed to still conform to their preconceived notions of the natural order of things – Cuba.

With much of their property destroyed in the war, stripped of the slave labor that previously provided the basis for their material support, the Gonzales' found themselves face to face with physical and material woes that they never imagined having to suffer. Married to a former Cuban insurgent and Confederate colonel, Ambrosio Jose Gonzales, Harriet Rutledge Elliot Gonzales was accustomed to a life of relative leisure, comfort, and status. After several years of struggling to rebuild a life in a South Carolina that was anything but the place she grew up in, the Gonzales' set out for Ambrosio's homeland, Cuba. There, in a society alien yet strangely familiar, Harriet Rutledge Elliott Gonzales found

## Abstracts | Graduate Oral Presentations

renewed hope. Still a slaveholding society at the time, the social, racial, and gendered norms were akin to that of the antebellum South and Cuba represented for her a return to a social hierarchy

she understood, a reestablishment of the status quo, and an opportunity for her family to start again in a world more like the one she remembered in her youth than the one it had become.

GO61

Examining Barriers and Health Literacy as a Facilitator to MyChart Practicality among Latino Caregivers: A Mixed-Method Study

Kali Elizabeth Guest  
Juhee Kim  
Holly Mathews

MyChart patient portal is particularly beneficial in the healthcare setting because it grants patients with more access to their health information and allows for greater communication with healthcare providers among other uses (Lyles, 2016). Low MyChart use among minorities and underserved populations has been associated with poor health outcomes (Lyles, 2016). The MyChart Latino Study is a mixed-method data analysis which seeks to understand how caregivers of Latino patients at the ECU Physicians Pediatric Outpatient Clinic respond to MyChart. This study has two unique populations amongst Latino caregivers of pediatric patients. The study examines the perception of MyChart amongst users and seeks to understand their experience in relation to MyChart non-users, and their intentions and expectations for MyChart use. It has been well cited within the literature that those with a higher health literacy engage in healthier behaviors and understand numeracy regarding wellness practices and caregiving. Thus, the hypothesis that I desire to present at the Research and Creative Achievement Week is: Spanish caregivers with a higher health literacy are more likely to be MyChart users and exhibit positive attitudes towards MyChart practicality.

The outcome variable is MyChart status which is defined as user or non-user and further operationalized as intention to use among non-users and current uses among MyChart users. To illustrate, the following MyChart features: scheduling/modifying an appointment feature, medication refills, or viewing test results/immunizations, etc., will be quantified as a measurement of frequency of use. The mixed-method analysis, is comprised of a qualitative interview designed to unearth barriers to MyChart usage including language challenges, and technical navigation among Latinos. Many of these challenges are associated with acculturation barriers including fluency in English and technical

aptitude (Ochoa, 2017). The quantitative portion of this study addresses the correlation between health literacy and MyChart usability among Latino patients. Currently, there are 26 Latino MyChart non-users and 3 MyChart users (n=29). The current Mixed-Methods study seeks to provide meaningful knowledge to address the digital divide in MyChart usability and inform health informatics policy and frameworks.

GO62

Exploring Effective Teaching Strategies at the University Level that Impact Low Socioeconomic

Students Taylor Leanne Sluss, BS

Department of Human Development and Family Science, East Carolina University

Mentor: Archana V. Hegde, PhD, BK

Department of Human Development and Family Science, East Carolina University

Higher education institutions are constantly questioning why lower socioeconomic students continue to graduate from college at lower rates (Morales, 2014). However, there has not been much work done on what low-socioeconomic students need in the classroom to increase graduation rates. Morales (2014) found that faculty who work with their students to build self-efficacy, realistically appraise students' strengths and weaknesses, encourage their help seeking tendencies, and provide clear linkages between academic success and future economic security were most helpful in promoting academic resilience in low-socioeconomic students. The purpose of this study is to examine and discuss how low-socioeconomic students at East Carolina University feel these teaching strategies are being implemented by their professors.

This study will be conducted by surveying students at East Carolina University who depend on a Federal Pell Grant to help pay for their college education. The survey will be sent to students using a secure Qualtrics link early January 2018. It is expected that participants of the study will be from a variety of age groups, academic majors, and ethnicities.

The findings of the research will describe students' perceptions of their faculty's teaching strategies. The results will also explore correlations between students' responses, their academic majors, college classification, grade point average, ethnicity, gender, and age. Open-ended responses accrued from students will be analyzed using qualitative strategies.

## Abstracts | Graduate Oral Presentations

Results from the research will help university faculty be aware of effective teaching strategies that impact low-socioeconomic college students. These teaching strategies will help build students' self-efficacy, help faculty appraise students' strengths and weaknesses, make faculty aware of how to encourage students to utilize campus resources, and help faculty understand how to link students' academic success to future economic security.

### 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

#### Toxic Confinement: Increased Exposure to Airborne Toxins in Prison Facilities

Thomas James Vogel

Prison facilities and other locally unwanted land uses (LULUs) cause a number of health, environmental, and socio-economic impacts on the local community. Prison facilities and other LULUs tend to be sited in locations where less wealth and social capital are available to contest their installation, similar to other LULUs. This causes an increased burden on the local population. Using a combination of the EPA's Toxic Release Inventory (TRI), a prison facilities database, and available census data, plume modeling and risk assessment were performed for North Carolina, Pennsylvania, and Texas. The chemicals evaluated are benzene, toluene, ethylbenzene, and xylene (BTEX), known respiratory irritants. BTEX emissions, outside of industrial uses, are prevalent in urban environments from car exhaust. However preliminary work in Texas showed an increase in interpolated BTEX concentrations surrounding prisons that was not a characteristic of an urban environment. The EPA plume model AERMOD was used in this analysis. Risk assessment was performed using a Python scripted regression analysis evaluating socio-demographic variables, health variables, and prison and TRI facilities to output an air quality value based on the EPA's Air Quality Index. Using the air quality index that accounts for both physical and socio-demographic characteristics will allow the results to be compared across states and minimize the risk of bias from urban-rural divides.

### GO64

#### Undergraduate Apathy: What Faculty Can Do

Rebekah Moye Stanton, East Carolina University

Melinda Kane, East Carolina University

David Knox, East Carolina University

Four-hundred-and-sixty-six undergraduates at a large southeastern university completed a self-administered 46 item online survey (Undergraduate Survey on Attitudes toward a College Education) developed by the authors. Age of respondent was the only demographic factor significantly associated with being apathetic- the younger the student, the greater the apathy. Factors associated with having lower academic apathy/being excited about courses were feeling that their teachers were approachable and having a faculty mentor. Hence, the answer to student apathy may be more faculty than student driven- when faculty are viewed as being approachable and become a mentor (particularly for juniors and seniors), students are more likely to be excited about their courses. Exchange theory was the framework use to explain the findings. Implications and limitations were identified.

### GO65

#### Emotions, Identity, and Sustainable Behaviors: A Study of Environmental Involvement in a Campus Community Camille Kresz

Sustainability has become one of the most urgent and complex topics in the 21st century. Universities are a key element in facilitating the production of scientific knowledge and sustainable development initiatives to address these challenges. However, while many Universities have been successful in generating student action on sustainable issues, campus-wide efforts to encourage more sustainable behaviors among students at East Carolina University (ECU) are still in their infancy. As a result, little is known about what may or may not motivate students to engage with these initiatives. Drawing on literature from feminist political ecology, masculinity studies, and emotional geography, this case study aims to understand how male undergraduates at ECU personally relate to nature and environmental discourse. First, I argue that my participants' emotions and experiences come together to build nature as an emotional "sanctuary", or a refuge from the reality of daily life and the expectations of society; a place where emotions

and personal identity can be expressed without being judged. At the same time however, this strong emotional bond also detaches nature from students' everyday life as it is built in opposition with rational capitalist society. Second, I aim to demonstrate how environmental discourse, by its focus on scientific expertise and its emphasis on global issues, facilitates the disconnection between nature as an emotional "sanctuary" and daily life. Finally,



## Abstracts | Graduate Oral Presentations

this research provides insights on how identity and emotions can be used as a way to promote environmental protection and sustainable action.

GO66

Analyzing Factors Contributing to Repeated Disaster Vulnerability and their Impact on Community Recovery

William D. Alexander

Holly F. Mathews, Ph.D.

Department of Anthropology, East Carolina University

Storm-related flooding is one of the greatest disaster risks facing communities in eastern North Carolina. After flood events, communities of limited means may be incapable of pushing for reconstruction agendas that increase their disaster resilience (Marino, 2015; Freudenberg et al, 2009). Recovery efforts driven by the agendas of outside agencies can perpetuate the pre-disaster status quo and result in a state of continued disaster vulnerability, highlighting the need for recoveries focused on the needs and viewpoints of the afflicted communities (MacKinnon & Derickson, 2013; Barrios, 2016). In the past 20 years, the town of Windsor in Bertie County has dealt with four floods reaching the 500-year flood stage. Data from participant observation and in-depth interviews with 16 business-owners, civic leaders and residents of Windsor are used to explore the issues inhibiting the community's long-term recovery. Specifically, I argue that part of the failure is due to a political power structure that favors assistance to regions with greater economic growth at the expense of economically vulnerable populations. Second, I show how repeated disaster trauma and disruptions to the recovery cycle have led many residents to distrust external agencies, misidentify the factors and risks for repeated flooding, and doubt the ability of the community to recover. I hypothesize that this attitudinal cluster is another key factor that mitigates against long-term recovery by inhibiting community building mechanisms. The goal of the research is to propose a more inclusive and holistic recovery model that addresses community viewpoints and actively seeks to create mutually beneficial relationships between residents and external agencies during recovery efforts. The goal of the research is to propose a more inclusive and holistic recovery model that addresses community viewpoints and actively seeks to create mutually beneficial relationships between residents and external agencies during recovery efforts. It is hoped that the implementation of such a model and the building of these relationships would strengthen proactive attitudes in the community and promote agendas emphasizing resiliency and

sustainability

GO67

WHO'S GETTING THE BEST SEX?: A Comparison by Sexual Identity

Hannah Rebekah Morris, MA Candidate, East Carolina University

Lacey Ritter, Assistant Professor of Sociology, Wingate University

David Knox, Professor of Sociology, East Carolina University

This study examined the difference in sexual satisfaction between sexual minority and heterosexual college students testing the mediation effects of institutional affiliations and interpersonal relationships. A convenience sample of 280 college students completed a 47-item Internet questionnaire, including self-reports on sexual satisfaction and sexual behaviors/activities. Data on 193 heterosexuals and 87 sexual minority respondents were analyzed using regression to test for differences in reported levels of sexual satisfaction by sexual orientation. Results revealed that sexual minority undergraduates reported lower sexual satisfaction than heterosexual undergraduates. This difference persisted when controlling for sex, race, education, and SES. Mediation analyses found support that institutional affiliations and interpersonal relationships have an effect on this association. Previous researchers have suggested that sexual minority relationships exist in a context of heterosexism, suppression, stigmatization, prejudice, discrimination and violence which results in lower relationship quality. Such an impact on minority couples' satisfaction may spill over into lower sexual satisfaction.

GO68

A Systematic Review of Racial Biases in Healthcare Workers and Healthcare Disparities

Victor G. Aeby<sup>1</sup>, Tracy Carpenter-Aeby<sup>2</sup>, Shyla Cabell<sup>2</sup>, Roger Crowe<sup>2</sup>, Brianna Knox<sup>2</sup>, Tram Nguyen<sup>2</sup>

<sup>1</sup>Department of Health and Education and Promotion, East Carolina University

<sup>2</sup>College of Health and Human Performance, Social Work, East Carolina University

United States health care may exhibit noteworthy racial

## Abstracts | Graduate Oral Presentations

disparities as a result of racial bias among health providers. Racial bias is an issue in the United States that can have a substantial impact on the lives of individuals of racial minority. The primary objective of this study is to investigate the number of articles that occur in the social work literature regarding disparities in healthcare related to racial bias. A Cochrane Systematic Literature Review (SLR) was used to identify existing professional social work literature on the existence of racial bias in health disparities pertaining to the social work field. Results indicated that many healthcare providers exhibit racial bias in their practice. This bias was found to be implicit rather than explicit bias. While explicit bias was present in professionals who express racist ideologies, they imply a minimal portion of the population when compared to professionals who unknowingly present implicit bias. Future interventions will need to focus on training healthcare professionals and future healthcare professionals the importance of addressing racial bias, especially in the form of implicit bias. Alerting medical school and social work educators to the findings may be the first step necessary to begin removing racial bias from healthcare.

GO69

Nike Store Las Ramblas; Behind The “Shoe Wall”

Pol Solanellasm East Carolina University

Dr. Mark Moore, Department of Kinesiology, East Carolina University

The case deals with the local-global nexus concerning management operations of the Nike Store Las Ramblas, a local franchise in Barcelona, Catalonia. It poses several dynamics that impinge on being a local authorized retailer for the largest seller of athletic footwear and apparel in the world. From the perspective of departmental manager Laura Muñiz, students are induced to analyze the characteristics of the store; uncover its marketing singularities and revenue sources; discern fundamental strengths, weaknesses, opportunities, and threats of the franchise; and devise an opinion on whether she should leap in addressing controversial issues surrounding Nike during upskilling of employees.

GO70

A Post-Race Society? A Content Analysis of Race during the Obama and Trump Inaugurations

Jerry Lynn Johnson

Objective. More than a century ago (1903), noted sociologist W.E.B Du Bois proposed that “the problem of the Twentieth

Century is the problem of the color-line.” This proposition led to a contentious debate on the significance of race in the American society. Then, in 2008, the United States of America would elect its first African American president, Barack Obama. Some pundits claimed that America had reached a post-race era. Recent events seem to suggest otherwise. To replace the first African American president, voters have elected to appoint Donald J. Trump. President Donald J. Trump is partly known for his racially charged birther movement against President Obama, the racial discrimination lawsuits by the Justice Department against his family’s real estate company, a vicious declaration for the death penalty of 5 black teens – known as the Central Park Five- that were later found not guilty, and for conjuring the support of many racially biased White Americans, such as David Duke (former KKK leader). The current study will examine and contrast perceptions of race relations on the inauguration dates of both, President Barack Obama and President Donald J. Trump.

Methods. The current study is a qualitative content analysis of major national newspapers and social media outlets for common themes on race perception. The current study provides coverage over the inauguration dates of President Obama and President Trump (January 20, 2009 and January 20, 2017, respectively). The following is a non-exhaustive list of major national newspapers that were included in the content analysis; USA Today, The Wall Street Journal, and The Denver Post. The following is a non-exhaustive list of social media outlets that were included in the content analysis; Facebook, Instagram, Reddit, and Twitter.

Findings. Preliminary results suggest that we have not yet reached a post-race society in America. Perceptions of race relations were by-large harmonious during the inauguration of President Obama. In contrast, the inauguration of President Trump was met with dire perceptions of race relations in America. Large scores of hopelessness was posited by many social media users, while major national newspapers struggled to maintain a positive racial rhetoric. In sum, perceptions of race relations in America have declined between the Obama and Trump Inaugurations.

GO71

Exploring Pre-Service Early Childhood Education Teachers’ Experience with Nutrition Education

Jessica Resor<sup>1</sup>, Archana Hegde<sup>1\*</sup>, Virginia Stage<sup>2\*</sup>

<sup>1</sup>Department of Human Development and Family Science, East Carolina University

<sup>2</sup>Department of Nutrition Science, East Carolina University

\*Co-mentors

## Abstracts | Graduate Oral Presentations

Children's nutrition habits are developed early in life. Teaching children about healthy eating in this period can protect them from childhood obesity and future increased risk of chronic disease. Teachers are a major influencer in these habits outside of family and the home. According to the US Department of Education in 2016, 58% of children attended center-based care as their primary early care and education source, making it the ideal setting to develop healthy nutrition habits. While teachers have a unique opportunity to incorporate nutrition into the early childhood classroom, few studies focus on reviewing teacher perceptions and behaviors related to this topic. Therefore, this study's purpose was to understand what experiences early childhood education pre-service teachers have had with nutrition education during their undergraduate program and how these experiences may play into their future perceptions as teachers.

Phenomenology was used in this study. Purposive sampling was utilized to recruit Birth through Kindergarten (B-K) education seniors from two public North Carolina universities. In North Carolina, B-K education is the early childhood education teacher program that provides the license to teach in public preschools/ kindergartens and in the private child care system. Students who were completing their internship in the classroom setting in the spring semester were invited to participate. Participants completed a demographic questionnaire online and an in-depth semi-structured interview via phone. Roughly equal numbers of participants were recruited from each university. Interviews were transcribed verbatim, coded, and analyzed for common themes. Institutional Review Board approval was received from East Carolina University to conduct the study.

Anticipated findings will reveal themes that reflect early childhood education pre-service teachers' personal and academic experiences with food and nutrition as well as their thoughts on nutrition education within the classroom. This study will identify what barriers and support participants anticipate going into the classroom setting as well as their feelings about their own nutrition knowledge. With its exploratory nature, this study contributes to the early childhood education field by exploring an area that has received little attention in the literature and discussing implications for educators and teacher education degree programs. This study is ongoing and will be completed mid-April 2018.

GO72

Effects of temperature, salinity, and steel type on microbiologically influenced corrosion in North Carolina estuarine river systems

Cody E. Garrison<sup>1</sup>, Kyra Price<sup>1</sup>, Erin K. Field<sup>1</sup>

<sup>1</sup>Department of Biology, East Carolina University

Iron-oxidizing bacteria (FeOB) play a large role in the biogeochemical cycles of iron in the environment, and recent advancements in culturing methods have shed new light on their role in steel colonization and corrosion. Biological oxidation of iron may increase the rate of corrosion via FeOB colonizing the surfaces of steel structures. Differences in steel type susceptibility to corrosion was assessed via a colonization study on two stainless steel types that vary in metal composition (304 and 316) to identify distribution and abundances of FeOB along a salinity gradient in two separate North Carolina estuarine river systems (Neuse and Pamlico Rivers). Stainless steel samples were deployed at five sites on each river along a salinity gradient for a period of six weeks to ensure adequate time for colonization, and collections were repeated for one year. A most probable number (MPN) method was used to estimate abundances of FeOB for each site. Results from seven deployments have shown that FeOB have been more abundant at higher salinities, more abundant at moderate temperatures, and more abundant on 316 steel type. This is notable because 316 steel type has an added component of molybdenum and is intended to be more corrosion resistant than 304. The differences in abundance on different steel types suggest that FeOB resistance to heavy metals can be variable and depends on the composition of the steel. Ongoing laboratory studies focus on the interactions of FeOB with the individual metals that comprise stainless steel in order to help explain why colonization varies between steel types, and to help us develop better corrosion resistance strategies in the future. These combined results will reveal differences in susceptibility of stainless steel in aquatic environments and implications for the long-term preservation of commercial and private property in coastal environments characterized by tidally influenced estuarine systems.

GO73

Evolution of fast muscle movement in New World manakins (Pipridae)

Robert Driver<sup>1</sup>, Chris Balakrishnan<sup>1</sup>, Lainy Day<sup>2</sup>, Matt Louder<sup>1</sup>, and Matt Fuxjager<sup>3</sup>

<sup>1</sup>Department of Biology, East Carolina University

<sup>2</sup>Department of Biology, University of Mississippi

<sup>3</sup>Department of Biology, Wake Forest University

Extreme phenotypes such as the longest lifespan, the most toxic venom, or the most sensitive smell, provide insight to the mechanistic limitations of cellular pathways and physiology. Manakins (Pipridae) are Neotropical suboscines with acrobatic sexual displays performed using the fastest known vertebrate limb muscles. The Scapulohumeralis caudalis (SH) muscle is responsible for medial movement of the humerus and is integral



for manakin displays with complex wing movements. Androgen receptor (AR) expression is increased in the muscle of species with complex wing displays and inducing the AR pathway causes regulatory changes in SH. To define the regulatory changes occurring in species with complex wing displays, we obtained transcript expression levels and sequence data derived from the SH and Pectoralis (PEC) muscles from six manakin species and a flycatcher, representing species with and without rapid wing movements. Species without rapid wing movements in our dataset included basal taxa that split prior to the lineage developing rapid movement, but additionally one descendent species that exhibited a reversal of the display. We contrasted expression levels of 7,194 transcripts between species with and without rapid wing movements, and found enrichment for genes corresponding to skeletal muscle contraction and muscle filament sliding gene ontology (GO) categories. Specifically, we found that species with rapid wing movements showed increased expression of fast-twitch skeletal muscle troponin I (TNNI2), a calcium-mediated regulator of striated muscle expressed in “fast-twitch” skeletal muscle myofibers. We also found differentially expressed transcripts for proteins in the AR pathway, including associated heat shock proteins 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.

GO74

### Generate and Characterize Adamts9 Knockout Mutants

Nichole Jansch Carter, Dongteng Liu, Yong Zhu

The release of a mature egg is essential to reproduction; it requires modifications to cell-surface proteins and the extracellular matrix in follicular cell layers that surround a mature oocyte. Disruptions in the function of these proteases have been associated with polycystic ovarian syndrome (PCOS), infertility, and cancer. Metalloproteinases from several families are known to be involved in ovulation related tissue remodeling, however specific proteases responsible for the terminal degradation of follicular layers is still unknown. From previous analyses using RNA-seq and qPCR done by our lab on metalloproteinase expression in preovulatory oocytes of PGR knockout (PGRKO) zebrafish, which are anovulatory, we found *adamts9* had the most dramatically reduced expression (around 60 fold) compared to wild type

(WT). Due to localized expression of *adamts9* in the follicular layers and significantly reduced expression in PGRKO fish, embryonic lethality of *adamts9* (-/-) mice, and highly conserved GON-1 protein domains that are responsible for cell migration in the gonad of nematodes, we hypothesize that ADAMTS9 may function at the terminal stage of ovulation by inducing the breakdown of follicular layers in zebrafish. To test this hypothesis, we generated *Adamts9* global knockout (*Adamts9* KO) zebrafish using CRISPR/Cas9. From 1149 fish generated by *adamts9* heterozygous crossings, we found significantly fewer *Adamts9*KO fish (45) than the predicted by the Punnett square (287). In WT and heterozygous *adamts9* mutants the ratio of male to female is 2 to 1, but the majority (40) of 45 *Adamts9* KO fish had testis and of those (27) had fertility comparable to WT. The remaining males (11) either were subfertile or not able to cause WT females to release eggs (infertile). Astoundingly, the remaining mutants (5) did not have functioning gonads but instead have empty membrane-bound compartments similar to the size and shape of ovaries. We have not found any fertile female knockouts and have not determined how cell migration has influenced the development of zebrafish gonad in *Adamts9*KO. Due to embryonic lethality in ADAMTS9 knockout mice, this is the first time an adult *Adamts9* KO vertebrate model has been established, providing a good model to study the functions and underlying signaling pathways involving *Adamts9* and reproduction in zebrafish.

GO75

### A Biophysical Approach to Understanding Fibrin's Extensibility

Taylor C. Dement, Nathan E. Hudson

Department of Physics, East Carolina University

A primary constituent of blood clots are fibrin nets that can stretch to great lengths without breaking. This ability facilitates optimal function: many cardiovascular diseases are characterized by altered rigidity, thickness, and lysis time of fibrin fibers. In theory, fibrin stretching is the mechanism that enables clots to overcome the force of blood flow and thus plug vascular injuries. But the origins of fibrin's elasticity and the tension held therein remain unknown. Fibrin has three peptides ( $\alpha$ ,  $\beta$ , and  $\gamma$ ) that form a six-chained homodimer; human  $\alpha$  chain residues 221-391 are dubbed the  $\alpha$ C connector. This region contains ten, thirteen-amino-acid, tandem repeats and is thought to play an important role in fibrin's overall structure and function. Preliminary species studies have shown a positive correlation between the length of this region and fibrin elasticity. Thus, the prime goals of this study are to measure tension in the  $\alpha$ C connector and to characterize how this region affects clot formation and extensibility.

Through recombinant protein techniques, three fibrin variants with different portions of the repeat region deleted from the  $\alpha$  chain have already been expressed. Mutant fibrin polymerization

## Abstracts | Graduate Oral Presentations

rates and structure will be characterized and compared with wild type fibers with confocal/TIRF microscopy. Extensibility experiments with each variant will be done to test if an altered  $\alpha$ C connector leads to altered stretching capabilities. Preliminary results will be presented. Plans to use a microfluidic chamber, in which polymerized blood clots can be stretched via fluid flow, will be discussed.

To measure force, three fibrin variants have been designed with a molecular tension sensor inserted before, amidst, and after the repeat region. The tension sensor, capable of picoNewton sensitivity, is comprised of two fluorophores that undergo fluorescence resonance energy transfer (FRET) and are connected by an entropic spring sequence. Efforts to synthesize this recombinant fibrin and the proposed methodology for calculating molecular tension will be detailed. The methods described above provide a way to probe the  $\alpha$ C connector and take steps toward determining the biophysical mechanisms of fibrin function. Understanding the fundamental mechanical properties of fibrin fibers is vital to understanding blood clots and thus cardiovascular diseases that affect people worldwide.

GO76

Using Parasite Diversity in a Common Host Fish to Evaluate Anthropogenic Impact

Christopher Moore<sup>1</sup>, April Blakeslee<sup>2</sup>

<sup>1</sup>Interdisciplinary Doctoral Program in Biological Sciences, Biology Department, ECU

<sup>2</sup>Assistant Professor, Biology Department, ECU

The naked goby *Gobiosoma bosc* is a benthic species of fish that is highly abundant in shallow estuarine habitats from Massachusetts to Mexico. Throughout its range, *G. bosc* is widely tolerant of both salinity and anthropogenic disturbance, making it an ideal indicator species for assessing ecosystem health in the Pamlico Sound: the second largest estuarine system in the USA. We are sampling for *G. bosc* along a salinity gradient in the Pamlico and Neuse rivers using a paired-habitat approach. At multiple sites along each river, we will quantify parasite diversity in *G. bosc* from both degraded/disturbed and protected/natural habitats, focusing particularly on trophically-transmitted parasites that require multiple hosts to complete their lifecycles. 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). As a result of this positive correlation between trophically-transmitted parasites and free-living biodiversity, we hypothesize that parasite diversity in naked goby hosts will be higher in conserved or protected habitats with natural shorelines (e.g. state parks, national forests, or game

lands) compared to marinas or other anthropogenically-stressed environments. Given the ubiquity of the naked goby, quantifying parasite diversity in these fish offers a promising rapid assessment tool for evaluating community diversity and ecosystem health, not only in North Carolina but throughout the range of this widely-distributed species.

GO77

Effects of nutrient addition and disturbance on plant community assembly: a functional trait analysis in a long-term experiment

Emily Michelle Tate, Carol Goodwillie

Department of Biology, East Carolina University

Two of the most important factors in determining plant community composition are nutrient availability and disturbance. Plant species interact with variation in the environment through functional traits. Analysis of functional traits can provide insights into the resource use strategies that allow plants to be successful in different environments. Resource use strategies occur on a spectrum from conservative to exploitative. Conservative and exploitative strategies differ in the rate at which resources are acquired and used in the plant. Functional traits can also exhibit phenotypic responses to changes in the environment, and the amount of phenotypic response may be ecologically important and related to resource use strategy. This study, which takes place at a long-term experiment in a protected wetland site in eastern North Carolina, examines the functional traits of plant species, building upon the previously collected community data from the past 13 years. Functional trait data were collected on 49 of the most common species at the site in both fertilized and unfertilized treatment plots. The integration of data on species abundance and functional traits, in addition to the phenotypic responses of traits to fertilization, have provided insight into the mechanism behind changes in community composition due to differing amounts of disturbance and nutrient availability.



# Abstracts | Graduate Poster Presentations

## GP1

### ENGINEERING A NOVEL DYSFUNCTIONAL HIGH-DENSITY LIPOPROTEIN MIMETIC PEPTIDE

MJ Yaeger, B Muller-Borer, L Limberis, S Reece, B Kilburg-Basnyat, B Lou, MB Fessler, K, Kew, WE Allen, T Zeczycki, L Yang, E Krewson, J Keever, KM Gowdy

**Background:** Cardiovascular and pulmonary diseases are leading causes of morbidity and mortality worldwide. Studies report an inverse correlation between levels of serum high density lipoprotein (HDL) and the severity of heart and lung diseases. However, HDL can become dysfunctional (D-HDL) in chronic inflammatory diseases. It is challenging to study D-HDL, in part, because it is found in populations commonly burdened with comorbidities and subsequent medications. Therefore, to better understand how D-HDL differs from HDL, we sought to design a D-HDL mimetic peptide inspired by an HDL mimetic peptide (L-4F) that has been shown to be biologically protective.

**Methods:** Healthy HDL, L-4F, and an engineered D-HDL mimetic peptide (oxL-2W) were incubated with human umbilical vein endothelial cells (HUVECs) for 16 hrs. HUVECs were then scratched and exposed to lipopolysaccharide (LPS) or phosphate buffer saline (PBS) for 12 hours. Wound healing was assessed and HUVECs were collected 12 hrs after LPS exposure to measure expression of pro-inflammatory cytokines (TNF- $\alpha$ , IL-6, and IL-1 $\beta$ ), neutrophil chemokine (IL-8), and adhesion molecules (ICAM-1 and VCAM) by real time PCR.

**Results:** We first assessed the impact of L-4F on endothelial cell wound healing and inflammatory response to LPS to serve as a comparison for oxL-2W. We determined that endothelial cells incubated with L-4F 16 hrs before challenge with LPS healed  $22.75 \pm 11.91$  % more than cells incubated with PBS and exposed to LPS. L-4F incubation also significantly decreased the gene expression of ICAM-1, VCAM, and TNF- $\alpha$  in cells exposed to LPS. We have designed oxL-2W by substituting the N-terminus phenylalanine of L-4F for a tryptophan, which has been shown to increase the susceptibility of L-4F to become oxidized. We will oxidize the modified L-4F peptide (L-2W) with myeloperoxidase, to make oxL-2W, and assess its impact on endothelial cell wound healing and inflammatory response to LPS.

**Discussion:** The data generated from these experiments will be the first to provide a critical tool for studying how D-HDL may change the inflammatory environment inside the vasculature. Designing a novel tool such as a D-HDL mimetic peptide will be useful to better understand how D-HDL can influence the progression of cardiovascular and pulmonary diseases.

## GP2

Incorporation of Fibronectin on Electrospun Scaffolds to increase Biocompatibility and hMSC proliferation

Nicholas Anton Bernath

Research engaged in the enhancement of human derived mesenchymal stem (hMSC) cell proliferation through polymer-cell interactions has advanced in the last 10 years. Many emerging studies in regenerative medicine are focused on the development of 3D microenvironments for studying anisotropic cell growth. These 3D models are often used in addition to implanting laboratory animals for studying in vivo interactions in native live tissue. Although the specific microenvironments vary among different research applications and cell types, the fundamental principal of a model that mimics live tissue remains the same. This project will focus on the adsorption of fibronectin to electrospun structures (scaffolds) to increase biocompatibility and hMSC proliferation. The electrospun structures will be functionalized by adhering fibronectin (FN) to its surface. The goal is to mimic the natural architecture of the extracellular matrix (ECM) of living tissues and evaluate its influence on cell proliferation and viability. Scaffold characteristics including fiber diameter measurements, and wettability will be assessed before and after FN treatment. hMSC growth on untreated and treated scaffolds will be evaluated using cell proliferation assays and confocal microscopy. The goal of this project is to evaluate the application of FN on electrospun scaffolds to mimic the hMSCs microenvironment in the development of 3D tissue models to study in vivo interactions.

## GP3

Effect of inhibitors of sphingolipid metabolism on colon cancer tumor spheroid formation

Kamara Jones

Sphingolipid (SL) metabolism plays a vital role in cell signaling, particularly as it relates to the regulation of apoptosis and

autophagy. Ceramide, the diradyl backbone of sphingolipids, is an effective tumor suppressor; however, in colorectal cancer (CRC) as well as other multidrug resistant cancers, ceramide is rapidly metabolized. Depending on the enzymes involved, formation of mitogenic products ensue. Although researchers have recognized the potential of targeting SL enzymes to



## Abstracts | Graduate Poster Presentations

regulate the balance between pro-apoptotic ceramide and mitogenic sphingosine 1-phosphate, little research has focused on evaluating the effectiveness of this approach using a 3D cell model. Assessing the tumor-suppressor capacity of sphingolipid enzyme inhibitors on CRC cell growth using a tumor spheroid model is important because it is well established that 3D cell models better recapitulate the physiological properties of in vivo tumors versus standard monolayer cancer cell cultures. CRC spheroids were generated using the hanging drop technique to create these 3D cell models. The HT-29 human CRC cell line was used in this

study. Spheroids were initiated using 500 cells/25  $\mu$ l drop size. Preliminary results demonstrate that the spheroids grow to accommodate approximately 3,000 cells with a diameter of around 200  $\mu$ m, after a 4-day incubation at standard cell culture conditions. To determine the impact of blocking SL metabolism on CRC tumor spheroid formation and growth, small molecule pharmacological inhibitors of sphingosine kinase 1, acid ceramidase, and glucosylceramide synthase will be added to the media prior to cell seeding. On day 4, spheroid diameter and sphericity will be determined using image analysis software, after which, the spheroids will be dissociated and cell counts and viabilities will be determined. This research will shed light on the extent to which sphingolipids impact CRC cell growth and possibly metastatic potential.

GP4

### Relationship Between Muscle Volume And Tibial Stress

Mara Thompson<sup>1</sup>, Stephanie George, PhD<sup>1</sup>; Stacey A. Meardon PT, PhD<sup>2</sup>

<sup>1</sup>Department of Engineering, East Carolina University

<sup>2</sup>Department of Physical Therapy, East Carolina University

Tibial stress injuries are common in runners. These injuries have been associated with smaller calf girth, which suggests a possible relationship between lower leg muscle volume (MV) and stress experienced by the tibia during running. The purpose of this study was to determine if a significant relationship exists between MV and maximum normal and shear stress in the tibia.

3D kinematic and kinetic data were collected while participants (10 female, 24.6 $\pm$ 1.7 yrs) ran on an instrumented treadmill at a self-selected speed (2.8 $\pm$ .3 m/s) for 20 sec. Kinematic and force plate data were sampled at 200 Hz and 1000 Hz, respectively, using real-time data acquisition. Joint angles and moments for

10 stance phases were extracted for input to musculoskeletal models (MSM). Subjects underwent MR imaging of the right tibia. An MRI axial slice at the distal 1/3 location was used to create a finite element (FE) mesh, comprised of 600 elements. Using a validated MSM, muscle and joint reaction forces were used to estimate 3D moments and forces in the distal 1/3 tibia for each 1% of stance. These were applied to a cross-sectional FE model to produce normal and shear stresses across the stance phase in each mesh element. Peak normal and shear stresses of each trial were extracted for statistical analysis. MRIs were imported into MIMICS software to estimate MV. Total MVs were calculated from below the knee joint to above the ankle joint using a thresholding method to remove extraneous tissue and bone. Curve estimation was used to quantify the relationship between MV and peak bone stress ( $a=0.10$ ).

Non-linear logarithmic relationships were observed between total MV of the lower leg and maximum tension ( $r=0.60$ ,  $r^2=0.36$ ,  $p=0.03$ ) and compression ( $r=0.51$ ,  $r^2=0.26$ ,  $p=0.07$ ). For normal stresses, the regression indicated that, in general, as MV increased, maximum bone stress decreased. No statistically significant relationship was found between MV and maximum shear stress. The data indicated that normal stresses decreased at higher MV values with a logarithmic relationship suggesting that at lower MVs, per unit change in MV has a larger effect on the stress experienced by the tibia than at higher MVs. Increasing muscle surrounding the tibia may benefit runners by reducing the risk of stress-related injuries, and which may be more pronounced for those with lower MVs. Additional work is needed to examine sex-specific responses and the contribution of specific muscles to bone stress.

GP5

### Additive Manufacturing in Military Applications

Zachary Alan Cleghorn

Military warfare has come a long way from the days of the Civil war. Then muskets had to be returned to the workshop to be fitted with custom parts as the concept of interchangeable parts had not yet evolved. Additive manufacturing today allows us to scan the old part and make a new part in minutes, from the same or better materials. This has reduced the need to search for old drawings, inventory parts that might become obsolete, and the need to keep raw materials on hand to make a part.

Additive Manufacturing has shown great promise in today's industries. This is due to it being a low-cost, highly customization production process for complex parts and tooling. The problem

## Abstracts | Graduate Poster Presentations

of this study was to identify the effective method of integrating additive manufacturing into the United States Military to increase fleet readiness and to reduce the time equipment is out of service. The objective of this study was to conduct a critical evaluation of Additive Manufacturing material that has already been published, and examine the potential benefit to the United States military. The focus behind the study was to limit the amount of raw materials a unit must store and manage. While simultaneously reducing the amount of time equipment is waiting for parts. A review of The Army's Rapid Equipping Force Expeditionary Lab, the Mobile Parts Hospital, and of similar processes and practices from various other manufacturing industries will be done to present a holistic plan to the US military on how to quickly put their failed equipment back on-line using the evolving field of additive manufacturing.

GP6

Use Recycled Concrete Aggregate as an Aggregate in Concrete – A Global Review and Current Status in America

Mingqi April Hang, Hang Ding, George Wang

Abstract

Demolished concrete accounts for 12% to 75% of the debris from construction depending on the nature of the constructed structure. Reuse recycled concrete aggregate (RCA) in concrete can create a sustainable end use and reduce the demand for natural aggregate. In order to practically use RCA in concrete production, firstly the material must virtually meet the requirements for natural aggregate; secondly the concrete design and production procedures may need slight adjustment to meet the end product's requirements; thirdly a financial assessment is necessary with considering the local recycling operation, concrete production operation, and the model to evaluate the financial effect of processing RCA and producing RCA concrete in lieu of normal concrete. Two groups of information are presented in this presentation based on the research team's literature study and national surveys to highway agencies, ready-mixed concrete producers, and construction companies: (i) the results from a thorough review of the practice and research on RCA concrete worldwide, and (ii) the current practices in the United States and the trends in the use of RCA in infrastructure construction.

GP7

Generating Knowledgebase of Common Behavior and Workflow Patterns for Secure Healthcare Systems

Bigyan Pandit

Knowledge discovery from large data for system security management and threat detection have been a complex task due to large number of users and the dynamic nature of distributed systems. As a sensitive application domain, healthcare organizations serve a large community of users with different roles performing different tasks concurrently. To maintain data integrity and system security, it is almost impossible to monitor individual user's actions within a large community of users with random interactions with the system. Thus, we need a system capable of handling and monitoring users' actions closely. To address this issue, we propose a system that considers users' real-time behavioral activities and their predefined workflows based on their roles. We record system access log and apply data mining techniques to extract the common behavior patterns of users. These behavior patterns help to analyze the common activities within the system. Adding knowledge base of workflow helps to make the system more robust by predefining the set of actions the user can perform. A search-based engine is then applied to common behavior knowledgebase and workflow knowledgebase to discover the hidden knowledge behind user's interaction with the system. We construct a Petri Net of workflow to support the proposed architecture and validate the major findings using various healthcare scenarios. This work presents a knowledge driven decision support system that effectively assists the system administrator to get a deep insight into the users' behaviors, track insecure activities and redefine existing access control policies. An illustrative case study is provided to indicate the feasibility of the approach.

GP8

Knowledge Discovery in EHR System for Decision Support System

Dev Raj Budhathoki

Knowledge discovery from the patients' records is a challenging task. The generated knowledge will be useful for the physicians to make effective decisions during examination of patients. This research develops data mining techniques to discover patterns and relationships among the disease symptoms and corresponding diagnoses. The generated patterns are used to assist physician to determine appropriate diagnoses for patients, knowing their symptoms. Moreover, we will

## Abstracts | Graduate Poster Presentations

develop an approach for graph visualization of the relations among the disease and symptoms using Neo4j open source graph platform. In Neo4j, data are interpreted in the form of a knowledge graph, from which we are able to discover more information related to patient symptoms.

GP9

### Automatic Segmentation of LVP Muscle using Optical Flow Algorithm

Anil Adhikari

Quantitative analysis of LVP (Levator Veli Palatini) muscle is considered as one of the crucial step in surgical and anatomical investigation of Velopharyngeal Insufficiency (VI) which includes Cleft Palate anatomy. The rapid advancement in MRI (Magnetic Resonance Imaging) technology, has made it possible to acquire good quality images for the analysis, however, the literature shows the lack of automatic computational model to segment and analyze the LVP muscle. This research is primarily focused on designing a computational model which can efficiently segment the LVP muscle from MRI images. In this research, MRI movies are under gone through image pre-processing techniques to remove noise followed by dense optical flow algorithm to predict the movement of LVP muscle. The optical flow algorithm predicts the shape of LVP muscle in each image frame before it is passed to train a machine learning model for the semantic segmentation of the muscle from MRI images.

GP10

### The Importance of Cybersecurity Education in the Society

Tolulope Bukola Awojana

Cybersecurity is the practice of protecting systems, networks and programs from digital attacks. These attacks are capable of gaining unauthorized access to computers and networks.[1] A major aim of these attacks is to access and destroy sensitive and confidential information for fun, financial gain or ideological reasons. Education brings about knowledge; it enables the brain to be empowered with information. It allows you to think, learn and critically assess a situation.[2] An educated computer security workforce is essential to building trustworthy systems. As the world is advancing in technology, there seems to be an increasing trend in the number of malware attacks recorded. Align reported that about 400 million malware attacks were carried out across the globe in the past summer [3]. According to Sun, there has

been a tremendous increase in the number of data breaches in the past few years, as a Digital Security company Gemalto reported 708million records of breach in 2015, 1.38billion records of data breach in 2016 and 1.9billion records of data breach just in the first half of 2017 [4]. While a major part of these attacks were carried out from outside the organization, some might have been prevented if the employees were well equipped with effective cybersecurity training. It has become imperative for the society to be fully aware of these threats and become actively involved in bringing it to a halt. This research will be addressing the various studies on the importance of education on cybersecurity by highlighting the different types of cyber attacks, their effects on systems, and various countermeasures. It will also discuss the extent of the damage of the attack on the society and precautionary measures to be taken.

### References

1. The Economic Times (2017). Definition of Cyber Security. Retrieved from: <https://economictimes.indiatimes.com/definition/cyber-security>
2. Bernard, Z. (2017). Here's how technology is shaping the future of education. Business Insider. Retrieved from: <http://www.businessinsider.com/how-technology-is-shaping-the-future-of-education-2017-12/#technology-is-providing-a-way-for-learning-models-to-become-increasingly-personalized-1>
3. (2017). The Importance of Cybersecurity Education. Retrieved from: <https://www.align.com/blog/cybersecurity-education>
4. Sun, L. (2017). Cybersecurity Stocks: What to Watch in 2018. The Motley Fool. Retrieved from: <https://www.fool.com/investing/2017/12/11/cybersecurity-stocks-what-to-watch-in.aspx>

GP11

### Simulated Environment for User-Behavior Pattern Matching in Distributed Systems

Rabindra Khanal

Identifying users with possible malicious actions in large distributed systems requires a complex data analytics process. In particular, sensitive application domains such as healthcare, government, finance, and businesses are the major areas of concern. The presented approach aims at enhancing a pre-existing user behavior pattern language (BPL) provided by Dr. Sartipi's research team. The BPL is a specification language that offers

## Abstracts | Graduate Poster Presentations

different features to demonstrate the structure and semantics of the user behavior patterns, where a behavior is an ordered set of the user's transactions with the system. The BPL provides input to an event-log engine which generates synthetic datasets with embedded user behaviors and random behaviors to be used for different data analytics approaches. In this research, we extend the features of the BPL to include more complex relations among two or more user behaviors and their corresponding attribute-constraints. We also develop an approximate pattern matching solution which receives the complex constraints defined in the BPL to identify user behaviors that closely match with the defined behavior patterns. The result will be a set of ranked user behaviors which will be presented to the system security administrator to further investigate for the possibility of security breaches.

### GP12

Diversity of Parasites in the Eastern Mud Snail *Ilyanassa obsoleta* associated with an Invasive Alga *Gracilaria vermiculophylla*

Timothy S. Lee, April M.H. Blakeslee

Department of Biology, East Carolina University

The invasive alga *Gracilaria vermiculophylla*, native to the eastern Asia, has been widely sighted along the eastern U.S. coasts. Previous studies have indicated that this invasive alga, which can degrade water quality and shellfish recruitment, can also host dense colonies of native macroinvertebrates. Hence, *G. vermiculophylla* has the potential to change macroinvertebrate community composition as well as the parasitic infection prevalence within macroinvertebrates associated with the mudflats the *G. vermiculophylla* are proliferating. Understanding the parasitism in macroinvertebrates is critical because parasites are reliable indicators of water quality, disease prevalence, and overall biodiversity of coastal ecosystems. The eastern mud snail *Ilyanassa obsoleta* preferably deposits eggs on *G. vermiculophylla* over sediments. This snail is also a common intermediate host to a wide range of trematode parasites. We conducted a pilot study along the coasts of North Carolina and Virginia to see if the parasitic prevalence in *I. obsoleta* change across different biomasses of *G. vermiculophylla*. In North Carolina and Virginia, we found average of 12.82% and 10.5% parasitism prevalence respectively. In Virginia, the parasitism was higher among *I. obsoleta* associated with patchy *G. vermiculophylla* distribution (18%), and the trematode *Himasthla quissitensis* was the most abundant, while in North Carolina the highest parasitism observed was in the site densely colonized by *G. vermiculophylla* (37%), with *Lepocreadium setiferoides* making up most of

the trematode diversity. Continued analysis of *I. obsoleta* parasitism prevalence can enhance our understanding of how macroinvertebrate parasitism will change with increasing *G. vermiculophylla* proliferation on biogeographic scale.

### GP13

Nassau Grouper Larval Distribution in Response to a Changing Climate and its Potential Fisheries Impact

Brian Scott Bartlett<sup>1</sup>, Rebecca G. Asch<sup>2</sup>

<sup>1</sup>Coastal Resources Management, East Carolina University

<sup>2</sup>Department of Biology, East Carolina University

Climate change is already affecting marine ecosystems and the organisms that inhabit these ecosystems. For fishes that reproduce through forming spawning aggregations at particular locations and specific times of year, such as the endangered Nassau grouper (*Epinephelus striatus*), climate change may lower larval growth and survival. While some research has addressed climate change's effects on Nassau grouper spawning aggregation locations, probability, and timing, previous work has not evaluated how climate change will impact larval dispersal. This is a reflection of the limitations on climate model spatial resolution and incorporation of ecosystem characteristics into such models. Larval distribution is important for population structure and reproductive success as how the larvae distribute can determine their survival to maturity. By utilizing climate modelling systems, projections can be made regarding larval dispersal in the face of climate change. Comparisons will be made between the current larval distribution from historic data, models for oceanic conditions (i.e., chlorophyll concentration, sea surface temperature, and ocean currents) from a baseline time period, and changes to these conditions that may occur in the future. I hypothesize that the results will: (1) Identify optimal locations for larval dispersal to juvenile and adult habitats, and (2) Show that larval survival will decrease as a result of climate change altering the location and timing of spawning aggregation formation and oceanic characteristics conducive to larval survival. A lack of larval recruitment success can significantly affect the sustainability of Nassau grouper populations, which can impact the viability of fisheries for Nassau grouper.



## Abstracts | Graduate Poster Presentations

GP14

Genetic analysis of miRNA translation control in maize

Hailong Yang and Beth Thompspon

miRNAs are the short length with about 20~24 nt, noncoding RNAs that regulate gene expression by cleavage or translational inhibition of target mRNAs. In plants, most miRNAs are thought to promote cleavage and degradation of target mRNAs whereas in animals, most miRNAs are thought to inhibit translation of target mRNAs. The extent to which miRNAs regulate gene expression through translational inhibition in plants is unknown. In Thompson lab, we study the maize fuzzy tassel (fzt) mutant, which contains a mutation in dicer-liker1 (dcl1), a key enzyme required for microRNA biogenesis. fzt has the severe vegetative and reproductive defects including sterile stamens and reduced plant height. Levels of several miRNAs are significantly decreased in fzt mutants, but we do not observe a corresponding increase in predicted and known miRNA targets. One possibility is that translational inhibition by miRNAs is a more widespread in plants than currently thought. My project focuses on determining translation efficiency miRNAs target mRNAs in fzt mutants (with reduced levels of miRNAs) and normal siblings (normal levels of miRNAs). We hypothesize that translation efficiency of miRNA targets in fzt mutant will decrease comparing to normal if miRNAs function widely at the translation level. To determine translational efficiency, we will use RNA-seq in parallel with Riboseq which maps protected mRNA sequence in the position of translating ribosomes to capture translation outputs from genes. Currently we have successfully obtained ribosome footprints using RNA derived from shoot apices. We are currently growing fzt and normal sibling plants to collect tassel primordia for Riboseq as well as RNA-seq. Briefly, we can see how miRNA function at translation level in maize by these techniques.

GP15

Will you be my neighbor? Exploring the relationship between iron-oxidizing and sulfate-reducing bacteria in coastal systems

Chequita Brooks<sup>1</sup>, Erin Field<sup>1</sup>

<sup>1</sup>Department of Biology, East Carolina University

Just as a tiny pebble in a shoe can alter stride, the relationships between microorganisms can have global implications for geochemical cycling by connecting essential elements such as iron and sulfur. The interaction of iron-oxidizing bacteria (FeOB) and sulfate-reducing bacteria (SRB) could not only

connect these two major cycles, but also has more regional influences on issues of import to coastal resources such as biocorrosion. These microbial guilds have been found to co-occur in a variety of environments such as sediment, microbial mats, and in the water column. This co-occurrence suggests the possibility that these organisms may participate in a mutually beneficial relationship, where these microbes participate in interrelated redox reactions. The purpose of this study was to assess whether FeOB and SRB are involved in a syntrophic relationship. Samples were collected from estuarine sediments in North Carolina and a method of growing the organisms in co-culture was developed. The oxygen and hydrogen sulfide concentrations in growth media of lab cultures were measured. Results from these analyses suggest that oxygen concentrations determine where in the media FeOB can grow (4mg/L to anoxic boundary). However, results indicate that SRB growth is not driven by the anoxic boundary or hydrogen sulfide concentrations; suggesting other factors are influencing the niche separation of FeOB and SRB. Developing an understanding of how these organisms interact will deepen our knowledge of how microbial community function could influence cycling of geochemically important elements in coastal systems.

GP16

Design of an MeV Range Particle Accelerator Beamline for the Purpose of Optically Stimulated Luminescence

Joel Anthony Pogue

Optically Stimulated Luminescence is a method which determines the radiation dose delivered to a crystalline structure. The emission signal of the crystal is measured during exposure to light. One method of delivering a radiation dose would be by way of a particle accelerator. In this presentation we describe the design of a particle accelerator beam line that will allow for controlled irradiation of a variety of different samples. Post irradiation luminescence measurements determine dose and other characteristics.

There are several components that are crucial for the construction of such a beam line. A beam pipe guides the radiation from the particle accelerator to the chamber while at vacuum. A vacuum tight chamber houses the samples along the path of the beam line and an actuating arm extends the individual samples in front of the beam. Multiple pumps evacuate the line down to the required pressure and an ion gauge ensures that the desired pressure is achieved. In addition, a light tight structure around the sample collection area is critical in order to prevent light from tarnishing the samples.

## Abstracts | Graduate Poster Presentations

GP17

Evaluation of the Ecological Services of Stormwater Control Measures in a Nutrient Sensitive Watershed

Caitlin Skibiell

Urban storm water runoff may cause frequent flooding and property damage, erosion of drainageways, degradation of water quality, and loss of aquatic habitat. Replacing and/or remediating the effects of excess stormwater runoff is costly, and thus may cause economic hardships for those affected. The US EPA develops and/or approves plans for watersheds that identify major sources of water pollution. Stormwater runoff is a commonly listed contributing factor of water use impairment in the US. The Lick Creek (LC) watershed in NC is listed as an impaired waters due to poor aquatic habitat. Fecal bacteria, oxygen demanding substances, and turbidity are elevated in LC relative to water quality standards, and better management of runoff has been suggested to improve water quality. Storm water control measures (SCM) such as rain gardens, rainwater harvesting, bioreactors, and check dams, are designed and implemented to slow and treat stormwater, thus reducing environmental, economic, and public health issues related to excess urban runoff. The goal of this project is to reduce urban runoff in the LC watershed during storms by implementing SCMs. The SCMs should reduce runoff, thereby reducing turbidity, bacteria, and nutrient loading to LC. The treatment efficiency of the SCMs will be determined using a pre and post SCM monitoring approach, along with some site-specific inflow and outflow water quality measurements.

GP18

Infinity, human consciousness, and string theory.

Jacek Teller

Scientists have a social obligation to debunk myths, superstitions, and misinterpretations of scientific thought and experiment. Often, such myths and superstitions come from lay-persons, who lack the epistemological and specialized training of scientists. Occasionally, however, scientists are moved to scrutinize even the work of other scientists.

In this presentation, I examine several popular publications, including some that are scientific in origin, that tout the result:

$$1+2+3+4+5+\dots = -1/12$$

The various publications derive the result in a myriad of

mathematically unsound ways, and then interpret it to have some bearing on subjects ranging from human consciousness, to string theory.

I clearly point out the flaws in the derivations, and challenge some of the interpretations that purportedly give the result some kind of special status and supernatural meaning. I then cite the rigorous work of mathematicians who have put this result, and other related results, on solid theoretical footing. Lastly, I offer a mathematically mature point of view on such results, and place them in the context of the larger body of work that is modern mathematics. Disappointingly for some, in doing this, I strip the results of any mystical properties.

GP19

A Study of Impurities in Emerald and Beryl as Indicators for Color

Daniel X. Gray<sup>1</sup>, Adriana Heimann-Rios<sup>1</sup>

<sup>1</sup>Department of Geological Sciences, East Carolina University

Unique colorations in minerals, such as deep green in the emerald variety of beryl, are what define them as gemstones. It has been traditionally known that the green color of emerald is due to small quantities of Cr and V within the beryl structure ( $\text{Be}_3\text{Al}_2\text{Si}_6\text{O}_{18}$ ), but the exact chemical differences that produce variations in the coloration of this beryl variety are debated. It has been suggested that trace amounts of Fe and its valence state can also affect the green color of emerald, although the effect of its presence and concentration in beryl has yet to be determined. A small number of studies analyzed beryl with Raman spectroscopy, focusing mostly on distinguishing synthetic from natural emeralds. Through the use of Raman spectroscopy, synchrotron microanalytical techniques, and LA-ICP-MS, this research will determine the relationship between concentration of impurities, peaks in Raman spectra, the presence and oxidation state of Fe, Cr, and V, among others, and the various hues of green, pink (morganite), and light blue

(aquamarine) in beryl. The concentration of Cr, V, and Fe will be determined by LA-ICP-MS, the ratio of  $\text{Fe}^{2+}$  to  $\text{Fe}^{3+}$  and valence states of Cr, V, Fe, and other elements by synchrotron techniques, and these two will be compared with Raman spectra to identify peaks that represent each element and oxidation state. By comparing emeralds from the Mineralogical and Geological Museum Collection at Harvard University that represent a wide variety of colors, well-documented provenance, and quality, emeralds obtained in the field from Hiddenite, NC, and beryl of various tones of green, morganite and aquamarine, this study will provide new insights into the specific elements responsible for

## Abstracts | Graduate Poster Presentations

color variations in beryl. Findings from this research will have a range of applications. Identification of various transition metals in beryl from different host rock settings (pegmatite, biotite schists, black shales, ultramafic rocks, and rhyolite) will further our understanding of the sources of elements that produce these beryl varieties in each host rock. In applied mineralogy and gemology, new data will help better identify natural emeralds from synthetic ones. By characterizing emeralds from key market localities, this study will add value to emeralds that are already part of a multimillion dollar market.

GP20

Constraints on incremental assembly of upper crustal igneous intrusions, Henry Mountains, Utah

Laura Isabel Maria de Sousa

The purpose of this research is to provide a better understanding of the development of igneous intrusions in the shallow crust. This study will examine multiple forms of data from the five intrusive centers of the Henry Mountains of Utah. The conceptual model of how plutons intrude the upper crust as a single magmatic body is now recognized as an incremental assembly rather than an emplacement. However, there isn't an immense amount of data to demonstrate the incremental assembly model. The incremental assembly model identifies pluton growth from multiple magma pulses rather than a single mass. The compilation of this study would provide a significant contribution to our understanding of the incremental assembly model for igneous intrusions. A substantial amount of work has been done in the Henry Mountains. These studies include more than 100 stations with major and trace element geochemical data and more than 200 stations with anisotropy of magnetic susceptibility data (AMS). However, significant gaps remain in the spatial distribution of data, and the existing data needs to be compiled. I hypothesize that if chemical, magnetic, and textural difference exist, then we can recognize that these intrusions were assembled by separate magma pulses.

To test my hypothesis, I will compile previous geochemical and AMS data from the Henry Mountains and use them as a gateway to determine where new work and samples are necessary. With this compiled information, I will travel to the Henry Mountains of Utah for a month to collect hand samples and make new observations. Once my field work is completed, I will process the samples in the lab to get geochemical data (Major and Trace), AMS, and CSD results.

Although the Henry Mountains are an inactive system, this research could be a proxy for how we view active intrusive systems in the future. Our understanding of how

shallow intrusive systems function would be significant to the mitigation of human hazards. If the emplacement or assembly of laccoliths is more understood, it would aid in the understanding of volcanic development.

GP21

Passive acoustic monitoring for estuarine fish in very-shallow water using multi-channel hydrophone arrays

Phillip M Deville

The goal of this research is to map population distributions of sound producers in the marsh creeks at Baruch Marine field Laboratory in Hobcaw Barony, South Carolina. Mid-summer, seven channel hydrophone arrays were deployed in two locations and left to record for a total period of seventy-two hours. GPS, biological, and physical measurements were taken at the site. The array location measurements were refined, using the time delay of arrival of certain calibration tones. By adjusting the delay between each of the seven tracks, one can listen locally at a point in space in time within or surrounding the array. Fish calls can be identified through sound analysis techniques like Welsh plots and spectrograms; then population mapping can begin. Expected results are density plots, that show population density and location within the array at certain times. This can be done for a variety of species, and one can see how two types of sound producers interact, as well as move through the array.

GP22

Geophysical survey of a buried Triassic rift basin, Bertie County, North Carolina

Cody Jesse Shell (student)

Eric Horsman (mentor)

The east coast of North America includes a series of Triassic rift basins many of which host significant mineral and petroleum reserves. Dozens of these rift basins have been identified, studied, and characterized due to their economic importance, but some remain hidden under Cenozoic coastal plain strata. A buried, newly discovered Triassic rift basin has been identified in Bertie County, North Carolina, from a deep core sample that documented Triassic age sedimentary rocks (Weems et al., 2007). Although samples from this core have been investigated using thin sections and magnetic susceptibility, interpreting the data requires more context regarding the size, structure, and geometry of the basin. Geophysical surveys can provide information on the density, dimensions, and geometry of rock

## Abstracts | Graduate Poster Presentations

bodies at depth. Therefore, a gravity survey will be conducted in order to constrain the density of rock units and underlying size, structure, and geometry of the buried basin. Using the software Oasis: Montaj, an inverse model of the anomaly data can produce a 3-D structure contour map to help visualize the basement rock and rift basin feature. A comparison of the basin can then be made to the larger framework of continental scale rifting which may also give insight to subjects like continental breakup, rifting processes, and mantle flow. Recognition of the characteristics and spatial distribution between basins will play a significant role in future exploration for other buried basins and potential oil and gas resources along the Atlantic margin.

GP23

Development of a material analysis system using proton induced x-ray emission

James William Eisenmann

In ECU's Department of Physics Particle Accelerator Laboratory, a material analysis system is currently under development. 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. With this analysis technique, 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 a silicon-lithium x-ray spectrometer, and the emission spectrum is fit using known spectral line energies to determine elemental composition of the sample by means of GUPIX software. Details of the new PIXE beamline and target chamber, including the multiple-sample analysis capabilities of the system, will be presented. Proposed multidisciplinary applications for biology, archeology, and medicine will also be discussed.

GP24

Impact of the insect growth regulator pyriproxyfen on life table characteristics of *Aedes albopictus*

Megan Rhyne<sup>1</sup>, Stephanie Richards<sup>1</sup>

<sup>1</sup>Department of Health Education and Promotion, East Carolina University

*Aedes albopictus* is a vector of several arboviruses, including dengue, chikungunya, and Zika. However, control of this day-active species is difficult with ultra-low volume treatments

applied at dusk/dawn periods. We evaluate the impacts of an alternative control method, the insect growth regulator (pyriproxyfen), on life table characteristics of *Ae. albopictus*. Blood fed *Ae. albopictus* were exposed to Archer® (active ingredient: pyriproxyfen; stock made in acetone) in coated bottles (to approximate contact from a barrier spray) for two hours and allowed to oviposit. Control mosquitoes were exposed to bottles coated with acetone.

Mosquitoes were held in incubators at 28°C for the duration of the experiment. To evaluate potential dilution effects of water volume, mosquitoes were allowed to oviposit in containers (relatively) small (59 mL water) or large (177 mL water). We characterized the extent to which fecundity (number of eggs laid), fertility rate (number of larvae hatched/number of eggs laid\*100), and emergence rate (number of adults emerged/number of larvae hatched\*100) changed. In the control group, 18-21 mosquitoes laid eggs, while only 10-11 mosquitoes laid eggs in the group exposed to pyriproxyfen. Significantly lower ( $P = 0.0008$ ) fecundity was observed in mosquitoes exposed to pyriproxyfen (mean±SE) (small:25.2±7.1, large:24.3±7.1) compared to control mosquitoes (small:49.2±7.8, large:52.7±5.2). No significant differences in fecundity were observed between mosquitoes allowed to oviposit in different sized containers. Hatch rate was significantly lower in the pyriproxyfen group and was impacted by size of container ( $P=0.032$ ) and treatment ( $P < 0.0001$ ) (large, control:61.9%±7.8; small, control:38.0%±7.1; large, treated:2.9%±1.9; small, treated:10.3%±2.4). Adult emergence rates were not impacted by treatment or size of container. Pyriproxyfen applied as a barrier spray may be an effective tool for controlling *Ae. albopictus* when mosquitoes are exposed when resting in vegetation. Further work is planned to evaluate impacts of different volumes of water and for different mosquito species.

GP25

The effects of climate variability on ichthyoplankton ingress phenology through Beaufort Inlet, NC, USA

William Christopher Thaxton

Rebecca G Asch

Climate change has shifted the timing of seasons in many ecosystems worldwide making it critical for science to develop an improved understanding of how environmental variables affect the phenology of different organisms. The purpose of this study is to determine if there have been shifts in the reproductive phenology of winter-spawning, estuarine-dependent fish species that reproduce offshore of Beaufort Inlet, North Carolina and whose larvae ingress through this inlet to access juvenile estuarine habitat. We investigated



## Abstracts | Graduate Poster Presentations

changes in the larval ingress phenology of eleven fish species through Beaufort Inlet from 1987-2014, in conjunction with variations in climatic factors that potentially influence phenology. Preliminary results of this investigation showed significant changes in species' ingress phenology over time. Ingress phenology was also seen to vary significantly with variation in temperature and wind stress. We plan to expand these analyses to include other potential environmental influences on ingress phenology, such as the position of the Gulf Stream and long-term modes of climate variability.

GP26

Defining the Late Pleistocene Stratigraphy of a Low Gradient Coastal System in Beaufort and Hyde Counties, North Carolina.

Amy Waters Cressman

The late Pleistocene stratigraphy of eastern North Carolina is characterized by coastal and inner shelf deposits that are the result of morphodynamic changes associated with high rates of sea-level rise during Marine Isotope Stage 5 (MIS 5) and Marine Isotope Stage 3 (MIS 3). By identifying the characteristics of these deposits, and modeling the processes responsible for their formation, we can determine the geological, morphological and hydrodynamic responses to sea-level rise in a low gradient coastal system. The MIS 3 and MIS 5 shorelines have been mapped and studied for similar projects throughout eastern North Carolina, however there are some areas where few or no data have been collected, creating a gap in the research. For example, there are few data surrounding the area in and around the Pamlico River, near Bath, NC. In order to more fully understand the effects of rapid sea-level rise on a low gradient coastal area, geophysical and geological data from the Pamlico River area (Beaufort and Hyde Counties) will be collected and analyzed. In preliminary studies, high resolution seismic (chirp) data were collected in the Pamlico River, revealing seismic stratigraphic units likely corresponding to MIS 5 and MIS 3. To expand upon these preliminary data, more geophysical data will be acquired along the Pamlico River, GPR data will be acquired on land, and cores will be acquired in terrestrial and estuarine areas. Paleoenvironmental conditions will be determined from cores based on biofacies and lithofacies. Cores will be used to correlate facies to the chirp and GPR data (linking the terrestrial and estuarine systems). Samples from the cores will be dated using an optically stimulated luminescence (OSL) dating technique to place paleoenvironmental change in a temporal framework. By studying the morphology and paleoenvironmental changes and modeling the processes that shaped paleoshorelines from highstands in the past, we can make reasonable predictions of

what we can expect our coastline to look like in the future as a result of accelerated rates of sea-level rise.

GP27

Simulating Transient Flow on Barrier Islands in Response to Predicted Climate and Sea-level Rise

Kyle Prock, Alex Manda

Little is known about impacts of climate change and sea-level rise on groundwater systems on barrier islands. The purpose of this study is to evaluate how changing thickness of the vadose zone is impacted due to sea-level rise and climate change for the next 100 years. With high populations living on the coast, land resources are important to maintain because it is costly to rebuild property if the land becomes no longer available due to sea level rise. In preparation for future populations, it is important to forecast potential changes to the groundwater system and how the surficial aquifer may adjust to climate change. The goal of this research is to use variations in recharge in a transient groundwater flow model to understand changes in storage and how these changes are impacted by climate change and sea-level rise. A steady state groundwater model was previously developed to evaluate the response of groundwater levels to sea-level rise. A steady state model however, doesn't take change in storage into consideration during the simulation period. So, the transient model, which will be developed using visual MODFLOW will improve the previous study and provide expanded data on the region. The results of this study will provide estimates of potential changes in groundwater levels that could impact coastal communities. The results of this research can also be used to help water managers understand potential changes to the groundwater system and determine viable solutions to consequences that can occur from significant changes in groundwater levels. The relevance of this research is that it will help give insight on how climate change and sea-level rise effect water levels in surficial aquifers on barrier islands.

GP28

Could Viral Co-infection of Mosquitoes Impact Current Vector Control?

Avian V White

Mosquito-borne diseases are responsible for hundreds of millions of human illness cases yearly (e.g. dengue, Zika, malaria and chikungunya). Many of these arboviruses may be found

## Abstracts | Graduate Poster Presentations

circulating in the same region. Dengue virus, one of the most important arboviruses in terms of public health, is primarily found in the tropics and the sub-tropics. This is the same footprint of many other viruses, such as Zika and chikungunya. In addition to having the same spatial distributions, these viruses are also carried by the same vectors: *Aedes aegypti* and *Aedes albopictus*. This overlap in regions and vectors could result in co-infections in humans. Mosquitoes can also harbor viruses and other pathogens that do not cause human disease. In Espirito Santo, Brazil, a biological sample containing DENV-2 was analyzed, leading to the discovery of a new virus aptly named, Espirito Santo Virus (ESV). Preliminary studies on this virus showed the virus replicates in C6/36 (*Ae. albopictus*) insect cells but not Vero (African green monkey kidney; mammalian cells). We have shown that ESV reduces DENV-2 replication in C6/36 cells, when co-infected simultaneously. Our preliminary studies have shown a reduction in DENV-2 infection in ESV-infected mosquitoes and this will be discussed. Investigations into co-infections of ESV-DENV could impact vector control techniques aimed at reducing vector competence, hence opening new avenues for suppression of virus transmission.

GP29

### Biophysical studies of Platelet-Fibrin Interactions

Laura Ashley Russell

This study will measure and analyze how fibrin fibers interact with platelets. Platelets will be purified from healthy donors. Platelets perform a vital role in blood clotting, initially as a preliminary wound healing mechanism and then by binding fibrin fibers and stretching the network in a process called platelet retraction. The biomechanical and biochemical mechanisms of platelet retraction are not currently understood.

The platelets will be added to samples containing fibrin fibers suspended between ridges. Platelet retraction will be activated and fibrin fibers will be speckle labeled with fluorescent beads, allowing a direct measurement of fiber extension using epifluorescent microscopy as the fibers are stretched by the platelets. The second experiment that will be conducted observes how red blood cells are not expelled as efficiently from FXIIIa cross-linked clots during retraction. The effect of FXIIIa on fibrin stretching will be directly tested by polymerizing fibers in the presence and absence of FXIIIa. We hypothesize that individual fiber stretching by platelets will be reduced by at least 50% in cross-linked clots during retraction and we hypothesize that this is directly related to decreased extensibility in cross-linked fibrin.

GP30

Simon Says Help Me Procreate! Testing Behavioral Differences in two Non-Native Crabs after Exposure to a Microphallid Trematode

Rebecca Brady Barnard

Dr. April Blakeslee

Department of Biology, East Carolina University

Throughout maritime history, humans have facilitated the introduction of species to new and previously inaccessible environments. Two species, the European green crab (*Carcinus maenas*) and the Asian shore crab (*Hemigrapsus sanguineus*) were both introduced to the Western North Atlantic (WNA) ~200 and ~40 years ago respectively, occupy the same niche space, and have both escaped many of their native parasites. A parasite that *Carcinus* has not escaped is a microphallid trematode whose intensity can be high in some *Carcinus* populations along the WNA. Trematodes have a complex life cycle utilizing three hosts in order to sexually reproduce. In multi-host parasites, their secondary hosts generally feel the strongest effects of infection which manifest in a variety of ways such as changes in foraging behavior, tissue damage, or increase conspicuousness. In this system *Carcinus* serves as secondary hosts and therefore is a prime candidate for this behavioral comparison between introduced crabs. Both crabs were exposed to the microphallid parasite for 72 hours before behavioral experiments were conducted immediately following the 72 hour mark and then again three and a half weeks later. This experiment can help us to understand the shift in dominant species on the WNA coastline as well as understand how parasites alter species interactions.

GP31

Investigating Incrementally Assembled Intrusions in the Upper Crust, Henry Mountains, Utah

Tanner Evan Eischen

The Henry Mountains (Southern Utah) are a suite of five spectacularly exposed upper crustal intrusions emplaced about 25 million years ago. Each mountain represents a separate intrusive center, with multiple satellite lobes of igneous rock radiating out from a central intrusive body (Hunt, 1953; Jackson and Pollard, 1988). In this study, a high resolution analysis of Sawtooth Ridge (Henry Mountains, Southern Utah) will be conducted in order to better characterize its subsurface geometry and its relationship to larger intrusive complexes. The structure of Sawtooth Ridge (Mount Hillers Complex) may

## Abstracts | Graduate Poster Presentations

provide significant insight into the assembly of these laccoliths, however, its subsurface geometry remains poorly understood. Hunt et al. (1953) provide two opposing theories: Sawtooth Ridge may be a vertical dike extending some distance into the subsurface, or it may be a horizontal, pipe-like extension of the main Mount Hillers stock. The latter interpretation points to a direct connection between Sawtooth Ridge and the Mount Hillers complex, and highlights mechanisms behind the incremental assembly of shallow magmatic intrusions.

In order to delineate the history of Sawtooth Ridge, techniques such as high resolution geologic mapping, field analysis of magnetic intensity, lab measurement of anisotropy of magnetic susceptibility (AMS), 3-d shape-preferred orientation analysis (SPO), and trace/rare earth element (RRE) chemical analysis will be used. Volcanic hazards often originate from shallow intrusions not unlike the Henry Mountains, making these complexes an important analogue of modern volcanic processes. Our perception of these shallow igneous bodies has not always encompassed the concept of incremental assembly. Previously thought to consist of a single large magma chamber, shallow intrusions are now believed to be assembled in discrete pulses or sheets. A lack of significant syn-depositional deformation, combined with robust outcroppings of the Henry Mountains porphyry, provide a noteworthy opportunity to study the incremental assembly and behavior of shallow magmatic bodies.

GP32

Response of groundwater systems to changes in predicted climate

Tyler Anderson<sup>1</sup>, Alex Manda<sup>2</sup>

<sup>1</sup>Department of Geological Sciences, East Carolina University

<sup>2</sup>Department of Geological Sciences and Institute for Coastal Science and Policy, East Carolina University

Water resources, particularly those in coastal areas, are vulnerable to the effects of climate change. Changes to the amount and frequency of precipitation can greatly impact how groundwater reservoirs are recharged. Such changes to groundwater systems can potentially have grave repercussions on natural systems and the public. Surface water systems have, principally, been the focus of studies on how water bodies respond to changes in climate. However, little is known about the influence of climate change, particularly the changes to the amount and frequency of precipitation, on groundwater systems. In this study, the response of groundwater systems to changes in predicted climate over the next 100 years in North

Carolina coastal plain settings will be evaluated. The objective is to evaluate how changes in recharge, due to climate change, alter flow patterns, water levels, and fluxes between surface and groundwater bodies. To assess the impact of predicted climate change on groundwater, a generic two-dimensional transient numerical model will be developed to simulate groundwater flow beneath wetland sites in coastal plain settings. A case study may be pursued after development of the transient model to highlight processes of a specific site in the coastal plain. The results of this study will contribute to a better understanding on how to manage land and water resources under a changing climate. Furthermore, this study plans to help bridge the gap in the literature about the influence of climate change on groundwater systems.

GP33

The Geological Constraints of Blue Carbon Sequestration in Salt Marshes

Casey Jane Gilleland

The purpose of this study is to identify the geological constraints of blue carbon sequestration in coastal systems, and to determine the effects of certain factors such as vertical land movement and coastal evolution on the amount of carbon sequestered or exported from these areas. Coastal ecosystems play a major role in the global carbon cycle by storing excess carbon in their sediments, acting as a carbon 'sink' to prevent CO<sub>2</sub> from re-entering the atmosphere and contributing to global warming.

Salt marshes, which develop in low-energy coastal locations in response to rising sea levels are particularly important to the sequestration of carbon. Marsh grasses trap sediments, enabling them to store excess CO<sub>2</sub>. They occur worldwide, most commonly in mid to high latitudes. It has been hypothesized that relative sea level may have a significant impact on the accumulation of carbon in salt marshes at different time scales. Vertical land motion (including isostasy and tectonic activity) is the key to understanding sea level change, and plays a significant role in long-term sea level studies. Tidal gauges and satellite images are used to evaluate relative sea level change. Previous studies have shown that there has been a loss of 25-50% of salt marshes worldwide compared to global historical coverage due to natural and anthropogenic activity. For the purpose of this research, the Holocene and the Anthropocene were specifically studied. Through the use of GIS (Geographic Information Systems) and Google Earth, specific sites were examined both globally and locally (eastern North Carolina.) History of relative sea level during the Holocene is important because it indicates



## Abstracts | Graduate Poster Presentations

where there was potential carbon accumulation, and how these regions may have evolved. A different trend in relative sea level was observed during the Anthropocene, which may have caused a change in the way that coastal ecosystems trap sediments. This study attempts to provide information about the potential decrease in the amount of carbon sequestered following the loss of coastal systems such as salt marshes due to sea level change.

GP34

Simulating the Seasonal Change of Precipitation in the Southeast United States

Mary Ruth Brown<sup>1</sup>, Rosana Nieto-Ferreira<sup>1</sup>, Thomas M. Rickenbach<sup>1</sup>, Mark Nissenbaum<sup>2</sup>

<sup>1</sup>Department of Geography, Planning, and Environment, East Carolina University, Greenville, NC, USA

<sup>2</sup>Department of Earth, Ocean, and Atmospheric Science. Florida State University. Tallahassee, FL, USA

Isolated precipitation features (IPF) are short-lived, small, and spatially heterogeneous features that are most predominant during summertime in the southeast United States. They are thermodynamically driven and make up 30%-50% of the total summer precipitation. Using radar data and a precipitation organization classification algorithm, Rickenbach et al. (2015) established that the springtime transition to predominantly IPF occurs abruptly between the months of March-June. The goal of this study is to investigate whether the Weather Research and Forecasting model (WRF) is able to capture the observed springtime transition to increased IPF and shed light on the mechanisms for the shift. To that end WRF simulations for mid-May to mid-June 2009 will be run using a set-up similar to that in Lackmann (2013). Two resolutions will be tested for use with the precipitation organization classification algorithm, that is a 3 km and a 6 km innermost nested grid. The results of this study will later be extended to a study of the effect of climate change on the abrupt onset of the IPF rainy season in the Southeast United States.

References:

Lackmann, G.M., 2013: The south-central U.S. flood of May 2010: Present and future. *Journal of Climate*, 26(13), pp.4688–4709.

Rickenbach, T. M., R. Nieto-Ferreira, C. Zarzar, and B. Nelson,

2015: A seasonal and diurnal climatology of precipitation organization in the southeastern United States. *Q. J. Roy. Met. Soc.*, 141, 1938-1956.

GP35

Stabilizing Commercial Starch Based Emulsions

Rohan U Parekh, Ryan Cotroneo, Yu Yang

Solutions are homogenous mixtures of at least one solute dissolved in a solvent, the solvent is present in the larger amount and is responsible for dissolving the solute(s). Emulsions are defined as a combination of at least two immiscible liquids, where one constitutes the droplets which are dispersed in the other liquid (continuous phase). Separation of phases is a major contributing issue of emulsion based product instability. A majority of emulsions in the cloth laundering process are starch based emulsions. U.N.X., Inc. is a large producer of starch based emulsion products which are used every day in large laundry settings. Their main starch emulsion product has shown issues with phase separation and prolonged stability due to underlying issues. With being composed of multiple components there are many approaches to improving the stability and extending the overall shelf-life of that product. Differences of density and even the pH could impact the how stable a product may be. Using a variable temperature oven, sample pH, density and their differences were observed over the course of a month in an accelerated environment. The results from the pH and density study aided in determining specific ranges needed to promote emulsion stability.

GP36

Dynamic and Thermodynamic Mechanisms for the Onset of the Southeastern United States Convective Season

Hannah Wells<sup>1</sup>, Thomas Rickenbach<sup>1</sup>, Rosana Nieto-Ferreira<sup>1</sup>  
<sup>1</sup>Department of Geography, Planning, and Environment

The southeastern United States (SE US) receives ample precipitation year-round. In the winter, precipitation primarily comes from synoptic-scale baroclinic systems and cold fronts. Meanwhile, precipitation in the summer over the SE US is primarily the result of convection modulated by diurnal thermodynamic forcing. With this shift from the winter to summertime precipitation regimes, the springtime transition to the convective season occurs rather abruptly within a few weeks. This spring transition has been shown to be characterized by an increase in precipitation from isolated

## Abstracts | Graduate Poster Presentations

precipitation features (IPF) while precipitation from mesoscale precipitation features (MPF) stays relatively unchanged over the SE US. IPF is defined as small, short-lived, and spatially heterogeneous features while MPF is defined as larger, well-organized, and generally longer-lived precipitating features.

To study the springtime transition to the convective season, data from the North American Regional Reanalysis (NARR) and the National Mosaic and Multi-Sensor Quantitative Precipitation Estimation (QPE) (NMQ) will be used to study the springtime onset of the convective season. Pentad averages of IPF will be created using the NMQ dataset to determine the progression of rapid IPF increase across the SE US during May and June of each of four years (2009-2012). We will determine the pentad of IPF onset, in a manner analogous to the onset of a seasonal monsoon. Next, various meteorological parameters from NARR will be analyzed using the Gridded Analysis and Display System (GrADS) to determine what the atmospheric conditions were shortly before, during, and immediately after onset. Dynamic and thermodynamic mechanisms such as the shifting jet stream and cyclone tracks, the strength and position of the North Atlantic Subtropical High (NASH) and southerly moisture advection in the NASH western ridge, passage of mid-latitude cyclones and their cold fronts, and increasing surface temperatures and convectively available potential energy will be analyzed to determine what role each plays in the transition to the onset of the convective season.

GP37

### Hickory Shad Stock Identification Using Multiple Methods

Steven D. Meyer<sup>1</sup>, Roger A. Rulifson<sup>1,2</sup>

<sup>1</sup>Department of Biology, East Carolina University

<sup>2</sup>Institute for Coastal Science and Policy

Hickory shad *Alosa mediocris* of the family Clupeidae, is an anadromous fish species native to the East Coast of the U.S. ranging from the St. Johns River, Florida to Cape Cod, Massachusetts. As an understudied species, little is known about their life history and particularly their spawning habits. A prior study in our lab used meristic counts and morphological measurements to accurately predict spawning populations of hickory shad. The purpose of this research is to determine if hickory shad spawning populations can be uniquely identified thereby implying homing to natal streams. Specifically, we will employ three different assessments: otolith (ear bone) shape, otolith microchemistry, and body geomorphometrics. Over 800

adult hickory shad were collected from 17 different locations throughout the species range. Ten fish from each location will be analyzed using all three assessment types. Sagittal otoliths will be examined and photographed for shape analysis using an Olympus SZX16 microscope. Otolith microchemistry will be analyzed using LA-ICP-MS for key elements and their ratio of presence to calcium (as the standard); strontium, manganese, magnesium, and barium are the primary elements for examination. Photographs of the whole fish will be analyzed for multiple geomorphometric characteristics using morphoJ, tpsUtil64, and tpsDig232 computer programs. Findings of this study will be used by the North Carolina Wildlife Resources Commission and other management agencies to help make best management decisions regarding hickory shad conservation.

GP38

### Genetic Analysis of miR319-regulated TCPs in Maize Development

Jessica Rose Wilson, Dr. Beth Thompson

Inflorescences contain flowers, which are required for reproduction and produce seeds that are consumed as food. In the Thompson lab, we seek to understand the genes that function during normal inflorescence development in maize. This information may facilitate the development of maize varieties with increased yield. One mutant we study is the fuzzy tassel (*fzt*) mutant. *fzt* has severe inflorescence defects including indeterminate meristems, fasciation, and defects in sex determination. The *fzt* phenotype is caused by a mutation in the *dicer-like1* (*dcl1*) gene. *dcl1* encodes for an enzyme required for microRNA (miRNA) biogenesis. miRNAs are small, non-coding RNAs that function in post-transcriptional regulation of gene expression. Some miRNAs are significantly reduced in *fzt*, including miR319, which targets mRNAs that encode TCP transcription factors. TCPs are plant-specific transcription factors and have known roles in floral development in other plant species. Seven miR319-regulated TCPs are expressed in tassel primordia; however, these mRNAs are not significantly upregulated in *fzt* mutants. To determine the function of miR319-regulated TCPs during development, we obtained transposon insertions in or near six miR319-targeted TCP genes. I want to know if any of these TCP genes are loss of function or null alleles. I will do this by examining their RNA levels. I have collected tissue from homozygote individuals and wildtype controls for each *tcp*. I am currently extracting RNA from these tissue samples and will then perform an RT reaction.

Another miRNA that is decreased in *fzt* is miR167, which targets genes involved in auxin signaling. Auxin is a plant hormone

## Abstracts | Graduate Poster Presentations

that has multiple functions in plant development including the initiation of lateral primordia and branching. To understand how the *fzt* mutant interacts with the auxin signaling pathway, I am isolating double mutants between *fzt* and the auxin biogenesis mutants, *vanishing tassel2 (vt2)* and *sparse inflorescence1 (spi1)*. These experiments will help us understand the genetic relationship between miRNAs and auxin biogenesis. Overall, by using *tcp* and auxin mutants we will gather a better understanding of these pathways and the role they play in the normal development of maize.

GP39

Landscaping for Pollinators with Native Plants on Solar Panel Farms

Ashley Dow<sup>1</sup>, Claudia Jolls<sup>2</sup>

1 Department of Biology, East Carolina University

2 Department of Biology, East Carolina University

Anthropogenic pressures including habitat destruction, the use of agrochemicals, and climate change threaten ecosystems worldwide. One resultant impact is global pollinator decline and loss of ecosystem services. Solar panel farms (SPFs), a growing industry in North Carolina, are one model of sustainable land use methods that seek to enhance pollinator habitat using native plants. There are, however, many knowledge gaps that present challenges to SPF landscapers, e.g., limited knowledge of microclimate conditions under photovoltaic (PV) panels, including light and temperature regimes. Additional challenges include a limited shade categorization of plant species used by the horticulture industry, limited knowledge of native plant responses to low light, and limited availability of native seeds. In response to these knowledge gaps, I recorded light and temperature samples during Fall 2017 and Winter 2018, both under as well as outside a simulated panel that I constructed, noting a 90% reduction in light availability. I then selected 16 shade-tolerant perennial native plants for possible use on solar panel farms to promote pollinators, based on 1) on pollinator use (food resources, larval habitat, flowering period), 2) height (to minimize contact with panels), and 3) availability (from local nurseries and as seed and/or plants). Germination response to shading of these plant species will be evaluated in a greenhouse experiment and in a field setting with simulated panels. These native plants also will be evaluated for pollinator attractiveness (diversity and abundance of pollinators observed) in shaded pollinator beds on ECU campus funded by Bayer Crop Science Feed A Bee™ program. With this work, I seek to provide more information to support the development of

pollinator habitat using native plants on SPFs in North Carolina and beyond.

GP40

Potential for sublethal insecticide exposure to impact vector competence of *Aedes albopictus* (Diptera: Culicidae) for Zika virus

Heidi Knecht<sup>1</sup>, Stephanie Richards<sup>1</sup>, Avian White<sup>1</sup>

<sup>1</sup>Department of Health Education and Promotion, East Carolina University

Zika virus (ZIKV) can cause birth defects in humans and is a serious public health concern. This arbovirus is primarily transmitted to humans by *Aedes aegypti* and *Ae. albopictus*; however, it can also be transmitted sexually and congenitally. Vector-virus interactions influencing vector competence vary, depending on biological and environmental factors. A mosquito's chronological age at time of infection may impact its immune response against virus infection. There are currently no vaccines for many arboviruses, including ZIKV, hence insecticides are one of the only defenses against exposure to pathogens via mosquito exposure. *Aedes albopictus* is difficult to control due to its day-active nature and propensity to oviposit in containers throughout landscapes. Barrier sprays can be used to control *Ae. albopictus* and may use pyrethroid insecticides, such as bifenthrin. However, the efficacy of these treatments decreases over time due to environmental degradation.

The aim of our study is to characterize the extent to which mosquito-bifenthrin interactions affect vector competence for ZIKV. To accomplish this, we exposed young (6-7 d post-emergence) and old (11-12 d post-emergence) *Ae. albopictus* to bifenthrin prior to oral exposure with ZIKV (7-day incubation period). Samples are currently being processed and mosquito infection rates, dissemination rates, and viral titers will be calculated and compared between bifenthrin and control groups.

GP41

Effects of Mechanical Manipulation on Cancer Cell Motility and Proliferation

Sean Edward Cavanaugh

Determining how biological systems respond to mechanical force (mechanobiology) is important for both understanding

## Abstracts | Graduate Poster Presentations

physiological function and combatting disease. Cancerous diseases are characterized by anomalous cell growth, and varying potentials to produce motile cells capable of metastasizing. As cancerous cells replicate within their microenvironments, the increase in mass contained within a constant volume produces a compressive force upon the cells from interstitial fluid pressure. Mechanical compression is a stimulus for cellular motility through confined spaces. At the boundaries of cancerous cellular groups, the formation of a "leader cell" phenotype is stimulated by compression. These specialized cells employ pseudopodia to accomplish migration.

The Centrifuge Force Microscope (CFM) is a unique tool utilizing a miniaturized microscope within a centrifuge bucket to image samples experiencing centripetal or the false centrifugal force, depending on method. By attaching cancer cells to an adhesion substrate on a slide within a CFM, a continuous compression of those cells can be achieved as the centrifuge spins. The force experienced can be calculated, and an onboard camera can record cellular activity. This study will seek to observe viable cell migration during mechanical compression. Furthermore, any observations of cell proliferation under force could be made during the same trials. The major benefit of this study is to discover and characterize relationships between cell metabolic processes (increasing motility and proliferation) and mechanical manipulation. The importance of a characterization of this kind is to provide information on cancer cells that could lead to the inhibition of migration and invasion. Additionally, the intensification of susceptibility to chemotherapy and radiation therapy of cells with increased activity is proven, therefore numerically accounting for the effects of mechanical forces on cellular activity would be beneficial.

GP42

Sediment, Water-Quality, and SAV Interactions in Currituck Sound, NC

Natasha G. Biarrieta

Submerged aquatic vegetation (SAV) declines have been observed worldwide for decades. The back barrier sounds that are characteristic of eastern North Carolina have not been immune from this alarming trend. SAV declines in Currituck Sound, an oligohaline estuary in northeastern North Carolina, have been observed since the 1920s and rates of decline have increased exponentially since the 1960s. Like many other systems, this decline has been attributed to changes in water-quality. However, few studies have succeeded in directly correlating changes in SAV habitats to the dynamic physical, geological, and geochemical conditions that govern a waterbody. The primary objective of this study is to evaluate

possible limiting factors of SAV abundance and distribution in Currituck Sound by investigating historical and current SAV, water-quality, and sedimentological trends, assessing sediment characteristics, and determining how spatial and temporal changes in sedimentology have affected SAV beds. Previous work in Currituck Sound includes aerial mapping of SAV beds and studies on hydrodynamics, water-quality, and sediment chemistry. However, this earlier work neglected the physical properties of sediments and failed to include an evaluation of the evolutionary relationship between the hydrodynamics, the water-quality, the sedimentology, and the changes to SAV habitats. This project will combine literature- and field-based research to compare trends in SAV abundance and distribution with spatial and temporal variations in water-quality and the physiochemical properties of sediments. Fieldwork and laboratory analyses will be used to determine sediment properties, sediment accretion rates, and percent contribution of shore erosion to total suspended solids. This research will identify dominant drivers of SAV change in oligohaline estuarine waters and will provide a foundation for future research on SAV declines in oligohaline salinity zones, wind-tidal estuaries, and sedimentologically similar areas.

GP43

Characterization of Polytypic1 Expression in Inflorescence Development

Anastasia Amoiroglou, Beth Thompson

A main focus of the Thompson lab is to study genes that regulate maize development. Specifically, we are trying to identify the genes that are necessary for the development of the tassel and the ear. The Polytypic1 (Pt1) mutant is a gene that affects the growth of the ear and tassel of maize plants. Pt1 is a semi-dominant mutant with abnormal floral development that was first observed in a commercial field in the 1950s. Although the exact gene mutated by Pt1 has not been yet identified, previous work showed that Pt1 is located on chromosome 6. A map-based cloning approach is being used to narrow down the position of Pt1. We have determined that Pt1 is located within a ~6cM interval (approximately 8,285,127 base pairs) between the SSR markers umc1352a and bnlg1922. To identify the gene that underlies Pt1, RNA-sequencing and then differential gene expression analysis will be performed. Next, the candidate genes that will arise from the RNA-sequencing will be validated and confirmed to find the exact DNA lesion

responsible for the Pt1. To further and better characterize the phenotype of Pt1, we are using scanning electron microscopy to examine floral development in the tassel and ear of Pt1. Both

## Abstracts | Graduate Poster Presentations

mutant inflorescences have indeterminate floral meristems. Pt1 tassels have irregular sized spikelet meristems and some are found to have a lack of depression of the bract. Pt1 ears give rise to extra floral organs and the spikelet pair meristems have a developmental arrest after developing at the base of the ear. I am currently working on RNA extraction from Pt1 and normal sibling inflorescences and then those will be sent off for RNA-sequencing and analysis

GP44

The Coloring Effect of Chemical Impurities in Emerald and Beryl

Cindy Elizabeth Mauro

Beryl ( $\text{Be}_3\text{Al}_2\text{Si}_6\text{O}_{18}$ ) is a complex mineral that occurs in a variety of colors and a valued mineral for collectors and as a source of beryllium. The basic cause of color in a mineral is the presence of elemental impurities, such as Fe, Cr, and V. Valence state of the elemental impurities may also play a role in mineral color. The goals of this project are to evaluate the use of analytical techniques (e.g., Raman spectroscopy) for emeralds, to identify relationships between color and chemical impurities found in beryl, and to determine differences in host rocks that lead to various impurities found in beryl, particularly emerald.

Raman spectroscopy has been used in recent years to study mineral chemistry in rubies, sapphires, quartz, and emeralds, but much of what controls color hue remains unknown. Raman spectroscopy is a non-destructive technique that does not require sample preparation, thus it is of interest in the study of gem-quality minerals, such as emeralds. Raman has been successful in comparing natural versus synthetic emeralds by identifying the presence of elements based on spikes in the spectra. However, Raman spectroscopy, alone, cannot identify elements so it must be combined with another analytical technique, such as LA-ICP-MS (Laser Ablation Inductively Coupled Plasma Mass Spectrometry). Synchrotron analysis will also be used in the project as a comparison of identified elements and oxidation state.

Samples of emerald and beryl in various colors will be obtained from the Mineralogical and Geological Museum Collections at Harvard University, in the field from two emerald mines near Hiddenite, NC, and from colleagues and other collections. Raman spectroscopy analysis will be conducted at Harvard University and synchrotron data previously obtained from the Advanced Photon Source Lab will be used for comparison with Raman spectra. A comparison of synchrotron and LA-ICP-MS will help identify the elements present in the selected varieties

of beryl (red, yellow, and colorless) including concentration and oxidation states. The Raman spectra will then be compared by synchrotron data and LA-ICP-MS in order to establish a possible correlation between trace element concentrations and Raman peak intensity.

GP45

The impact of mobile HRV training on depression in military personnel with posttraumatic stress disorder

John Michael Locke

According to the United States Department of Veterans Affairs (2016), between 11 and 20 percent of veterans have posttraumatic stress disorder (PTSD). Symptoms of depression are a major contributor to PTSD and common among military personnel occurring at a similar rate, roughly 12 percent (Gandermann et al., 2012). Depression not only causes significant psychological distress but also physiological changes, notably in heart rate variability (Agelink et al., 2002). The purpose of this randomized controlled study is to determine if telehealth HRV Biofeedback can reduce symptoms of depression in active duty, combat exposed, Marines. To test this hypothesis, pre-post HRV training PHQ-9 scores will be analyzed. Participants will be instructed how to conduct personal HRV biofeedback HRV training on a tablet with a prescription of 10 minutes, in the AM and PM every other day for 30 days. At the conclusion of their training, the subjects will be reassessed with the PHQ-9. Data will be analyzed using a repeated measures ANOVA and correlation statistics, using a significance value of  $p < .05$ . The findings of this study will add to the knowledge about the effectiveness of HRV training on symptoms of depression in active duty Marines and contribute to novel approaches for treating PTSD.

GP46

The effects of zinc oxide nanoparticles on the pharyngeal pumping and neurological behavior of *Caenorhabditis elegans*

Luke Lish

Cogent data regarding the effects of manufactured zinc oxide nanoparticles on human health and other organisms is limited. With the prominence of manufactured ZnO-NPs increasing rapidly in recent years, the identification of prolonged consequences of exposure to the NPs is crucial. Humans undergo daily exposure to ZnO-NPs by using products such as toothpaste, sunscreen and cosmetics. Zinc oxide is widely used



## Abstracts | Graduate Poster Presentations

as a bulking agent or filler and can be found in many cosmetic products, medical products and toiletries. Studies have been done on animals and humans to monitor possible absorption through the skin. The combined results indicate that small amounts of zinc, in soluble form, may pass through the skin barrier. Thus, further study regarding their biological effects is highly significant. The purpose of this research is to discern the potential toxicological effects of manufactured zinc oxide nanoparticles on the pharyngeal pumping and neurological behaviors of *C. elegans*. *C. elegans* are an effective model for the toxicological effects of ZnO-NPs in part because their genome and cell lineage have been completely sequenced and described. Whereas several studies have examined endpoints regarding behavior, reproduction efficacy, lethality and transgene expression after exposure to ZnO-NPs, insufficient attention has been allocated to the effects of the ZnO-NPs on the “heart” of the nematode, the pharynx. Both the pharynx in *C. elegans* and the heart in other organisms are tubes that move material along their lumens using binucleated muscles. Both organs pump continuously, for the life of the organism. Furthermore, both organs rely on similar electrical circuitry to control pumping. This experiment is designed to test hypotheses that determine whether exposure to ZnO-NPs results in aberrant neurological behavior and alterations in the pharyngeal pumping of *C. elegans*. Since the number of conserved genes from *C. elegans* to humans is relatively high, the data collected in these studies can be indicative of human physiological responses stemming from the exposure to ZnO-NPs. In order to investigate said consequences of ZnO-NP toxicification, behavioral assays will be performed on *C. elegans* wild-type and mutant strains exposed to three different concentrations (50, 5 & 0.05 ug/L) of manufactured ZnO-NPs for different exposure times. Genes responsible for pumping regulation in response to ZnO-NPs exposure will be identified, and their expression will be quantified.

GP47

EphrinA1-Fc-Induced Phosphorylation and Nuclear Translocation of STAT3 Mitigates I/R Injury in Mouse Heart

Samuel Alan Vance, Smrithi Valsaraj, Evan Vlahos, Justin Parks, Uma Sharma, Jitka Virag P.h.D.

EphrinA1, a GPI linked receptor tyrosine kinase ligand for Eph receptors is expressed in healthy cardiomyocytes, and is decreased following infarction. Previously we have shown a single intramyocardial injection of chimeric ephrinA1-Fc at time of ischemia reduces infarct size by 46% and completely preserves cardiac function (ejection fraction, fractional shortening, and chamber dimensions) in acute ischemia/

reperfusion injury (I/R – 30min/24hrs). Signal Transducer and Activator of Transcription 3 (STAT3), acts through genomic and non-genomic pathways to promote cell survival via the upregulation of antiapoptotic proteins, protection of the mitochondria and attenuation of oxidative stress, downregulation of immune cell infiltration, and the promotion of autophagy which keeps myocardium in the peri-infarct region functional. Preliminary data shows that, in hearts treated with ephrinA1-Fc, cardioprotection is associated with a significant 5-fold increase in nuclear pSTAT3/STAT3 in ephrinA1-Fc-treated mouse hearts compared to controls (IgG-Fc). To further probe the relationship between ephrinA1 and STAT3 in I/R, we have generated cardiac specific STAT3 knockout mice that express a STAT3 allele with two loxP sites in introns 17 and 20 as well as  $\alpha$ -myosin heavy chain ( $\alpha$ -MHC)-Cre transgene. This mutation is regularly confirmed via PCR analysis for the  $\alpha$ -MHC-Cre gene as well as with western blotting for the presence or absence of STAT 3 protein in right ventricle. We propose that ephrinA1-Fc-mediated activation of STAT3 acutely combats apoptotic stimuli during ischemia by reducing cytokine production, adhesion, recruitment of leukocytes and upregulates cardiomyocyte autophagy in the infarct margin, resulting in reduced injury and preserved cardiac function. This hypothesis is being tested and results of survival rates, protein expression, infarct size, and cardiac function of ischemia/reperfusion models of wildtype and cardiomyocyte specific STAT3 knockout mice will be reported. We are also utilizing B-mode echocardiographic measurements of regional heart wall velocity to assess strain and strain rate which can measure the relative changes in cardiac deformation of infarct and peri-infarct regions independently to more precisely identify region-specific effects of ephrinA1-Fc. The results of these experiments will clarify the role of STAT3 in ephrinA1-Fc-mediated protection from I/R injury.

GP48

Cognitive Motor Control: The Event Related Potential of Tool-use

Alexandra A. Shaver, Kevin A. Hooks, Jessica Lynn McDonnell, Tyler J. Whittier, J.C. Mizelle

Introduction: Though tool-use not exclusive to humans, we have an enhanced ability to create, manipulate, and decipher what objects could be used to complete a task. This ability results from cortical processes throughout the brain evaluating different aspects of tools and objects in regards to specific tasks and eventually executing the appropriate movements. The areas of the brain involved in these processes are well known but how they interact— their connectivity—is not as well understood. Functional and effective connectivity are two measures that have

## Abstracts | Graduate Poster Presentations

the ability to determine the nature of information flow through the brain, and could provide new insight about how different parts of the brain are connected in cognitive motor control tasks.

**Methods:** Electroencephalography (EEG) was used to assess brain activation as participants evaluated images of different tool-use scenes. Some images demonstrated correct tool use (e.g., hammer-nail pair) or proper tool substitutions (e.g., fork-yogurt). Others showed incorrect tool use (e.g., hammer-coffee cup pair). Functional and effective connectivity was used to determine patterns of brain connectivity as participants viewed the images and determined if the image was “correct” or “incorrect”.

**Results:** Across the different image conditions, event-related potentials showed similar levels of activation. However, different patterns of information flow were observed for the different tool-use images.

**Discussion:** These results indicate that new measures of brain activation, such as functional and effective connectivity, can provide additional information about the brain functions in complex tasks, such as cognitive motor control.

GP49

### Defining Synaptic Circuitry in Autism Spectrum Disorders

Kinsley Morgan Tate

Autism Spectrum Disorders refer to a group of a genetically complex neurodevelopmental disorders in which patients exhibit social deficits in both verbal and non-verbal forms of communication and display restricted and repetitive behaviors. Autism affects approximately 1 in every 68 children in the United States (CDC). Emerging evidence suggests that altered neural connectivity, particularly at the level of synaptic connections, contributes to disease pathology. Post-mortem patient brain samples from individuals with idiopathic Autism exhibit increased numbers of excitatory synaptic connections (PMID: 21346746). While altered neural connectivity at the synaptic level is thought to play a role in disease pathology the pre- and post-

synaptic contributions to Autism pathology are unknown. In this study we co-culture control and Autism-derived neurons to assess the contribution of pre- and post-synaptic compartments to Autism pathology. The cells are plated in three distinct configurations: control alone, Autism alone, and

mixed co-cultures of control and Autism-derived neurons. These configurations allow us to determine normal excitatory synapse density (controls alone) and levels of increased excitatory synapse formation in Autism cases. Furthermore, we can assess whether Autism and control co-cultures restore normal excitatory synapse formation and whether excitatory synapse morphology is altered when Autism-derived neurons contribute either an axonal pre-synaptic compartment or dendritic post-synaptic compartment. We hypothesize combined pre- and post-synaptic deficits resulting from Autism-derived neurons will promote increased excitatory synapse density that will be partially rescued by co-culture with control-derived neurons.

GP50

### The Effect of Poxvirus Virulence Genes on Host Immune Response

Alexandra Hayes, Gwendolyn J. B. Jones, Rachel Roper

Department 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. The variola virus, a notorious species of poxvirus, was responsible for the smallpox epidemic that took the lives of hundreds of millions until it was eradicated in 1980. Poxvirus infection remains a threat today. The poxvirus, monkeypox, caused an outbreak in 2003 in the U.S., and poxviruses could also be used for bioterrorism. Understanding the mechanism by which poxviruses circumvent the immune system will be instrumental in the development of safer vaccines and therapeutic treatments. Our lab has identified two vaccinia virus proteins as playing a role in virulence, A35 and O1L, and we are assessing their effects on antibody and cytokine production. Mice were infected intranasally with the A35 deletion mutant, O1L deletion mutant, wild type (WR) virus, or mock infected with PBS. Sera and spleen cells were collected each week for 4 weeks post infection, and sera were analyzed for anti-viral antibody production using ELISA. Preliminary data show that sera from A35 Del and O1L Del infected mice have increased amounts of antibody relative to sera from WR infected mice, suggesting that A35 and O1L do play a role in inhibition of antibody production. Antigen presentation experiments using the two deletion mutant viruses were also performed, and supernatants are being analyzed to measure the effects of A35 and O1L proteins on cytokine production by T lymphocytes. Understanding how poxviruses turn off immune responses



## Abstracts | Graduate Poster Presentations

will aid in anti-viral drug design, improve vaccines, and may allow us to mimic poxvirus immunosuppression to control autoimmune diseases.

GP51

Comparisons of Tumor Movement with Fiducial Movement Using 4D CT for Cyberknife Treatment for Lung Cancer Patients

Yurianna Huh<sup>1</sup>, Baaqir Yusuf<sup>2</sup>, Jae Won Jung<sup>1</sup>, Andrew Ju<sup>3</sup>

<sup>1</sup>Department of Physics, East Carolina University

<sup>2</sup>University of North Carolina

<sup>3</sup>Department of Radiation Oncology, Leo W. Jenkins Cancer Center

The treatment for lung cancer using Cyberknife requires the fiducial markers implanted in the patient's lung to move with the patient's breathing. The purpose of this study is to observe whether the patient's tumor also moves alongside with the fiducials.

This study consisted of 18 upper lung cancer patients, 8 lower lung cancer patients, and 1 middle lung cancer patient. The fiducial markers were first tracked through Cyberknife's CT program. Then the 4D CT contours of each patient were used to find the center of mass of the tumor. Finally, the center of mass and the fiducial marker movements were compared. The centroids of the fiducial markers were used as the coordinates for comparison. The X value was used for the medial and lateral movements, the Y value was used for the anterior and posterior movements, and the Z value was used for the superior and inferior movements.

The root mean square error, which shows the statistical spread of the compared values, was found for the superior and inferior movements of the tumor for comparison to the fiducial markers. Small RMS values would mean that the average spread between the tumor position values and the fiducial position values was small and that the fiducials track the tumor well. Some lower lung patients had the RMS of 0.031cm, 0.039cm, and 0.197cm. Some upper lung patients had the RMS of 0.05cm, 0.287cm, and 0.054cm. The values of the lower lung patients and the upper lung patients were separated to see if there was a significant difference in tracking from where the tumor was in regard to the diaphragm movement.

The results showed a variation of the average spread between the tumor and fiducial movements, which most were relatively small, but some had significant discrepancies. The patients

with lower lung tumors had slightly better RMS values in comparison to the upper lung tumor patients, but the difference was not very noticeable. The discrepancies may be from the markers not staying in sync with the patients' breathing, but they also could be from other discrepancies, such as the markers not being tracked well from being shadowed by each other. Future research can develop and lower the uncertainty of fiducial marker tracking of lung tumors.

GP52

Film dosimetry in dose delivery to mice for clinical trials

Dillon A Ellis

Radiochromic film has been routinely used in radiation therapy quality assurance protocols to verify dose delivery in external beams. It provides high spatial resolution, but dose measurements may vary due to handling and orientation when paired with a high-resolution scanner. Absolute dosimetry is critical in clinical trials for understanding the physiological and neurological responses to radiation treatments. We have established protocols for accurate dose delivery to mice using radiochromic film in support of medical research.

Dosimetry was performed using the X-RAD 320 X-Ray delivery system utilizing Filter 1 (2.0 mm Al), with settings of 320 kV and 12.50 mA to determine the output factor for a 3x3 cm<sup>2</sup> opening block aperture compared to the open field. We collected dose-response data from 3 lots of Gafchromic EBT2 film at doses ranging up to 2254 cGy. In this work, we utilized an Epson 11000XL scanner for reading films. Five preview scans were taken to ensure baseline operating temperature of the scanner, and orientation was identical for each film lot on the scanner. Scanner was used in Professional mode in 48-bit RGB format at 96 dpi resolution. Postexposure time before scanning was 21 hours. Pixel data was extracted using Matlab and dose-response plots were created. Preliminary data suggests that the output factor was 0.983 at the distance of 50 cm from the source.

GP53

Generation of Transgenic Models to Isolate Mammalian Spermatogonia

Oleksandr Kirsanov, Christopher Geyer

Spermatogenesis in the mammalian testis results in the daily

## Abstracts | Graduate Poster Presentations

production of millions of spermatozoa. This developmental process is founded upon the actions of a small population of spermatogonial stem cells (SSCs). As SSCs divide, their progeny must either remain an SSC to maintain the stem cell pool (self-renewal) or become an undifferentiated progenitor spermatogonium that proliferates prior to differentiating in response to retinoic acid (RA) and entering meiosis. Our laboratory is focused on understanding the mechanisms that regulate these fate decisions as well as defining the changes that occur downstream of RA that prepare spermatogonia for entry into meiosis. Currently, there is a need for tools enabling facile isolation of pure populations of spermatogonia, which are the only germ cell type in the developing testis through postnatal day (P)7. Therefore, we have generated two transgenic mouse models with germ cell-specific expression of fluorescent reporter genes that will enable us to isolate spermatogonia during this developmental time using fluorescence-activated cell sorting (FACS). The first model is the Ddx4-TdTomato transgenic mouse, which expresses red fluorescent protein (TdTomato) under the control of the mouse Ddx4/Vasa/Mvh promoter. Expression should initiate in prospermatogonia in the fetal testis at embryonic day (E)15 and then continue in all germ cells through adulthood. The second model, Ddx4-Cre;Rosa26-EGFP, employs Ddx4-mediated Cre expression to excise a lox-STOP-lox sequence, resulting in activation of enhanced green fluorescent protein (EGFP) in a similar pattern as in the first model. We are currently breeding both lines to homozygosity, and have begun preliminary characterization of both models using FACS on testicular single cell suspensions. We are also verifying the populations of spermatogonia expressing each reporter using indirect immunofluorescence staining (IIF) with pan germ cell protein markers as well as markers for undifferentiated and the differentiating fates. These new models will provide us with the ability to isolate pure populations of spermatogonia for a wide variety of biochemical and molecular assays aimed at uncovering the mechanisms directing the development of the spermatogonial populations in the mammalian testis. This project was supported by a grant from the NIH/NICHD (HD090083) to C.B.G.

GP54

The Effect of Ca<sup>2+</sup> on  $\alpha$ -synuclein Binding to Transglutaminase 2

James Washington, Anita DeSantis, Tonya N. Zeczycki

Transglutaminase 2 (TG2) is an allosteric enzyme ubiquitously expressed in human tissue. This versatile enzyme has Ca<sup>2+</sup>-dependent and GTPase activities. Ca<sup>2+</sup>-dependent TG2

activity is also linked to many different diseases, more notably Parkinson's disease. In the brain, initial neuronal damage causes a loss of Ca<sup>2+</sup> homeostasis, which further causes TG2 to promote the formation of pathogenic protein oligomers. The exacerbated symptoms of neurodegenerative disease can be attributed to this destructive cycle. The issue with TG2 is that the allosteric mechanism by which Ca<sup>2+</sup>

controls TG2 activity is not fully understood. The currently accepted model posits that Ca<sup>2+</sup> binding to TG2 prior to the substrate induces conformational changes necessary for substrate binding and catalytic turnover. However, our preliminary data, using  $\alpha$ -synuclein as a model substrate, challenges this theory. Our data suggests that Ca<sup>2+</sup> binding induces conformational changes within the TG2:substrate complex, rather than TG2 alone.

In light of this data, we aim to answer the question "How does Ca<sup>2+</sup> activate the TG2:substrate complex?" We hypothesize that Ca<sup>2+</sup> binding to the complex increases the stability of the complex, thereby increasing the rate of catalysis. Using Surface Plasmon Resonance (SPR) and  $\alpha$ -synuclein, we

have found that increasing Ca<sup>2+</sup> concentrations results in a rise in the association and dissociation constants ( $k_a$  and  $k_d$ , respectively). Increasing Ca<sup>2+</sup> concentrations also causes a decrease in the equilibrium binding constant ( $K_D$ ). These results suggest that the complex is more stable in the presence of

Ca<sup>2+</sup>. This could be caused by a potential conformational change in the complex once a specific concentration of Ca<sup>2+</sup> is reached. Our results contribute to a better understanding of how Ca<sup>2+</sup>-allosterically regulates physiological and pathogenic activity of TG2.

GP55

Pharmacological Regulation of Neural Circuit Formation in hiPSC-derived Neurons and 'Mini-brains'

Taylor Lee Rudisill

Autism is a genetically complex neurodevelopmental disorder in which patients exhibit social deficits in both verbal and non-verbal forms of communication and display restricted and repetitive behaviors. Emerging evidence suggests that altered neural connectivity, particularly at the level of synaptic connections, contributes to disease pathology. In particular, post-mortem patient brain samples have increased numbers of excitatory to inhibitory synaptic connections, referred to as an E/I imbalance (PMID: 21346746). In order to understand

## Abstracts | Graduate Poster Presentations

the mechanisms that underlie the formation of these synaptic circuits, we develop 3-D cortical organoids ('mini-brains') from human induced pluripotent stem cells (hiPSCs). Previous research demonstrates that dynamic rearrangements of the actomyosin cytoskeleton drive neural circuit formation, in particular the development and maturation of actin-enriched spines at excitatory synapses. We are currently investigating how pharmacological regulation of actomyosin activity affects neuronal connectivity during neurite formation in 2-D and excitatory synapse formation in 3-D 'mini-brains'. The ROCK inhibitor, Y-27632, both inhibits non-muscle myosin II and leads to a corresponding increase in Rac-driven actin polymerization. In 2-D, Y-27632 increases neurite formation, and even rescues defective neurite formation in Autism-derived neurons. However, in 3-D, acute Y-27632 treatment increases excitatory synapse area, consistent with an increase in Rac-driven excitatory synapse area (PMID: 26169356). Thus, while Y-27632 rescues defective neurite formation in Autism, it elevates excitatory synapse area. This study demonstrates the need for physiologically-relevant brain models, such as 3-D cortical organoids, to assess the impact of drug therapies on developing neural circuits.

GP56

Using MALDI-MSI to determine relative quantitation of ephrin-A1 in murine cardiac tissue

Justin Curtis Parks

Laura Gruer

Smrithi Valsaraj

Stephan Lefcoski

Sky Reece

Lisandra E. de Castro Brás

Tonya Zeczycki

Kim Kew

Jitka Virag

EphrinA1, an endogenous protein that has a GPI link to the cell membrane, is the only ligand in the ephrin (Eph) family which is known to bind to all the Eph-family receptors resulting in bidirectional signaling. Although ephrinA1 is expressed in healthy cardiomyocytes, it is lost in injured cardiomyocytes following myocardial infarction (MI). Previously, it has been

reported that a single intramyocardial injection of chimeric ephrinA1-Fc at the time of ischemia reduced injury in the non-reperfused myocardium by 50% at 4 days post-MI by reducing apoptosis and inflammatory cell infiltration, but currently the underlying mechanism is still unknown. To better understand the cardiac effects of ephrinA1-Fc, matrix-assisted laser desorption ionization-mass spectrometry imaging (MALDI-MSI) was used to simultaneously measure the distribution and spatial localization of endogenous ephrinA1, while also identifying tryptic fragments of ephrinA1 in healthy controls and acutely infarcted murine hearts. Optimization of matrix selection and tryptic digestion parameters specifically for ephrinA1 allowed for the development of a novel method using MALDI-MSI to determine relative quantitation of endogenous cardiac proteins using analytical standards to generate calibration curves. This relative quantitation by MALDI-MSI data suggests that, in a single 10  $\mu\text{m}$  section of non-injured control murine cardiac tissue, there is between 10 to 50 ng of endogenous ephrinA1. Using relative quantitation there is an opportunity to delve further into understanding the effects of ephrinA1-Fc as a potential therapeutic and the effects it has on endogenous protein expression levels post myocardial infarction. Specifically, uninjured cardiac tissue will be compared to murine cardiac tissue at 1, 2, 4 and 7 days post-MI in both males and females, to determine the effect of time and gender on the dynamic changes of endogenous expression of ephrinA1 following permanent coronary artery ligation. When comparing uninjured myocardium, infarcted myocardium with control IgG-Fc, and infarcted myocardium with ephrinA1-Fc-treated animals at same time points post-MI, differences in expression profiles between treated and non-treated groups will allow for quantitative determination of endogenous ephrinA1 and may help explain the influence and effects of recombinant ephrinA1-Fc.

GP57

Presentation Assessing Damage-Associated Molecular Patterns (DAMPs) activation by Cannabinoids and Prostaglandins

Rene Escobedo, Nina E. Neill, Daniel A. Ladin, Rukiyah Van Dross

Cancer is the second leading cause of death in the United States. Many of the chemotherapeutic agents and surgical procedures that eliminate cancer can cause severe adverse effects because they also damage normal cells. In addition, some treatments are inefficient in completely removing the tumor, which may lead to cancer recurrence. Therefore, improved chemotherapeutic treatments are needed to reduce cancer mortality and recurrence. Agents that induce damage-associated molecular patterns (DAMPs) are being targeted

## Abstracts | Graduate Poster Presentations

for development due to their ability to initiate immune cell-mediated tumor death. DAMP signals include cell surface calreticulin (ecto-CRT), as well as the release of ATP and HMGB1. 15dPMJ2 is an endocannabinoid metabolite that induces tumor cell death in an ER stress-dependent manner. Interestingly, agents that induce DAMPs require ER stress. Therefore, the goal of this study is to determine if the prostamide 15dPMJ2, other prostaglandins, and cannabinoids are potent inducers of DAMP expression. B16F10 melanoma cells were treated with different concentrations of prostaglandins (15d-PMJ2 and PGE2), cannabinoids [arachidonoyl ethanolamide (AEA), met-AEA, Win55,212-2, arvanil and CBD], commercially utilized chemotherapeutics (doxorubicin, mitoxanthrone, oxaliplatin and cisplatin) or vehicle. Cell viability was then determined by conducting MTS assays. Of the agents tested, only 15d-PMJ2 (IC50= 4.5  $\mu$ M), CBD (IC50= 9.74  $\mu$ M), arvanil (IC50= 14.4  $\mu$ M) and doxorubicin (IC50 = 3  $\mu$ M) were potent inducers of melanoma cell death. To determine if these agents increased the expression of ecto-CRT, cells were treated with each agent for different periods of time and CRT expression was detected by conducting flow cytometric analysis. Of the drugs tested, 15d-PMJ2, CBD and doxorubicin significantly increased ecto-CRT expression. Next, the ability of 15d-PMJ2 to induce ATP secretion was evaluated compared to oxaliplatin. Cells were treated with drugs or vehicle and ATP was measured by a luminescence assay. 15d-PMJ2 was more potent than oxaliplatin at inducing ATP secretion. These results suggest that 15d-PMJ2 and CBD will effectively stimulate antitumor immune responses in vivo.

GP58

DO LYMPHOCYTES FROM THE MEDIASTINAL LYMPH NODES OF CARBON NANOTUBE + ESAT-6 INSTILLED MICE PRODUCE AN ADAPTIVE IMMUNE RESPONSE?

Victoria Lane Sanderford

Other Authors: Nancy Leffler<sup>1</sup>, Dr. Anagha Malur<sup>1</sup>, Dr. Barbara Barna<sup>1</sup>, Dr. Arjun Mohan<sup>1</sup>, Dr. Mary Jane Thomassen<sup>1</sup>

<sup>1</sup>Department of Internal Medicine, East Carolina University

Background: Sarcoidosis is an inflammatory disease that is characterized by granuloma formation in the lungs, and exposure to environmental pollutants and mycobacterial antigens has been implicated in the etiology of the disease. We established a murine model for granuloma formation by oropharyngeal instillation of mice with multiwall carbon nanotubes (MWCNTs) with or without ESAT-6, a peptide derived from *Mycobacterium tuberculosis*. Peroxisome Proliferator Activated Receptor  $\gamma$  (PPAR $\gamma$ ), a transcription factor

associated with inhibition of pro-inflammatory molecules, was downregulated in the MWCNT model, and PPAR $\gamma$  KO mice presented with increased severity of granuloma formation compared to wild-type. We noted a marked lymphadenopathy of the mediastinal lymph nodes (MLN) in mice instilled with MWCNT+ESAT-6. Thus, we hypothesized that the MLN of MWCNT+ESAT-6 mice would yield an adaptive immune response to ESAT-6.

Methods: PPAR $\gamma$ KO and C57Bl/6 mice were instilled with MWCNTs with or without ESAT-6, PBS, or ESAT-6 alone. After 60 days, the MLN were collected and cultured for 5 – 24 hours with 1 – 10  $\mu$ g/mL ESAT-6 or only complete media. Gene expression was measured with RT-PCR.

Results: MWCNTs were observed within alveolar macrophages (AM) and the MLN of treated mice. Additionally, the MLN of MWCNT instilled mice

were, on average, 2 mm<sup>3</sup> larger (a 40% increase) in volume compared to PBS or ESAT only mice. Moreover, only lymphocytes from the MWCNT+ESAT-6 MLNs upregulated IFN $\gamma$  expression after challenge with ESAT-6. These lymphocytes displayed a dose-dependent response to ESAT-6 after 5 hours. After 24 hours, the response was even more robust (16-fold relative increase compared to unstimulated lymphocytes).

Conclusions: The increase in size of the mediastinal lymph nodes of MWCNT treated mice was characteristic of a proliferative response. However, only mice treated with a combination of MWCNT and ESAT-6 were able to produce an adaptive immune response in mediastinal lymph node lymphocytes.

GP59

The manganese exporter EmfA is a critical virulence determinant for *Brucella abortus* 2308

Matthew James Johnsrude

*Brucella abortus* is a Gram-negative bacterium that causes abortion and infertility in food animals and a debilitating febrile disease in humans known as undulant fever. *Brucella* encounter numerous host defenses throughout the course of an infection. One of these is the metal-withdrawal defense, which restricts the availability of these essential micronutrients as a means of preventing microbial growth. To overcome host-mediated metal limitation, bacterial pathogens have evolved high affinity metal acquisition systems to actively compete against the host for readily bioavailable metals. Not surprisingly, the high affinity manganese (Mn) importer MntH plays an

## Abstracts | Graduate Poster Presentations

essential role in the virulence of *Brucella* strains. However, we have recently obtained evidence that the Mn exporter *EmfA* is equally important in the bacterium's pathogenesis. Like other biologically useful metals, Mn is toxic for bacterial cells if accumulated in excess of the cell's physiologic needs, but the precise basis for the attenuation of a *Brucella emfA* deletion mutant is unknown. One possibility is that excess intracellular Mn disrupts the normal activity of the bacterial cell cycle, leading to inefficient replication within the host. Alternatively, *EmfA* could protect the cell against metal co-factor substitutions in proteins that disrupt their enzymatic, structural or regulatory functions.

### GP60

#### AMP Deaminase 3 Knockout Does Not Reduce Mitochondrial Content Loss in Denervation Induced Inactivity

Nicolas A. Verhoeven and Jeffrey J. Brault  
East Carolina University, Departments of Kinesiology, Physiology, and Biochemistry & Molecular Biology.

Muscle atrophy leads to decrements in muscle function, partly attributable to decreased mitochondrial content. One controller of mitochondrial content is AMP-activated protein kinase (AMPK), which when bound by AMP activates PGC-1 $\alpha$  leading to mitochondrial biogenesis and possibly greater mitochondrial content. AMP Deaminase (AMPD: AMP  $\rightarrow$  IMP + NH<sub>3</sub>) isoform 1 is the dominant isoform in skeletal muscle, yet AMPD3 is robustly upregulated during atrophy of skeletal muscle. This study will determine if loss of AMPD3 gene will reduce mitochondrial content loss typically seen with atrophy. Methods: Whole body AMPD3 knock out, heterozygous (HET), and wildtype (WT) littermate mice (female, 10wk old, C57BL6 background) were unilaterally, surgically denervated by sectioning of the sciatic nerve. Contralateral limbs were sham treated. Two weeks later, muscles were collected, weighed, and analyzed for citrate synthase enzyme activity as a measure of mitochondrial content. ANOVA was used to detect significant differences ( $P < 0.05$ ). Results: AMPD3 genotype had no effect on body weight ( $22.9 \pm 0.7$  g WT,  $22.3 \pm 0.4$  HET,  $22.0 \pm 1.0$  KO). Likewise, non-denervated EDL ( $8.8 \pm 0.2$  mg WT,  $8.5 \pm 0.2$  HET,  $8.8 \pm 0.3$  KO), and soleus ( $7.9 \pm 0.2$  mg WT,  $7.6 \pm 0.4$  HET,  $7.9 \pm 0.3$  KO) muscle weights were not significantly different among genotypes. As expected, surgical denervation led to substantial muscle atrophy versus innervated muscle in EDL

( $22.0 \pm 1.4\%$  WT,  $23.7 \pm 4.8$  HET,  $19.2 \pm 3.6$  KO) and soleus ( $22.4 \pm 1.8\%$  WT,  $21.6 \pm 3.8$  HET,  $18.3 \pm 4.8$  KO), which were not different among genotypes. Finally, citrate synthase activity in innervated muscles was not significantly different among

genotypes in EDL ( $13.9 \pm 0.77$  WT,  $14.9 \pm 1.31$  HET,

$14.5 \pm 0.96$  KO) ( $p = 0.78$ ) and soleus ( $27.6 \pm 1.7$  WT,  $23.7 \pm 2.05$  HET,  $21.5 \pm 1.9$  KO) ( $p = 0.11$ ). Predictably, denervation resulted in loss of CS activity of EDL ( $13.16 \pm 0.7$  WT,  $14.00 \pm 0.7$  HET,  $14.68 \pm 1.9$  KO) and soleus ( $16.38 \pm 1.5$  WT,  $12.02 \pm 0.9$  HET,  $15.11 \pm 1.82$  KO) ( $p = 0.09$ ), but the loss was not significantly different between genotypes. Conclusion: These data suggest AMPD3 does not affect mitochondrial content loss in this atrophy model. However, since AMPD3 is not present during development in our AMPD3 knockout mice, we cannot exclude compensation from other AMPD

isoforms. Therefore, we are currently measuring AMPD activity and isoform-specific protein expression. Future research should investigate either inducible muscle specific AMPD3 knockouts or loss of both AMPD1 and AMPD3.

### GP61

#### A Smad3/FoxO3 Transcriptional Relationship in the Regulation of Vascular Growth

Jake Francisco, Andrew Holt, Nathan Holland, Jeffrey Brault, David Tulis

Cardiovascular disease (CVD) accounts for ~18 million global deaths annually and remains the number one cause of mortality in the United States and worldwide. Unfortunately, despite extensive basic science and clinical investigation many of the underlying mechanisms associated with CVD remain unknown and the number of afflicted individuals continues to rise. Uncontrolled migration and proliferation of vascular smooth muscle cells (VSMCs) represent two primary events in the development of CVD. The transcription factors Smad3 and FoxO3 have been suggested to have capacities to alter VSMC migration and proliferation, with Smad3 being pro-growth and FoxO3 being anti-growth. Previous studies in skeletal muscle cells showed that a synergistic and cooperative relationship exists between Smad3 and FoxO3 in terms of gene transcription. With both Smad3 and FoxO3 being implicated as potential regulators of CVD, elucidating the relationship between these transcription factors in VSMCs could prove beneficial for future therapeutic approaches. Our research broadly focuses on the relationship between Smad3 and FoxO3 in VSMCs with regards to their expression and activity profiles including their spatial arrangement within the cell. Preliminary data in primary VSMCs suggest that, when co-expressed, phosphorylated Smad3 (indicative of active Smad3) is translocated into the nucleus while phosphorylated FoxO3 (indicative of an inactive FoxO3) is shuttled into the cytoplasm. Based on these provocative early findings, our discrete



## Abstracts | Graduate Poster Presentations

hypothesis is that Smad3 and FoxO3 operate in antagonistic fashion in the growth control of VSMCs in the context of CVD. While important facets of their relationship are not currently known, ongoing studies will use adenovirus/plasmid-driven gain-of-function/loss-of-function approaches in VSMCs to identify key mechanisms of our suspected Smad3/FoxO3 antagonistic relationship. Furthermore, we will use VSMC fractionation to determine cellular localization of Smad3 and FoxO3 in quiescent and growth-stimulated conditions to gain further insight into their spatial localization and inhibitory relationship. Through these studies, we anticipate our findings will elucidate Smad3 and FoxO3 as crucial transcriptional mechanisms underlying CVD and hope to identify them as possible targets for therapeutic intervention.

GP62

### CHRONOLOGICAL EXPRESSION OF MATRIX METALLOPROTEINASE-12 IN GRANULOMATOUS DISEASE.

Nicole Naadei Neequaye, D Vargas, 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 part of a family of enzymes involved in the inflammatory response. Little is known about the exact role of MMP-12 in granulomatous diseases, but previous studies have shown an association between MMP-12 expression and disease severity. An established murine model of multiwall carbon nanotube (MWCNT) which mimics the characteristics of sarcoidosis was used to examine a potential role of MMP-12 in disease etiology. The murine model showed that MWCNT+ mycobacterial Early Secreted Antigenic Target protein 6 (ESAT-6) elicited a prominent fibrotic response. The hypothesis is that MMP-12 is important in the initial and late inflammatory responses, and fibrosis development in sarcoidosis.

Methods: C57/Bl6 mice were instilled with PBS (control), MWCNT, and MWCNT+ESAT-6. At the 3, 10, 20, 60, and 90-day time points after instillation, the mice were sacrificed and the bronchoalveolar lavage (BAL) cells were extracted from the lungs. Immunocytochemistry (ICC) MMP-12 staining was done on BAL cytopins to investigate the expression of MMP12. Images were taken on the Axio scope for optical analysis of the MMP-12 antibody's fluorochrome signal. RT-PCR was used as a quantitative measure of MMP-12 and chemokine ligand 2 (CCL2) gene expression in BAL cells.

Results: Preliminary results shows a 34-fold increase in MMP-12 levels ( $P < 0.001$ ), and a 1024-fold increase in CCL2 ( $P < 0.01$ ) after 3 days; an 11-fold increase in MMP-12 and a 4-fold increase in

CCL2 after 60 days in the MWCNT exposed mice ( $n \geq 3$ ). Alveolar macrophages from mice exposed to MWCNT+ESAT-6 ( $n \geq 3$ ) demonstrated a 104-fold increase in MMP-12 ( $P < 0.001$ ), and a 675-fold increase in CCL2 ( $P < 0.001$ ) after 3 days; a 27-fold increase in MMP-12 ( $P \leq 0.05$ ) and a 34-fold increase in CCL2 ( $P \leq 0.05$ ) after 60 days. ICC MMP-12 cytopsin stains showed more positive fluorochrome signal in MWCNT+ESAT than MWCNT treated mice.

Conclusions: Our initial findings suggest that MMP-12 is involved in both the acute and chronic phase inflammatory response of granulomatous disease. Furthermore, MWCNT+ESAT-6 treated animals developed a more prominent inflammatory response, which may be associated with development of fibrosis.

GP63

Sensitization of malignant cells by nanoparticles to proton radiation

Libby,<sup>1</sup> Y. Huh, <sup>1</sup> C. Putnam Evans,<sup>2</sup> and J.L. Shinpaugh<sup>1</sup>

<sup>1</sup>Department of Physics, East Carolina University

<sup>2</sup>Department of Biology, East Carolina University

The ability to make radiation therapy more efficient for the treatment of cancer has been widely explored through the use of nanoparticles. In experiments conducted in the ECU Accelerator Laboratory in the Department of Physics at East Carolina University, we have investigated the enhancement of tumor cell killing using metallic nanoparticles for irradiation by energetic protons. In these experiments, malignant cells are irradiated in vitro by 3-MeV protons after being treated with gold and cerium oxide nanoparticles. In this report, we describe the modification of the cell irradiation target system, including upgraded high-vacuum hardware and enhanced control over the proton beam dosimetry. New experimental results will be presented using the upgraded system for sensitization of malignant prostate and breast epithelial cells by gold nanoparticles.

GP64

Construction of Realistic Hybrid Computational Fetus Models for Radiotherapy Applications

Rasha Makkia<sup>1</sup>, Keith Nelson<sup>2</sup>, Michael Dingfelder<sup>1</sup>, and Habib Zaidi<sup>3,4,5,6</sup>



# Abstracts | Graduate Poster Presentations

1Department of Physics, East Carolina University, Greenville, NC

2Department of Obstetrics and Gynecology, East Carolina University, Greenville, NC

3 Division of Nuclear Medicine and Molecular Imaging, Geneva University Hospital, CH-1211 Geneva, Switzerland

4 Geneva Neuroscience Center, Geneva University, Geneva, Switzerland

5 Department of Nuclear Medicine and Molecular Imaging, University of Groningen, University Medical Center Groningen, Groningen, Netherlands

6 Department of Nuclear Medicine, University of Southern Denmark, DK-500 Odense, Denmark

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 adjusting to match ICRP-89 data record. 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. After the models were finished, different fetus angles and locations were applied to represent fetus motion inside the uterus for each trimester of pregnancy with the guide of ultra sound images. 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.

Results:

Radiation risk for fetus has a big concern for a pregnant patient who is undergoing radiation therapy or diagnostic treatment. A series of computational fetus models can be used to estimate the radiation dose to the fetus and evaluate the risk from radiation exposure due to a particular procedure.

Attached are complete results of 31 weeks fetus model representing all major fetus organs.

Conclusion:

This approach is demonstrating that fetus computational phantom sets are applicable to estimate the initial fetal organ doses than what was obtained from using TG-36 recommendations. In addition, newly developed fetus 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

GP65

Examination of immune cell-mediated cell death as a new approach to selectively eliminate non-melanoma skin cancer

Ariel Myers<sup>1</sup>, Justin Hess<sup>2</sup>, Aubrey Allen<sup>2</sup>, Daniel Ladin<sup>1</sup>, Ahmed Elhassanny<sup>1</sup>, Gina Murray<sup>3</sup>, and Rukiyah Van Dross<sup>1,4</sup>

<sup>1</sup>Department of Pharmacology & Toxicology, <sup>2</sup>Medical Doctor Program, <sup>3</sup>Department of Pathology, <sup>4</sup>Center for Health Disparities

Non-melanoma skin cancer (NMSC) is the most common malignancy in the US with more than 3.3 million new cases diagnosed each year. NMSC therapy includes surgical techniques and topical therapeutics that are associated with serious adverse effects and tumor recurrence. As such, highly effective therapeutics that are cancer-directed and produce durable responses are needed to improve treatment outcomes. Damage-associated molecular pattern (DAMP)-immunogenic cell death (ICD) is an immunostimulatory signaling pathway that is now a target for drug development. DAMP activation provokes dendritic cell phagocytosis of the tumor, cytotoxic T cell activation, and memory T-cell production that ultimately immunizes the host against the tumor. DAMP activation is characterized by translocation of intracellular proteins to the cell surface [e.g., calreticulin (CRT) and heat shock

## Abstracts | Graduate Poster Presentations

proteins] and the release of intracellular molecules into the extracellular space [e.g., ATP and non-histone chromatin-binding protein high mobility group box 1 (HMGB1)]. Most clinical chemotherapeutics fail to activate DAMPs except for a select group of agents that induce endoplasmic reticulum (ER) stress, a process required for DAMP translocation. In different cancer cell types, favorable responses to DAMP inducing agents have been associated with elevated cell expression of DAMPs. However, DAMP and ER stress expression have not been examined in NMSC. Immunohistochemical (IHC) analysis was performed to quantify the expression of DAMPs (CRT and HMGB1) and ER stress (PDI) in verified NMSC and normal epidermis obtained Department of Dermatology and the North Carolina Tissue Consortium (NCTC) at East Carolina University. The results showed that in NMSC, CRT, HMGB1, and PDI expression were significantly elevated compared to the noncancerous epidermis. Furthermore, pharmacological DAMP inducers increased the expression of pro-phagocytic DAMPs in NMSC but not in non-tumorigenic keratinocyte cell lines. These data suggest that NMSC will be more susceptible to the cytotoxic effects of DAMP inducers than the normal epidermis thereby leading to fewer adverse effects. Hence, pharmacological DAMP inducers may improve treatment outcomes for individuals with NMSC.

GP66

Developmental manipulation of endocannabinoid signaling persistently alters reinforcing properties of abused drugs

Ahmed Aldhafri and Ken Soderstrum

Department of Pharmacology and Toxicology

ECU Brody School of Medicine Greenville NC

Marijuana (Cannabis) is one of the most widely abused illicit drugs. The principal psychoactive substance in Cannabis is  $\Delta^9$ -Tetrahydrocannabinol (THC) and its euphoric effects are mediated by elements of the endocannabinoid system (ECS), a group of endogenous cannabinoid receptors, ligands and related enzymes. The ECS is involved in a variety of physiological processes including appetite, pain-sensation, mood, and memory. Given clear evidence that the ECS is important to establishment of neural circuits, altering ECS activity during adolescence, a period associated with brain maturation, is of particular concern. To better understand how manipulation of the ECS may alter learning that is dependent on CNS maturation we have used a zebra finch model of developmental psychopharmacology. Zebra finches are one of few natural vocal learners and have thalamocortical-basal ganglia circuitry similar to mammals, including dopaminergic

input from VTA to striatum essential for incentive learning. We have previously found that cannabinoid exposure during the sensorimotor vocal learning period alters song patterns produced in adulthood. To test whether altered vocal development is associated with changes in other types of incentive learning we have developed a conditioned place preference method to study cocaine reinforcement. The CPP paradigm is a standard preclinical behavioral model used to assess preferences for environmental stimuli associated with a positive or a negative reward. Animals were chronically treated once daily for 25 days during their sensorimotor stage of vocal learning and allowed to mature to adulthood before cocaine reinforcement experiments. Developmental treatments (in 50 ml IM) were: 3mg/kg of THC (partial CB1 agonist), 6 mg/kg of SR141716A (CB1-selective antagonist/inverse agonist) and 4 mg/kg of MAG lipase inhibitor (JZL184). Both developing and adult animals were employed. Results demonstrated that daily developmental THC treatments increased time spent in cocaine-paired chambers. In contrast, developmental JZL184 treatments produced avoidance of cocaine-paired chambers. Interestingly, these effects were not observed following treatment of adults, demonstrating distinct developmental sensitivity. Contrasting efficacy of direct vs. indirect cannabinoid agonism suggests the ECS is active within distinct brain regions relevant to negative reinforcement during development.

GP67

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

Bhavin Vinod Patel and Brian M. Shewchuk

Department of Biochemistry and Molecular Biology

Brody School of Medicine

East Carolina University

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

## Abstracts | Graduate Poster Presentations

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 CPT1B transcriptional 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.

GP68

Determining the Mechanism of how Increased mRNA Modification N6-methyladenosine (m6A) Increases Proliferation, Migration and Invasion of Breast Cancer Cells.

Mohammed G Dorgham

Dr. Kyle Mansfield

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. Using a genetically defined model of breast cancer, our lab has previously shown that increasing mRNA m6A levels by hypoxia or overexpression of the RNA m6A methyltransferase increased proliferation, migration, and invasion, making the cells more tumorigenic. The goal of this

study was to determine the mechanism by which that occurred. To begin, we focused on mRNAs involved in Epithelial to Mesenchymal transition (EMT) which is known to play a role in breast cancer progression. Expression analysis by real-time PCR confirmed that our human mammary epithelial cell (HMEC) model did indeed undergo an EMT as the cells progressed from primary to immortal to transformed. To identify EMT mRNAs that underwent changes in m6A content during cancer cell progression, we performed m6A immunoprecipitation followed by real-time PCR. Once candidate mRNAs are identified, future studies will investigate the impact of the m6A changes on the posttranscriptional regulation of the mRNA and ultimately relate gene expression changes in the EMT mRNA 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.

GP69

Electron Emission from Fast Ion Interactions with Gold and Amorphous Solid Water

Wilson Hawkins, Eric Maertz, Robert McLawhorn, Jefferson Shinpaugh Department of Physics, East Carolina University

Widely used in the treatment of cancer, radiation therapy delivers a lethal dose of energy to malignant tissue. Modeling the deposition of energy in the interactions of the radiation with biological material is important to accurately predict the dosimetry and the subsequent biological outcomes. Recently, nanoparticles have been observed to increase the effective damage during radiation therapy. We are investigating charged particle interactions with biological materials and gold nanoparticles to model energy deposition and electron transport.

Electron emission from gold, hydrated gold, and amorphous solid water surfaces have been measured for irradiation by protons in an energy range of therapeutic interest, 1 to 6 MeV (near the so-called Bragg peak). Doubly differential electron emission yields will be measured under ultra-high vacuum conditions using a combination of spectroscopic techniques: time-of-flight analysis for low-energy electrons and electrostatic analysis for the high-energy range.

GP70

Dynamic Posture in University Student

Marisa Lee, Mikayla Federico

## Abstracts | Graduate Poster Presentations

Postural deviations and habits executed during daily activities can lead to back pain in the younger population. There are many risk factors that may be associated with the manifestation of back pain including gender, age, physical exercise, psychosocial factors, family history of back pain, parents' level of education, and time spent: watching television, on the computer, playing video games, seated, and sleeping.

In order to determine if these risk factors can be extrapolated to a population of graduate students, we utilized the Lay-out for Assessing Dynamic Posture (LADy), a qualitative analysis of dynamic postures, and the Back Pain and Body Posture Evaluation Instrument (BackPEI), a self questionnaire. The LADy is a circuit designed to aid healthcare professionals in evaluating body posture in nine activities of daily life including carrying bags, carrying a backpack, sitting at a desk to write, lifting an object from the ground, carrying an object, sitting at a desk to use a laptop and a desktop computer, sitting on a stool, and sleeping. The BackPEI is a questionnaire consisting of 21 items including questions concerning frequency and practice of physical activity, time spent watching television and use of computer, whether or not the individual studies in bed, preferred sleeping position and amount of sleep, parents level of education, family history of back pain, and students presence, frequency, and intensity of back pain. The questionnaire also includes six pictures of different postures including sitting at a desk while writing, sitting at a computer, sitting in a chair, picking up an object from the floor, and different backpacks and how they are carried. The students are to choose which postures best match what they perceive themselves to look like in those activities, which backpack is most similar to their own, and how they carry that backpack.

The LADy and the BackPEI show agreement in the analyzed postures with similar levels of concordance and significant association ( $p < 0.05$ ) in the daily activities in school age children (Antoniolli et al. 2015). Therefore, we are also interested to determine if there is an agreement and significant association between the BackPEI and LADy in graduate students population, in addition to the inter-rater reliability of the LADy. To further utilize these two tests, we are also interested in which risk factors are most associated with back pain in this older student population.

GP71

Feasibility of using mesenchymal stem cell-derived skeletal myotubes to study skeletal muscle biology in vitro

Alec Chaves<sup>1</sup>, Donghai Zheng<sup>1</sup>, Linda May<sup>2</sup>, Joseph Houmard<sup>1</sup>  
<sup>1</sup>Department of Kinesiology, East Carolina University

<sup>2</sup>School of Dental Medicine, East Carolina University

Mesenchymal stem cells are a multipotent cell line that have been explored for tissue engineering, due their ability to differentiate into adipocytes, chondrocytes, osteocytes, and more recently skeletal muscle myotubes. Further, they can be easily obtained from several depots in the body including the whole blood and umbilical cord tissue. The latter source is important to distinguish, because these cells will be used for in utero development, indicating that the functionality of these cells may have long term implications for the phenotype of the offspring. However, data regarding the health of this stem cell pool is limited.

Our goal was to determine if we could generate a viable skeletal muscle cell line from mesenchymal stem cells. Following 14 days of treatment with a myogenic induction cocktail we verified via western blotting, that these cells expressed key myogenic markers including MyoD and myogenin, and members of the insulin signaling cascade, protein kinase B (AKT), AKT substrate of 160 kda (AS160), and GLUT4, indicating that these cells were successfully transformed into mature, insulin sensitive skeletal muscle cells. Furthermore, we tested if these cells were metabolically responsive to electrical stimulation, a key component of skeletal muscle biology, and determined that phosphorylation of AS160 (T642) was increased following stimulation. Preliminary data suggests that skeletal muscle derived from mesenchymal stem cells can be used as a suitable model for studying skeletal muscle biology, and future analysis should aim to determine the impact of maternal health on the functionality of this pool.

GP72

Effects of Cannabidiol (CBD) on Vocal Learning and Recovery from CNS Damage

Ali Alalawi<sup>1</sup>, Julien C. Dodu<sup>1</sup>, Marie Wooley-Roberts<sup>2</sup>, James Brodie<sup>2</sup>, Vincenzo Di Marzo<sup>2,3</sup> and Ken Soderstrom<sup>1</sup>

<sup>1</sup>Department of Pharmacology and Toxicology, ECU Brody School of Medicine, Greenville, NC, USA 27834

<sup>2</sup>GW Pharmaceuticals, Sovereign House, Vision Park, Histon, Cambridge, UK CB24 9BZ

<sup>3</sup>Endocannabinoid Research Group, Institute of Biomolecular Chemistry, Consiglio Nazionale delle Ricerche, Via Campi Flegrei, Pozzuoli (NA), Italy  
34- 80078

## Abstracts | Graduate Poster Presentations

The major non-euphorogenic ingredient derived from *Cannabis sativa* is CBD. It has many cellular targets including 5-HT1A receptors, GPR55,  $\alpha 3$  and  $\alpha 1$  glycine receptors and adenosine receptors. It holds promise as an anxiolytic, anti-inflammatory, and in the treatment of schizophrenia and seizure disorders. The anti-seizure properties of CBD have been evaluated in children who suffer from intractable seizures with promising results, including the suggestion that CBD may improve vocal learning.

To test the ability of CBD to influence vocal learning and recovery from CNS damage, a vocal learning animal model was employed: a songbird, the zebra finch. The capacity of CBD to improve recovery of vocal behavior in these animals following partial electrolytic ablation of a region of pre-motor-cortex was evaluated (HVC, approximately 10% destroyed). Four groups of adult animals were treated with 0, 1, 10 and 100 mg/kg CBD once daily via intramuscular (IM) injection; no-surgery and sham control groups were also evaluated at all four doses. Experiments were done over 20 days. Birds were recorded over this 20-day period to analyze vocal phonology, syntax and production. The first 3 days were baseline recordings with no treatment. Drug treatment period began at day 4. On day 10, HVC lesions (or sham lesions) were done and treatments and recording were continued for 10 recovery days.

We found that 10 and 100 mg/kg/day CBD improved recovery time and reduced the magnitude of lesion effects on phonology. As the recovery of phonology depends upon auditory feedback, this process involves sensorimotor learning that is improved by CBD. These results indicate that CBD can mitigate effects of CNS damage on phonology and improves vocal learning. The mechanism for this effect remains unknown, but may likely involve several cellular targets. Results from this project also demonstrate the utility of a songbird model in evaluating drug effects on vocal behavior.

Acknowledgement: This work was supported by GW Pharmaceuticals

GP73

TConstruction and Callibration of a Micro-PIXE Line

Austin A Davis, Yanping Xu

Proton induced X-ray emission (PIXE) is a method for elemental analysis that uses protons to excite the orbiting electrons and measures the emitted characteristic X-rays to identify them. Micro-PIXE is a similar system that uses a proton microbeam to scan the sample. This scan produces a 2D map of the chemical composition. The increased resolution adds many advantages,

such as crystalline protein identification, more accurate relative concentrations, as well as many others. The beam that the Micro-PIXE will be performed on has an energy is 2MeV, a beam diameter of 5  $\mu\text{m}$  and a current of 10nA. The initial calibration of the detector will start on an X-ray fluorescence (XRF) system with known samples before being moving to the beam line for final tests. Shielding designs are being modeled using Monte Carlo N Particle code (MCNP), and a radiation safety survey will be conducted after modeling has shown a successful shielding design.

GP74

Proton and Carbon-Ion induced Secondary Electron Emission from Gold and Condensed-Phase Biological Targets

Eric Christopher Maertz, Wilson Hawkins, Robert McLawhorn, Jefferson Shinpaugh Department of Physics, East Carolina University, Greenville, NC 27858, USA

Characterizing damage in materials from charged particle radiation has a wide range of applications, spanning from industrial materials processing to radiation therapy in the treatment of cancer. The field of medical physics relies on accurate modeling of the spatial distribution of dose administered during radiation therapy for treatment of various cancers and malignancies. It is well known that a significant amount of tissue damage occurs not simply from the primary radiation by photons and ions, but also from the secondary electrons that subsequently travel through the material and cause additional ionizations of their own. Monte Carlo track structure simulation codes are the most precise computational technique to model the production and transport of secondary electrons, and thus dose distribution, but lack accurate experimental data to test the models. This is especially true for increasingly promising therapies employing proton or carbon-ion radiation and gold nanoparticle treatment.

Experiments have been developed in the ECU Accelerator Laboratory in the Department of Physics to provide direct tests of the Monte Carlo electron transport simulations for modeling damage from charged particle radiation in biological systems. In our experiments, proton and carbon-ion beams from the 2-MV Pelletron particle accelerator irradiate condensed-phase targets. A new beam-pulsing system has been developed to produce nanosecond ion beam pulses to enable electron time-of-flight analysis of the secondary electrons emitted from the targets. Measurements of the doubly differential electron yields as a function of electron energy and emission angle will be presented for gold and amorphous solid water targets. The experimental data will be compared to results from Monte Carlo electron transport simulations.



## Abstracts | Graduate Poster Presentations

GP75

### Hyaluronan and Hyaluronan Synthase Expression in Cortical Brain Development

Emily Wilson, Warren Knudson, Karen Litwa

The extracellular matrix is crucial for tissue structure and function, but also relays biochemical signals that affect cell physiology. Hyaluronan (HA) is a glycosaminoglycan and the main component of the extracellular matrix of the brain. While its specific role in brain development remains unknown, HA is thought to contribute to tissue hydration and organization of the extracellular matrix, as well as cell-matrix regulation of cell mitosis, migration, and differentiation.

Previous studies have hinted at the importance of HA for brain function. For example, mice deficient in hyaluronan synthases (Has1<sup>-/-</sup>, Has3<sup>-/-</sup>) exhibit epileptic seizures, particularly in the Has3<sup>-/-</sup> mouse by mechanisms that are unknown but consistent with HAS3 being the predominant HA synthase in the brain. HA is also known to promote Ca<sup>2+</sup> influx and long-term potentials, and knockout of the HA receptor, CD44, results in hippocampal memory deficits in mice. Alteration of HA content by way of hyaluronidase treatment or addition of exogenous purified HA influence the proliferation and differentiation of natural neuroprogenitor stem cells in the Dentate Gyrus. Yet, in most of these examples, the exact mechanism of action for HA influence on brain development, differentiation or neuron function remain unknown or understudied.

In order to assess the contribution and mechanism of potential HA functions, we will follow the expression of HA and CD44 during differentiation human neural progenitor cells into astrocytes and neurons. In my preliminary work, astrocytes exhibit strong expression of CD44, and abundant HA, both of which were reduced in neurons. We will use treatment with a HA-specific hyaluronidase and exogenous HA addition as well as agents that block CD44 (blocking antibodies or HA fragments) to probe the function of HA in the proliferation/differentiation of these neuroprogenitor cells or the ability of HA to regulate differentiation into mature astrocytes or neurons. For example, it has been suggested that HA plays a role in synaptic signaling. We will address whether HA synthesized and secreted by astrocytes is required for neuronal synapse formation by co-culturing astrocytes with neurons. We will assess excitatory versus inhibitory synapse formation in the presence or absence of HA or the inclusion of HA-deficient astrocytes. This work will set the stage for investigations into the role of HA in other aspects of brain development, cell

function, or dysfunction.

GP76

### Real Time Imaging of GFP Tagged XRCC1 Repair Protein Responding to DNA Strand Breaks

Todd M. Mendenhall<sup>1</sup>, Yanping Xu<sup>1</sup>

<sup>1</sup>Department of Physics, East Carolina University

Understanding the biological effects of ionizing radiation is of utmost importance in the field of medical physics. Cancer occurs because DNA mutations cause cells to divide continuously. Damaging a cell's DNA causes it to produce proteins which repair single or double strand breaks. Using a 2MeV H<sup>+</sup> microbeam, we will irradiate one cell at a time and study DNA repair protein's actions at a subcellular level. For higher dose exposure scenarios, a custom-built fluorescence microscope will be used to identify DNA damage foci formation with a GFP tagged XRCC1 repair protein. For lower dose exposure scenarios, a custom-built confocal microscopy component will allow us to utilize dynamic light scattering to analyze aggregation of the repair protein. Both setups will enable us to view a cell repairing its damaged DNA in real time.

GP77

### Accelerator Driven Proton Microbeam System for Radiation Biophysics Studie

Robert Tyler Jobe, Yanping Xu

Department of Physics, East Carolina University

A proton microbeam is a uniquely useful tool in radiation biology studies, capable of precisely delivering proton-based irradiation to targets as small a few micrometers. The Physics Department at ECU is currently in the process of designing and constructing a proton microbeam system for cell irradiation studies, adding a new beam line approximately 7 meters in length to the existing particle accelerator in the Physics Department's accelerator lab. At this current stage individual components of the beam line are being assembled and tested, with the main focus placed on the steering magnet system, electrostatic focusing lens, and vacuum system. Once brought to vacuum conditions the electrostatic focusing lens will allow for a controlled beam size approximately 5  $\mu\text{m}$  in diameter, while the steering magnet system will ensure that the proton beam maintains proper alignment. It is anticipated that individual component testing will conclude and beam tests will begin as early as the beginning of Summer 2018.



## Abstracts | Graduate Poster Presentations

GP78

A regulatory role for the proton-sensing G protein-coupled receptor GPR68 in abnormal growth of vascular smooth muscle

Joshua S. Morgan, Nathan A. Holland, David A. Tulis

Throughout the United States and world, the number one cause of mortality and morbidity is cardiovascular disease (CVD). A critical component in the pathogenesis of CVD is abnormal growth of vascular smooth muscle (VSM), and dysfunctional VSM in the setting of CVD experiences acidosis from altered tissue metabolism and/or compromised blood flow. G protein-coupled receptors (GPCRs) are found ubiquitously and play significant roles as therapeutic targets in modern medicine. Within this group, a family of pH-sensing GPCRs has been recently discovered. One of these, GPR68, is localized primarily in VSM, yet its regulatory roles during normal VSM homeostasis, as well as during altered states including abnormal growth in the context of CVD, are not known. The broad goal of this research project is to determine the signals that GPR68 initiates and the functional roles that GPR68 plays in the provocation of pathologic VSM growth. Preliminary data suggest upregulation of GPR68 protein expression in both mouse injured cardiac tissue and in rat injured VSM. Based on these findings, we hypothesize that GPR68, stimulated by acidosis, induces the cyclic AMP target Epac and inhibits anti-inflammatory and growth protective AMPK, in turn, promoting migration and proliferation of VSM cells as foundations of vascular growth in CVD. In order to test this hypothesis, we will determine cellular signals of induced GPR68 in murine primary VSM cells and will evaluate their impacts on migration and proliferation in response to acidosis. We will also analyze cellular fractions to determine localization of GPR68 and its downstream signals including Epac and AMPK. We anticipate that these findings will provide a clearer picture on how these proton-sensing GPCRs contribute to the diseased vascular environment. Confirmation of their cellular signaling pathways and functional impacts will provide rationale for continued study of GPR68 and other pH sensing GPCRs, and we anticipate that results from this study will identify targets in pH-sensing GPCRs as future therapeutics for CVD.

GP79

AMP Deaminase 3 Overexpression Reduces Mitochondrial Content in C2C12 Myotubes by Decreasing PGC-1 $\alpha$  Promotor Activation

Spencer Miller and Jeffrey Brault

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

Skeletal muscles undergoing atrophy have decreased intracellular [ATP], PGC-1 $\alpha$  expression, and mitochondrial content. This combination is unexpected considering that decreased [ATP] is typically associated with increases in [ADP] and [AMP], activation of AMPK and PGC-1 $\alpha$ , and subsequent mitochondrial biogenesis. A possible explanation is induction of the enzyme AMP Deaminase 3 (AMPD3: AMP  $\rightarrow$  IMP+NH<sub>3</sub>), which is

highly upregulated during all types of muscle atrophy. We tested the hypothesis that increased expression of AMPD3, by decreasing [AMP], can reduce mitochondrial content in muscle cells by decreasing the AMPK PGC-1 $\alpha$  mitochondrial biogenesis signaling cascade. Methods: C2C12 myotubes were transduced with AMPD3 or GFP (control) adenovirus and allowed to differentiate 5 days. Myotubes were then collected and analyzed for nucleotide concentrations (UPLC), protein expression (Western Blot), 2 Kb PGC-1 $\alpha$  promotor activity (PGC-1 $\alpha$ -Luciferase assay), and citrate synthase enzyme activity (marker of mitochondrial content). Results: Increased AMPD activity was confirmed by the presence of IMP

( $0.20 \pm 0.01 \mu\text{mol/g}$ ) in AMPD3 group compared to undetectable in GFP controls. Overexpression of AMPD3 decreased [ATP] by 32%, [ADP] by 19%, [AMP] by 28%, and the total adenine nucleotide pool + IMP by 31% ( $p < 0.001$  for all). Notably, despite the pronounced decrease in [ATP], the [AMP]/[ATP] did not differ between groups. This was reflected by no differences in protein expression of AMPK, pAMPK(Thr172), and AMPK $\alpha$  substrate. However, PGC-1 $\alpha$ -luciferase activity was significantly lower after 1 and 5 days of AMPD3 overexpression compared to GFP ( $p < 0.0001$ ,  $p < 0.05$ ), suggesting decreased PGC-1 $\alpha$  promotor region activation despite no measurable difference in pAMPK(Thr172). Furthermore, citrate synthase activity was 17% lower in myotubes overexpressing AMPD3 compared to GFP ( $p = 0.01$ ), yet no differences in mitochondrial OXPHOS proteins were detected. Summary/Conclusions: Our results show that increased expression of AMPD3 can decrease adenine nucleotide concentrations without disrupting the relative ATP:ADP:AMP ratios or activating AMPK. However, we do find significantly lower PGC-1 $\alpha$  promotor activity and citrate synthase activity. These findings indicate that increased expression of AMPD3 can reduce PGC-1 $\alpha$  activation ultimately resulting in reduced mitochondrial content and may at least partly explain the decreased mitochondrial content observed in skeletal muscle atrophy.

## Abstracts | Graduate Poster Presentations

NIH RO1 AR070200

GP80

Elevated Skeletal Muscle Glucose Transporter 6 Levels May Attenuate High Fat Diet-Induced Insulin Resistance in Female Mice

Parker L. Evans, BS; Erin C. Stanley, BS; Maria Torres, PhD; Shawna L. McMillin, MS; Luke A. Weyrauch, MS; Carol A. Witzczak, 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 mass is a key factor in the regulation of blood glucose levels, and importantly lower muscle mass is associated with higher rates of type 2 diabetes. Females have lower muscle mass, yet surprisingly they have a lower prevalence of hyperglycemia and insulin resistance. This finding has been shown to persist following high fat diet feeding, but the molecular mechanisms underlying these sex differences remain poorly understood. The goal of this study was to assess whether female mice are protected against high fat diet-induced insulin resistance due to the effects of ovarian hormones on skeletal muscle glucose transporter (GLUT) levels. Male and female, 6 week old, C57BL/6J mice were placed on a 14% kcal, low fat diet (LFD) or a 60% kcal, high fat diet (HFD) for 12 weeks. Mice were fasted overnight and blood taken to assess glucose and insulin levels, and these values used to calculate the homeostatic assessment of insulin resistance (HOMA-IR), an indicator of whole body insulin resistance. Compared to LFD gender-matched controls, the HFD increased HOMA-IR ~120% in males but only ~26% in females, demonstrating that female mice are protected

against HFD-induced whole body insulin resistance. To assess whether this is due to greater skeletal muscle insulin sensitivity, *ex vivo* muscle [3H]-2-deoxyglucose uptake was assessed  $\pm$  submaximal insulin. Compared to LFD gender-matched controls, insulin-induced muscle glucose uptake was decreased ~50% in HFD males, and only ~20% in HFD females, suggesting that enhanced muscle glucose uptake protects female mice against HFD-induced whole body insulin resistance. To determine if the enhanced glucose uptake was due to increased GLUT levels, immunoblots were performed. Muscles from female mice exhibited higher levels of GLUT4 (~35%) and GLUT6 (~70%) compared to males, suggesting that one of these GLUTs plays a key role in this process. To assess whether ovarian hormones regulate the expression of these GLUTs in muscle, female mice underwent bilateral ovariectomy.

After 4 weeks, immunoblot analyses revealed a ~40% decrease in GLUT6, but no change in GLUT4 levels compared to non-ovariectomized controls. Collectively, these results demonstrate that female mice are protected against the development of HFD-induced whole body insulin resistance, and suggest that this may be due to ovarian hormone dependent regulation of skeletal muscle GLUT6 protein levels.

GP81

Dopamine Receptor D3 Has Sex-specific Roles in Age-dependent Left Ventricular Remodeling

Gabriel Araujo Grilo, Patti R. Shaver, Rugmani P. Iyer, Stefan Clemens, and Lisandra E. de Castro Brás

Aging is an independent risk factor for cardiovascular disease. Additionally, normal aging associates with a decrease of the levels of the neuromodulator dopamine (DA). While the role of DA in the pathophysiology of hypertension and in autonomic function is well-established in young animals, much less is known on how DA levels and signaling with cardiac aging. Decreased receptor expression/function of the D2-like DA receptor family (DRD2 and DRD3) have been implicated in the development of cardiac fibrosis, and fibrosis is a component of age-dependent left ventricular (LV) diastolic dysfunction. The goal of this study was to elucidate the effects of DRD3 deficiency in age-dependent LV remodeling and dysfunction.

Methods: We used 3, 6, 12, and 18 month (m.o.) old wild type (WT) and DRD3 knockout (D3KO) mice of either sex (n=6/sex/age/genotype). Cardiac function was assessed by serial echocardiography, after which blood plasma and left ventricle were harvested to analyze the molecular parameters of LV remodeling.

Results: Echocardiography analysis demonstrated that D3KO mice have a continuous, age-dependent, increase of the LV anterior wall (LVAW) over WT that is stronger in females than in males. In addition, the interior diameter in diastole (LVIDd) of D3KO animals was consistently smaller than WT mice of same age, particularly at 6 and 12 m.o., suggestive of increased LV hypertrophy in D3KO mice. Genes associated with cardiac remodeling, such as *Gsta1*, *Nrp2*, *Mmp12* and *Vcam1* showed increased expression with aging in WT females, but not in D3KO, suggesting reduced protein turnover in the D3KO mice. However, D3KO males displayed increased *Ccl2* and *Ecm1* at 18 m.o. compared to all other ages and *Casp1* (an inflammatory response initiator) was increased in D3KO with time. These data suggest D3KO have a different age-dependent inflammatory

## Abstracts | Graduate Poster Presentations

profile compared to WT.

Conclusion: Our data indicate that DRD3 function in the heart plays an important sex-and aging-dependent role in cardiac remodeling and hypertrophy.

We acknowledge support from American Heart Association (14SDG18860050) and the Research and Graduate School at East Carolina

GP82

A neutron microbeam irradiator at ECU radiological research accelerator facility

Raafat Khalid Haibet, Yanping Xu

Microbeam is a very narrow particle beam with micrometer diameter and it allows well-quantified radiation deposited at precisely defined locations. Thus, the microbeam is essentially a tool for investigators to study intra- and inter- cellular mechanisms of radiation-induced damage signal

transduction.

At ECU physics department accelerator lab, we are planning to use Li(p,n) nuclear reaction to produce a neutron microbeam with tens of micron diameter. It's based on an initial proton microbeam with a few nA current. Since it requires a high proton beam current to achieve effective neutron dose.

We will design a neutron target and modify the existing electrostatic focusing system with a high beam acceptance. The neutron dose rate will be estimated using Kerma factor and neutron flux measurement data.

Reference:

1- Y. Xu, G. Garty, S.A. Marino, T. N. Massey, G. Randers Pehrson, G. W. Johnson and D. J. Brenner. Novel neutron sources at Radiological Research Accelerator Facility. 2nd International workshop on fast neutron detectors applications, Nov. 6-11, 2011, EIN Gedi, Israel.

2- A. W. Bigelow et al., Single-Particle / Single- Cell Ion Microbeams as Probes of biological mechanisms, IEEE Trans. Plasma Sci.36(2008)1424. 3- Y. Xu et al., An accelerator-based neutron microbeam system for studies of radiation effect, Radiat. Prot. Dosimetry 145(2011) 373.

GP83

The Effectiveness of Battlefield Acupuncture in Reducing Pain

Allison Nicole Beachum, Aaron Craven, LRT/CTRS; Carmen Russoniello, PhD., LRT, LPC, BCB, BCN (Mentor), Matthew Fish, Ph.D., LRT/CTRS, LPCA, BCB (Mentor)

Acupuncture (AP) is a technique attributed to Chinese medicine (NCCIH, 2013) that benefits many people suffering from chronic pain. AP can increase individuals pain threshold and change the perception of pain in laboratory settings (Murray, 1995). AP involves practitioners stimulating specific points on the body through the process of inserting needles through the skin (NCCIH, 2016). The Department of Defense (DoD, under the guidance of Dr. Richard C. Niemtzow, and the support of the Samuelli Institute, have trained physicians throughout the Air Force and within the DoD for the past decade in this technique that involves five points on the ear (Bart-Knauer, & Friedl, 2013). Currently, there is little information on the physiological changes that take place when a person receives Battlefield Acupuncture (BA). Knowing more about these changes may help further understand its pain reducing effects. Thus, the purpose of this exploratory study is to report on heart rate variability (HRV) changes during AP and compare them with subjective reports of reductions in pain. At a demonstration hosted at East Carolina University, a certified BA practitioner asked students if they had pain and whether they wanted to volunteer to receive BA. The BA practitioner implemented the technique while researchers recorded HRV data. BA involves a participant receiving five (1cm) studs placed sequentially in each ear for a total of ten studs: cingulate gyrus, thalamus, omega 2, point zero, and shen men. The researchers collected HRV data as follows: (a) five-minute baseline, (b) placement of AP studs, and a (c) five-minute post-measurement. Participants were asked to rank their pain on a scale of 1 to 10 before and after BA. Descriptive data, correlations, and repeated measures ANOVA will be used to compare pain and HRV changes. Information will assist clinicians and researchers understand the psychophysiological benefits of BA.

GP84

The comparison of two assessments in measuring keyboarding skills of elementary students.

Alison Homan

Heather Muller

Keyboarding is an important skill of everyday life. Technology is becoming more prevalent in the classroom every year

## Abstracts | Graduate Poster Presentations

(Williamson, 2015). Teaching children the correct method of typing while they are young is an important step to ensuring future success. Students who become efficient keyboarders compose better work, are prouder of their work, produce documents with a neater appearance, and have better motivation (Zeitz, 2016). Keyboarding skills are also a necessity to succeed with computer-based testing because lack of these skills may create a barrier for students to perform to a level that is representative of their true level of understanding (Zeitz, 2016). Keyboarding Without Tears (KWT) is a web-based curriculum that teaches the keyboarding and pre-keyboarding skills students need in order to succeed in the classroom. The program is game-based and student-led and also provides general computer readiness and digital citizenship skills. When utilizing a computer program as a means to introduce and teach keyboarding skills to students, it is important to have a valid way to measure their progress. Keyboarding process is often measured by speed and accuracy. The KWT application has a keyboarding assessment included in the program, but this assessment has not been validated. The purpose of this study is to compare the results of keyboarding speed and accuracy from Typing Test Pro (a tool used in prior keyboarding research) to the speed and accuracy measured by KWT. Participants include K-5 students from two neighboring elementary schools in a rural city in Mississippi. Students completed a keyboarding assessment both on Typing Test Pro and KWT, and data was collected on typing speed (words per minute) and accuracy (total number of errors). After data collection from eligible students was completed, statistical analysis was done comparing students' results from both programs. With the increasing prevalence of computers both within and out of school settings, children of all ages require a level of proficiency in keyboarding skills. Outcomes from this study will help inform occupational therapists and teachers of the usefulness of the KWT assessment.

GP85

### Comparing Physical Activity Barriers in Adolescents With and Without Autism Spectrum Disorder

Nicholas Leahy, Katrina D. DuBose, Ph.D., Thomas D. Raedeke, Ph.D., Jihoun An, Ph.D. Department of Kinesiology, East Carolina University

Background/Purpose: Regular physical activity engagement in adolescence improves the cardiovascular system, muscular strength and endurance, and bone development. While physical activity is beneficial to health and development, only 25% of adolescents met the physical activity recommendations of 60 minutes of daily physical activity. Research has shown

Adolescents with developmental disabilities, particularly Autism Spectrum Disorder (ASD), are a group of populations at a higher risk of being physically inactive. Today 1 in 68 adolescents are diagnosed with ASD each year. Studies have shown that adolescents with ASD are less likely to engage in physical activity regularly than typically developing (TD) adolescents. Some studies reported that adolescents with ASD participated in 30% less PA weekly. Adolescents with ASD commonly face more barriers, but the desire to be active is still present in these individuals. Currently, there is limited research comparing physical activity barriers seen in adolescents with and without ASD. Therefore, this study aims at explaining the physical activity barriers and patterns of adolescents with and without ASD. Specifically, the purpose of this study is twofold: 1) to examine the physical activity levels between adolescents with ASD and TD adolescents, and 2) to determine if the physical activity barriers differ between in adolescents with ASD and TD adolescents. Methods: Adolescents will be screened for basic anthropometric data via stadiometer and calibrated scale. This study used PACE adolescent survey to assess barriers to physical activity. The PACE survey divides questions into subscales and grades a variety of different factors and their influence on physical activity. The subscales assessed are: stages of change, physical activity pros and cons, self-efficacy, family/peer influences, and environmental factors. Once the scores are calculated developmental strategies can be implemented that are appropriate for the individuals in question. Adolescents wearing an ActiGraph accelerometer for one week will assess physical activity. Time spent in moderate and vigorous intensity physical activity will be determined using an established cut-point.

GP86

### Effects of Music on Driving Performance in Individuals with Autism Spectrum Disorder Compared to Neurotypical Individuals

Brittany Beth Goehmann

PURPOSE: Driving is an important step in attaining independence, as it provides people with a mode of transportation to do as they please and go where they please (Monahan, 2012). The environment inherently provides sensory input, which may cause overresponsivity or underresponsivity in individuals with ASD (Rodger & Ziviani, 2012). Sudden changes in behavior from sensory input in the environment can create dangerous driving situations, so it is important to modulate the environment to facilitate driving. The purpose of this pilot study is to investigate the effects of music on the driving performance of ASD individuals as compared with

## Abstracts | Graduate Poster Presentations

neurotypical individuals. **METHOD:** A quasi-experimental 2 (ASD/not ASD) X 3 (music condition: no music, light classical, and self-selected) factorial design was used. The dependent variable of driving performance was measured by a quantitative score from a standardized observational tool for driving, the Performance Analysis of Driving Ability (P-drive). The P-drive scores are based on a four-point scale for the content areas of maneuvers, orientate, follow regulations, and attending and responding (Patomella, 2014). Ten participants with ASD (Mean age =18) were observed under the 3 conditions on a driving simulator route with critical events that are relatively the same. The learning curve is considered a covariate. **RESULTS:** Repeated measures ANOVA shows no difference in driving performance among young drivers with ASD when compared across music conditions ( $p=0.272$ ). Data collection is ongoing for the control group with plans to compare between the two groups. Limitations include a small sample size and not using actual on road performance, although simulator driving is linked to on road performance. **CONCLUSION:** While there was no difference in driving performance between the three music conditions for the ASD group, there are still key implications for practice. It may suggest music playing may not hinder driving performance, providing contesting evidence against the common assumption that music is a distraction while driving. This final pilot study will compare driving performance among ASD and a control group.

GP87

Chronic Pediatric Health Disorders in Economically Disadvantaged Families: Assessment of Stress and Coping in Children and Parents.

Alexis M Metz

Families of children with chronic pediatric health disorders (CPHD) find their daily lives to be stressful enough due to the health status of their children. Families in disadvantaged areas have additional stressors due to the limited income and lack of resources. There is lack of available research addressing the coping methods of children with CPHD and their families with CPHD. This study seeks to identify what methods of coping are being used by children and families with CPHD. This information will be gathered through face- to face- and phone interviews with parent and child dyads. Results will be discussed during presentation.

GP88

Anxiety and College Students: The Benefits of Mindfulness-Based Meditation

Amelia Day Saul

Dr. Matthew Taft Fish

Anxiety and College Students: The Benefits of Mindfulness-Based Meditation

Amelia Saul<sup>1</sup>, Matthew Fish<sup>1</sup>

<sup>1</sup>Department of Recreation and Leisure Studies, East Carolina University

Stress and anxiety are something that most individuals experience every day. High amounts of stress and anxiety can negatively impact an individual's life (Li & Goldsmith, 2012). Specifically, the American College Health Association (ACHA; 2016) reported that 61.9% of college students reported having anxiety at some point during the last 12 months. The stress experienced by college students can cause a multitude of adverse effects including anxiety, depression, suicidal ideations, sleep deprivation, and lowered mood. In a survey conducted by the ACHA (2016) during the Fall 2016 National College Health Assessment, 26.5% of college students indicated that anxiety had impacted their academic performance during the past 12 months.

This study aimed to test the efficacy of prescribed mindfulness meditation in reducing symptoms of anxiety in a college population when compared to a control group. This study employed a classic experimental design using Headspace as a prescribed activity in comparison to a control group. Headspace is an interactive mindfulness meditation mobile phone application with substantial research that is freely available for cell phones and tablets.

The study consisted of 100 college students randomly assigned to either the experimental group or control group. The participants were assessed at baseline and after completing the 14-day intervention using the State-Trait Anxiety Inventory (STAI). Over the 14-day period, the experimental group participants completed ten sessions of Headspace while the control group participants continued with business as usual.

The data from this study are currently being analyzed using descriptive statistics, t-tests, and repeated measures



## Abstracts | Graduate Poster Presentations

GP89

### Ground Reaction Force And Kinematic Differences In The Kicking Leg During Accurate And Maximal Effort Soccer Kicking

Kelsey Ann Reeves, Caroline Yeomans, Patrick Rider

**Introduction:** Soccer is one of the most popular sports in the world. Previous studies have found that soccer goals scored from set pieces, such as corner kicks and free kicks, have a significant effect on competition results. In addition, much research has been conducted on the biomechanics of a soccer kick in order to optimize kicking performance. However, little is known about the relationship between the loading step of the kicking leg (KL) and the plant leg (PL), and which biomechanical factors can influence stationary kick performance.

**Objective:** The purpose of this study is to examine the ground reaction forces and joint kinematic differences between the PL and KL in maximum effort kicking and accurate kicking in female soccer players.

**Methods:** A 3D motion capture system and two force plates were used to collect data for 15 female soccer players (13 club-level and 2 varsity-level). 31 reflective markers were placed on the subject's body so that the cameras could record their movements. The subjects performed three trials of a maximum effort kick and three trials of an accurate kick with the KL and PL on two separate force plates. Peak vertical and horizontal ground reaction forces were measured in each leg. Peak hip extension and velocity, peak knee flexion and velocity, and peak ankle plantar flexion and velocity were measured on the KL. Significance was set at 0.05.

**Results:** During maximum effort trials, subjects significantly increased peak hip velocity ( $7512.4 \pm 171.8$  vs.  $-405.8 \pm 130.1$ ), peak knee velocity

( $1081.6 \pm 132.3$  vs.  $843.3 \pm 192.7$ ), peak foot velocity ( $12.7 \pm 1.5$  vs.  $10.2 \pm 2.9$ ), and peak horizontal ground reaction force ( $256.5 \pm 203.5$  vs.  $196.5 \pm 182.7$ ) of the KL. Additionally, peak hip extension ( $14.9 \pm 11.2$  vs.  $6.5 \pm 13.3$ ) and peak knee flexion ( $-94.3 \pm 7.5$  vs.  $-83.7 \pm 12.1$ ) were significantly increased as well as a greater peak horizontal ground reaction force ( $-419.3 \pm 233.8$  vs.  $-341.4 \pm 212.5$ ) caused by the PL during the maximum effort trials.

**Conclusions:** The results indicate that maximum effort kicks are achieved by increasing the KL ground reaction forces which resulted in increasing the KL peak hip, knee and foot velocities.

These results may be utilized by trainers and coaches to help develop drills that can increase performance of maximum effort kicks.

GP90

### How Strength and Motion Training Effect Quadriceps Strength and WOMAC Score in Adults with Knee Osteoarthritis

Olukunle Akindahunsi, Gabriela Pedroso, Paul DeVita

Osteoarthritis (OA) is one of the leading cause of chronic disability worldwide. Pain, stiffness, joint swelling and quadriceps weakness are symptoms associated with Knee OA that contribute to the decline in quality of life. Fortunately, exercise therapy is effective in improving these symptoms. Typically, programs that strength train the quadriceps are used but a variety of aerobic programs can improve knee OA symptoms. The mechanism behind the benefits of exercise is unknown. We hypothesize increase knee movement while performing exercises is the cause of improve symptoms. We predict motion training (MT) has similar effect as strength training (ST) in reducing pain and stiffness and improving function in individuals with knee OA. This study purpose is to compare effects of ST and MT on quadriceps strength, pain, stiffness and function in knee OA patients. 45 healthy participants diagnosed with knee OA at 30-65years old with BMI between 19-32kg/m<sup>2</sup> were accepted into study. Participants completed WOMAC questionnaire and quadriceps isokinetic and isometric strength test pre and post intervention. Participants were placed into ST, MT, or control group (CT). ST group performed quadriceps strengthening exercise 3 times a week for 12weeks. MT group was similar to ST but with no load. Data were analyzed with 2-factor (Time: pre v post; Group: ST, MT, CT) ANOVA with repeated measures on time and Tukey post hoc test when significant interactions were observed. Alpha set to  $p < 0.05$  for all significance tests. Significant interactions were observed for WOMAC pain, physical function and total scores and post hoc tests showed ST & MT groups improved by 45% and 51% on average for these scores while CT scores weren't statistically different over time. Quadriceps strength increase significantly over time with ST, MT, and CT groups improving 24%, 11%, and 4%. We suspect a Type II error due to learning effect for the interaction which was  $p < 0.07$  for the isokinetic test. This is one of the first studies investigating effects of MT in knee OA patients and its association to pain, stiffness, and physical function. Results showed MT can be effective as ST for improving pain, stiffness, and physical function in this population. MT improve OA symptoms almost identically to ST with reduce improvement in strength, we provide the first evidence that joint motion may be a critical



## Abstracts | Graduate Poster Presentations

mechanism for exercise benefits in knee OA.

GP91

Development of Narratives in Kindergarten Latino Children

Heather Capps, Carson Powers Gatlin Hauswald, Lucía I. Méndez, Ph.D., CCC-SLP

Department of Communication Sciences and Disorders, East Carolina University

The Latino population of young children is rapidly growing in the United States, and constitute 23% of the U. S. child population (U.S.Census.Bureau, 2015). However many of these children who are dual language learners (DLLs) are at high risk for reduced literacy and academic outcomes due to their low-income status and limited English language skills (August & Shanahan, 2006; Garcia & Miller, 2008; Snow, Burns, & Griffin, 1998). It is therefore critical to understand their process of oral language development in order to support positive language, literacy and academic outcomes.

Narrative skills or story telling abilities are associated with language, literacy and academic outcomes and have been also used to assess language development in monolinguals and bilinguals. Narratives are typically measured in terms of their macrostructure, the overall structure and organization of the story, and microstructure, the linguistic components that convey meaning within the story like vocabulary skills. Narrative development in DLLs however, may differ from that of monolinguals, due to their additional linguistic resources in two languages (Bedore, Pena, Garcia, & Cortez, 2005). However the few studies examining narrative discourse using narrative retells in this population report inconclusive findings regarding the relation of micro- and macrostructural components within and across languages (Gutiérrez-Clellen, 2002; Lucero, 2015, 2016; Squires et al., 2014).

The current study examined the association between language measures of microstructure and macrostructure within and across languages in 15 bilingual kindergarteners using a narrative retell task in Spanish and English. The narrative retells were analyzed using Systematic Analysis of Language Transcripts. Microstructure was examined using Number of Different Words (NDW) and mean length of utterance (MLU) in both Spanish and English. Macrostructure was analyzed using components of the Narrative Scoring Scheme (story grammar, cohesion, and literate language). Results of the study indicated that elements of macrostructure transfer cross-linguistically, while microstructure elements are strongly associated within

the same language but do not transfer across languages. These findings suggest that bilingual children acquire lexical and grammatical skills independently in each of their languages, and that bilingual children should be assessed in both the L1 and L2 to accurately capture their language

GP92

Increases in insulin signaling following electrical pulse stimulation are blunted in myotubes derived from severely obese individuals with or without type 2 diabetes

Seongkyun Lim<sup>1,2</sup>, Alec Chaves<sup>1,2</sup>, Donghai Zhen<sup>1,2</sup>, Joseph Houmard<sup>1,2</sup>

<sup>1</sup>Human Performance Lab

<sup>2</sup>Department of Kinesiology, East Carolina University

Introduction: Exercise training has been shown to be effective in improving skeletal muscle insulin sensitivity, but individuals with severe obesity and/or type 2 diabetes (T2D) may not respond as robustly as lean individuals. Electrical pulse stimulation (EPS) applied to primary human skeletal muscle cell cultures (myotubes) has been used as an in vitro exercise model to understand responses to contractile activity alone. Purpose: The purpose of this study was to examine the effect of antecedent EPS on insulin signaling in myotubes from lean and severely obese individuals, with and without type 2 diabetes. Methods: Human muscle cells were cultured from muscle biopsies obtained from lean (BMI:  $21.7 \pm 0.75$  kg/m<sup>2</sup>), obese (BMI:

$39.1 \pm 0.99$  kg/m<sup>2</sup>), and diabetic (BMI:  $40.7 \pm 9.44$  kg/m<sup>2</sup>) individuals. Following differentiation, mature myotubes were stimulated with electrical pulses, set at 11.5 V, 1 Hz and 2 ms for 24 h. Following, myotubes were treated with 100nM insulin for 10 minutes, after which the cell lysate was harvested for western blot analysis to measure the phosphorylation status of AKT (pAKT). Results: Insulin stimulation increased pAKT levels in all three groups ( $p = 0.04$ , Mean  $\pm$  SEM,  $2.86 \pm 0.43$ ,  $2.1 \pm 0.33$ ,  $1.85 \pm 0.12$ ; fold change over control in lean, obese, and T2D respectively). However, in response to EPS, only the lean group increased insulin-stimulated pAKT further ( $p=0.03$ ,  $2.86 \pm 0.43$  vs  $4.07 \pm 0.11$ , fold increase over control). Conclusion: Our data show that EPS increases insulin-stimulated pAKT levels in myotubes from lean individuals, but this response is absent in myotubes from individuals with severe obesity with or without T2D, indicating that there is an inherent defect in their cellular response to electrical/contractile activity.

GP93

### Risk Assessment of Forester Exposure to Hymenoptera

Danielle Dillane Carter

Ants, bees, hornets, wasps, and yellow jackets, collectively known as Hymenoptera, are a serious concern to outdoor workers as their stings have the potential to cause life-threatening allergic reactions. This study assessed current training about and impact of Hymenoptera stings on outdoor workers across the US. A survey was distributed to nearly 2,000 outdoor workers in all four regions of the US (South, West, Northeast, Midwest). Results show that ants are a primary concern in the South with over 75% of participants reporting to have been stung by an ant in this region within the last five years. Bees, hornets, wasps, and yellow jackets are a concern in all four regions of the US with 60-70% and 75-93% of participants respectively having been stung by bees or hornet/wasp/yellow jacket within the last five years. Despite such a large number of participants experiencing Hymenoptera stings, nearly 75% of participants are concerned about being stung or their reaction to such stings. Approximately 70% of participants in the survey reported not having received any safety training related to Hymenoptera from their employers. An educational brochure was developed as a potential tool for employers to distribute to employees to help train outdoor workers on Hymenoptera to help reduce the risk of exposure to these insects.

GP94

### Analysis of the Impact of Cranial Base Abnormalities on Cerebellar Volume and Velopharyngeal Variables Related to Speech in 22q11.2 Deletion Syndrome

Abigail Haenssler<sup>1</sup>, Adriane Baylis<sup>2</sup>, Richard Kirschner<sup>2</sup>, Lakshmi Kollara<sup>3</sup>, Jamie Perry<sup>1</sup>

<sup>1</sup>East Carolina University, Greenville, NC, <sup>2</sup>Nationwide Children's Hospital, Columbus, OH, <sup>3</sup>Texas A&M University, Kingsville, TX

Individuals with 22q11.2 deletion syndrome (DS) present with unique craniofacial features. Cerebellar volume has been reported to be significantly reduced among this population, specifically in the anterior lobule and neo-cerebellum (Bish et al., 2006). Velopharyngeal dysfunction (VPD) and hypernasal speech are considered hallmark features of 22q11.2 DS (Persson

et al., 2003). Anterior and posterior cranial base angles have been reported to be more obtuse in patients with 22q11.2 DS (Ruotolo et al., 2006). However, not all studies have observed platybasia among this entire population (Nachmani et al., 2013). Platybasia has been reported to be linked to an increase in pharyngeal cavity volume and pharyngeal width among those with 22q11.2 DS (Ruotolo et al., 2006). To the best of our knowledge, no studies have examined the relationship between cranial base, cerebellar volume, and velopharyngeal variables among this population. Given that cerebellar volumes determine posterior cranial fossa volume and, therefore, cranial base morphology, it is likely there is an association between such features. The purpose of this study is to determine if there is an association between the cranial base angle and the volume of the cerebellum, depth of the velopharynx and velopharyngeal dysfunction in patients with 22q11.2 DS.

Magnetic resonance imaging (MRI) was used to analyze the cranial base angle, cerebellum volume and depth of the velopharynx among 15 children with 22q11.2 DS and 15 age-matched control patients. MRI data were imported into Amira 6.0 Visualization Modeling software. Linear and angular cranial base angle measurements were obtained manually using a midsagittal slice on the sagittal image. Cerebellum volume was obtained by manually tracing the cerebellum in each slice on the sagittal and oblique-coronal images. The depth of the velopharynx was obtained using a midsagittal slice on the sagittal image. A standard speech sample was used to perceptual ratings of hypernasality. ANCOVA will be used to compare cranial base angles to the volume of the cerebellum, depth of the velopharynx and speech resonance in patients with 22q11.2 DS.

MRI images have been obtained from enrolled participants. Imaging analysis is ongoing and will be completed in Spring 2018.

This new study will provide insights into the relationship between cerebellar volume, velopharyngeal depth and cranial base, and downstream speech effects.

GP95

### Secondary Post-Traumatic Stress and Its Treatment in Children of PTSD Veterans

Alexis Maxwell (B.S.) and Tacy LeBaron (B.S.), (Matthew Fish, Ph.D., LRT/CTRS, LPCA, BCB. Mentor) (Carmen V. Russoniello, Ph.D., LRT, LPC, BCB. BCN Mentor)

Secondary post-traumatic stress (PTS), or secondary

## Abstracts | Graduate Poster Presentations

traumatization, is defined by the National Child Traumatic Stress Network as the emotional duress that results when an individual hears about the firsthand trauma experiences of another and whose symptoms mimic those of post-traumatic stress disorder (PTSD). To date, the research conducted on secondary PTS in military children is limited at best. One existing study found that adult children of PTSD veterans showed higher levels of psychological distress, higher terror-related stress, and a lower capacity for intimacy than children of non-PTSD veterans (Dinshtein et al., 2011). Continued work on this topic is of paramount importance because secondary PTS, left unchecked, can be debilitating and result in PTSD. According to a 2014 review conducted by Lambert et al., there is no significant difference between the magnitude of effect in studies when a parent experiences a potentially traumatic event and studies where both parents and children were exposed. In an effort to contribute to this topic, this study aims to both demonstrate how prevalent PTSD is in secondary PTS children of military personnel and to test whether using heart rate variability (HRV) and skin conductance (SC) biofeedback can reduce their symptoms. There has been extensive research conducted using biofeedback to help relieve the symptoms of PTSD veterans but, to the best of our knowledge, there have not been studies that examine how biofeedback can help relieve PTSD symptoms in children of PTSD veterans. In light of research supporting resonance frequency breathing biofeedback combined with other techniques to treat PTSD symptoms (Petta, 2017), this study further aims to shed light on how biofeedback can help children of affected PTSD veterans using HRV, SC, and resonant breathing patterns. We propose that children with military parents diagnosed with PTSD will exhibit lower HRV and higher SC levels when exposed to a stressor than individuals with military parents not diagnosed with PTSD and that feedback from these modalities with guided resonance breathing training will decrease the adverse reactions to stressful stimuli in PTS children of PTSD veterans.

Keywords: secondary PTS, PTSD, military families, military children, biofeedback, HRV, skin conductance, resonance frequency breathing

GP96

Maintaining a sense of identity across the caregiving trajectory

Anna Batts<sup>1</sup>, Abby J. Schwartz<sup>1,2</sup>

<sup>1</sup>School of Social Work, East Carolina University, <sup>2</sup>Aging Studies Program, East Carolina University

Individuals often assume a caregiver role as the health needs of

a family member or friend change over time. Females represent approximately 75% of family caregivers in the United States (National Alliance for Caregiving & AARP Public Policy Institute, 2015). Often compounded with the responsibility of having a career, raising children, and maintaining social relationships, it is not uncommon for women to lose their sense of personal identity while caring for others (Ume & Evans, 2011; Bullock, Crawford, & Tennstedt, 2003). Once the role of caregiver ceases (e.g., upon care recipient death, new caregiver identified) some women are challenged to seek a new purpose. Given the increase of older adults and in turn the number of informal caregivers, it is possible that more female caregivers will be faced with the task of reinventing their former self upon completion of their caregiver role. This poster presents one case from a larger qualitative study that examined the experience of older cancer caregivers following the discharge of the patient from hospital to home. Two interviews were completed with each caregiver at 1 week and then 2 weeks following hospital discharge. The case presented is that of a 73-year-old female caregiver, Mrs. P, who provided informal care to multiple family members throughout her life. At the time of her interviews, she was nearing the end of her lifelong caregiving role. Mrs. P's desire to maintain and develop her sense of identity beyond just being a caregiver, and what she would do next in her life was apparent during her interviews. Preliminary themes include: setting boundaries with others, a sense of guilt and obligation, and a desire for change and adventure in her life. Mrs. P's case draws attention to the dilemma

of sacrificing self over others in caregiving, and contributes to the literature concerning caregiver needs during bereavement and beyond. Health professionals of various disciplinary backgrounds who provide supportive services to caregivers must understand the secondary losses caregivers face upon losing their "title" as caregiver.

GP97

THE VARIATION IN STRENGTH DECREMENT OF LOWER EXTREMITY MUSCLE GROUPS AND BIOMECHANICAL PLASTICITY IN OLDER ADULTS; A RESEARCH PROPOSAL

Ashley Moulder, Dr. Paul DeVita

Introduction: While walking, older adults exhibit age-associated Biomechanical Plasticity, in which the contributions of total joint work and power of the lower extremities shift from distal to proximal joint muscles. Specifically, older adults produce more hip and less ankle work than young adults during the stance phase while still producing a similar amount of total work. This biomechanical plasticity is thought to be strength

## Abstracts | Graduate Poster Presentations

dependent, with weaker older adults exhibiting more biomechanical plasticity. Muscle function declines with age, which reduces the ability to perform activities of daily living, such as walking. However, the decline in muscle function is not equivalent between muscles. Strength and power in lower extremity muscles decline at a faster rate and at an earlier age than upper extremity muscles. However, the rates of strength and power decline among lower extremity muscles are inconsistent, but suggest the possibility of a larger strength decrement in ankle muscles. This could be a potential cause of the age-associated biomechanical plasticity. To date, no study has compared the rate of decline in strength and power of all lower extremity muscle groups, or defined the relationship between the rate of strength and power decline at each lower extremity joint and the amount of biomechanical plasticity.

The first purpose of this study is to compare the amount of age-related strength and power decrements observed in the muscles of lower extremity joints. The second purpose is to determine the relationship of the magnitude of muscle strength and power decrement at the lower extremity joints of older adults and the amount of age-associated biomechanical plasticity observed while walking.

Methods: Twenty healthy young adults (18-30 years old), and 20 healthy older adults (70-80 years old) will be recruited. The hip, knee, and ankle flexors and extensors will be tested isokinetically, at 60°/s, 120°/s, and 180°/s. The maximum joint torque and power at each joint will be compared between young and older adults using a 2(Age) x 3(Joint) ANOVA. Using 3D kinematics and ground reaction forces collected during walking trials, joint torques and powers will be calculated through inverse dynamics. Regression analyses will use the maximum joint powers and total work at each joint to determine the relationship between the strength and power decrements and the proportion of hip, knee, and ankle contributions to total work. All tests will use alpha <0.05.

GP98

Maternal Aerobic Exercise and DHA Levels during Pregnancy Influences Infant Heart Outcomes

Cody J. Strom[1,3], Kimberly Kew[2], Blake R. Rushing[2], Linda E. May[1,3,4], Christy Isler[4], Ed Newton[4]

[1]Department of Kinesiology, ECU

[2]Department of Chemistry, ECU

[3]School of Dental Medicine, ECU

[4]Department of Obstetrics & Gynecology, ECU

Infant heart rate(HR) and heart rate variability(HRV) are measurements used to estimate nervous system development and overall well-being of the fetus. Exercise during pregnancy is associated with improve infant HR and HRV. Similarly, DHA supplementation during pregnancy has also been shown to improve HR and HRV. However, there has not been any observation of the potential relationship between exercise intervention and maternal DHA levels on Infant HR and HRV.

PURPOSE: To determine the relationship between maternal exercise and plasma levels of DHA on infant nervous system development, estimated by measures of HR and HRV.

METHODS: Maternal plasma levels of DHA collected at 16 and 36 weeks of gestation were processed using solid phase extraction and analyzed using liquid chromatography/triple quadrupole mass spectrometry (LC/MS). Samples were analyzed from 3 exercising (>50min aerobic exercise, 3x week) and 2 non exercising pregnant women; average weekly METs were calculated based on standard MET values for each exercise activity. Infant HR and HRV were measured 1 month after birth. T-tests determined significance between groups; relationships between variables were tested with ANOVA and linear regression.

RESULTS: There were no significant differences at a p-value <0.05 between groups in infant HR (p=0.35, F=1.208) or 36 week plasma DHA levels (p=0.57, F=0.407). Average weekly METs were also analyzed between subjects. Regressions were determined between METs by Infant HR

(r<sup>2</sup>=0.312), 36 week plasma DHA levels by Infant HR (r<sup>2</sup>=0.156), and METs by 36 week plasma DHA levels (r<sup>2</sup>=0.029).

CONCLUSION: The current data suggest a relationship between exercise intervention and DHA have on infant HR. This is the first study to determine the amount of exercise and its influence on end of pregnancy DHA levels and infant HR. Additionally, this is the first study to directly measure plasma DHA levels and determine the influence on Infant HR. Further samples will be analyzed to confirm the relationship between exercise level, maternal DHA levels and infant outcomes.

GP99

Barriers to Healthy Eating in North Carolina-based Head Start Programs: Examination of Food and Beverage Practices

## Abstracts | Graduate Poster Presentations

Kristi Wilkerson, RD, LDN1, Kristina Bandy, BS1, Archana Hegde, PhD2, & Virginia C. Stage, PhD, RDN, LDN1

1Department of Nutrition Science, East Carolina University

2Department of Child Development and Family Relations, East Carolina University

USDA's Child and Adult Care Food Program (CACFP) serves 3.3 million children attending childcare centers and daycare homes each day. The program was established in 1968 with the goal of improving the quality and affordability of meals provided in childcare settings. Despite the existence of these guidelines, prior research has indicated children in CACFP-funded centers still consume excessive sugars and fats, and inadequate amounts of whole grains, fruits, and vegetables. Unfortunately, these studies have been limited to non-Head Start (HS) centers. Head Start programs are required to follow CACFP food and beverage guidelines, but may face more challenges related to funding and access to healthful foods and beverages. More research is needed to understand the quality of food/beverages currently served in HS, and the barriers programs face when trying to encourage healthy eating among the children they serve. The purpose of this cross-sectional study was to examine current food and beverage practices and barriers to healthy eating in North Carolina (NC)-based Head Start programs. HS-Health/Nutrition Coordinators (n=24), representing over 50 counties across NC, were recruited to participate in the study. Participants completed a 76-item online survey addressing mealtime practices, frequency of foods/beverages served, and beverage policies. Analyses were conducted using basic descriptives, Spearman's Rho Correlations, and Wilcoxin-signed rank tests. Current practices were compared to the new 2017 CACFP standards to assess quality of food/beverages served. Preliminary results demonstrated HS centers need to make improvements in their food and nutrition practices in order to align with new CACFP guidelines. However, HS programs in NC face barriers to encouraging healthy eating with the most significant challenges being costs associated with serving healthier meals/snacks, and lack of control over the types of foods when meals/snacks are delivered by outside foodservice providers. In April 2016, the first major revisions to the program were released, however, mandatory compliance is not required until the 2018-2019 school year. Future research should explore food/beverage quality and related barriers compared to these findings after the new CACFP standards have been fully implemented.

GP100

A Case Study of Virtual Reality Graded Exposure Therapy (VRGET) in Military Personnel with Post-Traumatic Stress Symptoms

Joseph Riddle (B.S.), Atticus Toriello, and Alexis Maxwell (B.S.), (Matthew Fish, Ph.D., LRT/CTRS, LPCA, BCB. Mentor), (Carmen Russoniello, Ph.D., LRT, LPC, BCB, BCN. Mentor)

According to the national census of 2014, there are 3.8 million disabled Veterans in the United States. Post-traumatic stress disorder (PTSD) is among the most disabling psychopathological conditions affecting veterans (Rothbaum et al., 1999). There is a growing need for non-pharmacological interventions as treatment options. The purpose of this study is to measure the physiological response in a subject with post-traumatic stress symptoms participating in a virtual reality combat simulation to determine if it has possible use as a modality for graded exposure therapy and biofeedback. Symptoms of PTSD are often intensified when the person is exposed to stimulus cues that resemble or symbolize the original trauma (Rizzo et al., 2009), like those facilitated through virtual reality. Additionally, in a 2012 study, McLay et al. reported that virtual reality exposure therapy could successfully decrease PTSD, depression, and anxiety scores in active duty service members with diagnosed combat-related PTSD. We propose that exposure to combat-related settings and stimuli in virtual reality will trigger post-traumatic symptoms and that the physiological response will decrease across multiple sessions of exposure. To test this hypothesis, we will conduct an individual case study consisting of three one-hour sessions of graded exposure therapy using a unity-based virtual reality software system. Heart Rate Variability (HRV) data and skin conductance (SC) analysis will be used to measure sympathetic and parasympathetic responses. The study method includes measurement in two-minute data collection segments consisting of five phases: baseline, virtual reality "safe zone" with non-stressful stimuli, non-guided relaxation period, virtual reality "danger zone" with stressful stimuli, and a final post baseline relaxation period. The first and following two sessions will be conducted every other day over the course of five days. Changes in HRV and SC will be measured during three sessions and compared through repeated measures analysis of variance (ANOVA) and correlations,  $\alpha=0.05$ , between variables using SPSS 24. Upon completion of this study, results should provide practitioners with additional quantifiable data to elevate the use of graded exposure therapy as an evidence-based practice. Practitioners could develop individualized graded therapy protocols using custom combat-related scenarios based on self-reported "triggers" for treatment of PTS symptoms.



## Abstracts | Graduate Poster Presentations

GP101

Effects of Visual Rehabilitation on Occupational Performance and Participation

Megan Green<sup>1</sup>, Ashley Watkins<sup>1</sup>, Kaitlin Wainwright<sup>1</sup>, Caroline Pray<sup>1</sup>, Jennifer Radloff, OTD, OTR/L, CDRS2

<sup>1</sup> Student, Department of Occupational Therapy, East Carolina University

<sup>2</sup> Faculty, Department of Occupational Therapy, East Carolina University

More than 2.4 million individuals acquire brain injuries (ABIs) each year, including traumatic brain injuries, strokes, aneurysm, brain tumors, vestibular dysfunction, and/or post-surgical complications resulting in anoxia or hypoxia (Ciuffreda & Kapoor, 2012). Some of the most common and lasting clinical consequences of ABI are visual scanning and perceptual disorders, characterized by problems with eye alignment, visual field, and visual attention. Such visual and perceptual deficits can be addressed by occupational therapy (OT), as they negatively impact participation in meaningful occupations and quality of life (Teasell & Hussein, 2016; Warren, 2009). However, limited research exists concerning the effectiveness of visual scanning retraining relating to occupational participation post-ABI. This study intends to compare the effectiveness of occupation-based intervention and preparatory intervention (Vision Coach intervention) for visual scanning retraining in clients with ABI.

Two case studies were conducted to compare the effectiveness of two visual impairment interventions. A randomized crossover design was used in which participants were randomly assigned to one of two intervention orders: Occupation-based intervention followed by Vision Coach intervention or Vision Coach intervention followed by occupation-based intervention. Each of these paths ended with a four-week period of treatment combining both Vision Coach and Occupation-based intervention in each session. The Test of Visual Perceptual Skills-4 (TVPS), the Assessment of Motor and Process Skills (AMPS), and Vision Coach were used as outcome measures. The results from this study will provide clients with visual scanning re-training to facilitate participation in meaningful occupations and inform the field of occupational therapy about effective visual retraining interventions for the ABI population.

Initial data analysis has yielded improvements in visual scanning speed and ongoing analysis will provide further evidence on the effect of visual rehabilitation on functional performance. An important hypothesis we wish to present at the Research and

Creative Achievement Week gleaned from the case studies is that both occupation-based and preparatory interventions provided benefits for each participant. Ongoing analysis will allow us to explore the hypothesis that use of these combined intervention methods will maximize visual scanning retraining within the field of OT.

\*Sources on poster

GP102

"The Isolation and Quantification of Metabolically Active Pharmaceutical Compounds in Drinking Water"

Ryan Christopher Coco

The use of personal care products and pharmaceutical chemicals, or PPCPs, is pervasive in modern society. According to 2002 survey data from the FDA, over 100 billion tablets of 200 milligram ibuprofen pills were sold in the United States alone. As a result, the existence of secondary pollutants derived from PPCPs is ubiquitous in surface water and waste water throughout the United States. Chronic, low concentration exposure to PPCPs is associated with health hazard threats to humans. For example, young and elderly people exposed to PPCPs may be at risk of hormonal disruption. Can detectable amounts of PPCPs be found in drainfields in North Carolina, and how do concentrations of PPCPs threaten not only human health but also industry around the world? Previous works have evaluated the health risk, economic influences and technological advancements, but no single paper has comprehensively evaluated all three to make suggestions for regulation of PPCPs. This research paper makes recommendations for regulations based on past research on the effects of PAHs on the human body. I carried out my research by compiling papers from many authors around the world, contacting researchers in the field of PPCPs, collecting water samples, isolating specific PPCPs and quantifying PPCPs through gas chromatography. This research paper is important because it makes suggestions for future regulations on human health.

GP103

The Relationship of Physical Activity and Motor Skills in Children Ages 3 – 5 Years Old: National Youth Fitness Survey

Aaron P. Wood<sup>1</sup>, Satomi Imai, PhD<sup>2</sup>, Amy Gross McMillan, PhD, PT<sup>3</sup>, Damon L. Swift, PhD<sup>1</sup>, Katrina D. DuBose, PhD<sup>1</sup>

<sup>1</sup> Department of Kinesiology, East Carolina University

## Abstracts | Graduate Poster Presentations

2 Department of Public Health, East Carolina University

3 Department of Physical Therapy, East Carolina University

**Purpose**The purpose of this study is to examine the relationship between physical activity (PA) and motor skills in children ages 3-5 years

**old.Methods**Secondary data analysis was performed using NHANES National Youth Fitness Survey (NNYFS) on children between 3–5 years of age. NNYFS collected data on 1,500 children (3-15 years) and of these 342 children were the appropriate age and had the variables of interest to this analysis. Collected measures that were used included the Computer Assisted PA questionnaire (PAQ), and overall motor quotient score from the Test of Gross Motor Development–Second Edition. The PAQ asked about engagement in PA and specific types of PA. Mean, standard deviation, and frequencies of descriptive variables were calculated. Regression analyses were used to determine the relationship between overall PA, different PA types, and motor quotient score, controlling for sex, race, and poverty index.**Results**Of the 342 (176 boys, and 166 girls) children that participated, 15% were African American, 52% Caucasian, 26% Hispanic, and 7% another race. PA participation over a 7-day period was separated into three categories, 0–3 days (8% all), 4–6 days (9% all), and 7 days (83% all). Significantly more boys (87%) than girls (80%) participated in PA over the past 7 days ( $p < 0.05$ ). The top activities children participated in the last 7 days included running (43%), playing outdoor games (35%), riding a bike (34%), playing active games (19%), and walking (17%). The average (SE) motor skill percentile of all participants was 50 (1.33) for locomotor, 34.83 (1.45) for object control, and 41.43 (1.36) for motor quotient. The number of days in which children participated in PA was not related to motor quotient score ( $p = 0.30$ ). The relationship between participation of specific PA in the past 7 days and total motor quotient score was also examined. The results indicated that not participating in certain PA types was related to a lower motor quotient score in the following activities: bike riding ( $\beta = -5.28$  (1.92),  $p = 0.0071$ ), scooter riding ( $\beta = -9.67$  (2.36),  $p < 0.001$ ), swimming ( $\beta = -4.04$  (1.03),  $p < 0.001$ ), and jumping on a trampoline ( $\beta = -7.38$  (2.91),  $p = 0.0125$ ).**Conclusion**The results show that a higher percentage of boys than girls met the recommendation of 7 days of PA participation. While the number of days children participated in PA was not related to motor skill scores, participation in specific PA types was related to a higher motor quotient score.

GP104

It's not only your classroom, learning is chaotic

Jessica Lynn McDonnell

**INTRODUCTION:** Fundamentally, motor control is the integration of sensory information both about the world and the current state of the body, to determine the appropriate set of muscle forces and joint activations needed to generate desired movements or actions. It requires a continuous cooperative interaction between the central nervous system and the musculo-skeletal system. Motor learning generally refers to increasing spatial and temporal accuracy of movements with practice. The present study examines the nature of motor control organization using overt behavioral changes that occur throughout the process of motor learning as determined through nonlinear measures.

**METHODS:** Subjects used two hand held force transducers to control a cursor displayed in a 2D virtual reality environment. Force produced with the left hand manipulated the cursor along the y-axis while the right hand controlled the cursor's trajectory along the x-axis. A target traced a preprogrammed path, providing real time visual simulation of cursor and target's position in space. Subjects performed 3 conditions: a left and right unimanual condition in which the target tracked linearly along respective axes, and a bimanual condition in which target traveled between the two axes and subject modulated force with both hands to maintain cursors position on target. For each condition subjects tracked the cursor's repetitive force pattern for 10 minutes.

**RESULTS:** Behavioral markers: EMG, force, and error were used to evaluate and quantify learning of the motor skill. Error measures derived from cursors deviation from target within trials and across conditions afforded insight into how the central nervous system interacts with the peripheral system. Analysis of entropy, a measure used to calculate chaos, indicated a dynamic learning process in which different strategies are explored until an 'optimal' one is discovered.

**DISCUSSION:** Variability within movement has emerged as a critical measure and is thought to be fundamental in understanding the nature of system organization. Variability of error in this study was calculated using the nonlinear measure of entropy. In this context entropy quantifies the randomness of position and velocity of the cursor about the target. A decrease in the entropy of error indicates a more decisive error.

## Abstracts | Graduate Poster Presentations

GP105

Understanding Influences of Preschool Children's Fruit and Vegetable Liking in a Low-Resource Population

Candace Underwood, [underwoodc13@students.ecu.edu](mailto:underwoodc13@students.ecu.edu), East Carolina University, Department of Nutrition Science, E 5th Street, Greenville, NC 27858, USA

Suzanne Goodell, PhD, [suzie\\_goodell@ncsu.edu](mailto:suzie_goodell@ncsu.edu), North Carolina State University, Department of Food, Bioprocessing & Nutrition Sciences, Campus Box 7624, Raleigh, NC 27695, USA

Archana Hedge, PhD, [hedgea@ecu.edu](mailto:hedgea@ecu.edu), East Carolina University, Department of Child Development and Family Relations, E 5th Street, Greenville, NC 27858, USA

Virginia Stage, PhD, [carrawaystagev@ecu.edu](mailto:carrawaystagev@ecu.edu), East Carolina University, Department of Nutrition Science, E 5th Street, Greenville, NC 27858, USA

Research indicates fruit and vegetable (FV) exposure can significantly influence liking and intake in young children. Literature has also shown children's sex may be a factor that influences liking of FVs. However, there is limited research on factors affecting children's liking in preschool aged children. The purpose of this secondary study was to determine if parent's reported exposure and children's sex are influential factors on young children's liking of FVs. Participants were recruited from six Head Start centers serving low-resource preschool children in the Raleigh-Durham metropolitan area. A total of 35 preschool- aged children (females, n= 19; males, n=16) were included in this study. Child reported liking was assessed using a validated pictorial method featuring 20 photographs of 10 common FV (corn cob, whole carrot, whole apple, whole strawberries, grapes, broccoli sprig, whole tomato, whole pear, whole unpeeled banana, whole orange). Each food was computed as a score by taking the average of each food's transformations. Scores were computed for individual foods, fruits, vegetables and combined FVs. Children rated their liking for individual FVs using a 5-point hedonic scale (super yummy to super yucky). Parents completed a survey assessing basic demographic information and their children's exposure to target FVs. Data was analyzed using basic descriptives, Spearman Rho Correlation, Wilcoxon Signed-rank Tests and Linear Regression. Spearman Rho Correlation was used to examine the association between children's reported liking and food score. Wilcoxon signed-rank test was used to determine the ranked differences between children's FV liking of FV based on sex. Data revealed that low-resource Head Start children's sex in central North Carolina does not influence their liking for FVs. The regression was not significant, indicating that sex

was not a significant predictor of liking when controlling for exposure. Research shows parental exposure to FVs increases children's liking of such foods, and girls have a greater liking of FVs than boys. This study did not reveal such data; therefore, additional research is needed to further understand how children's sex and parental exposure affect children's liking of FVs by exploring a larger sample.

GP106

Outcomes of a Formal Keyboarding Instruction Program on Keyboarding Skills of Kindergarten Through Fifth Grade Students With Disabilities

Sydney Branson

Keyboarding is an important skill for special education students to develop to enable their participation school activities. Students with disabilities commonly struggle with handwriting skills, which can lead to poor school performance and negative psychosocial consequences (Batorwicz, Missiuna, & Pollock, 2012). Fortunately, keyboarding can often be used as an alternative method of written expression and assignment completion for these students (Batorwicz, Missiuna, & Pollock, 2012). However, in order to develop efficient, and eventually automatic keyboarding skills, explicit keyboarding instruction is needed (Ashburner, Ziviani, & Pennington, 2012). Research considering the effects of keyboarding instruction on keyboarding skills of special education students have shown that children with disabilities can benefit from these programs, and with these programs, they can almost reach the keyboarding speed of their typically developing peers (Marom & Weintraub, 2015).

This research will compare the effectiveness of two different keyboarding instructional approaches, a structured curriculum, Keyboarding Without Tears®, and an unstructured keyboarding instruction approach, on elementary school students with disabilities' keyboarding speed (as measured by net

words per minute) and keyboarding technique. Pre- and post-test data were collected on students receiving the Keyboarding Without Tears® intervention at two experimental schools (N=117 across grades K-5) and at two control schools that used traditional keyboarding instruction (N=91 across grades K-5). Two-sample t-tests will be used to compare the changes in net words per minute (WPM) and keyboarding technique ratings between the control and experimental schools for students in each grade over one academic year. A repeated measures ANOVA will be used to show the overall trend in the dependent variables for students in each grade at each school. Preliminary

## Abstracts | Graduate Poster Presentations

analysis supports the use of the Keyboarding Without Tears<sup>®</sup> to improve net WPM and keyboarding technique for students with special education services.

GP107

Do Head Start Teachers in North Carolina Use Supportive Feeding Practices at Mealtimes with 3-5-year-old Low-Resource Children?

Kristina Bandy, BS1, Kristi Wilkerson, BS, RDN, LDN1, Archana Hedge, PhD, BK2, & Virginia C. Stage, PhD, RDN, LDN1

Children's eating behaviors are influenced by the mealtime environment. Early child educators (ECE) are encouraged to utilize practices supportive of children's healthy eating. Supportive feeding practices (SFP) include sitting with children during mealtime, role modeling, encouraging children to try new foods, providing nutrition education, and addressing children's hunger cues. Head Start (HS) aims to support SFP through policy; however, studies indicate the need for improvement regarding implementation of these policies. The purpose of this cross-sectional study was to explore feeding practices and policies in HS centers across North Carolina (NC). Health/Nutrition Coordinators from 52 NC-based HS organizations were invited to participate in this study. Participants (n=24) completed a 71-item online survey featuring questions on food/nutrition policies and perceived mealtime practices of teachers in their programs. All participants were female and had an average of 12 years teaching experience. Overall, Coordinators reported their ECE followed SFP at mealtime. All participants reported sitting with children during mealtime was a regular practice, 70.8% provide daily nutrition education during mealtime, 83.3% role model eating healthy foods, and 95.8% praise children for trying new foods. Non-SFPs were also reported, for example, less than half (45.8%) of Coordinators indicated ECEs address children's hunger before serving children second helpings and 37.5% of coordinators indicated teachers bring food from outside the center. When asked about commonly used approaches to training new teachers about feeding practices, 62.5% of coordinators indicated teachers attend a workshop or training session versus utilizing video-tapes, written guidelines, instruction from a more experienced teacher, or articles/books about feeding practices. Findings suggest most NC-based HS programs perceive they are generally utilizing supportive feeding practices with a few exceptions. For example, addressing hunger cues with children during mealtime is important to help children regulate their intake, yet results indicate several teachers do not practice this. Future research should use observational methods to explore the impact of ECE feeding policies and professional development strategies

on actual practice in the classroom, versus administrative perceptions, and the impact on child dietary behaviors.

GP108

Factors that Influence Rural Head Start Parental Engagement in Preventing Childhood Obesity

Amy Denise Lee1, Dara Forrest2, Archana Hegde1\*, Virginia Stage2\*

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

2Department of Nutrition Science, East Carolina University

Background: One of three low-income children between the ages of two and four were overweight or obese before their fifth birthday in 2009 (CDC, 2015). Children living in rural areas of the US are approximately 25% more likely to be overweight or obese than children in urban areas (Peters et al.,

2016). Head Start (HS), has been recognized as an essential place to begin addressing childhood obesity (Battista et al., 2014; Willette, 2007). It is important to extend opportunities to engage parents in child focused obesity prevention efforts.

Purpose: To explore the factors that influence parental engagement within one of NC's most rural Head Start county that is leading efforts on obesity prevention.

Methods: 15 semi-structured telephonic interviews were conducted between October 2017 - January 2018 with HS parents in one rural county in Eastern North Carolina. To be eligible parents were required to be able to speak and read English, and have a child between 4-5 years of age enrolled for a second year in the local HS program. Participants were recruited via flyers and HS site visits. Participants completed a demographic questionnaire at the beginning of the interview and listened to a brief summary at the end of the interview to confirm its accuracy. Each interview was recorded

and transcribed verbatim. Data was coded for recurring themes. Researchers used triangulation to test validity. Descriptive statistics were used to describe the participant characteristics.

Results: Researchers identified four recurring themes influencing parent engagement in childhood obesity prevention that emerged from the qualitative



## Abstracts | Graduate Poster Presentations

data analysis: healthcare professional-parent relationship, communication, health promotion, and scheduling conflicts.

Conclusion: Findings suggest a need to refocus on building and strengthening ongoing relationships with families. Developing new innovative and culturally responsive strategies to educate and empower parents to utilize health promotion skills that can lead to positive family health outcomes may be essential to engaging rural head start parents. Results will be used to inform the development of a comprehensive community-based parent education initiative, alongside Bertie County HS to actively engage parents as learners and teachers of health related behaviors.

GP109

Public Education, Health, and Positive Citizenship Behavior: A Scoping Review

Mackenzie C Brown

Craig M Becker, PhD

This scoping review examines the public education goal and mission, "To prepare people for citizenship in a democratic society". Over its history, public education has grown and adapted to changes in accordance with this ideal. Over this time, however, differences in the purpose of public education emerged between goals centered on the pursuit of happiness and goals focused on improvement of the common good. Research suggests converging the common good and pursuit of happiness ideals may be beneficial to the education system. This study, using a systematic framework to examine the literature, focused on factors that influenced school-aged children to self-regulate their behavior in classroom settings. Specifically, the relationship between self-regulation, academic performance, academic achievement, and citizenship behavior were mapped through incidence in the literature to denote past and current Education research trends. This review suggests citizenship behavior, in terms of civic engagement and participation, are not being measured currently in the literature. Precisely, self-regulation and academic achievement are not being measured longitudinally to understand their influence on citizenship behavior later in life. In addition, academic achievement, public education, and positive citizenship behavior may have the potential for improvement with better self-regulation. Implications for practice and further research are discussed.

GP110

"An Analysis of Beach Nourishment Projects Conducted by Local Governments in North Carolina"

Edward Frank Dembowski

One of the most valuable resources for coastal communities are healthy beaches that power local economies and help shelter them from storms. When gradual beach erosion narrows beaches and threatens oceanfront properties, local governments often conduct multimillion-dollar beach nourishment projects, which continue to leave the coastline vulnerable to severe erosion events such as storms. Coastal scientists have criticized this mitigation

strategy for not being a sustainable solution to beach erosion, often favoring the gradual retreat of buildings from the shoreline. However, public infrastructure and tax revenue from the oceanfront properties is greater than the cost to conduct the projects, so the cost-benefit analyses support beach nourishment. The oceanfront property owners typically benefit the most from the projects, and it is unclear how much the general public benefits, so the equitable source of funding is controversial. Further research is required to analyze the local governments' decision-making process, in order to assess the efficiency and prudence of major public investments into beach nourishment projects. Based on data collected through structured interviews with local government officials in North Carolina coastal communities, this presentation will employ an ethnographic decision tree model to diagram the criteria and constraints through which research participants navigate in their decision-making process. Specific attention will be placed on the criteria officials consider in the decision-making process, as the emic perspective is essential to understanding their decision-making. The constraints that are perceived to limit the options available to beach communities are fundamental to understanding why there is not more variety in the coastal erosion adaptation strategies. The analysis of these identified constraints may yield practical inferences into local government beach erosion mitigation policies.

keywords: local government, beach nourishment, coastal management, decision tree

GP111

Exploring Social Inequality at Petra through Dental Pathology

Alysha Justine Lieurance



## Abstracts | Graduate Poster Presentations

Megan Perry

Dental pathologies such as linear enamel hypoplasias (LEHs), periapical lesions, dental calculus and caries, and ante-mortem tooth loss (AMTL) can indicate physiological stress during childhood development as well as reflect biocultural markers of nutrition and oral infection. Combined, they provide a powerful indicator of differential access to resources and dietary variation. This research explores the frequencies of these pathologies in two samples from the ancient Nabataean capital city of Petra to illuminate their relationship to social stratification. The mortuary repertoire of Petra includes ornate monumental façade tombs surrounding the city center in addition to less elaborate shaft chamber tombs. Previous archaeological research explains these tomb variants as reflecting family groups of higher and lower social status, respectively. Statistical analysis of dental pathology frequencies in 654 teeth from the non-elite tombs and 232 teeth from the elite façade tombs identified statistically higher frequencies of dental calculus

( $\chi^2=29.750$ ,  $p<0.0001$ ) and LEHs ( $\chi^2=54.855$ ,  $p<0.0001$ ) in the elite façade tombs, and no differences in dental caries, periapical lesions and AMTL. Our data show that higher status individuals likely had greater access to cariogenic foods, perhaps fermentable carbohydrates such as figs, dates, and plums that proliferate the archaeological record. The higher frequency of LEHs suggests that the elite individuals more often experienced stress during childhood development. However, in reality more observations of LEHs point to a higher frequency of childhood stress survival. Unfortunately the limited subadult remains from both contexts hinders understanding the relationship between LEH frequencies and childhood morbidity and mortality.

GP112

Why Won't You Leave: An Evaluation of Employees' Willingness to Take Time Off

Shelby Akers<sup>1</sup>, Dr. Mark Bowler<sup>1</sup>

<sup>1</sup>Department of Psychology, East Carolina University

Presently, there is little empirical literature that considers the possible reasons as to why some employees seem more inclined than others to take advantage of their organization's leave benefits. This study aims to expand upon and explore employees' willingness or initiative to take leave based on various individual and organizational characteristics. The

individual characteristics believed to have an influence on this willingness and present in this research include perceived work stress, engagement, burnout, perceived gender inequality, and work-life balance. Additionally, organizational characteristics such as leadership/management support, coworker support, and job-demands resources model are each considered in how they may contribute to an employee determining their comfortability and willingness to take their allotted leave. When evaluating employees' willingness to take leave, sick leave, vacation leave, and leave included in the Family and Medical Leave Act are all collectively considered. This study will explore a possible model for predicting employees' willingness to take leave based on each of the aforementioned characteristics. Survey data collected through MTurk from approximately 300 working professionals will be analyzed to determine which and how much each of the identified characteristics play a role in an employee's willingness to take leave. The desired outcomes of this study are to give guidance and information to organizations on how to encourage employees to feel comfortable and willing to take their leave if and when it is needed. This study will also add to the limited research concerning employee leave benefits.

GP113

Examining the Relationships Between Supports for Youth Development and School Connectedness in a Police Athletic League After School Program

Katina Hilliard<sup>1</sup> and Dr. Clifton Watts<sup>1</sup>

<sup>1</sup>Department of Recreation and Leisure Studies, East Carolina University

For the past twenty years, research and practice in recreation and after school services have utilized the positive youth development (PYD) framework. PYD is guided by principles that emphasize investing in the youth through the promotion of developmental assets; it steers clear of past models that view youth as risks (Benson, Scales & Syvertsen, 2011). Internal assets are outcomes for youth that include commitment to learning, developing

positive values and a positive identity, and having social competency (Scales, Benson, Leffert & Blyth, 2000). Schools, after school and recreation programs affect internal assets by supporting external assets such as establishment of boundaries and expectations, empowerment of youth, constructive use of time, and support from family, peers, schools, neighbors, and other adults (Scales et al.). Staff practices related to supporting developmental assets fall into four categories: (a) safe environment (e.g., psychological and physical safety; (b)

## Abstracts | Graduate Poster Presentations

supportive environment (e.g., skill building, conflict resolution); (c) interaction (e.g., mentoring, fostering belonging); and (d) engagement (e.g., opportunities to plan and lead) (Smith et al., 2012). While there have been several studies of school-based after school programs, there is very little research on programs run under the Police Athletic League model. The current study seeks to investigate the following research questions: (1) to what extent do youth value and feel staff are enacting specific youth development practices in the PAL program? (2) what is the relationship between staff practices and connection to the PAL program? and (3) what is the relationship between connection to the PAL program and school connectedness? Data collection is set for March with analyses occurring shortly after. The study seeks to inform practices for programs beyond school-based models by identifying what staff do to add to youth's experiences in after school programs.

GP114

### WORKAHOLISM AND AFFECT: THE MODERATING ROLE OF MINDFULNESS

Gerald Bellows

Dr. Shahnaz Aziz (mentor/thesis committee chair)

The current study sought to examine the relationships between workaholism, mindfulness, and negative affect. Workaholism is compulsively working excessively hard and is related to detrimental outcomes to both the employee and the organization. Therefore, it is vital that researchers target dispositional driving forces of workaholism to help mitigate its potential harm. As such, the current study utilized self-report measures to study whether dispositional mindfulness had the ability to weaken the relationship between workaholism and negative affect. The sample consisted of working adults from various occupations and backgrounds. The results indicated that workaholism was positively correlated with negative affect, supporting previous research. Dispositional mindfulness was found to be negatively correlated with negative affect, and workaholism was found to be negatively correlated with dispositional mindfulness. The results also show that mindfulness moderated the relationship between workaholism and negative affect. Organizational implications, limitations, and future directions are discussed.

GP115

### Together We Can: Increase Couple Functioning for Low-SES Families

Lindsey Almond<sup>1</sup>, Eboni Baugh<sup>1</sup>, Jacquelyn Mallette<sup>1</sup>, Kate Taylor Harcourt<sup>1</sup>

<sup>1</sup>Department of Human Development and Family Science, East Carolina University

Relationship stability and satisfaction can be difficult to upkeep with life's daily stressors; one partner's perception of stress can influence the couple's communication (Zemp, Nussbeck, Cummings, & Bodenmann, 2017). The adapted Together We Can program is a relationship education program for parenting individuals. Together We Can focuses on strengthening relationships, for a variety of relationship types, within a low-SES population (Harcourt et al., 2017; Kirkland et al., 2011; Shirer et al., 2009). It is theory laden and is based off the framework of experiential learning theory, which states that individuals learn by changing their experiences (Kirkland et al., 2011). Many parenting programs are made for Caucasian, middle-class, married couples, with children under 5 years old (Bryan et al., 2006; Ooms & Wilson, 2004); many also do not include aspects of relationship education between the parenting couple.

The present study evaluates the program Together We Can by comparing a low-SES and minority sample with a middle to high-SES Caucasian sample. The authors desire to present the hypothesis at the Research and Creative Achievement Week that after engaging with the program, participants will improve their parenting self-efficacy, as well as have increased knowledge of communicating within their couple relationship. Specifically, the middle to high-SES Caucasian sample will start with higher levels and have lower levels of growth, while the low-SES minority sample will start with lower levels initially and higher levels of growth. Bronfenbrenner's ecological theory and the spillover hypothesis are used to address the effects of multiple influences on the couple and parent relationship.

In order to adequately explore the effects of Together We Can, we surveyed a sample of 26 participants. Eligibility criteria included being at least 18 years of age, an English speaker, and being either pregnant, a parent, or the caregiver of a child. The methodology used employs pre and post-tests to measure the effect of the program. The surveys include demographics and measures of relationship quality and parenting efficacy from the adapted Together We Can base study from the Georgia Cooperative Extension.

## Abstracts | Graduate Poster Presentations

GP116

An Investigation of the Impact of a Sustainability Coordinator

Shivani J Pandya<sup>1</sup>, Dr. Craig Becker<sup>2</sup>

<sup>1</sup>Department of Public Health, Brody School of Medicine

<sup>2</sup>Department of Health Education & Promotion, East Carolina University

Initiatives related to sustainability in Asheville, Charlotte, Raleigh, Durham, and Chapel Hill have enabled residential and employment growth, while decreasing overall city costs and lessening the use of natural resources. Sustainability coordinators are hired to manage and advise the local government on policies, programs, or initiatives that support these objectives by promoting local environmental, energy, economic, and social sustainability. Increased quality of life, improved economy, local business attraction, residential growth and an increase in wellness have also been hypothesized to be related efforts of the sustainability coordinator. This study investigates work completed in cities and organizations that have sustainability coordinators to assess the value of these coordinators. Our analysis will compare these factors in North Carolina cities who have or do not have sustainability coordinators. The analysis will explore implications of how this investment in sustainability has or has not provided a city or organization improvement. Although this investigation will evaluate financial concerns, the focus will be on overall life factors and wellness within the community. The data analysis is ongoing and results will be discussed within the conclusion of the article.

GP117

Does Interpersonal Conflict Management Influence the Current Relationship

Andra Anesha Glover

Interpersonal conflict management is a crucial part of a healthy romantic relationship. The ability to articulate appreciation or discontent with a partner and put bitter feelings aside when having a fight is needed to manage a balanced relationship. Some studies have assumed a link between conflict management and current relationship quality may be caused by the participants' agreeableness (Jensen-Campbell & Graziano, 2001). Using data gathered under Dr. Kate Taylor Harcourt, I will examine the link between these interpersonal conflict management skills and current relationship quality

based on self-report questionnaires. The questionnaire used a Likert scale to determine the degree that the participant identified with several statements related to both interpersonal conflict management skills and current relationship quality. While conflict in a relationship is generally seen as neither good nor bad, how the conflict is managed seems to have a large impact the quality of the relationship (Brett & Hafen, 2011; Aloia & Solomon, 2010). I hypothesize that the participants' answers on the interpersonal and conflict skills portion of the assessment will show a link to current relationship quality for the participants. The participants in this study were mostly previously incarcerated fathers and may demonstrate differences in this particular understudied population (Wildeman & Western, 2010). This research is valuable to enhance existing literature on the influence of conflict management skills and relationship quality with the focus of an understudied population.

GP118

"Sure I'll do that but the joke's on you." Trait Aggression and Malicious Compliance in the Workplace

Lauren Scanlan<sup>1</sup>, Dr. Mark Bowler<sup>1</sup>

<sup>1</sup>Department of Psychology, East Carolina University

Malicious compliance is a phenomenon that has not been substantially investigated in previous literature. It could be conceptualized as a subset of counterproductive work behavior that emphasizes an employee's willingness to purposefully follow assigned tasks and policies exactly as stated even with the knowledge that these behaviors will not result in desired goals. The present study seeks to draw data from willingness to engage in counterproductive work behaviors, trait aggression, which is a known precursor to counter productive work behavior (Bing et al., 2007), as well as organizational justice in order to predict willingness to engage in malicious compliance. Counterproductive work behaviors are deviant workplace behaviors that breach organizational norms and negatively target the organization, its employees, or both (Bennett & Robinson, 2000). Trait aggression is the natural predisposition of someone that determines his or her baseline aggressiveness across situational variables (Kalmoe, 2014; Barlett & Anderson, 2012). Organizational Justice is the employees' perception of equitable treatment with reference to outcomes, procedures, and interactions in the organization (Folger & Cropanzano, 1998; Greenberg, 1986). The aim of this research is to identify the antecedents of malicious compliance as well as potential correlates. The current study hypothesizes that the trait aggression interaction will be significant when predicting

## Abstracts | Graduate Poster Presentations

willingness to commit malicious compliance; organizational justice will be negatively correlated with predicting willingness to commit malicious compliance; and adding organizational justice will provide incremental validity to the model. The data will be collected via an anonymous online survey in hopes of maximizing the sample size as a larger sample will allow for regression analyses. Considering counterproductive work behaviors have outcomes such as absenteeism (Spector et al., 2006), lost revenue (Ho, 2012), and customer dissatisfaction (Hunter & Perry, 2014), discovering more about this untapped territory of behaviors could provide more information on employee deviance. Knowing where malicious compliance fits as a psychological construct in the larger network of counterproductive work behavior will allow for future research avenues. This will also allow practitioners apply the knowledge gained in this study to mitigate instances of malicious compliance in the workplace.

GP119

Early Literacy Within Pitt County: Perspectives From Community Stakeholders

Shawnice Aienna Johnson, Dr. Sheresa Blanchard, Kaitlyn Seay

Department of Human Development and Family Science, East Carolina University

Community stakeholders throughout Pitt County have come together to develop and implement various early literacy programs throughout many communities as a means to increase early literacy and school readiness. The purpose of this study is to gain the perspectives of Pitt County stakeholders regarding early literacy and school readiness for young children within the community. Results will give insight on the effectiveness of current early literacy programs, as well as, suggestions on way in which creating a culture of literacy throughout Pitt County can be achieved. Personal perceptions on the importance of early literacy and school readiness will also be shared.

GP120

IA prospective cohort study of patient portal use among primary caregivers of children with comorbidities

Gladys Ruby Alvarado Gonzalez  
Dr. Juhee Kim - Mentor

The HITECT Act, US Department of Health and Human services

(DHHS) has long emphasized the need for health information technology in healthcare. Despite advances in health and technology sector, North Carolina still ranks among the lowest states in the US to adopt patient portals, such as MyChart. Pediatrics patients who are proxy users present disproportionately low rates of patient portal adoption.<sup>1</sup> Improving a person's access to

their health records could lead to better communication and management of their disease.<sup>2</sup> When looking at North Carolina, the percentage of children ever diagnosed with ADHD is 14.6% which is larger than the US average of 11%. Asthma is also a very common condition that can cause disturbances

that could potentially increase ADHD symptoms and impulsivity.<sup>3</sup> Both conditions disproportionately affect low-income populations and minorities.<sup>4</sup> It is important to assess the challenges, specifically in rural NC, that caregivers might face when accessing the MyChart portal for their children.

With this in mind a prospective cohort study was designed to investigate whether primary caregivers of children with these comorbidities had different patient portal use than other caregivers. This study seeks to do several things. First, to determine if parents of children with serious conditions, like ADHD and asthma, will have more patient portal use than those with less severe conditions. Second, to see if changes in the child's health across time will motivate or deter use of the patient portal. Third, this study seeks to bridge the gap in knowledge about patient portal use in children, particularly with regards to comorbidity condition influencing patient portal use.

GP121

Using dental metric analysis to understand prehistoric population variability on the north carolina coastal plain

Kara Danielle Weidner

Megan Perry<sup>1</sup>

Randy Daniel<sup>1</sup>

Biodistance studies can quantify intra- and inter- population relatedness through non-metric and metric skeletal variables. In this study, dental metric traits of two linguistically distinct Late Woodland (AD 800-1650) populations, the Algonquian and Tuscarora-speaking groups within the North Carolina coastal regions were assessed to determine if presumed linguistic barriers led to a reduced gene flow. Previous research by

## Abstracts | Graduate Poster Presentations

Kakaliouras and Killgrove using cranial and dental non-metric traits identified few significant differences in frequencies of these traits between the Algonquian and Tuscarora, suggesting little genetic differentiation between the two groups. This research using the dental metrics of 164 Algonquian and 53 Tuscarora individuals found that the Tuscarora had significantly less variation in only the maxillary first molar buccal-lingual B-L measurement compared to the Algonquian and the combined samples (Levene's  $F=5.1127$ ,  $p=0.0070$ ), but otherwise identified no overall significant differences in variation (Van Valen  $F=0.053$ ,  $O=0.9947$ ). In addition, the only difference in mean dental measurements that existed between Algonquian and Tuscarora groups was the maxillary first molar B-L measurement ( $t=1.975$ ;  $p<0.001$ ). These results confirm those utilizing other cranial and dental non-metric traits, and indicate that genetic dissimilarity did not follow that of language variability. Furthermore, one site linguistically categorized as Tuscarora but which shows a mixture of Algonquian and Tuscarora culturally-affiliated artifacts, was indistinguishable from either group, further supporting genetic admixture regardless of linguistic or other cultural differences.

GP122

Future Flood Risk Perceptions Following Hurricane Matthew: A Study of Eastern North Carolinians

Samantha Connolly

Floods are one of the most dangerous weather-related natural disasters in the world. A flood event can develop quickly, and cause catastrophic damage to life and property. The manner in which messages are conveyed from officials to the public is a key factor in their perceptions of risk during a flood event. This study examines factors affecting flood risk perceptions in Eastern North Carolina following Hurricane Matthew. Prior research has shown that perception of risk, prior experience with flooding, communication from officials and resultant actions are related. However, research on these relationships has not been widely studied in rural flood-prone areas like Eastern North Carolina. This study utilizes a face-to-face survey of approximately 100 participants in three Eastern North Carolina counties. It is the goal to discover if flood risks are currently being perceived in a way that will elicit adequate preparation for future floods. This will ultimately shed light on how flood information is being communicated to Eastern North Carolina residents, and if improvements in communication need to be made to lessen the loss of life and property for future floods.

GP123

Outer Banks Tourists' Preferences, Sensitivities, and Environmental Perceptions: A Case Study of Cape Hatteras National Seashore

Logan McSherry

Tourism is the driving economic force for North Carolina's Outer Banks, attracting millions of visitors every year. However, through the combined effects of increased human activity and development, storms, sea level rise and climate change, portions of the island chain are disappearing. This study presents an index of perception, calculated from scores and responses to survey questions administered to visitors at Cape Hatteras National Seashore. This index is used to better understand why visitors choose the Outer Banks, how aware and concerned they are about environmental changes occurring there, and how that may affect their beach destination choice in the future. The relative sensitivity to seven environmental variables is considered and differences in perception among local and non-local beachgoers are compared. Of the 137 people surveyed, scenery and uncrowded beaches are the primary reasons for choosing the Outer Banks, followed closely by location and accessibility. Visitors appear to be generally conscious of the changing environment there, with a majority of respondents saying they were aware of environmental changes at the Outer Banks prior to being surveyed. However, only half of respondents indicate experiencing effects from these changes during their visit. As such, respondents expressed environmental changes as having little to no effect on their decision to return, with over 95% claiming they will still recommend the Outer Banks and revisit in the future. For many, the fact that the Outer Banks remains relatively undeveloped compared to other East Coast beaches constitutes enough reason to return in spite of other changes.

GP124

Stable Isotope Analysis of Childhood Diet at 1st Century B.C./A.D. Petra, Jordan

Mallory Elizabeth Provan<sup>1</sup>, Megan Perry<sup>1</sup>, Robert H. Tykot<sup>2</sup>

<sup>1</sup>Department of Anthropology, East Carolina University

<sup>2</sup>Department of Anthropology, University of South Florida

Investigations of diet and disease of the Nabataean capital city Petra have found that the adult residents suffered little from chronic infections or malnutrition and a diet consisting



## Abstracts | Graduate Poster Presentations

primarily of C3 sources. However, little is known of childhood health and nutrition in the population since few

remains of children have been recovered from excavated tombs. This study uses carbon and oxygen isotope ratios ( $\delta^{13}\text{C}$  and  $\delta^{18}\text{O}$ ) of dental enamel apatite in first molars ( $n=31$ ), first premolars ( $n=20$ ), and second molars ( $n=29$ ) to explore childhood diet and weaning patterns in a 1st century

B.C./A.D. sample from Petra. Dietary and trophic level changes, particularly those associated with weaning, should result in a decrease in mean  $\delta^{18}\text{O}$  values and a shift toward the adult bone apatite  $\delta^{13}\text{C}$  values across the M1, PM1, and M2 tooth classes.

In this case, the differences between tooth classes did not follow the expected pattern. A slight decrease in  $\delta^{13}\text{C}$  mean values occurs between M1 ( $\mu=-11.6$ ) and PM1 ( $\mu=-11.2$ ) (Wilcoxon  $Z=3.3131$ ,  $p=0.0017$ ), followed by no difference in M2 values ( $\mu=-11.3$ ). All tooth classes differed from the

adult bone value mean ( $\mu=12.9$ ) ( $p<0.0001$  in each case). The  $\delta^{18}\text{O}$  values show a similar pattern, with an initial decrease between PM1 and M1 means followed by an increase in M2 mean values. Thus, the expected shifts as children become less reliant on breastmilk and shift to solid foods do not appear in this sample. Immigrant children, with slightly divergent diets and water sources within the sample, could present a confounding factor.

GP125

Responses of NFL Owners to Players' Protests of Social Injustice

Alora Brackett

The NFL player protests during the 2016 and 2017 seasons are a new form of workplace protest in that the players are not protesting their employers, but rather social injustices they perceive in the country. This study uses a mixed methods approach to analyze the response of NFL owners in the week following a tweet made by the President. The study will qualitatively analyze the statements made by NFL owners at various points during player protest to identify prevalent themes, and to see if these themes changed following the tweet by the President. A quantitative analysis will examine the responses of owners using a variety of factors including the action taken, the racial composition of owners, managers, coaches, and team captains, television ratings, region of the country, and more. The goal is to contribute to the literature on social movements in general, and workplace protest specifically.

GP126

Site formation processes and assigning significance to submerged cultural sites

Tara Rae Van Niekerk

Documenting and interpreting site formation processes on submerged cultural resources is an important aspect of cultural resource management. These processes include the impacts of waves, tides, currents, sediment movement, and biological communities. Although managers document these processes as part of site condition inspections, there is little attention given to these factors in relation to assigning site significance. Significance status is driven by factors that include people's beliefs, the value that they assign to objects and the personal or professional benefits that they derive from any particular site. Therefore, the primary research question is whether cultural resources managers could and should evaluate submerged cultural sites, additionally, in terms of their ecosystem characteristics. A useful variable, is that the public are often more interested in the ecosystem a site like a shipwreck supports, than the actual ship and the history or example of material culture. Another example is that a submerged site that is vulnerable may be pro-actively prioritized for research or have public access restricted as part of management policy. A value assigned to a resource based on the benefits that public or professional researchers derive from a site is also a benefit that changes across time and space, and across different social and cultural groups. In order to analyse how managers, assign and apply significance status to submerged sites, this research will assess historic sites listed on the National Register of Historic Places, as well as those nominated as eligible by local communities. For the purpose of this poster, the research will look beyond traditional nomination criteria A to D and evaluate the way in which significance has been attributed to sites based on predefined criteria that would include environmental variables.

GP127

Focus groups with parents: What does it mean to be "healthy?"

Katharine Didericksen

Erin Sesemann

Amy Lee

Sarah Calhoun Padgett

Human Development and Family Science

East Carolina University

## Abstracts | Graduate Poster Presentations

In the United States (US), obesity is threatening children, adults, and society with a steady 17% of youth and over a third (36.5%) of the US adult population experiencing obesity (Ogden, Carroll, Fryar, & Flegal, 2015). The symptoms of obesity itself (e.g., joint pain, sleep apnea) as well as the common comorbid health conditions (e.g., heart disease, high blood pressure; Must et al., 1999) both contribute to its threat. Furthermore, Engel (1978) noted that many biomedical illnesses have psychosocial components that impact people's health (e.g., depression and anxiety; Zhao, Ford, Dhingra, Li, Strine, & Mokdad; 2009). This leads to society spending an estimated \$147 billion annually in the US on the treatment of an obesity related health concern (Finkelstein, Trogon, Cohen, & Dietz, 2009). Thus, it is imperative to intervene in obesity for the health and stability of children, adults, and society.

Researchers have turned to family-based interventions for child obesity and Tilson, McBride, and Brouwer (2005) suggested that family-based interventions could be beneficial for the parents too due to the bidirectional nature of relationships—particularly, adult-child relationships. As a result, working with families to intervene in obesity has the potential help both children and the parents. Additionally, obesity disproportionately affects low-income communities and those who belong to ethnic/racial minorities (Fontaine, Redden, Want, Westfall, & Allison, 2003; Singh, Kogan, Van Dyck, & Siahpush, 2008), therefore, it is essential to specifically examine the risks and protective factors within these populations. The present study sought to better understand how to support the health of low-income families within the communities of Eastern North Carolina by collaborating with a community partner, the Food Bank of Central & Eastern North Carolina. A series of focus groups were conducted with the parents of children who attended the Kid's Café, a program that offers children who are "at risk of hunger" (foodbankcenc.org) opportunities for tutoring, mentoring, nutritional education and nutritious meals. The themes that emerged from the interviews are important to present at the Research and Creative Achievement Week because they will help address the public health crisis of obesity through informing community-based professionals as well as researchers about the lived experiences of low-income families as they relate to healthy living.

GP128

Operationalizing Frequent Emergency Department Use: A Systematic Review

Jessica M. Goodman & Angela L. Lamson

Medical Family Therapy PhD Program

Department of Human Development and Family Science

Frequent emergency department (ED) users have been the focus of media attention, clinical intervention, research, and policy discussions, but it remains unclear whether assumptions about this population are empirically supported. Understanding this population is complex, as frequent ED users are a heterogeneous group, with greater healthcare needs and utilization than other ED users across the continuum of care. The way in which frequent ED use is defined informs research design, types of interventions, and healthcare policies. As such, the purpose of this study is to (a) evaluate the existing definitions of frequent ED utilization and (b) identify the evidence used to support the existing definitions. General systems theory serves as the framework for this study. This systematic review followed guidelines suggested by the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) statement. Two researchers performed reviews of titles, abstracts, and full text independently to establish interrater reliability. One-hundred sixty-two articles met full text criteria and were included in the analysis. Findings indicate that most (97%) articles use only one unit to operationalize frequent ED use (i.e. number of visits to the ED), and many (45.1%) provide no justification for the definition used in their study. Only four of the 162 articles (2.5%) provide empirical evidence for the selection of their criteria. This review highlights the fact that current definitions of frequent ED utilization do not take into consideration systemic factors associated with use and lack theoretical or empirical foundation. Future research and clinical implications are also discussed. Future research should focus on creating a holistic, systemic understanding of the individuals that frequently utilize the ED across time, identifying distinctive subgroups of patients through consideration of as many systemic factors (e.g. demographics, diagnosis, etc.) as possible. Until an empirically-based systemic understanding of frequent ED use is available, clinical providers should employ a systemic lens when interpreting ED utilization, and consider factors such as diagnosis and symptom severity, social supports, and other biopsychosocial factors when contemplating appropriate goals for a patient. Finally, providers should consider whether patients are getting the appropriate care for their needs given all these factors, rather than if they are making too many visits.

GP129

Let's Talk About Stress: Exploring Physiological Arousal While Discussing Relationship Problems

Braden J. Brown<sup>1</sup>, Lauren Rainone<sup>2</sup>, Jakob F. Jensen<sup>1</sup>, Matthew Fish<sup>3</sup>

<sup>1</sup>Department of Human Development and Family Science, East Carolina University

<sup>2</sup>Department of Psychology, East Carolina University

## Abstracts | Graduate Poster Presentations

3Department of Recreation and Leisure Studies

Given that conflict with one's romantic partner is inevitable (Zeidner & Kloda, 2013), partners often seek support from friends when facing romantic challenges (Helms, Crouter, & McHale, 2003). Prior research indicates that talking to a friend about relationship problems has both advantages and disadvantages (Helms et al., 2003; Keneski et al., 2017). Some of the benefits may include gaining a new perspective, obtaining social support, and building communication skills, so long as these conversations do not replace talking with one's partner (Jensen & Rauer, 2015; Proulx et al., 2004). Researchers have also highlighted that gender may play a role, given that females are socialized to be more expressive, whereas males are often discouraged from sharing interpersonal problems with others (Brown, 2012). Although researchers have highlighted links between romantic relationship communication and psychophysiological distress (i.e., heart rate, skin conductance), no research has assessed changes in physiological stress when speaking with friends about romantic challenges. The aim of this study was to explore if gender plays a role in the physiological distress—measured by galvanic skin response (GSR), heart rate (HRT), and respiration (RSP)—of partners when talking about romantic problems with partners and friends.

To answer our research question, we examined mean differences by gender to determine whether females ( $n = 71$ ) or males ( $n = 71$ ) were more distressed when engaging in talks with partners and friends. Results revealed that at baseline, males ( $M = 2.15$ ) had higher GSR scores than females ( $M = 1.45$ ),  $t(62) = 3.87$ ,  $p < .001$ ,  $d = .49$ . Conversely, females ( $M = 83.97$ ) had higher HRT scores than males ( $M = 75.82$ ) at baseline,  $t(69) =$

$3.67$ ,  $p < .001$ ,  $d = .44$ . Moreover, females ( $M = 17.69$ ) had greater RSP rates than their male counterparts ( $M = 15.81$ ) at baseline,  $t(69) = 2.84$ ,  $p < .001$ ,  $d = .34$ . Next, when examining gender differences during the partner conversation task, males ( $M = 3.22$ ) were observed to have greater GSR scores than females ( $M = 2.24$ ),  $t(62) = 3.87$ ,  $p < .001$ ,  $d = .52$ . Alternatively, females ( $M = 91.76$ ) had greater HRT scores than males ( $M = 82.29$ ) during the partner task,  $t(67) = 4.66$ ,  $p < .001$ ,  $d = .57$ . Finally, during the friend task, males ( $M = 3.68$ ) had greater GSR scores than females ( $M = 2.61$ ),  $t(66) = 4.26$ ,  $p < .001$ ,  $d = .52$ . Conversely, females ( $M = 91.96$ ) had greater HRT scores than males ( $M = 83.95$ ),  $t(68) = 3.69$ ,  $p < .001$ ,  $d = .44$ .

GP130

The Association between Poor Quality Sleep, Daytime Sleepiness, and Eating Behaviors among College Students: An Ecological Momentary Assessment

Emily P. Midgette, BA, Matthew C. Whited, PhD, Jordan Ellis, MA, J. Taylor Freeman, MA, Ansley Taylor Corson, MA, Eliza

131 | RCAW 2018

Varju, Ashley Edwards Department of Psychology, East Carolina University

**Introduction:** Sleep disturbance and daytime sleepiness is a common problem among college students, with 73% reporting at least occasional sleep difficulties and 50% reporting difficulty with alertness throughout the day. Lack of sleep increases the brain's reactivity to rewarding stimuli; therefore, it is possible that individuals with poor quality sleep will be more sensitive to the hedonic aspects of the food environment. Increased susceptibility to environmental food cues could result in overeating and impair one's ability to make healthy food choices. Perceived stress could also play a role. Investigating the poorly understood factors that influence reward-based eating is important for the development of interventions designed to improve college student health.

**Method:** Ecological momentary assessment was used to assess perceived sleep quality, daytime sleepiness, stress levels, and eating behaviors as experienced in-the-moment, using a smartphone-based EMA application. Participants ( $N = 150$ ) were asked to respond to questions regarding their subjective sleep quality each morning upon awakening for 7 days. Daytime sleepiness, level of stress, eating behaviors, and eating-related thoughts were assessed twice daily (afternoon and evening). This technique allows for assessing eating behavior over one full week to compare experienced eating behavior across day-to-day subjective sleep quality.

**Results:** Regression analyses were used to examine the mediating effect of stress on the relationship between subjective sleep quality and eating behavior throughout the day. After accounting for stress, results indicated that difficulty staying asleep ( $b = -0.26$ ,  $SE = 0.10$ ,  $p < 0.05$ ), sleep duration ( $b = 0.18$ ,  $SE = 0.05$ ,  $p < 0.05$ ), sleep latency ( $b = -0.15$ ,  $SE = 0.07$ ,  $p < 0.05$ ), restfulness ( $b = 0.34$ ,  $SE = 0.12$ ,  $p < 0.05$ ), and daytime sleepiness ( $b = -0.65$ ,  $SE = 0.13$ ,  $p < 0.05$ ) were significant predictors of binge eating behaviors (e.g. overeating, feeling out of control while eating). Daytime sleepiness was also a significant predictor of the temptation to eat good tasting, high-calorie foods ( $b = -0.61$ ,  $SE = 0.18$ ,  $p < 0.05$ ).

**Discussion:** These results suggest that factors related to poor quality sleep may influence the maintenance of unhealthy eating behaviors among college students, partially due to perceived stress. Future studies should seek to identify the types of foods eaten, and factors that students experience as most determinative in their food choices.

GP131

Mindfulness and Self-Compassion as Protective Factors in Psychological Well-being

Erin Haley, Erin McCullen, Christyn Dolbier PhD

Mindfulness and self-compassion training have been shown to

## Abstracts | Graduate Poster Presentations

have several benefits, such as enhanced well-being and adaptive psychological functioning for a variety of populations (Neff et al., 2015). Mindfulness involves non-judgmental awareness of thoughts, feelings, or events as they unfold in the present moment, whereas self-compassion is defined as “extending compassion to oneself in instances of perceived inadequacy, failure, or general suffering” (Neff, 2003a). While the benefits of both mindfulness and self-compassion have been demonstrated in numerous studies, less is understood about how these complementary constructs uniquely contribute to psychological health (Neff et al., 2015). The present study seeks to address this gap in existing research to better understand the unique roles of both mindfulness and self-compassion as mechanisms of psychological health in a large college student sample. Specifically, the study will examine how dispositional levels of mindfulness and self-compassion may differ or function similarly across various psychological disorders, symptom severity, and psychological vulnerabilities. This will be achieved through a web-based survey containing several self-report measures. Up to 500 East Carolina University college students are expected to participate. Measures will assess dispositional mindfulness and self-compassion, forms of psychological symptomology such as anxiety, depression, disordered eating behavior and post-traumatic stress disorder symptoms, and lastly, adverse childhood experiences and stressful or traumatic life events. In addition to an exploration of these variables, an important hypothesis that we wish to present at the Research and Creative Achievement Week is the possibility that mindfulness and self-compassion will mediate and/or moderate relationships between adverse life experiences and psychological symptoms. We hope that results will elucidate how these constructs may uniquely protect against psychological symptomology, and subsequently inform tailored delivery of mindfulness and/or self-compassion interventions for different populations.

GP132

A Reaction-Diffusion Model for Market Fluctuations - A Relation between Price Change and Traded Volumes

Steven Yuvan

Dr. Martin Bier

A simple reaction-diffusion model is employed to characterize the relationship between buyer and seller initiated trading and their subsequent impact on stock price. This approach suggests that the connection between trading and price change is an intrinsic property of the system, as opposed to the more common explanation, that it results from complicated stratagems employed by all of the individual actors independently. In addition to describing this model, proposed in original form by Bak et al (P. Bak, M. Paczuski, and M. Shubik, Physica A 246 (1997) 430-453) to describe market dynamics, a new analytic derivation is presented which is robust to many of the further

modifications made to the original model. Finally the model itself is substantiated by comparison of computer simulation to data retrieved for bond markets in the real world, both of which exhibit the expected relation between trading and price change.

GP133

Sea-Level Rise: Risks to Cultural Heritage Sites

Matthew Harrup

Coastal Resource Management Program

East Carolina University

Rising sea levels pose a risk to coastal archaeological sites worldwide. Public land managers are tasked with managing these cultural resources and are concerned with which sites will be affected, which sites will need to have these impacts mitigated, and what will be the result of geomorphological processes on the remaining sites. North Carolina has not adequately addressed these questions despite having recorded hundreds of important cultural heritage sites along its coast. In this study, at-risk sites will be evaluated in the region south of Cape Hatteras, North Carolina, and will be organized by location, risk, and significance in order to inform policy on how this resource should be managed. The North Carolina Office of State Archaeology is providing spatial data on the location and current determinations for significance (eligibility for preservation according to the National Historic Preservation Act). These sites will be analyzed using remote sensing, plotted onto digital elevation models, and organized by the aforementioned criteria. A single site will be selected for further geomorphological analysis. The creation of a universal, accessible database for at-risk coastal archaeological sites and information on geomorphological processes will assist the North Carolina Office of State Archaeology in developing policies for managing these sites, including future environmental reviews and resource allocation.

GP134

The Impact of the Multiethnic Placement Agreement (MEPA) on Foster Families and Their Communication Environment

Jaquelin Hillary Dodge Evans

Mentor: Sachiyo Shearman

Foster care services were privatized in 1997, despite outcry from professionals such as individuals in the Department of Social Services. Since the privatization of foster care, state regulation (such as the multiethnic placement agreement) has heavily influenced placement opportunities for children based



## Abstracts | Graduate Poster Presentations

on culture. The Multiethnic Placement Agreement intended to protect ethnic minorities from not being placed in a foster home due to cultural-matching. While well intentioned, the regulation reads to prevent any child from placement with a foster family due to cultural-matching. Previous research projects identified placement disruption is consistently the result of child behaviors during crisis events (Taylor, & McQuillan, 2014). Similar research projects have identified Foster Parents are not adequately trained to resolve crisis situations (Wang et al., 2016). The crisis response training available to Foster Parents rarely teach Foster Parents to address crises in a culturally appropriate context. These level II residential foster care services require training to circumvent limitations in maintaining culturally diverse placements while increasing the frequency of diverse placements. This research project examined what MEPA contributed to the foster care services through Foster Parent surveys and Case Manager Interviews. The analysis used both qualitative and quantitative data and reported on approximately 10 foster parents responses as well as 4 interviews. The themes in both the survey and interviews were analyzed for consistency, and how it impacted the potential placements. The results indicated potential benefits for further training and support are needed for foster parents to serve children and adolescents who did not identify as heterosexual.

Keywords: MEPA, Foster care, Cultural competency, Level II Residential

GP135

An Evaluation of Assessment Center Exercise Order Effects

Randy J. Knebel, Mark C. Bowler, Jennifer L. Bowler, Alexander M. Schoemann

Department of Psychology, East Carolina University

This study investigated the effects of assessment center (AC) exercise order presentation on dimension performance ratings. Although limited, previous research on this matter has led to the conclusion that the effects of exercise order presentation on post-exercise dimension ratings (PEDRs) were of little concern. Using data collected from a developmental AC, the authors examined mean differences in PEDRs based on the presentation order of different exercises – two one-on-one role-play exercises and a leaderless group discussion. Overall, significant mean differences in PEDRs were found to exist in a pattern that was supportive of a priori expectations based on priming theory. Effect size estimates of the differences in PEDRs ranged from small to large and are provided along with the proportion of variance in PEDRs explained by exercise order arrangement. Implications of the results on the assessment center validity paradox and overall assessment center functioning are discussed along with potential limitations and suggestions for future research.

GP136

A Grounded Theory Examination of the Experiences of Families of Individuals with Intellectual Disability across the Lifespan

Natalie M. Richardson<sup>1</sup>, Kami L. Gallus<sup>2</sup>, & Jennifer L. Jones<sup>2</sup>

<sup>1</sup>Dept. of Human Development and Family Science, East Carolina University

<sup>2</sup>Dept. of Human Development and Family Science, Oklahoma State University

Special thanks to my research mentor, Dr. Angela Lamson<sup>1</sup>

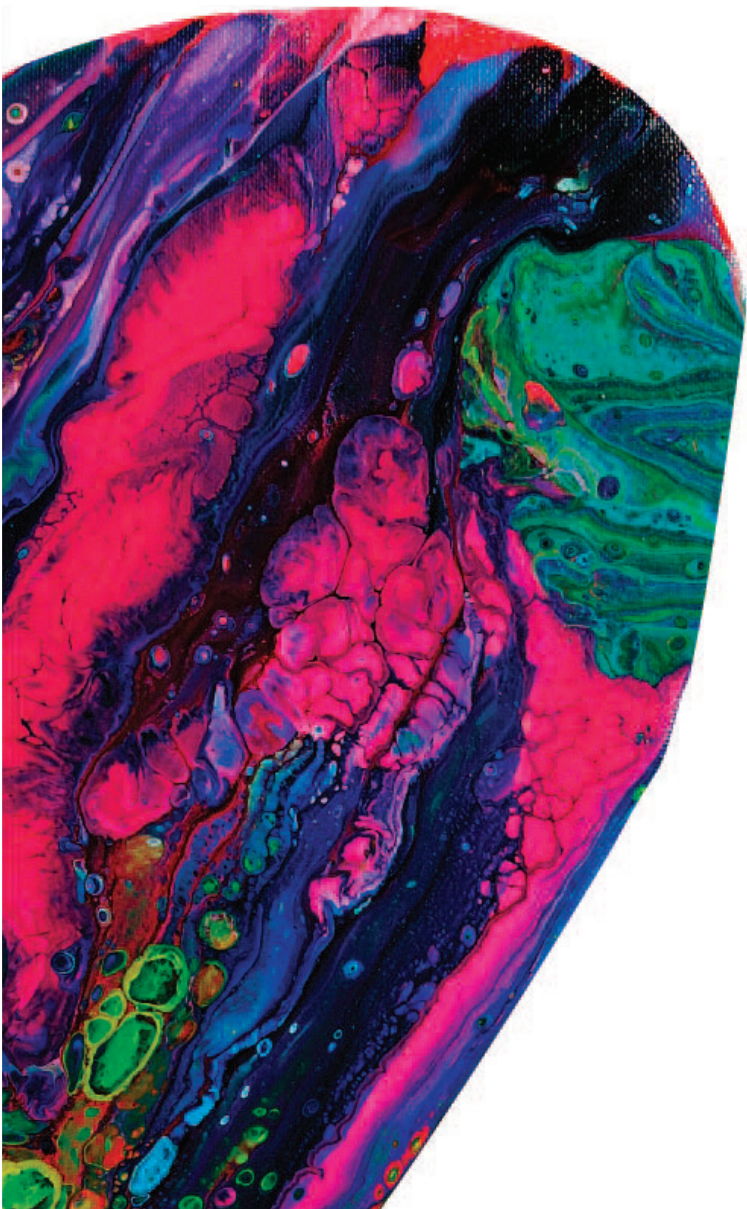
Families are a valuable resource for individuals with intellectual disability (ID) and are uniquely influenced by ongoing societal and policy changes. However, the experiences of such families are often overlooked. The services and supports that states provide are typically designed exclusively for the individual with ID, leaving family members with limited support of their own. In order to better support the needs of such families, an understanding of common family processes across the life course, specifically during times of family stress and transition, was necessary. To address the gaps in the

literature, the current study explored the unique patterns of stress and coping of family members of adults with ID in order gain a better understanding of their unique experiences from a family systems perspective. Using grounded theory methodology, the current study explored the experiences across the lifespan of parents and siblings of adults with ID who experienced not only the institutionalization of their relative but also, years later, state-mandated deinstitutionalization. Participants were recruited through convenience sampling, and nineteen semi-structured interviews were conducted with a total sample of 23 family members. An in-depth, multi-step analysis revealed five common categories of intra- and interpersonal processes shared among family members that took place during difficult transition periods across the lifespan: (a) ambiguous loss, (b) ambiguous roles, (c) ambiguous futures, (d) ambiguous emotions, and (e) ambiguous coping. A theoretical model was developed to represent the ongoing interrelatedness between these experiences of family members over time. The current presentation will first review previous literature and historical trends of families of individuals with ID, describe the utilized grounded theory methodology, and introduce the theoretical model. Additionally, the presentation will highlight the importance of acknowledging the interconnectedness of family emotional processes and the ambiguity associated with such experiences for families as an important step toward providing appropriate supports for today's families facing their own unique transitions. For professionals of the intra- and interpersonal experiences many families of individuals with ID face within a lifetime and provide a better



# Abstracts | Graduate Poster Presentations

understanding of the unique challenges helping professionals may endure when working with family members of individuals with ID.



## Abstracts | Graduate Online Presentations

GON1

Wake Kids Move!: An Advocacy Plan for Increasing Physical Activity in Wake County Schools

Maria Michele Bruzzo

School of Communication, East Carolina University

Childhood obesity is a growing problem in the U.S. According to the CDC (2017), one in five school aged children is obese. In Wake County, NC, that number is even higher at 36.5%. Childhood obesity has many negative health impacts including higher risk for chronic health problems such as type 2 diabetes, higher likelihood of being a victim of bullying, increased risk of depression and mental health issues, as well as being more likely to miss school. Many experts believe that school based programs can be effective at lowering the childhood obesity rates. Currently in North Carolina, there is only a physical education (PE) requirement for high school students; PE and recess are not required for younger students. Due to a recently passed law regarding class size mandates, physical education programs are among some that are being cut. The goal of Wake Kids Move! is to advocate to the Wake County School Board to implement a policy that requires students of all ages to participate in physical education and to implement a Comprehensive School Physical Activity Program (CSPAP) program for all Wake County schools.

GON2

Combating Food Deserts with Corner Stores in Eastern North Carolina: An Exploratory Study

Sara Wingate

The purpose of this exploratory study is to improve access to, and increase consumption of fresh and healthy food options in eastern North Carolina communities, which are located in food deserts lacking the ability to access larger grocery establishments. Food deserts are areas with poor access to affordable fruits, vegetables, whole grains, low-fat dairy products and other essential nutritional items that make up a healthy and balanced diet (CDC, 2017). Evidence suggest that people who reside in food desert areas sometimes have an overabundance of fast food chains, which sell cheap and highly processed foods. Such establishments contribute to higher obesity rates and chronic diseases, which more commonly appear in food desert communities as a result (Food Empowerments Project, 2017). In order to support those communities and encourage healthier food options, this

exploratory study will focus on creating a multi-dimensional framework campaign. Through this exploratory study, the implementation of the healthy corner store campaign can provide positive influence and increased awareness on the availability and affordability of fresh and healthy food options within federally-recognized food desert areas in eastern North Carolina.

GON3

Student-Teacher Book-Talks and Reading Motivation

Kayla Jean Hacker

This is an action research project proposal, which seeks to analyze the impact of student-teacher book-talks on reading motivation. The research is built on Vygotsky's theory that learning is social and current research that demonstrates the impact of student book discussions on reading motivation. The fifteen students participating in this intervention are in 2nd Grade at a rural, Title I K-2 elementary school. This project will begin with student reading interest surveys that will be used as both the pre- and post-test and administered to each student individually. As an intervention, students will meet with the teacher twice each week for 3-5 minutes to carry out a one-on-one book-talk. During this book-talk, the student and teacher will discuss various topics such as how they feel about reading, what motivates them to read, if they have an appropriate book, what they do when they read, and so forth. This intervention will last for 6 weeks. Students will complete a self-evaluation of their independent reading time during the course of the intervention, which will work as one form of data. The researcher will take notes about the book-talks and student reading engagement behaviors during the course of the intervention to serve as another data point. All data will be analyzed for correlating patterns in order to determine the success of the intervention on reading motivation.

GON4

Examining the Impact of the Hidden Curriculum on First Year Medical Students: a quantitative approach

Christopher S. Thomas, M.S.1, Jill M. Sutton, M.D.2

1.Brody School of Medicine at East Carolina University

2.Department of Obstetrics and Gynecology, Brody School of Medicine

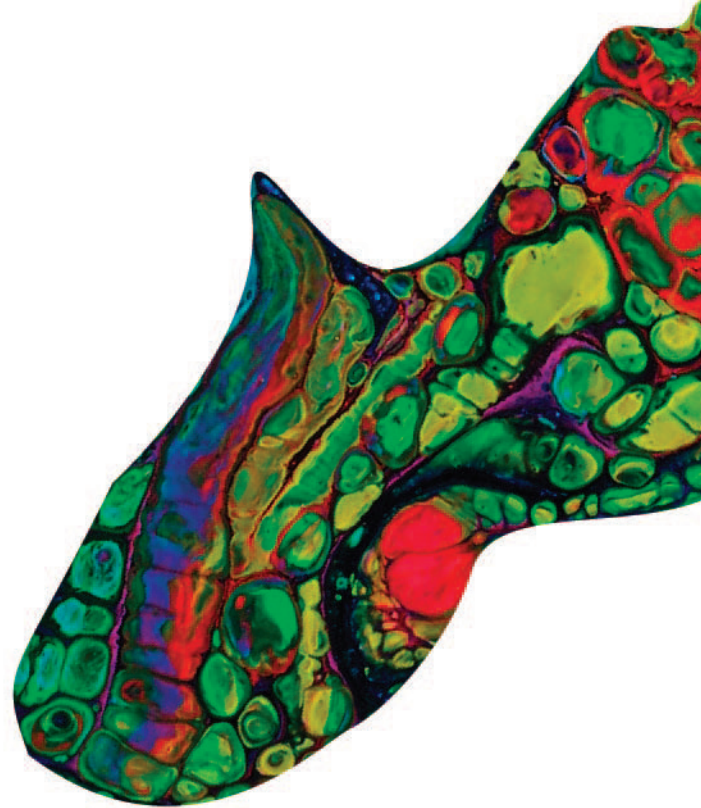
## Abstracts | Graduate Online Presentations

**Background:** The hidden curriculum can be defined as anything learned, but not implicitly taught. A review of the literature yields extensive research into how the hidden curriculum effects Graduate Medical Education and clinical medical students, however little research has been done to identify the effects of the hidden curriculum on pre-clinical medical students and incoming medical students. This study aims to examine the effects of the hidden curriculum on first year medical students, specifically the effects on students' perception of physicians, patients, and medical specialties.

**Methods:** The protocol and procedures of this study were approved by the University Medical Center IRB. All participants were informed about the purposes and the methods of the research prior to their participation. As part of the first-year medical student orientation, a lecture describing the hidden curriculum and its application to medical education was given. An optional anonymous pre-/post- survey using Likert Scale responses was given before and after this lecture. This quantitative data was analyzed for differences in the pre- and post- survey responses.

**Results:** Prior to learning about the hidden curriculum during the first-year medical student orientation, 13.23%, 19.12%, and 17.65% of students either "somewhat" or "strongly" agreed that the hidden curriculum had impacted their perception of physicians, patients, and medical specialties, respectively. After the lecture defining the hidden curriculum and exploring its application to medical education, 83.72%, 81.40%, and 83.72% of students either "somewhat" or "strongly" agreed that the hidden curriculum had impacted their perception of physicians, patients, and medical specialties, respectively. Students reported these influences have come in the forms of media, previous clinical experiences, witnessed patient care, etc.

**Conclusion:** Entering medical students believe they have been immune to the hidden curriculum prior to matriculation into medical school. However, once the hidden curriculum is thoroughly explained students realize their views of physicians, patients, and medical specialties have been molded by the hidden curriculum even before starting medical school. Modern undergraduate medical education curricula should aim to define and explain the hidden curriculum early in the pre-clinical years in order to allow students to confront bias and unwanted influences, even in the classroom setting.



## Abstracts | Post Doctoral Scholar Presentations

PD1

Interleukin-6 Trans-Signaling in Response to Acute Myocardial Infarction in Male BALB/c Mice

Nathan A. Holland<sup>1</sup>, Patti R. Shaver<sup>1</sup>, Lisandra E. de Castro Brás<sup>1</sup>, Robert M. Lust<sup>1</sup>, Christopher J. Wingard<sup>1,2</sup>, and David A. Tulis<sup>1</sup>.

<sup>1</sup> Department of Physiology, Brody School of Medicine, East Carolina University, NC, 27834.

<sup>2</sup>Department of Physical Therapy, Lansing School of Nursing & Health Sciences, Bellarmine University, Louisville, KY, 40205

Interleukin-6 (IL-6) is a pleiotropic cytokine with both pro- and anti-inflammatory effects that have long been associated with cardiovascular disease (CVD). Despite this long-standing association between IL-6 and CVD, the role of IL-6 in influencing the pathogenesis or severity of CVD, notably acute myocardial infarction (AMI), remains unclear. Classically, IL-6 has been thought to mediate its effects directly through an interaction with a membrane-bound IL-6 receptor on populations of leukocytes, as well as via induction of acute phase response proteins via hepatocytes. Over the past decade, the identification of an IL-6 soluble receptor (sIL-6R) has reinvigorated investigations into the role of IL-6 in CVD, mainly via the trans-signaling mechanism. Trans-signaling allows IL-6 to induce signal transduction in cells that do not natively express the membrane-bound IL-6 receptor, ultimately activating signal transducer and activator of transcription 3 (STAT3) mediating gene expression and promoting cardioprotection. Furthermore, IL-6 trans-signaling can be inhibited by a solubilized form of the IL-6 signal transduction unit glycoprotein 130 (sGP130). We hypothesize that IL-6 trans-signaling plays a crucial role in the injury response post-AMI, by increasing IL-6 secretion and altering the balance between sIL-6R and sGP130. We expect to see increases in concentrations of IL-6 with a concomitant increase in sIL-6R and decrease in sGP130. To test this hypothesis, we subjected male BALB/c mice either to an ischemia/reperfusion (I/R) protocol of 30-minute occlusion of the left anterior descending (LAD) coronary artery followed by two hours of reperfusion or to 24-hour permanent occlusion (PO) of the LAD. Following the experimental protocol, mice were sacrificed, and the area at risk of containing the ischemic regions of the left ventricle (LV) and the serum was collected and analyzed for IL-6, sIL-6R, and sGP130 and compared to naïve or sham cohorts. AMI was associated with increased concentrations of IL-6 in both serum and LV from both I/R and PO groups. PO was associated with increases in sIL-6R within the LV but not serum. AMI was not associated with differences in serum sGP130. However, LV sGP130 was

modestly elevated in both I/R and PO cohorts. LV STAT3 phosphorylation was also increased following AMI. These data suggest an increase in IL-6 and activation of IL-6 trans-signaling in response to AMI.

PD2

Predicting the effects of predator diversity on prey populations

Elizabeth A Hamman<sup>1</sup>, Michael W McCoy<sup>1</sup>, Ben Bolker<sup>2</sup>, James Vonesh<sup>3</sup>, Jeremy Wojdak<sup>4</sup>

<sup>1</sup> Department of Biology, East Carolina University

<sup>2</sup> Department of Mathematics & Statistics, and Department of Biology, McMaster University

<sup>3</sup> Department of Biology, Virginia Commonwealth University

<sup>4</sup> Department of Biology, Radford University

Predators have important effects on prey communities, yet we are often unable to predict the effects of multiple predators on prey communities. This is particularly evident when predators are either introduced to a system or when a predator goes extinct. In this study, we model the effects of predator diversity in a model system: riverine rock pools. Our model, a partial differential equation, incorporates size-dependent predation and size-dependent prey population dynamics. We use this model to explore the effects of predator invasions, extinctions, and diversity. We demonstrate how increased functional diversity decreases prey abundance, and how the effect of a predator invasion or extinction depends on the functional dispersion present in the predator community.

PD3

Dietary DHA mitigates ozone induced pulmonary inflammation and reductions in specialized pro-resolving mediators

Brita Kilburg-Basnyat, S.W. Reece<sup>1</sup>, M. Hodge<sup>1</sup>, B. Luo<sup>1</sup>, M. Yaegers<sup>1</sup>, M.R. Odom<sup>1</sup>, C. Psaltis<sup>1</sup>, J. Manke<sup>2</sup>, M.L. Armstrong<sup>2</sup>, J.L. Hannan<sup>1</sup>, N. Reisdorph<sup>2</sup>, R.M. Tighe<sup>3</sup>, S.R. Shaikh<sup>4</sup>, K.M. Gowdy<sup>1</sup>

<sup>1</sup>East Carolina University, Greenville, NC; <sup>2</sup>University of Colorado, Denver, Denver, CO; <sup>3</sup>Duke University Medical Center, Durham, NC; <sup>4</sup>University of North Carolina Chapel Hill, Chapel Hill, NC.



## Abstracts | Post Doctoral Scholar Presentations

**Background.** Ozone (O<sub>3</sub>), a criteria air pollutant, causes significant pulmonary morbidity and mortality annually. Obesity and metabolic disorders are more susceptible to the health effects of O<sub>3</sub>. Currently, it is unknown why these populations are more susceptible to O<sub>3</sub>. Our previous studies indicate O<sub>3</sub> exposure decreases pulmonary specialized pro-resolving mediators (SPMs). SPMs are produced at the site of injury and support resolution

of the immune response. In obesity, docosahexaenoic acid (DHA)-derived SPMs are decreased in adipose tissue and in spleens. Obesity can be caused by a consumption of a western diet (WD). We hypothesize that increased pulmonary inflammation with WD after O<sub>3</sub> exposure is due to a decrease in pulmonary SPM production that can be mitigated with DHA supplementation.

**Methods.** 5-week-old C57Bl/6J (WT) male mice were fed a normal diet (ND), a WD (45% fat) or a WD+DHA (43%+2% DHA). After 6 weeks, mice were exposed to filtered air (FA) or 1 ppm O<sub>3</sub> for 3 h and necropsied 24 h post-exposure. Bronchoalveolar lavage fluid (BAL) was assessed for cytokine production, cell counts/differentials, and protein. Lipid mediators were quantified from lung tissue using LC-MS/MS.

**Results.** O<sub>3</sub> exposed ND and WD fed mice had decreases in pulmonary 14-HDHA. The WD+DHA had a significant increase in 14HDHA compared to WD and ND. O<sub>3</sub>+WD+DHA decreased 14-HDHA compared to FA+WD+DHA. DHA increased pulmonary RVD5 levels with O<sub>3</sub> exposure yielding significantly higher levels of RVD5 compared to the ND and FA+WD groups. In the ND group, O<sub>3</sub> exposure significantly increased BAL macrophages (M<sub>2</sub>s). The WD group had decreased M<sub>2</sub>s compared to O<sub>3</sub>+ND group. Compared to O<sub>3</sub>+ND and O<sub>3</sub>+WD, DHA significantly reduced O<sub>3</sub>-induced CCL2, CCL3, IL-6, and IL-1 $\beta$  expression in lung tissue. Additionally, DHA reduced O<sub>3</sub>-induced increases in BAL protein when compared to WD vs. ND groups.

**Conclusions.** A WD can be a risk factor for adverse O<sub>3</sub> induced health effects. Supplementing a WD with DHA increases pulmonary SPMs and their precursors resulting in a decrease in pulmonary M<sub>2</sub>s. These data support the novel idea that a DHA supplemented diet may mitigate O<sub>3</sub>-induced pulmonary responses by increasing pulmonary SPMs.

PD4

The dihydroartemisinin oxime dimer (NSC735847) displays a selective toxicity in colon cancer cells which is potentially mediated by endoplasmic reticulum stress

Ahmed Elhassanny<sup>1</sup>, Eman Soliman<sup>2</sup>, Paul McGuire<sup>1</sup>, Mahmoud ElSohly<sup>3,4</sup>, Waseem Gul<sup>3</sup> and Rukiyah Van Dross<sup>1,5</sup>

<sup>1</sup>Department of Pharmacology and Toxicology, Brody School of Medicine, East Carolina University, Greenville, NC, USA

<sup>2</sup>Department of Pharmacology and Toxicology, Faculty of Pharmacy, Zagazig University, Egypt.

<sup>3</sup>ElSohly Laboratories Inc., 5 Industrial Park Drive, Oxford, MS, USA

<sup>4</sup>National Center for Natural Products Research, School of Pharmacy, The University of Mississippi, MS, USA

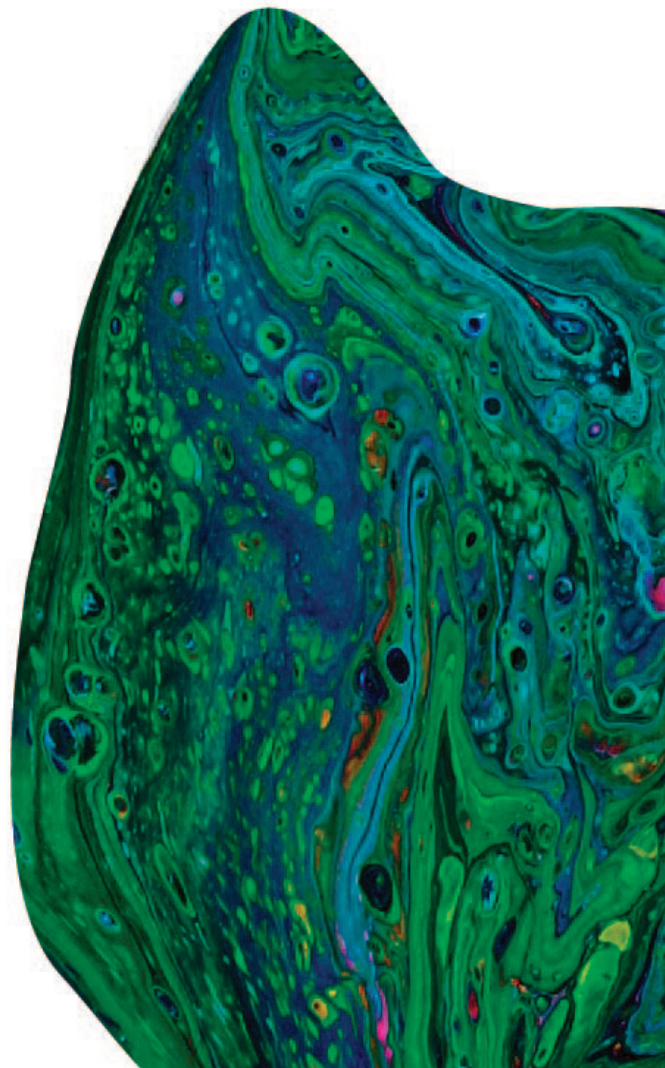
<sup>5</sup>Center for Health Disparities, East Carolina University, Greenville, NC, USA

Colorectal cancer (CRC) is the third leading cause of cancer-related deaths in the United States. Common chemotherapeutic regimens for CRC include a combination of chemotherapeutic agents to produce synergistic drug activity and reduce adverse effects and the development of resistance. However, adverse effects due to lack of selective toxicity is still a major problem with many chemotherapeutic agents. Several studies have shown that artemisinin monomers possess antineoplastic activity with minimal toxicity. Interestingly, artemisinin dimers showed more potent antineoplastic activity compared to the monomers. However, few studies have fully characterized the activity of these molecules. In this study, we tested the antitumor activity of five chemically-synthesized dihydroartemisinin (DHA) dimers using the human colon cancer cell lines, HT29 and HCT116 and the non-tumorigenic colon cell line, FHC. Compared to other tested dimers, the DHA oxime dimer, NSC735847 showed pronounced selective toxicity in HT29 and HCT116 cells. Using MTS cell viability assays, NSC735847 caused a preferential reduction in the viability of HT29 and HCT116 colon cancer cells compared to the non-tumorigenic FHC cells. In addition, NSC735847 significantly increased caspase 3/7 activity in HT29 and HCT116 cells but not in FHC cells which suggests that this compound causes selective apoptosis in these colon cancer cell lines. The combination of NSC735847 and the topoisomerase I inhibitor, irinotecan (commonly used chemotherapeutic agent for colorectal cancer) showed synergistic antitumor activity in HT29 cells. Previous studies using other tumorigenic cell lines,



## Abstracts | Post Doctoral Scholar Presentations

suggested that NSC735847 induces oxidative and endoplasmic reticulum (ER) stress. To gain insight into the potential mechanisms of anti-colorectal cancer activity of NSC735847, we tested if this compound causes ER stress and/ or oxidative stress in HT29 cells. NSC735847 increased the expression of ER stress marker C/EBP homologous protein 10 (CHOP10) in HT29 cells and the use of ER stress inhibitor, salubrinal, significantly decreased NSC735847-induced cell death and apoptosis. Additionally, NSC735847 caused oxidative stress in HT29 cells which was inhibited by pretreatment of the cells with the antioxidant, Trolox. Our results suggest that NSC735847 causes ER stress in HT29 cells which plays a major role in drug-apoptosis in these cells.



## Abstracts | Undergraduate Oral Presentations

U01

Using LC/MS to Quantify Metabolites in Urine Samples Post Clinical Exposure to Benzoates in Beverages

Cameron Dale Worthington, Aaron Robinson, Nicole El-Khoury, Kimberly Kew, David N. Collier, Allison S. Danell

It is hypothesized that benzoic acid, a common preservative in beverages, acts as an endocrine disrupting chemical (EDC) that inhibits release of leptin from adipocytes resulting in decreased satiety and decreased metabolic rate; changes expected to promote obesity. Benzoate requires ATP to be converted into benzoyl CoA, which conjugates with glycine to produce hippurate. Hippurate is eliminated from the body by urination. The FDA requires benzoates to be listed as an ingredient, but it does not require an amount on the nutritional label. LC/MS is used to detect the concentrations of benzoate, hippurate, and glycine in clinical urine samples of patients who have been exposed to varying levels of benzoates through the consumption of benzoate-containing beverages.

The FDA does not require beverage manufacturers to present concentrations of benzoates in beverages. Because of this, our group has been working to identify concentrations of benzoate in beverages using HPLC. We have detected benzoate concentrations in 176 beverages, giving a concentration range of 0 mg/L to 950 mg/L. IRB approval has been gained for clinical studies targeting a total of 20 overweight or obese young adults (18-30, BMI >25). Through initial clinical studies, our group has learned that the average intake of beverages is 39.6 fluid oz. per day, and the top tercile intake is 89.6 fluid oz. per day. A 2 week "washout period" avoiding beverages with benzoate was carried out, base line studies and samples obtained, then a 1-week exposure period targeting consumption of 5 mg/kg/day benzoic acid delivered by commercially available beverages with post-exposure studies was performed and samples were obtained at the end of a 7-day exposure period. LC/MS is being conducted on early morning fasting urine sample. Other samples to be analyzed include time course urine samples collected every 2 hours following consumption of 5 mg/kg benzoate in a single dose from a single individual. Preliminary injections of metabolites have been completed to optimize methods for those compounds resulting in peaks at m/z 121 and m/z 178, for deprotonated molecules of benzoic acid and hippuric acid, respectively. Initial MS/MS of benzoic acid has resulted in a peak at m/z 78, or loss of the carboxyl group from the parent ion. Initial MS/MS of hippuric acid resulted in peaks at m/z 134 and m/z 77, loss of the carboxyl group and loss of the amino group and carboxyl group from the parent ion, respectively.

U02

Folic Acid: Friend or Foe?

Swapna Sahiti Marella

Over several decades, the vitamin supplement folic acid has been praised for its ability to reduce neural tube defects in the developing embryo. Many studies show that folic acid plays a vital role in the reduction of severe and diverse congenital abnormalities. The health benefits of folic acid are so

highly regarded that in the mid-1990s Food and Drug Administration mandated that foods be fortified with folic acid, and it is generally accepted that it should be consumed unconditionally. More recent studies however, suggest that supplementation may not be entirely beneficial, and that safety depends on dosage. Inappropriate supplementation of folic acid can influence risk for health implications such as pre-term birth, multiple births, chronic disease development in children, and vascular, neurodegenerative disease, and tumorigenesis in adults. There is a concerning rise in chronic diseases such as obesity, Type II diabetes, cardiovascular disease, and cancer which might in part be mediated by inappropriate exposure to folic acid. Folic acid supplementation may also be a source for epigenetic modifications, leading to transgenerational effects. My presentation will highlight the positive and negative effects that folic acid has across life stages and body systems. We find that the benefits of folic acid supplementation vary across life stage, and depend on body system. For example, exposure during adulthood likely decreases risk of cardiovascular disease but also might increase risk of colon cancer. A comprehensive understanding of folic acid's effects across life stage and body systems will facilitate the development of studies to understand mechanisms of action, and allow personalized healthcare and dosing regimens.

U03

Impacts of Metal Oxide nanoparticles ZnO, CuO, and TiO<sub>2</sub> on reproductive function and gene expression in *Caenorhabditis elegans*

Thomas Elliott Thornburg

Dr. Xiaoping Pan

Dr. Baohong Zhang

There has been increasing use of nanoparticle forms of Zinc, Titanium and Copper oxides in various types of consumer

## Abstracts | Undergraduate Oral Presentations

product such as sunscreen, skin creams and toothpastes. However only limited information regarding their potential toxicity is currently available. The goal of this project is to identify toxic effects in reproduction upon exposure to these nanoparticles and to compare the toxicity between different nanoparticles with different metal components. We hypothesize that exposure of *Caenorhabditis elegans* (*C. elegans*) to ZnO, CuO, TiO<sub>2</sub> nanoparticles (NPs) will result in impaired

reproductive function, alterations in selected gene expressions, and different toxicity among different metal oxide NPs. To test this hypothesis, our ongoing experiments include the use of the following methods 1) Characterize effects of exposure to a range of environmentally relevant concentrations of ZnO, CuO, TiO<sub>2</sub> on reproductive function using fluorescence microscopy with Nomarski optics. Reproductive defects include alterations in brood size, abnormalities in spermatogenesis, oogenesis, embryogenesis, and abnormality in offspring development and behaviors. And

2) Evaluate effects of exposure on gene expressions by quantitative real-time PCR. Our preliminary finding using DAPI staining has observed the changes in gonadal morphology, and mitosis and meiosis progression. The gene expression analysis are ongoing. Changes in worm locomotion behaviors following exposure has also been characterized. This study using the *C. elegans* model will guide validation studies in vertebrate animals.

U04

Select hnRNPs facilitate the establishment and maintenance of germline stem cells in *Drosophila melanogaster*

Vivian Victoria Holt<sup>1</sup>, Danielle Finger<sup>1</sup>, Elizabeth T. Ables<sup>1</sup>. East Carolina University.

<sup>1</sup>Department of Biology, East Carolina University, Greenville, NC 27858

An organism's ability to grow and regulate tissue repair relies on the stimulation of stem cells in response to changes in physiological state, such as cell damage, sexual maturation and growth. Tissue-resident stem cells are capable of long-term self-renewal to maintain a steady stem cell population and produce daughter cells that can differentiate into specialized cells. Stem cell self-renewal is influenced by local signals and long-range hormonal signals, but the signaling pathway undergoes complex regulation that requires further elucidation. *Drosophila melanogaster* is a well-characterized ovarian system

with easily-accessible germline stem cells (GSCs), making it an excellent system for the study of this complex pathway. The *Drosophila* steroid hormone ecdysone regulates stem cells through unidentified mechanisms. We previously identified Heterogeneous nuclear ribonucleoprotein at 27C (Hrb27C) as a potential downstream target of ecdysone signaling through a reverse genetic screen; however, it was unclear whether other related RNA binding proteins could also contribute to stem cell self-renewal. Using a transgenic resource of endogenously tagged proteins, I identified eight RNA binding proteins expressed in GSCs and their daughters, including no-on-or-off transient A (nonA). Hrb27C and nonA belong to a family of heterogeneous nuclear ribonucleoproteins (hnRNPs) that aggregate into complexes to process, stabilize, and splice mRNA. I investigated the effects of Hrb27C and nonA on GSC activity using the Gal4/UAS RNAi system to knockdown expression of Hrb27C and nonA in the germline. Reduction in Hrb27C in germ cells resulted in fewer GSCs than in controls. By measuring the average GSC number at 4, 8, and 12 days after eclosion, we will determine whether nonA is also required for maintenance or establishment of the GSCs. The highly conserved nature of genetic machinery between humans and *Drosophila* may aid in understanding how the mammalian homologs of nonA and Hrb27C regulate stem cells in humans. Understanding which hnRNPs regulate establishment and maintenance of stem cells may direct future research on the use of stem cells in cancer therapies and regenerative medicine.

U05

Radical prostatectomy and androgen deprivation cause a negative cumulative impact on neuron survival in the major pelvic ganglia

Jennifer C. McMains<sup>1</sup>, Shelby A. Powers<sup>2</sup>, Michael R. Odom<sup>2</sup>, Elena S. Pak<sup>2</sup>, Johanna L. Hannan<sup>2</sup> <sup>1</sup>College of Health and Human Performance, East Carolina University <sup>2</sup>Department of Physiology, Brody School of Medicine

Introduction: Prostate cancer is often treated with androgen deprivation therapy (ADT) to shrink the prostate before removal via radical prostatectomy (RP). Following RP, erectile dysfunction (ED) affects 25-100% of men, negatively impacting their quality of life. RP induced ED is primarily attributed to injury of the cavernous nerves which branch from the major pelvic ganglia (MPG). ADT also causes ED, because androgens are required to maintain penile function and structure.

Methods: Male Sprague-Dawley rats (12 weeks) were separated into control (no surgery; CON), castration (CAST), bilateral cavernous nerve injury (BCNI), or CAST+BCNI (C+B) groups

## Abstracts | Undergraduate Oral Presentations

(n=4/grp). At 16 weeks rats underwent BCNI to mimic RP and 2 weeks post-BCNI neurons from the MPG were dissociated and cultured for 72 hours. Neurons were fixed and stained with immunofluorescence for neuron-specific class III beta-tubulin to measure axonal branching and length and then co-stained with TUNEL assay to identify apoptotic neurons. Additional neurons were stained with sympathetic (tyrosine hydroxylase) or nitroergic (neuronal nitric oxide synthase) markers.

Results: Overall, CAST, BCNI and C+B decreased neurite growth and branching, increased apoptosis, and decreased nitroergic neurons compared to CON ( $p < 0.05$ ). CAST and BCNI alone both caused 25% decrease in neurite length, 20% decrease in branching and 2-fold increase in apoptosis

( $p < 0.05$  vs CON). C+B further decreased neurite length by 33%, decreased branching by 50% and doubled apoptosis ( $p < 0.05$  vs CON). The population of nitroergic neurons were drastically reduced by 60% in the CAST or BCNI alone and by 70% in the C+B ( $p < 0.05$  vs CON). Sympathetic stained neuron populations are currently being analyzed.

Conclusions: Our preclinical model of ADT+RP demonstrated markedly impaired neuritogenesis and decreased nitroergic, pro-erectile neurons compared to controls, ADT or RP alone. These data indicate that recovery of erectile function following nerve damage due to RP in a state of ADT is unlikely and these patients will presumably have higher incidence and severity of ED. Future studies will examine if testosterone supplementation following RP can restore neurite health and increase the population of nitroergic, pro-erectile neurons in order to recover erectile function.

UO6

Studying the Effects of Aerobic Physical Activity on the Cognitive Performance of a Type 2 Diabetic Population

Jeffrey Grayson Fellows

Type 2 Diabetes Mellitus (T2DM) and Alzheimer's disease (AD) are two extremely prevalent conditions. With 30 million Americans already diagnosed with T2DM, this number will soon skyrocket as there is an estimated 84 million cases of Pre-Diabetes. In addition, 5.5 million people are currently living with AD. These conditions are a draining force on the economy. The annual care costs amount to \$322 billion and \$259 billion for T2DM and AD respectively. Until recently, T2DM and AD were viewed as unrelated conditions. T2DM developing from a sedentary lifestyle and poor diet, while AD was symptom of the natural aging process. Thanks to new research findings, a link

between the two has been found in the form of Insulin. It was discovered that almost half of all cases of AD was accompanied by hyperinsulinemia, a key physiological component of T2DM. The purpose of our study is to further investigate this newly discovered relationship between T2DM and AD, while including aerobic physical activity as a key variable. We will recruit a total of 30 males, all being clinically diagnosed with T2DM, ages 50 to 75 years old, and who can be currently classified as having a sedentary lifestyle (<150 minutes of moderate to vigorous physical activity/week). One half of subjects will constitute the "Control" group, where they will be asked to continue their normal physical activity habits. The other half of participants will be prompted to perform 30 minutes of walking, 5 times a week, for every week of the 3 month protocol. Upon recruitment to the study, all subjects will take a stress survey and a working memory examination created by the Alzheimer's Research and Prevention Foundation to create baseline scores. Post-intervention these tests will be re-administered to search for cognitive regression or progression. Consistent aerobic physical activity has to shown aid in memory retention by increasing the growth of new blood vessels and maintaining brain cell health. Because of this, we hypothesize that participants in the "Physical Activity" group will demonstrate improved cognitive function compared to the "Control" group. A t-test will be ran to find statistical differences amongst the two groups, using a p-value of 0.05 to determine the accuracy of our hypothesis. In the future, we hope to expand our current parameters by investigating other variables such as including both men and women, analyzing insulin sensitivity levels, and varying amounts of physical activity.

UO7

Control of vascular growth by protease-activated receptors

Michael T. Bullock, Sean C. Johnson, Nathan A. Holland, David A. Tulis

Department of Physiology, Brody School of Medicine East Carolina University

Pathologic growth of vascular tissue represents a crucial element that underlies cardiovascular disease (CVD), the number one cause of illness and death in individuals worldwide. Unfortunately, despite ample investigation over many years discrete mechanisms behind CVD remain elusive. Members of the G protein-coupled protease-activated receptor (PAR) family have been speculated to contribute to the development and/or maintenance of CVD yet their exact roles remain unclear. In this study we hypothesize that PAR2 and/or PAR4 and their downstream protein kinase signals



## Abstracts | Undergraduate Oral Presentations

have capacity to control pathologic vascular growth critical to CVD. Preliminary data obtained using an experimental rodent model of trauma-induced vascular growth suggest that protein expression of PAR2 and PAR4 as well as phosphorylated Erk1/2, an indirect readout of PAR activity, are increased compared to naïve uninjured arteries. Preliminary findings using cultured vascular cells also show induction of phosphorylated Erk1/2 under growth-stimulated conditions. Ongoing experiments are analyzing protein expression and activity of both PAR2 and PAR4 in whole artery and cultured vascular cell fractionated samples to provide insight into PAR localization and internalization/recycling. We argue that PAR2 and PAR4 have biological implications in growth abnormalities associated with CVD and that these operate via protein kinase signals. These novel findings promise to increase our understanding of PAR2/PAR4 signaling as key players in vascular biology and hope to identify them as potential therapeutic targets against CVD.

U08

Linking Tev to Maltose-Binding Protein to Promote Gene Expression

Jessica Laurel Norris and Robert M. Hughes, Ph.D

Department of Chemistry

Proteases with highly specific activities are valuable tools for biochemists and molecular biologists. They have applications in the purification and downstream processing of overexpressed proteins, including cleavage of affinity tags and solubility promoting partners such as GST and MBP. However, a highly specific protease such as Tobacco Etch Virus (TEV) which cleaves fusion proteins can be prohibitively costly. The generation of robust and reusable site-specific proteases would be of significant value to the life science community. In this work, we use restriction enzyme-free cloning to assemble a TEV-streptavidin fusion protein and investigate its overexpression in *E. coli*. Streptavidin's high affinity for biotin will potentially enable the TEV-streptavidin fusion protein to be coupled to biotin coated beads to create a recoverable reagent.

U09

Molecular Evolution of Genes Associated with Preeclampsia: Gene Conflict

Alistair Arthur, Ana Terman, Chelcie Kurzontkowski, Kyle Summers, Keith Keene, Toyin Babatunde

Although human pregnancy exemplifies our most intimate relationships, there is conflict between the mother and fetus. While Hamilton's inclusive fitness theory explains parental altruism, Trivers' parent-offspring conflict theory predicts chronic conflict between mothers and offspring on evolutionary and ecological timescales. David Haig's extension of these theories to explain genomic imprinting reveals further scope for genetic conflict between mothers and offspring, and even between the maternal and paternal genomes in the fetus. During pregnancy, "disagreements" between the mother and fetus over resource allocation levels are likely to be orchestrated by products that mediate key aspects of maternal physiology, such as the resistance to flow within the maternal and fetal circulatory systems. Fetal genes are predicted to promote increased resistance within the maternal circulation, potentially leading to hypertension and associated conditions such as preeclampsia. Long-term chronic antagonistic coevolution between genetic changes promoting fetal interests and counter-changes promoting maternal interests are predicted to lead to continual change at the associated loci. One gene in particular (FLT1) has been implicated as a key locus mediating a struggle over blood pressure in the maternal circulation between mothers and offspring. In this study, we investigate the molecular evolution of this locus at multiple levels: across primates, on the human lineage, and within the human lineage (both across and within populations). We find strong, statistically significant signals of positive selection acting on this locus at all levels, consistent with predictions of the genetic conflict hypothesis. To broaden the investigation of genes likely to be involved in antagonistic coevolution in the context of genetic conflict between mothers and embryos, we investigate the molecular evolution of several sets of genes likely to be involved in this type of conflict, focusing on genes that 1) are strongly associated with risk of preeclampsia in GWAS analyses, 2) have functional effects related to blood pressure in the vascular system, 3) show evidence of effects on the depth of placental invasion across mammalian lineages, 4) have effects specifically associated with fetal genotype, or 5) are known to be maternally or paternally imprinted.

U010

Purifying Antarease from *E. coli*

Victoria E Hudson, Eric S Anderson

Department of Biology, East Carolina University

Vesicular trafficking is a system of intracellular transport that allows for the distribution and secretion of molecules. In the pancreas, normal secretory processes have been found to be



## Abstracts | Undergraduate Oral Presentations

interrupted by Antarease, a metalloprotease isolated from the venom of the Brazilian scorpion *Tityus serrulatus*. Antarease cleaves membrane proteins that take part in the transport and release of intracellular vesicles. The purpose of this project is to develop and optimize a production system for Antarease to provide higher concentrations of protein. Antarease was cloned into a cytoplasmic expression system and potential candidates were screened for protein expression. After identifying Antarease-expressing candidates, SDS-PAGE and Western Blotting were used to confirm this identification and determine relative concentration of Antarease in a small scale system. Once small scale growth conditions were determined, larger scale protein inductions were carried out and evaluated. It was found that the small scale conditions did not translate well to a larger scale. However, protein is still being expressed and minor optimization should allow higher level expression in a scaled up system. The current focus is on finding these optimal conditions.

U011

Unraveling the Mechanism of Action of the Immunoregulatory Poxvirus A35 Gene

Rishita R. Yeduri - East Carolina University

Gwendolyn B. Jones - Microbiology & Immunology at Brody School of Medicine, East Carolina University

Rachel L. Roper - Microbiology & Immunology at Brody School of Medicine, East Carolina University

Poxviruses cause diseases in animals and humans throughout the world. Smallpox killed approximately 500 million people in the twentieth century alone, and although the smallpox virus was eradicated in 1980, poxviruses remain a bioterrorism threat. In an effort to understand how poxviruses make mammals/humans sick, counter bioterrorism threats, and provide safer and more effective vaccines, we are studying the viral genes involved in virulence.

The highly conserved poxvirus A35 gene is found in vaccinia virus and is a virulence factor that inhibits the immune response, reducing antibody production and T lymphocyte responses. However, how A35 functions to block the immune response is unknown. To determine if the A35 gene affects the killing of immune cells, we measured cell viability via metabolism assay. Viral effects on the RAW macrophage cell line, CTLL T lymphocytes, and bone marrow dendritic cells (BMDC) were tested. Cells were all killed by vaccinia and A35 knockout (A35?) viruses, however there was no effect of the

A35 gene. Previous experiments indicated that the A35 gene blocks antigen processing or presentation in the endosomes of antigen presenting cells such as macrophage and BMDC. To measure the effects of the A35 gene on uptake of extracellular molecules into endosomes, their acidification, and proteolysis, we used five different endocytic tracers measured by flow cytometry. The results suggest that A35 does not directly act on these endosomal properties, so future experiments will focus on A35 effects on endosome protein composition and interacting proteins. Understanding how these viral proteins work will aid in anti-viral drug design. In addition, we may learn how to mimic the viral proteins to block immune responses that cause diseases.

U012

Optimization of an optogenetic switch for "one-click" light-mediated initiation of apoptosis

Walton Colby Godwin, Robert M. Hughes

Department of Chemistry, East Carolina University

Optogenetic tools provide a window into the world of cell signaling pathways and protein-protein interactions with a precision and elegance that other biological probes can struggle to achieve. The creation of optogenetic switches for the control of cell death pathways can provide insight into the mechanisms of apoptosis and form a basis for non-invasive, next generation therapeutic strategies. Previously, we have employed Cryptochrome 2 (Cry2)/CIB, a blue light photoreceptor protein – protein dimerization module from *A. thaliana* in conjunction with BAX, an OMM targeting pro-apoptotic protein, for light-mediated initiation of mitochondrial outer membrane permeabilization (MOMP) and downstream apoptosis. In this work, we are further developing our light activated Cry2-BAX system (henceforth referred to as "OptoBAX") for "one click" initiation of the BAX-mediated apoptotic cascade. We also report results of experimental efforts to optimize our optogenetic switch to reduce light-independent cell death (dark activation), and to enhance experimental control of our switch by manipulating photophysical properties associated with the Cry2/CIB interaction.

## Abstracts | Undergraduate Oral Presentations

U013

“I sing of words and the man”: Thwarting Obsolescence in Digital Humanities Software Through Test-Focused Design

James Patrick Philips

Department of Computer Science/Foreign Languages and Literatures

East Carolina University

This project examines software engineering strategies for refactoring digital humanities software projects to improve their longevity. An open-source Latin-English dictionary program, Whitaker’s Words, is examined as a case study. The process of converting the source code of this program from the Ada to the Python language is discussed along with the crafting of a software test-suite to ensure long-term viability. Finally, reflections are offered, comparing the translation of computer code to the translation of human texts from a hybrid Classical Studies-Computer Science perspective, providing insight on software development (especially in the digital humanities) as a humanistic endeavor.

U014

Critiquing New Iterations of Hegemonic Vision in Cuban Cultural Tourism

Glenesha D Berryman

The easing of US-Cuba relations in 2014 brought Cuba to the forefront of American tourism, and despite recent policy changes, Cuba remains a popular vacation destination for American tourists. Enamored with ideas of Cuba as a Caribbean paradise and “frozen” socialist experiment, tourists are flocking to experience the island “before it changes.” Cuban cultural tourism is rooted in this fantasy of a frozen Cuba. Instagram posts and Tumblr blogs showcase shiny classic cars, revolutionary art, decaying buildings, and colorfully dressed Afro-Cuban women smoking cigars in the streets. These social media images feed into the hegemonic vision of Cuban tourism and provide the sensuality, tropical adventure, and cold war nostalgia tourists desire. Analyzing Jamaica Kincaid’s *A Small Place* alongside Ana Dopico’s critique of the photograph in “Picturing Havana,” I argue that that social media is operating the way postcards once did, inviting consumption and desire, and hiding the deep instability plaguing Cuba. “Woke” travelers consuming these images simultaneously subvert Kincaid’s

unthinking tourist and dangerously reify it. Their “wokeness” is false consciousness operating under the guise of trendy social consciousness. However, the liminal identity of the American study-abroad student, who is neither tourist nor citizen, offers a chance to disrupt the traditional mechanisms of Cuban cultural tourism. Unlike the unthinking tourist, the study-abroad student is constantly engaged in a project of critical thinking, and is able to see the social and political complexities hiding behind tourism’s hegemonic vision of Cuba. Thus, the study abroad experience exposes the dangerous unthoughtfulness of the tourism industry while offering a new, more ethical future for travel.

U015

A comparison of Aristotle’s guidelines for Tragedy in ancient literature to modern day video games.

Madison O’neill Jones

The message I hope to convey is one of awareness. I will aim to bridge the gap between the ancient world of Aristotle and the modern world of technological advancement. In his work, Aristotle outlines multiple guidelines for tragedies that he believed should be included in order for each literary piece to adhere to the proper, and from his point of view, superior, specifications.

But what if those guidelines that spanned all those centuries ago were applied to modern day tragedy in the form of video games? Would

his instructions be evident in their stories? Would they live up to his expectations? I’ve explored these concepts and many more and have answered these questions and from my experience, I can definitely say they have. I have taken two art forms set nearly 2300 years apart, set under the same principles and regulations, and forced them both into cohesion.

The first goal of this assignment was to end the stigma associated with video games, to prove that they are more an art form and less a recreational hobby; that just like a tragic play (that garners more respect), they can be just as beautiful and realistic. The second goal was to take the guidelines of an extremely well known and respected philosopher, Aristotle, and apply them to the modern day criteria of the gaming world. The third and final goal was to prove that the two are not mutually exclusive. The purpose of my presenting this topic is to show you how.

## Abstracts | Undergraduate Oral Presentations

U016

Wilmington Coup 1898 Literary Tour

Justin Riley Martin

Jennifer Claire McMains

Margaret Bauer

Karin Zipf

The only successful coup d'état to take place in the United States occurred in Wilmington, North Carolina in November 1898. The southern Democratic party overthrew the elected Fusion coalition which consisted of the Republican and Fusionist parties. During the day of the coup, a mob of White Supremacists forced many prominent African American community leaders and successful businessmen to leave the city where they had flourished. Furthermore, the mob burned down many businesses, including the only black-owned newspaper in the city, and murdered numerous African Americans in the process.

Media reports regarding this horrifying event varied largely to the point that citizens in surrounding areas were unclear of the illegal and immoral circumstances which had occurred. The public school curriculum of North Carolina history largely ignores the coup, leaving the vast majority of North Carolinians, including Wilmington residents, unaware of the bloody conflict that inspired and perpetuated racism following the era of Reconstruction. Many works of literature have been inspired by this mysterious atrocity which provide sorely needed historical knowledge that is not found in history books. In order for citizens to learn about the Coup they have to read beyond their NC history textbooks and instead look at the poems and novels surrounding and created because of these events.

In order to assist with this process this literature was compiled and using The Clio app, students enrolled in an honors seminar, taught by Dr. Margaret Bauer and Dr. Karin Zipf, published a literary tour for residents and visitors in Wilmington to use in order to learn about this hidden yet integral part of NC history. The Clio is a website and app with a collection of guides providing more information relating to popular and historical sites throughout the United States. Using the Wilmington 1898 Clio Tour, residents and visitors alike can learn about the important locations and their impact in the coup d'état, as well as about the literary sources that have been written throughout the years.

U017

An Analysis of Existentialism and the Ontological Possibility of Authentic Love

Katharine E Chandler

Existentialism is a philosophy about how to live an authentic life. A well-known version of existentialism has the odd implication that romantic love is

unworkable. Jean-Paul Sartre, a famous and influential 20th century French philosopher, advanced a compelling theory of the structure of human consciousness and detailed its implications for romantic relationships. According to Sartre, given the structure of consciousness, genuine equality between people in a romantic relationship is psychologically impossible. At any time in any relationship, one person must be dominant, the other submissive. In this research paper, I present Sartre's arguments against the possibility of the kind of romantic relationship many people see as ideal. These arguments revolve around several key notions, such as the idea that humans are radically free and that an individual's self-understanding is

psychologically impacted by what Sartre refers to as the presence of the "Other." Because humans are radically free, they must at all times choose between dominating the other and being dominated by the Other.

Sartre's view was strongly opposed by his own "romantic" partner, Simone de Beauvoir, who claimed that although romantic love was "existentially dangerous," it was not impossible, and could be engaged in "authentically". For de Beauvoir, radical freedom and its role in conscious self-awareness does not preclude the coming-into-being of a unified self in a two-party love-relationship – a situation wherein one's partner no longer is experienced as Other. Taking this position commits de Beauvoir to saying that the role played by the Other in self-awareness is not a matter of the structure of consciousness, but is instead a function of one's radically free choices. After reviewing de Beauvoir's arguments, I argue for the position that Sartre's analysis better fits what people experience when they engage in reflective self-awareness. I then argue that de Beauvoir's way of reshaping Sartre's view to allow for the possibility of genuine romantic love abandons key elements of any theory worthy of being called existentialism. I note that the problem with revising Sartre's view to allow for romantic love is that doing this collapses the existential understanding of consciousness. The resulting theory no longer can account for the dimensions of self-consciousness that Sartre emphasized and that we all routinely experience.

## Abstracts | Undergraduate Oral Presentations

U018

From the Temple of God to the Temple of the Proletariat:  
Iconography and the Soviet Aesthetic

Brian Austin Thaxton

Throughout history, religion has played an apical role within the varying paradigms of Russian society, interacting with numerous sociological spheres. One of the most notable sociological relationships within Russia is the relationship between religion and politics. The Soviet Era from 1917-1991 largely molded and defined the relationship that exists currently between the Russian Orthodox Church and the State. Although the philosophical and political doctrine of the Soviet Union and the Communist Party largely ascribed to the Marxist theory of religion and rejected the notion of organized religion, elements of the rich theological history within the Russian Orthodox Church were evidently manifested within the Soviet Union. The most visible element of the Russian Orthodox Church, iconography, was clearly usurped by the propaganda machine of the Soviet Union. The appropriation of thematic, visual, and symbolic characteristics of Russian iconography into the secular paradigm of political propaganda, namely through graphic posters, demonstrates the uniquely symbiotic relationship between church and state within the context of the former Soviet Union. This paper will demonstrate that the aesthetic of the Soviet Union appropriated the visual imagery of Russian Orthodox iconography. The appropriation will be made apparent through the comparative analysis of two iconographic images and two Soviet propaganda posters. Through the discussion of significant historical periods of church and political developments, the unique role that religion holds within the concept of the Russian identity will be analyzed.

U019

“Reading” Fashion in A. Pushkin’s Eugene Onegin:

‘Word’ as ‘Image’ in 1820s Imperial Russia

Elizabeth R. LaFave

This digital humanities project emphasizes the visual potential of the canonical literary text to prospective readers, by linking the original Russian work with a pictorial gallery of textual references, through the incorporation of intercultural perspectives. The Omeka-based interactive digital exhibit was developed by the utilization of interdisciplinary methods to

employ concepts from disciplines of literary criticism, cultural studies, art history and translation studies. An in-depth textual analysis and close reading of Alexander Pushkin’s Golden Age novel in verse, Eugene Onegin (1823-1830), was used to evaluate the cultural significance of the relationship between fashion dynamics in Imperial Russia and the canonicity of the text itself, to develop a set of literary citations where visual representations, including archival sources, proved helpful in the overall comprehension of the nineteenth century Russian life and society in relation to Pushkin’s novel and its characters. The fashion-related ‘word’ choices articulated linguistically in the novel and inherently obvious for Pushkin’s contemporaries, now have been ‘lost’ in translation across times and languages, and thus require an additional sociocultural and/or visual commentary for modern readers.

Russian fashion during the 1820s varied dramatically; heavily influenced by European, both French and British, stylistic choices in the city, while more traditional in the countryside. Hillwood Museum’s recent exhibit “Friends and Fashion: An American Diplomat in 1820s Russia” (Washington DC, February – June 2017) combined with numerous Russian and Anglophone art & literary criticism sources were used to interpret the evolution from the Neo-Classical era to the Romantic period in Russian fashion trends. The multiplicity within each artifact or painting for each reference provided both the textual commentary and visual aids for correlation of original Russian citations and corresponding English translations. This cross-cultural digital guide was produced to reveal the sociocultural and linguistic value of fashion selections within Pushkin’s text for the more extensive understanding of its characters and their role in the narrative, and has the promise to be used as the most efficient learning tool to benefit both students and instructors. As such, it can be expanded beyond Russian studies into Humanities courses that may introduce this foundational Russian literature text in English translation.

U020

Gregory Poole Process Improvement

Jeffrey Jay Hood

Long Tran

RCAW Abstract – Gregory Poole Process Improvement

The project that we are undertaking will utilize Lean and Six Sigma methodologies to eliminate sources of waste. Within

## Abstracts | Undergraduate Oral Presentations

this project, we are planning to reduce wait time through the use of process improvement. We are working with a company called Gregory Poole Lift Systems. Gregory Poole Lift Systems is a warehouse that distributes Hyster & Yale fork lift truck parts. These parts are delivered to external customers in Eastern North Carolina and are also delivery to their service shop and large field service fleet. Every day Gregory Poole Lift Systems will receive approximately 30-45 UPS and Fed Ex packages that are filled with customer orders of critical machine down repair parts. The delay time in distributing the packages to the customer or technician would increase the company's downtime, which will result in money loss.

First, the order is picked from a UPS warehouse. Next, the orders are brought into Gregory Poole Lift Systems and is transported to their warehouse. A staff member would then open the boxes and check to see if all of the parts are inside each box. He manually inputs the serial code into the computer. After that, he would transport each part into their respective shelf space. The problem lies with the time it takes for each part to get to their rightful place; which increases service lead time. We plan on using time studies and value stream mapping in order to help solve the problem. With this project, we will implant Lean & Six Sigma methodologies in order to improve safety, efficiency, and organization.

UO21

Comparison of UAV-mounted atmospheric sensors

William J. Miller, Noah A. Sonne, Teresa Ryan, PhD

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

This work is part of a larger study which aims to develop a mathematical model that will describe the effects of atmospheric conditions on acoustic propagation in the near shore environment. An unmanned aerial vehicle (UAV) with an atmospheric sensor mounted to the airframe is used to scan the path of acoustic propagation up to 100 meters in elevation. The data collected from the UAV-mounted sensor includes temperature, humidity, atmospheric pressure, as well as GPS time and location. To obtain useful atmospheric data, accurate and reliable sensors are needed. This ensures that data is consistently recorded throughout the measurement period and that the data recorded accurately reflects the environmental conditions that were present during acoustic recording. The objective of this study is to compare a next generation UAV-mounted atmospheric sensor to existing hardware

UO22

Material Usage Variance Project (MUV)

Nelson Martinez-Borja

Abstract

Material Usage Variance is a financial term used to report results on a manufacturing site budget. The measure is a comparison between the expected amount of materials used for production versus the actual amount of materials used for production. The company is looking to improve the predictability (remove variance) and to reduce the amount of scrap during the process.

We will evaluate production line because of excessive unpredictable scrap rate from one production to the next. Will use the D.M.A.I.C process to eliminate possible cause to unpredictable scrap. We will evaluate each process step, identify opportunities and risks, create a process map outlining each product SKU and its respective components. Create a data analysis base of data gather and propose solutions to implement improvement activities to reduce the scrap rate. With implementation of improvements we will control the process of production where most of the scrap is being produced. The project will reduce scrap rate in one of the production line while also making the process more variable, consistent, and stable by analyzing production.

UO23

Contributing to ECU's Sustainability Efforts: Gateway Residence Hall

Wilson Corbett 1

1Department of Technology Systems, East Carolina University

With everything going on in the world today sustainability has risen to the forefront of discussion when dealing with design. So what is sustainability? It is defined as a development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The global growth rate is at 1.2%, much lower than it has been in the past; however, means that our population is growing every day. This then results in more resources being used and they are running out. It is crucial to be educated on the topic of sustainable design so we can minimize environmental damage and reduce energy consumption. The efforts of this examination was to inform our stakeholders and others of



## Abstracts | Undergraduate Oral Presentations

ECU's sustainable design efforts using the Belk Residence Hall at East Carolina University as a platform for the study. Belk Hall has been around for 47 years and as you can imagine was in dire need of a complete transformation. In 2014 the residence hall was demolished to make way for the new and improved, LEED-certified, Gateway Residence Hall. What is LEED? It stands for Leadership in Energy and Environmental Design. LEED is a program developed by the United States Green Building Council (USGBC) that provides third-party verification of green buildings. LEED provides building owners and operators the tools they need to immediately impact their building's performance. LEED buildings are designed to reduce waste sent to landfills, conserve energy and water, be healthier and safer for occupants, reduce harmful greenhouse gas emissions, lower operating costs and increase asset value. Gateway Residence Hall was designed to meet LEED Silver standards. Gateway is up and running and has been housing residence since the Fall of 2015.

UO24

Analyzing Sound Profiles of Unmanned Aerial Vehicles

Kaitlyn Kirkland, Christopher Smith, Teresa Ryan, PhD

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

The sound field of any source is affected by various factors. The dominant factors are the distance from the source to the recorder, the speed of the source, and the presence of competing noise sources at similar sound pressure levels. A procedure for recording and characterizing the source is necessary. The following work studies the sound profile of an Unmanned Aerial Vehicle (UAV) in order to assess the impact of distance and unique flight conditions. This work uses a custom MATLAB script to create and analyze spectrograms of recorded sound from a UAV. The sound is recorded at various specified locations in relation to the recording system and with distinctive flight parameters. These parameters analyze the impact of hovering compared at several different flight locations. Spectrograms show a visual representation of the various frequencies that the microphone array records. MATLAB will be used to create specific sound profiles for the source. The resulting spectrograms can be analyzed to find the frequencies which characterize the UAV flight. Future studies could consider how the recorded sound profile changes while the UAV is in motion as opposed to hovering.

UO25

Microphone Mount System for Unmanned Aerial Vehicles

Christopher Smith, Kaitlyn Kirkland, Teresa Ryan, PhD

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

Personal Unmanned Aerial Vehicles (UAV) are becoming more accessible to the public. With this increase of accessibility, concerns arise related to the threat to both military security and civilian wellbeing. Deterring the aforementioned threat is possible through an analysis of UAV sound signatures. This work is focused on the design of a UAV microphone mount system. The system is capable of holding three microphones along with the recording system. An existing vertical microphone array located on the ground will provide a standard for comparison against the UAV microphone mount system. The sound from the carrier UAV will be recorded to create spectrograms which can be used in analysis of the sound profile. Thus, a technique for characterizing the sound of the UAV and manipulating its profile from the recorded data can be developed. Moving forward, the performance of the system and microphones will be studied while the UAV and mount system is in motion.

UO26

PAS Process Improvement in Line Balancing

Dasha Tyneice Murphy

Our group's project is with PAS. The goal of our have a consistent production line that is balanced. Currently the process production is not meeting customer demand. We are studying the process for have familiarity of how operation works. My team joined PAS on this project because we wanted to improve the process. I believed this opportunity would challenge us and piece it together with our education and/or related experiences. PAS Kitchen Aid assembly line customer is Whirlpool only. The problem that the line is facing is production output is lower than customer demand. Another issue is there is inconsistent output being produce. The related cause has not been made known to me. We have recognized that there is an extreme bottleneck in the process. This bottleneck play a significant responsibility in flow rate of the process. My team and project champion will perform video time study on the process, utilize DMAIC process improvement to balance the line and in addition to create graphical charts to monitor improvements or the need for additional improvements. The

## Abstracts | Undergraduate Oral Presentations

expected end goal is have Kitchen Aid line production output flow optimized that meet customer demand. This process improvement will help the company to meet its customer demand rate for the first shift. Also, the operators and process will have the ability to have a consistent production output versus inconsistent.

UO27

Are there Temporal Shifts in the Perception of Cheating?

Samson Pepe Goodrich, Colleen Janeiro, PhD, Teresa Ryan, PhD

Dept. of Engineering, East Carolina University, Greenville, NC

Plagiarism and academic integrity violations have always been a problem in the educational system. The media has presented the next generation of students as lazier and more prone to resort to cheating than the previous generations. This widespread attitude has resulted in many studies being conducted in the past few decades, each involving high school or college students and their cheating behaviors. The various studies have addressed many aspects of the issue, including causes and methods of prevention. Dr. Ryan and Dr. Janeiro of East Carolina University organized and administered a survey each year for the past three years. The goal of this survey has been to gather longitudinal data and examine differences between student and faculty perceptions of academic integrity issues. During the second year of research, their study scope grew its focus on surveying students and faculty from East Carolina University to include two different institutions, Catholic University of America and Benedictine College. The third year of research maintained this scope, examining all three of the institutions with the same survey. This work presents the statistical analysis approach and includes key results from each administration of the survey.

UO28

Modeling impulse response of a complex coupled system.

Noah Sonne<sup>1</sup>, John Sterling<sup>2</sup>, Aldo Glean<sup>2</sup>, Ph.D, Joseph Vignola<sup>2</sup>, PhD, Teresa Ryan<sup>1</sup>, PhD

<sup>1</sup>Acoustics and Vibrations Lab, Dept. of Engineering, East Carolina University, Greenville, NC; <sup>2</sup>Center for Acoustics, Vibrations and Structures, Dept. of Mech. Eng., The Catholic University of America, Washington, DC

Cantilevers have been used as both static and dynamic sensing

mechanisms [1-2]. This work uses sets of cantilevers attached to a primary mass to detect system mass changes. The attached elements can be functionalized to trap a wide variety of specific target substances including chemical vapors, spores, bacteria, or other biomarkers [2]. Potential uses of this technique include many possible diagnostic or monitoring applications. When the coupled system is excited with an applied impulse, the cantilevers begin to vibrate in response. Eventually the cantilevers will synchronize their movement. The time at which this synchronization occurs is known as the coherence time. When mass is added to alternate cantilevers, the coherence time changes. By monitoring this change, the amount of mass added to the system can be determined. System arrays have been designed and tested through simulations to determine the amount of mass needed to experience a measurable change in the coherence time. Through these simulations, it has been shown that by adding two percent of the mass of a single cantilever element, a measurable change can be observed. Prototypes will be manufactured with 3D printing for testing arrays for agreement with the simulated results.

UO29

Hammer Reduction Project

Collin Sullivan  
Nathan Stafford

Abstract

Hyster Yale's main goal and objective is to make the workplace as safe as possible for employees. Reducing or eliminating hazards related to hammer use, improves safety and ergonomics. The use of hammers results in lower cycle time, increased errors and increased amount of injuries. Hyster Yale's leading cause of injuries in the manufacturing process is sprains and strains because of the use of hammers. Our goal is to develop a robust tool design that eliminates the use of hammers in the assembly process ensuring that safety and ergonomics concerns are not only recognized but improved.

Current methods of assembling forklifts using hammers establishes an increase in production costs, slower cycle time, increased errors, possible long-term illnesses and pose potential hazards to current employees. Our plan is to audit current hammer operations based on company priority. This allows us to determine which hammer applications need to be improved. At different stations on the assembly line, the use of hammers differ. At some stations the hammer is used with more force than others causing more risk for injuries. We will then develop solutions for individual assembly stations

## Abstracts | Undergraduate Oral Presentations

to pose minimal hazards with hammer use. This results in an improvement in safety conditions while eliminating hazardous situations for employees. With employee safety being the top priority, a foam pad should be added to handles at stations with more vigorous activity. At some stations the hammer might be able to be replaced by a compression gun eliminating the risk of strains and sprains. Since employees prefer hammers for priorities, keep hammers inspected and replaced when worn or damaged. The employees should then undergo training if new equipment is added and to operate existing equipment.

UO30

Changing the Mindset of Students on Academic Warning: A Comparison of Face-to-Face and Online Mentoring

Julie Gabrielle Smith

Freshmen often experience challenges with time management, sense of belonging, study strategies, and seeking out support. Research

has tested interventions designed to ease this transition, such as academic peer mentoring, encouraging students to adopt a growth mindset, and teaching them effective study strategies, but no research to date has tested all three interventions together. Peer mentoring between a more experienced student mentor and a freshmen mentee is generally effective in improving retention and academic performance (Gershenfeld,

2014). The existing research is inconsistent regarding effectiveness of online mentoring programs (Shrestha et al., 2008). Teaching students to adopt a growth mindset is another effective intervention for difficult academic transitions (Yeager & Dweck, 2012). A growth

mindset involves believing that your intelligence can be increased through persistence and hard work, and it helps students to cope with failure in positive ways that often result in improved performance. Both in-person (Aronson, Fried, & Good, 2002) and online (Paunesku et al., 2012) growth mindset interventions are effective, but no studies have compared both at the same time. A third way to help struggling students is to teach them about effective study strategies. Research has demonstrated that students' memory improves when they use strategies such as practice testing and distributed practice (Dunlosky et al., 2013).

The purpose of the present study is to test all three interventions in one setting using either an in-person or online

method of

delivery. Participants were students on academic warning with a GPA lower than 2.0. They were assigned either to an in-person or online

mentoring condition. The in-person mentoring group was enrolled in a class and met weekly with a mentor. The online group completed

weekly modules and had an online mentor. In both conditions, students learned about the growth mindset and effective study strategies. Outcome

measures included the LASSI, use of academic resources, and measures of mindset and achievement goals. The LASSI has 10 scales that assess

students' study strategies, time management, academic motivation, etc. The main hypothesis is that students in the in-person format will show

increased scores on factors that have a positive impact on academic performance, such as a stronger growth mindset, shifting from ineffective to more

effective study strategies, and increased use of resources.

UO31

The Emotional Effect of Musical Underscoring in the Play *columbinus*

Jessica Rogers, Aimee Radics

Department of Fine Arts and Communications, East Carolina University

My creative endeavor is examining the emotional effect of musical underscoring in the play *columbinus*. I chose to work with this specific play because I felt the story of the 1999 Columbine massacre is important and should still be shared publically. I also felt that the show could easily be enhanced by the use of appropriate underscoring. As a musical theatre major, I felt as though my understanding of how music is able to emotionally

impact an audience would be an asset in this process. My research exists in two steps: investigative and production. During the investigative process, I, along with my faculty mentor and student director, mapped out where we felt musical underscoring should exist. Then, we would spend two weeks exploring Spotify, Pandora, and our own musical collections to find musical underscoring that fit the moment and prospective emotional impact. At the end of the three-week period, we would run a case study with eight actors where they read the play aloud while the team played the underscorings. Once the reading was

## Abstracts | Undergraduate Oral Presentations

completed, each of the participants and members of the research team were given a survey to evaluate each underscoring for its appropriateness and emotional impact, along with the show's overall impact. We completed this process a total of three times during the fall of 2017.

This semester, my team and I are completing the production process. We submitted the show to a student production company, 5th Street Players, and were approved for production in November of 2017. Auditions for the show will be held in mid-February, and rehearsals will begin in March. My role during this time is that of production and academic supervisor. I will be overseeing the project to make sure that the production coincides with my artistic vision and is based on historical accuracy. I will work closely with my student director, who was also a part of the investigative process, as well

as the 5th Street players team, to create a full scale production with lights, costumes, set, and the musical underscorings that were found during the investigative process. The final project will be the performance of the show on April 27th and 28th in Messick Theatre Arts Centre.

UO32

Social Stress and the Health of Women in the Andean Highlands: An Explorative Study

Nadiya Volodymyrivna Yerich

Benjamin Blakely Brooks, PhD

Social stress and health were explored among Andean highlanders to understand what stressors Andean women experience. The women's stressors were investigated using the research methods of cultural domain analysis: free listing, unconstrained pile sorting, and constrained pile sorting. Analysis of the data has shown insight into how Andean women process the stressors they experience. The collected data was analyzed using cultural domain analysis to examine relationships between demographic variables and social stress. The findings reflect a shared consensus among women in the Andean highlands over the kinds of stressors they experience, as well as how they categorize these stressors.

UO33

The Effect of Art Therapy On the Mental Health and Overall Well-Being of Medical Students in Eastern North Carolina

Kayla Marie Daughtry

Current psychological research has consistently represented data which shows that medical students exhibit a high population rate of mental health issues. These issues typically include depression and anxiety, whose symptoms can cause difficulty in keeping up with the rigor of medical school coursework, a decline in grades, and loss of passion for their field of study (Givens & Tjia, 2002; Michalec & Keyes, 2013). Additionally, high rates of depression and anxiety are exhibited among current practitioners of healthcare. (Mata, Ramos, & Sen, 2017). The symptomology of these mental health issues can prevent both students and practicing physicians from performing at their highest capability. However, the stigma surrounding the reception of mental health services reduces the rate at which students seek help (Givens and Tjia, 2002). Lack of treatment of depression and anxiety can lead to a decrease in mental health for the long-term. Subsequently, this long-term negative affect may carry over into an individual's practice as a healthcare professional, thus causing a heightened percentage of doctors with reported mental health issues. Due to the negative stigma which surrounds the necessity of mental health services in medical school, it is important to find an alternative means to relieve student stress and increase self-efficacy. The purpose of this study is to invite medical students at the Brody School of Medicine to participate in free mini-art sessions in order to

create art in several different mediums, then record their perception of the classes and how they feel it has affected their well-being, if at all. It is estimated that approximately 50 students will attend at least one of the three sessions. The students then will fill out a short questionnaire modeled after various pre-established psychological measures of well-being. It is hypothesized that following the art sessions, students will express decreased levels of stress, feel more connected to the classmates who are also participating, and feel as if this is an outlet that could potentially help with the mental health issues that are commonly experienced among medical students.

UO34

The Effect of NFL protests for TV Viewership

Austin E Phillips

Two things have significantly impacted the National Football League (NFL) in the last year: First, there was a decrease of viewership of around 9.7% in the last Nielsen ratings of 2017 (Rovell, 2018). Second, the protests during the national anthem started by former San Francisco 49ers quarterback Colin Kaepernick, ultimately involved over 180 players in the 2017 season (Breech, 2017). There have been much speculation

## Abstracts | Undergraduate Oral Presentations

regarding why viewership has been down and many discussions regarding the impact of player protests. The purpose of this research is to see the effect of NFL player national anthem protest on TV viewership of NFL games. This protest, of course, has a short history and limited research has been conducted on it. In order to better understand the role of the protests this project first reviews the actions of Mahmoud Abdul-Rauf in the NBA. The NBA's restriction of his protest. And the viewer responses to the protest. This background is used to inform the discussion on player protests and guide the construction of a Qualtrics survey to learn about viewer attitudes regarding the NFL, Colin Kaepernick, and the ongoing protests during the anthem. Through the self-report responses I will be able to develop a preliminary assessment of how viewer's opinions and viewing behaviors have changed. Specifically, I will be examining how viewers experience dissonance between NFL viewing and the continued protests as many have already expressed a passion for the game but a negative reaction to players protesting. Cognitive dissonance is based of the idea "when apparent contradictions between two connected attitudes or behaviors force a realignment toward consistency or consonance" (Woodward and Denton, 2014). This approach will allow me to identify what the specific sources of dissonance are and reveal how viewers cope with that dissonance. Moreover, I will also be able to examine the role of race and gender as they influence viewer choices. Ultimately, I hope to better explain the role of player protests with the decline in NFL viewership and to provide insights on the future handling of protest to avoid this issue in the future.

UO35

The Effects of Fine Arts on Language and Literacy Skills in Children

Lauren Elizabeth Culver

Dr. Marianna Walker

Current techniques of teaching literacy to elementary school students are commonly based on standard reading programs from Macmillan, McGraw Hill and Houghton (LaJevic, 2013). Although systematic, these structured literacy approaches may not facilitate natural learning experiences for students. This study will utilize the constructivist approach to explore how children's experiences and reflections enhance natural literacy development. The constructivist approach is a method of learning in which an individual learns through his or her experiences as opposed to systematic content (Hedden, et al. 2017). Utilizing the constructivist approach, students acquire more sustainable knowledge development in comparison to simply memorizing

during repetitive teaching methods (Hedden et. al, 2017).

By integrating art practices with literacy tasks, specifically dance and visual arts, active experiences have been shown to enhance cognitive functions necessary for language and literacy skills, such as memory and recall (Giguere, 2011). While current studies have provided a basis that supports art-based and natural learning, minimal research has been conducted to examine the effects of these methods on oral language and literacy skills. The effect of art integration on oral and written language output complexity in children has not been sufficiently investigated.

The purpose of this study is to determine if creativity and arts engagement enhance language and literacy knowledge in young children. The study will be completed in Greenville, North Carolina at a childcare center and will include nine students who are at the first/second grade reading levels.

Pre-experimental language and literacy testing will be completed before the study in the areas of spelling, reading, and oral language. Experimentally, the children will participate in storybook, dance and visual art activities. Following each activity (condition), each child will engage in individual and group activities where oral and written language skills will be obtained. Word retrieval, sentence generation, and narrative skills will be compared between each activity (story listening, dance and art) to determine if there are differences in oral and written language abilities as a function of the conditions.

UO36

Breast Cancer Survivors (BCS) experience and management of musculoskeletal symptoms when receiving aromatase inhibitor therapy.

Ann Schreier, PhD, RN and Sarah Furnari

Department of Nursing, East Carolina University

Aromatase Inhibitors (AIs) are a type of estrogen-suppressive medication used for patients who have had hormone-receptor positive (HR+) breast cancer (BC) (Chumsri, 2015). These AI's decrease estrogen through the mechanism of suppressing the production of aromatase, which is an enzyme that converts androgens to estrogens (Chumsri, 2015). As such, when used for a patient that has a history of HR+ BC, these drugs have been proven effective in preventing recurrence and metastasizing of breast cancer (Chumsri, 2015). Unfortunately, it has also been discovered that for many women, there are significant side effects of AIs that lower health-related quality of life. These adverse symptoms are commonly musculoskeletal



## Abstracts | Undergraduate Oral Presentations

related, including myalgia and arthralgia, and can occur in up to 82% of patients (Lombard et al., 2015). As with most medications that induce such side effects, there are issues with compliance in medical regimen, whether delayed start of medication or nonadherence (Flanagan et al., 2016; Lombard et al., 2015). When AIs are discontinued, the production of aromatase begins again and estrogen is reintroduced. This can ultimately lead to a recurrence or metastasizing of estrogen positive breast cancer (Chumsri, 2015). The present study includes three major steps. First, a literature review was conducted and included the prevalence of adverse effects, qualitative data pertaining to the experience of receiving AI therapy and side effects and types and efficacy of symptom control methods. Results indicated that Black women were more likely to report depressive symptoms and have lower self-rated health, whereas there was no association between AI use and depressive symptoms/self-rated health in White participants (Calhoun, Helzlsouer, & Gallicchio, 2015). Further, previous studies found little evidence to support symptom control mechanisms. For the second step, qualitative interviews will be conducted with a diverse population of women who are breast cancer survivors, received AI therapy and experienced musculoskeletal symptoms. These interviews will be transcribed verbatim and then analyzed and coded based on themes and sub-themes. Little is known about diverse women's experiences and decision making regarding AI therapy. Lastly, the study will hope to increase healthcare providers understanding of breast cancer survivors experiences with AI's including intensity of symptoms, meaning of symptoms, and coping methods.

U037

The Impact of British Fire Control Doctrine on the Loss of the Battlecruisers at the Battle of Jutland

Briceño Lihar Bowrey

The Battle of Jutland is widely considered to be both one of the most important naval battles of World War I and one of the most important naval battles in British history. This battle, which occurred from 31 May to 1 June 1916, pitted the German High Seas Fleet against the Grand Fleet of the United Kingdom. During the battle, the British lost three battlecruisers to catastrophic internal explosions. The cause of these explosions has been the subject of much debate over the course of the last century. This paper seeks to survey and analyze several major theories on this topic using primary source documents and contemporary reports. These sources, in combination with an understanding of the technical specifications of battlecruisers and the equipment used by their crews, provide a multifaceted

explanation of the British losses. In the process of analyzing these sources, the reoccurring issue of British fire control doctrine, and its relationship to each theory, is considered. In this manner, a conjecture that both explains the losses and connects some of the seemingly disparate theories begins to emerge. This paper finds the claim that fire control doctrine was the fundamental and root cause of the loss of the battlecruisers at the Battle of Jutland to be valid.

U038

Examining the Outcomes of a Community Academic Partnership

Kelly Forbis and Deborah Tyndall

College of Nursing, East Carolina University

**Background/Purpose:** In Fall 2013, a Community Academic Partnership (CAP) began between the College of Nursing and Wells Elementary School in Wilson, North Carolina. CAPs have been shown to provide opportunities for mutual academic and community service-related initiatives. Although there are many potential benefits to implementing CAPs, research is limited on reported outcomes. Investigating these outcomes is critical to the development and sustainability of CAPs. The purpose of this study is to examine the outcomes of a four-year CAP between the College of Nursing and Wells Elementary School.

**Methodology:** A single, case study research design was used. Data is currently being collected and will be triangulated from multiple sources of evidence: 1) interviews with individuals who participated in the CAP, 2) physical artifacts (e.g. news clippings, poster presentations), 3) documentation (e.g. e-mails, minutes of meetings), and 4) participant-observation (i.e. observations made by the senior honors college student and research mentor). Purposive sampling was used to recruit individuals for interviews who participated directly or indirectly in the CAP. Ten participants provided consent to participate in audio-taped, semi-structured interviews. Data will be analyzed using content analysis.

**Results:** Preliminary findings suggest that a four-year CAP is sustained with quality relationships built on trust, support, and mutual benefit. CAPs

can be hindered by time, dissimilar interests, or lack of established relationships. Preliminary outcomes include: service learning opportunities for students, increased community and global awareness, student interactive learning, and support of leadership and service missions.

## Abstracts | Undergraduate Oral Presentations

Discussion: Schools of nursing should identify innovative approaches to provide service-learning opportunities by initiating and supporting relationships with community partners. Partnering with community agencies can provide a platform to mentor students and develop leadership skills. Fostering and building relationships is essential in the success of a CAP. This research provides a model for initiating partnerships with community agencies when service-learning outcomes are of significance.

UO39

Whats Cooking in the Beersheba Valley?

Teresa Leigh Yarbrough

Department of Anthropology, East Carolina University

This research is a comparative study of ceramic cooking assemblages between the Byzantine period and the British Mandate period in Israel. The purpose is to identify any differences in the types of cooking pots that are used to prepare foods. Both populations are engaged in agriculture, and by comparing the types of cooking vessels we can determine how the food was prepared during these two periods. This addresses a larger issue about culture change between ancient and recent populations in this part of the Middle East. In particular, it is often believed that traditional populations are appropriate analogs for ancient populations. However, preliminary results suggest that Byzantine and British Mandate period farmers prepared foods in significantly different ways. The farmers from the British Mandate period lack the vessels that are needed for preparing stews or casseroles, and they lack vessels that are used for frying food and vegetables. Instead, the Mandate period farmers are limited to vessels that are used for preparing bread. This discrepancy in food preparation, albeit speculative, may be due to the fact that these farmers were formally pastoral nomads. The plan for Research and Creative Achievement week is to present the provisional results, which suggest that traditional populations are not necessarily useful analogs for interpreting or explaining past societies in the southern Levant.

UO40

Examination of Disclosure After Adverse Childbirth

B. Bradley, M. Sharp, C. Dolbier

Introduction: Childbirth can be an adverse experience for some women that contributes to postpartum psychological distress. Disclosure (communication of personally relevant information, thoughts, and feelings) of a negative experience may affect distress. Disclosure has demonstrated associations with improved psychological adjustment following adverse experiences in other populations, such as decreased posttraumatic stress disorder (PTSD) symptoms. Little research has examined disclosure in the context of adverse childbirth. The purpose of this study was to identify 1) the proportion of women who disclosed their adverse childbirth, 2) characteristics of this disclosure, and 3) the relationship between aspects of disclosure and PTSD symptoms.

Method: Women who were at least 18 years of age, residing in the United States, able to read/write in English, and the biological mother of a living child resulting from an adverse childbirth in the year prior to study participation (N=166) were recruited from social media for an online survey. Sample characteristics: Majority Caucasian (86%), married (77%), college educated (57%), employed (53%), private/employer insurance (67%). The survey assessed disclosure methods, targets, and content, reasons for and for not disclosing, and PTSD.

Results: 81% of participants reported that they disclosed their adverse childbirth experience. Methods: talking in person (92%) or via phone (49%), writing online message post (67%) or text (58%). Targets: romantic partner (89%), family member (82%), close friend (79%). Content: description of experience (98%), feelings (77%) and thoughts (72%) related to the adverse childbirth. Qualitative data analysis of reasons for disclosure and non-disclosure are being explored. Those who disclosed had significantly fewer PTSD symptoms ( $M=24.93$ ) compared to those who did not disclose ( $M=36.56$ ),  $t(89)=2.09$ ,  $p=.04$ . Those who disclosed feelings had significantly fewer PTSD symptoms ( $M=22.04$ ) compared to those who did not disclose feelings ( $M=32.60$ ),  $t(71)=1.99$ ,  $p=.05$ .

Conclusions: A high proportion of women reported that they disclosed their adverse childbirth experience. Disclosure rates identified here are similar to other types of adverse experiences, such as sexual assault. Participants most often disclosed in person to individuals with whom they had close, personal relationships. Disclosure was related to fewer PTSD symptoms, with disclosure of feelings being most important.

## Abstracts | Undergraduate Oral Presentations

U041

Observational Play Assessment in Recreational Therapy (OPART): Applications for the Validation of Assessment in Recreational Therapy

Nicole C Fox & Dr. David P. Loy, CTRS/LRT, CDSS-II

The need for standardized assessments in healthcare is rapidly growing as new discoveries are made. As a growing occupation, it is critical that Recreational Therapy assessments are evaluated to provide evidence of the effectiveness of treatment. This study analyzed the interrater reliability, convergent validity, and predictive validity of a new RT Assessment, the Observational Play Assessment in Recreational Therapy (OPART). The assessment was designed to provide recreational therapists the opportunity to assess levels of physical, cognitive, emotional, and social skills of children with autism while observed in play settings. Reliability and validity evidence was generated through the comparison of the OPART to another psychometrically sound assessment used in RT, the Comprehensive Evaluation in Recreation Therapy (CERT). Four individuals observed children with autism while engaged in play to compare how a new instrument (i.e., OPART) might compare to an existing standardized instrument (i.e. CERT). Results suggested that the OPART had some evidence of interrater reliability (overall % agreement = .73; section agreement ranging from .60-.87%) with higher agreements when measuring functional skills with physical attributes (e.g., gross motor skills, fine motor skills, endurance/weakness). The OPART had some evidence of convergent validity with overall ( $r_s = .611$ ;  $p = .016$ ) and adjusted ( $r_s = .738$ ;  $p = .002$ ) scores of the CERT. Further analysis

of individual sub-sections of the OPART with the CERT suggested limited evidence of convergent validity as only one of the four sections approached statistical significance. The OPART also demonstrated some evidence of predictive validity in its' ability to accurately classify the functional level of the participants when compared to those assigned by staff familiar with individuals observed. The OPART was accurate in 8/15 (53.3%) cases while the standardized CERT was slightly more accurate at classifying participants in 9/15 (60.0%) cases. Overall, the OPART had some evidence of convergent validity with the CERT in terms of adjusted scores ( $r_s = .738$ ;  $p = .002$ ) and total scores ( $r_s = .611$ ;  $p = .016$ ) with total scores. While this initial step to validate a new instrument was promising, it is clear that significant development and validation is indicated. Recommendations and future considerations are provided for the validation of agency specific RT assessments.

U042

The Rural Prosperity Initiative: Public Health Disparities between Rural and Urban North Carolina

Erica Loraine Mullis

Rural America is the major supplier for agricultural crops, affordable energy, manufacturing materials, clean drinking water, and outdoor recreation otherwise not found in urban developments (Hales et al., 2014). Without the contribution of rural productivity to the economy and necessary resources in sustaining an increase in population, there would be no foundation or security for sustainability in more developed regions of the United States. Despite, the rural community's critical role in supporting urban regions, gaps in economic, educational, and health disparities continue to widen. With younger generations migrating towards more urbanized areas for job opportunities, those left are aging out with few remaining to replace their roles. Studies have shown the average age of rural counties is 5 years higher than that of urban (U.S. Census Bureau, 2013). The lack of investment in rural communities has created drastic increases in public health disparities, leaving those in rural regions of the nation such as Eastern North Carolina, in neglect and with minimal access to healthcare. In order to deeper analyze the differences between rural and urban areas, this project focused on the public health disparities seen between rural and urban counties in North Carolina and to call attention to the pressing issues that need addressing.

This study required collecting a diverse range of data and sources containing information from various databases, Public Health departments, Medical programs, federal, state, and local surveys, and data compiled from previous studies on health conditions and diseases. This data was analyzed, organized, and then converted into visual maps from which trends and distinct patterns are clear for various medical conditions and healthcare accessibility. It was evident the incidences of various health conditions are linked to the rural or urban classification of counties with rural counties exhibiting higher or more frequent rates of morbidity and mortality for many health issues. Rural counties had mortality rates that were 4.3 higher for Diabetes and 13.5 higher rates for heart disease. Urban counties had 14.9 more licensed physicians per 10,000 people than the average rural county. The results of this study provide a necessary foundation to open avenues for developing strategies to increase the investment of rural areas in order to improve quality of life for rural residents, including those in Eastern North Carolina.

## Abstracts | Undergraduate Oral Presentations

UO43

Scleroderma Defiance: A Practical, Educational and Free Guide for Self-Management of Scleroderma

Magen J Flanagan

Scleroderma is a rare, progressive and incurable autoimmune disease characterized by overproduction of collagen, which often leads to organ damage and sclerotic tissue. This health condition affects multiple organ systems and tissues, such as the skin and digestive system. Scleroderma afflicts people across the world. In the United States, it is estimated that 300,000 people suffer from this disease. Being diagnosed with Scleroderma is life changing and often results in feelings of helplessness and depression. Although there is no cure for this disease at this time, those with Scleroderma can slow the disease progression or even achieve a state of remission. For many, the internet is one of the first resources used to gather information regarding a medical diagnosis and disease management. However, online resources for Scleroderma patients are scarce and information regarding lifestyle modification is virtually non-existent. Nutritional counseling with Registered Dietitians (RD) has been shown to improve health outcomes in Scleroderma patients. Unfortunately, people with Scleroderma are rarely referred to RDs for nutritional consultations, which are not covered by medical insurance. Improving quality of life and helping patients to slow down their disease progression by implementing lifestyle and dietary changes are the principles behind creating “Sclerodermade defiance.com”. Sclerodermade defiance.com is a free, comprehensive, online resource designed to provide relevant information for daily management of Scleroderma symptoms. The goal is to help Sclerodermade defiance.com users improve health and nutritional status. This presentation will detail and expand upon these concepts to provide a clear understanding of this endeavor and its significance.

UO44

Head Start Teachers’ Experiences with Healthy Eating and Physical Activity

Jocelyn M. Bayles<sup>1</sup>, Lorelei Jones, MS<sup>3</sup>, Archana Hegde, PhD<sup>2</sup>, and Virginia C. Stage, PhD, RDN, LDN<sup>1</sup>

1. Nutrition Science, East Carolina University
2. Human Development & Family Science, East Carolina University
3. Expanded Food and Nutrition Education Program, North Carolina State University

Early childhood educators play a significant role in helping to

develop health behaviors in children; however they often lack sufficient health knowledge needed to effectively model positive health behaviors. The objective of the study was to examine the barriers, motivators, and facilitators Head Start (HS) teachers’ experienced when attempting to improve their personal healthy eating and physical activity (PA), and promote healthy eating and PA in their classrooms after receiving a 6-lesson nutrition education intervention. Seven HS centers (n=40 teachers) across two Eastern North Carolina counties received 6, 30-minute nutrition education lessons over a 7-week period. Lessons were delivered by trained Expanded Food and Nutrition Education Program assistants. Upon completion of the nutrition education program, researchers recruited teachers to participate in in-depth, semi-structured telephone interviews to explore their common experiences related to the nutrition education program, and attempts to improve personal and professional health behaviors. Interviews were recorded using digital audio and transcribed verbatim. Through open-coding, researchers identified themes related to teacher health behaviors. Fifteen female teachers averaging 11 years of teaching experience were included in the final sample. Outcomes revealed motivators: a desire to “break the cycle” (e.g. prevent child of teacher from suffering same ailments as teacher), body image (e.g. fitting into old pants), and having a workout partner. Common facilitators including: planning ahead (e.g. packing healthy snacks for the day) and convenience. Barriers to healthy lifestyles included: finances, lack of time, motivation, and access. The findings reveal an initial understanding of HS teachers’ personal health habits and their effect on performance and effectiveness in the classroom. It is probable that HS teachers who are committed to their own personal healthy behaviors will create an environment in their classroom that promotes similar improvements in their students. Yet, teachers often reported an underlying attitude of feeling ill-equipped to change children and families’ lifestyle at home. Additional research is needed to assess the changes in personal health behaviors that occur as a result of employee wellness initiatives.

UO45

“Eugenics in (and against) the Mix: Tracing Race as a Marker of Extralegal Governmentality in the Historical and Contemporary United States”

Treshawn J Blackmon

Too often we think of the eugenics movement as a mere historical phenomenon, but scholars argue that it expressed fundamental assumptions behind the racialized social hierarchy that shapes US society to this day (see Mitchell and Snyder 2003). This paper examines the history and enduring legacies of the eugenics movement from its origins in the early nineteenth century to contemporary political discourse about race relations, policing and incarceration, immigration in the US, and electoral politics.



## Abstracts | Undergraduate Oral Presentations

One of the legacies of eugenics is a long history of policies that dictate the tone of interracial relationships in the US. From miscegenation laws to welfare regulation, the federal government has imposed policies designed to control interactions among various populations as defined by race (Monroe and Alexander 2005). Developments related to policing and incarceration, and particularly to the rise of the private prison industry, reflect the continued salience of race as a marker of or barrier to social capital (Alexander 2010; Oleson 2016). And current debates about immigration reveal the ongoing differentiation of overseas populations into categories grounded in race (Nelkin and Michaels 1998; Smith 1993).

The pervasiveness of such racism is a perplexing legal phenomenon because it now lacks any statutory basis. Civil rights legislation ended the era of legalized discrimination. But the origins of eugenics in pseudo-medical science (Graves 2004), its staying power in the popular imagination, and its grounding in a presumably biological but entirely unscientific notion of race make it a potent electoral tool. Of late, legislators and political candidates have appealed to the notion of race as if it were real. As a result they have mobilized voters to elect them to office, often through gerrymandering and restrictive voter ID laws.

UO46

Making the Invisibles Visible: A Health Literacy Campaign for Eastern North Carolina Migrant Farmworkers

Author: Tulsi M. Patel

Mentor: Dr. Juan Daneri

Affiliations: East Carolina University, Association of Mexicans in North Carolina (AMEXCAN)

About 9 out of 10 adults in the United States have difficulty using everyday health information available in healthcare facilities, media and communities (Baur, 2010, p. 3). Health literacy is influenced by age, socioeconomic status and cultural background, and impacts how people communicate, understand, and respond to health information (Baur, 2010, p. 5). There are three million migrant farm workers in the United States, however they represent one of the most economically disadvantaged populations (Facts, 2017, pg. 2). Migrant farm workers experience barriers to health services based on isolation, poverty, language barriers, immigration status, and low health literacy (Connor, Layne, & Thomisee, 2010, pg. 160-161). The National Center for Farmworker Health reports that 73% of agricultural workers are foreign born and 70% speak English less than 'well' (Facts, 2017, pg. 1). Low health literacy reportedly limits the use of

preventive services and management of chronic conditions, and is also associated with misunderstanding prescription medication labels, increased preventable hospital visits, and mortality (Baur, 2010, p. 9). Moreover, the isolation associated with migration, in combination with the invisibility of farmworkers within healthcare and educational institutions, results in further poor health outcomes (Bail et al., 2012, pg. 1).

This project is designed to address this disparity by campaigning for the health literacy of migrant farmworkers. North Carolina ranks sixth in the United States for the number of migrant farmworkers, with a greater density existing on the farms in Eastern North Carolina. About 94% of these farmworkers are native Spanish speakers (Facts NC, 2012). In coordination with the Association of Mexicans in North Carolina (AMEXCAN), I am creating a health literacy program tailored to the needs of migrant farmworkers, as determined by a survey I administered in fall 2017. Programming conducted in Spanish will include instruction on medical English vocabulary, completing health history forms, describing pain, first aid, and reading prescription bottles. Funding from a \$1000 Phi Kappa Phi Literacy Grant will be used to develop and distribute materials for the project.

This presentation will consist of a review of my community engagement project, with specific focus on explaining how I translated my survey data into a health literacy program. The expected short and long-term benefits of the program will also be discussed.

UO47

Public Health Discourse as Healing Dialogue: Responding to Obeah as an Etiology of Suicide in Contemporary Guyana

William H Swain

In contemporary Guyana, witchcraft has become a means to account for a rising suicide rate, the highest in the world in 2015 (44.2 per 100,000). Health experts have thus felt the need to condemn Obeah as a "mistakenly attributed" cause of suicide. This paper explores the public health stakes in such statements. On one hand such cautions arise from a desire to protect the mentally ill from unnecessary stigma or abusive "healing" practices (Al Jazeera 2016; Mohammed 2015). On the other, un-nuanced responses may provoke mistrust in biomedical and public health personnel among local populations who rely on indigenous medical systems for more efficacious healing therapies.

In this paper, I argue that public health professionals should aim to achieve more than one goal in responding to such etiologies (cf. Anthony et al. 2017). Not only should they attempt to prevent such explanations from interfering with medical diagnoses and public health interventions; they should also have two additional



## Abstracts | Undergraduate Oral Presentations

goals: (1) to respond in ways that will avoid alienating indigenous healing practitioners from any collaborative dialogue with public health and biomedical personnel since misperceptions could undermine mutual trust; and (2) to explore such etiologies for insights into how local discourses on health and illness may classify, as “medical,” issues that biomedicine fails to think of as health-related, thereby highlighting the social preoccupations within which communities situate their health concerns. More nuanced responses can aid in communicating with local populations, even expanding public health’s understandings of health and illness in productive ways.

In Guyana, the term I gloss here as “witchcraft,” Obeah, is a congeries of African-derived healing practices useful for a range of problems involving physical and/or spiritual ailments as well as family problems, romance, professional success, etc.—a gamut of practical concerns on which a vast anthropological literature exists (e.g. Bell 1970; Hurston 1931; Paton and Forde 2012). Western observers, however, have long considered African-derived forms of witchcraft as logical in local terms but otherwise irrational (e.g. Evans-Pritchard 1976). And colonial powers outlawed Obeah as subversive. It remains illegal to this day throughout most of the Anglophone Caribbean (Handler and Bilby 2012). My aim is to undermine the risk that Guyanese will resist public health condemnations as further instances of neo-colonial control.

UO48

Community-Based Care as a Context for Addressing the Social Drivers of HIV Transmission: Charting Progress in Ghana

Courtney Hannah Kirchner

Models of community-based care have proven to be effective means of HIV and AIDS education because of the combination of local expertise and external resources that they bring to the challenge of reducing HIV transmission. In this paper, I explore the use and impact of such approaches in Ghana. Over twenty-five years ago, Awusabo-Asare (1995) proposed and described community-based interventions as key responses to the epidemic. Recent developments in HIV and AIDS prevention, however, also suggest that interventions must focus on the social drivers of infection while providing biomedical interventions (Mannell, Cornish, and Russell 2014). I therefore hypothesize that community-based interventions that simultaneously address the broader structural factors involved in HIV transmission will prove to be the most effective because they can both inform and empower participants.

I follow Aggleton’s (1990) assertion that biomedical models alone prove inadequate for understanding and addressing the vectors and impacts of illness. Yet debates and research continue over the forms of HIV and AIDS education best suited to reduce

transmission (Aggleton, Yakah, and Crewe 2011). In Africa, which remains the epicenter of the global pandemic, a confluence of economic, historical, and political factors will only enhance their ability to avoid infection and to teach others to do so not only as peer educators in specific interventions but more generally in their social lives at large.

If, as in South Africa, activism has proven a key means of responding to structural constraints and for unlocking resources in the fight against HIV and AIDS (Mbali 2013), then educating those most vulnerable to infection about the history of such efforts and the structural and historical reasons they emerged offer additional means for preventing new infections and for enhancing the futures of those infected and their loved ones and caretakers.

UO49

Healing Body, Spirit, and Society during Post-Earthquake Recovery: Vaudou and Public Health in Haiti

Cassandra Vixama

On January 12, 2010, a 7.0 magnitude earthquake devastated the poorest country in the Western hemisphere, Haiti. Piles of rubble still remain, and bodies are still being recovered from beneath the rubble throughout Port-au-Prince, Haiti’s capital. Haitians are still trying to heal their country structurally, physically, and spiritually. Public health and healthcare remain major preoccupations (Burki 2011; Dowell, Tappero, and Frieden 2011). Indeed, readily accessible treatment for so many medical conditions remains lacking (Friedrich 2011; McShane 2011; Moszynski 2012; Rahill et al. 2016).

Following the earthquake, Vaudou practitioners have helped their fellow citizens find meaning in their suffering and to develop a sense of control and self-efficacy under circumstances of recovery and rebuilding (Brown 2006). Because Vaudou plays such a fundamental role in daily Haitian life—in healing and multiple, practical pursuits—it has, not surprisingly, played important roles in recovery as well (Deren 1953; Hurston 1938; Métraux 1958) which go unremarked in most studies of the post-earthquake period (e.g. Schuller and Morales 2012).

However, Vaudou ritual experts, or vaudouisants, like Manbo Katy have created, overseen, and sustained supportive communities (lakous) that have provided housing, food, healing, emotional therapy, professional training, and financial support for participants (Vice News 2016). In this paper, I explore Haitian Vaudou as an alternative idiom around which to organize public health initiatives, in contrast to those typical of the “disaster industrial complex” that have dominated earthquake recovery (Svistova and Pyles 2017; Cohen 2012; Jobe 2011).

## Abstracts | Undergraduate Oral Presentations

As opposed even to public health, vaudouisants pursue wellness in a more holistic light, grounding wellness in social relationship with spirits or loas. The loas incarnate concepts, through spirit possession, that organize and classify various medicines and ritual therapies, in an embodied, performative healing manual, for the purpose of addressing different illnesses (see Vonarx 2011). As a result, there is little to differentiate social from strictly medical problems, and disasters like earthquakes become occasions for healing as much as any physical ailment. This social approach to health is indeed what makes Vaudou such a powerful response to the public health threats Haiti faces following the earthquake.

UO50

Pain perceptions of amputees with diabetes, their family and healthcare providers: A qualitative study

Joanna S Paul

Dr. Carolyn Horne

Chronic pain after lower extremity amputation surgery has been reported in up to 80% of patients. Amputations, which are among the most debilitating chronic complication of diabetes have a variety of consequences including increased likelihood of depression, inability to perform daily activities, stigma associated with chronic pain and perceived inability to reintegrate into society. This study sought to understand the lived experience of chronic

pain among those who have undergone a diabetes-related lower limb amputation. Researchers used a qualitative empirical phenomenology design. Private, semi-structured interviews were conducted on a purposive sample (N = 11) who had undergone a diabetes related amputation. Participants were primarily male (56%) with a mean age of 60.8 years (SD = +15.4) Interviews were transcribed verbatim. Transcribed interviews were read and re-read by each researcher separately and then coding was compared to enhance credibility of analysis. Codes were identified for each participant separately and then across participants for common themes. Three major themes are highlighted by this research: 1) Phantom pain is distinct from real amputation pain 2) Sympathetic but not empathetic 3) Identification of a new normal. The first theme revealed that the amputee was hesitant to speak to others about their pain. Participants gravitated toward non-pharmacological treatments and discussed the need for additional alternatives. The second theme uncovered that family members had a desire to help the person but could not due to lack of understanding or knowing the experience of the amputee. Finally, identifying a new normal included the amputation surgery being a choice for the person and spirituality assisting with adjustment. This research has implications for how chronic neuropathic or phantom pain is managed among persons with amputations. More research is needed in identifying and teaching amputees

alternative pain treatment beyond pharmacologic methods. This is especially important since amputees may be hesitant in discussing their pain with their healthcare provider and family if they feel the only solution is medication.

UO51

An Inventory of Waste: The Politics of Public Health and Race on Hog Farms in Eastern North Carolina

Hannah Ruth Allen

The history of hog farming in Eastern North Carolina demonstrates the racialized dimensions of public health and health disparities in the United States, amounting to environmental racism. The scale of hog husbandry in the region has produced a colossal amount of waste, roughly fifteen million tons in one year alone, diluted and left to evaporate in over 3,000 so-called "hog lagoons." But when the waste threatens to overflow even these repositories, hog farm management evaporates it more quickly by spraying it into the environment and inevitably onto the mostly African American neighborhoods nearby (Hellerstein and Fine 2017). Such measures have provoked a slew of health-related problems: gastrointestinal, respiratory, sinus issues, burning eyes, skin rash, chest pain, hearing problems, heart burn, and diarrhea as well as a perceived lack of control over their environment, a kind of psychological paralysis which may in turn lead to fewer if any attempts at activism to change the situation (Bullers 2005; Harmon 2015; Wing and Wolf 2000), and, last but not least, there is the proliferation of Salmonella and Listeria in hog lagoons (McLaughlin, Brooks, and Adell 2009).

Those impacted by the waste have attempted to bring civil law suits against the hog industry, but state legislators placed a legal cap on possible settlements with plaintiffs in 2017, whereupon Gov. Roy Cooper vetoed the bill; but it did not take long for the legislature to override the veto

(Targeted News Service 2017).

In this paper, I argue that only the most holistic approach to public health can prevail against such circumstances since even state health departments have little power to resolve the situation (Wing, Horton, Muhammad, Grant, Tajik, and Thu 2008; Wendee 2013). Indeed, since the 1970s, the North Carolina legislature has passed bills that promote the growth of hog farms, including cutting taxes on equipment and preventing local authorities from using zoning to deal with the odor issues (Wende 2013). Because politics has become a vector of illness in the current situation, nothing less than political as well as public health activism will end the problems associated with hog farming. Even as the conversion of hog waste to biogas offers a future solution (Ouzts

## Abstracts | Undergraduate Oral Presentations

2017), more immediate challenge persist.

UO52

Volatile Organic Compound (VOC) Emission in a University Printing Press Facility in Eastern North Carolina

Kellyn Marie Reese<sup>1</sup>, Jo Anne Balanay<sup>1</sup> and Ogaga Tebehaevu<sup>2</sup>

<sup>1</sup>Department of Health Education and Promotion, College of Health and Human Performance, East Carolina University

<sup>2</sup>Office of Environmental Health and Safety, East Carolina University

Many printing facilities use large scale printing presses to meet their order demand. Printing presses are known to release volatile organic compounds (VOCs) that may be potentially hazardous to the health of print workers and staff. Long term exposure to specific VOCs may lead to serious health outcomes affecting the blood, kidneys, liver, brain or central nervous system. The purpose of this study is to investigate the airborne total VOC (TVOC) and toluene concentrations throughout the workday in an eastern North Carolinian university printing facility. Photoionization detectors (PID) were utilized to measure the real-time TVOC concentrations for ~8 hours during each sampling day within a 6-week sampling period in 2 sampling locations (offset printing [OP] and digital printing [DR] areas) within the facility. Air samples were also collected using activated charcoal tubes at a flow rate of 0.20 liters per minute (LPM), and sent to an accredited laboratory for toluene analysis to determine the 8-hour TWA exposure. One-way analysis of variance (ANOVA) test was used for the comparison of mean TVOC concentrations by printing location. Preliminary results showed that the mean daily TVOC concentrations (n=38) have an overall average of  $6.68 \pm 3.25$  ppm for the entire study. The mean daily TVOC concentrations in the OP area ( $8.99 \pm 2.93$  ppm) is significantly higher than that in the DR area ( $4.38 \pm 1.38$  ppm), which may be attributed to the type of printing equipment used. Both the lowest and highest mean daily TVOC concentrations ( $2.46 \pm 1.35$  ppm and  $15.77 \pm 5.69$  ppm, respectively) were measured in the OP area. The maximum 1-second TVOC level was measured at 42.59 ppm in the OP area. The differences in TVOC concentrations between days may be attributed to the differences in workload (light vs heavy), while the differences within the day may be due to the specific tasks performed (e.g., ink loading, cleaning with solvents). The overall mean toluene concentration (n = 9) was  $0.14 \pm 0.10$  ppm, with a range of 0.04 – 0.31 ppm which are below the OSHA PEL-TWA (200 ppm), NIOSH REL-TWA (100 ppm) and ACGIH TLV-TWA (20 ppm). Findings of this study will help in further understanding the nature of offset printing and digital printing processes and in planning to improve worker protection in the printing and other similar industries based on important factors, such as location, equipment, workload and task.

UO53

The Kinematic and Kinetic Changes During Distracted Landing and Focused Landing Tasks in College-aged, Female Soccer Athletes

Caroline E Yeomans<sup>1,2</sup>, Kelsey Reeves<sup>2</sup>, Patrick Rider<sup>2</sup>

<sup>1</sup>Honors College, East Carolina University

<sup>2</sup>Performance Optimization Lab, Department of Kinesiology, East Carolina University

Soccer is one of the most popular sports in the world, and as it continues to grow in the female population there is a significant increase in leg injury risk. Research has shown that collegiate, female soccer players are 3-4 times more likely to suffer an injury vs their male counterparts and the female athletes' lower extremity biomechanics increase their injury risk. Some of the biomechanical risk factors that have been associated with leg injuries while landing were less hip and knee flexion and higher vertical ground reaction force (vGRF). Training programs have been implemented to correct these mechanics, but the high injury rate still seen in female soccer athletes questions how well the interventions transfer to game-like situations. A possible cause is that the focus of the athlete is directed internally during training (focused on proper body mechanics) as opposed to being externally focused on a game-like task (heading a soccer ball). Therefore, the purpose of this study was to determine the changes in lower extremity mechanics during a distracted landing task and a focused landing task in college-aged, female soccer players. All 27 participants completed the study protocol, signed an informed consent, and completed a questionnaire to gather information on their soccer history. Participants were prepped for bilateral lower extremity 3D motion capture using two force plates. They performed three successful trials of 2 different landing tasks. The distracted landing task required them to jump and tap their forehead on a suspended soccer ball. The focused landing task required them to jump and focus on their landing. A two-tailed, paired T-test was performed on each variable and significance was set at  $p \leq 0.05$ . During the distracted landing, the participants landed with significantly decreased hip flexion ( $-28.08 \pm 16.07^\circ$  vs  $-35.90 \pm 13.77^\circ$ ), knee flexion ( $-13.06 \pm 6.53^\circ$  vs  $-19.26 \pm 7.41^\circ$ ), and ankle dorsiflexion ( $-39.12 \pm 8.83^\circ$  vs  $-46.67 \pm 12.62^\circ$ ) at contact and significantly increased peak vGRF ( $1207.66 \pm 243.81$  N vs  $1069.66 \pm 253.11$  N). These results suggest that an individual's change in focus affects their mechanics when landing. Additionally, landing mechanics while distracted were consistent with a higher risk of serious injury according to established literature values. Future studies should examine whether the implementation of externally focused training techniques results in maintaining correct mechanics during game-like situations.

## Abstracts | Undergraduate Oral Presentations

UO54

The Effects of Using Music to Decrease Screen Time in Preschool Aged Children

Erica Carlisle and Deirdre Dlugonski, PhD Department of Kinesiology, East Carolina University

As children age, sedentary behavior increases, largely due to screen time. The goal of this study was to examine the effectiveness of using music and physical activity to decrease screen time among 2-5 year old children. Parent-child dyads were randomly assigned to either a screen time intervention (N=6) or screen time + music intervention (N=7) group. Parents and children wore accelerometers for 1-week before and after the intervention and parents recorded their child's screen time during the same weeks. Members of each group attended an introductory seminar and participated in a 4-week intervention. All participants received an email newsletter each week during the intervention with information and strategies for decreasing screen time using physical activity. The newsletters for the screen time + music intervention group also included songs to use as an alternative to screen time. All parent participants were asked to complete a process evaluation at the end of each week, where they listed challenges, successes, and effective physical activities or strategies. Parents in the screen time intervention group reported a small decrease ( $d=.39$ ) of 16.4 (41.5) minutes in daily child screen time from baseline to week 4 of the intervention, and parents in the screen time + music intervention group reported a moderate decrease ( $d=.65$ ) of 23.3 (42.5) minutes. Daily child sedentary time increased by 44.9 (32.4;  $d=-1.5$ ) minutes in the screen time intervention group. A decrease in daily child sedentary time ( $d=1.4$ ) of 45.4 (46.5) minutes occurred in the screen time + music intervention group. Parents in both groups reported that bad weather, long car rides, and using screen time as family time were challenges to limiting screen time. Going for walks or bicycle rides with

friends and family were commonly reported among both groups as effective physical activities. This intervention successfully decreased screen time in both groups, and decreased sedentary time in the screen time + music intervention group. Using music resulted in a larger effect on decreasing both screen time and sedentary time. Having resources with strategies for meeting screen time and physical activity guidelines was helpful to parents enrolled in the study. Substituting physical activity for screen time is worth investigating further in future studies.

UO55

Fiber's Doody: A Whimsical Tale of Fiber's Role in Digestive Health

Ashley Poindexter

According to a study conducted by Ogden and colleagues in 2015, 17% of United States youth ages 2-19 were obese in 2011-

2014. The percentage is nearly cut in half when the age range is narrowed to 2-5. There is a disconnect between these obesity rates—generally, children are getting more obese as they age. One possible intervention would be to educate children about nutrition at an early age; this would promote healthy behaviors and

potentially decrease the risk of developing obesity and its related diseases. The general agreement among health professionals is that public health nutrition should not only target at-risk groups, but also provide preventative measures for early childhood populations. My research focuses on enhancing the education of children and their families as it pertains to nutrition, diet, and a healthy lifestyle by creating fun resources. To do so meant researching various peer-reviewed health and psychology journal articles to discover the most effective ways to present nutrition science information to elementary-aged children. While the market for scientific resources geared toward children is expansive, such as The Magic School Bus series, there are far fewer specific to topics of nutrition. To fill this gap, I created a children's book about a basic, but vital aspect of everyday nutrition—fiber. The development of this book, named Fiber's Doody, was based on a literature review that I created on children's perception of shape, color, space, and word choice. Fiber's Doody will help children visualize and understand what happens in their bodies when they eat certain foods. This, in turn, will aid in the development of healthy food habits to lower the risk of nutrition-related complications later in life.

UO56

Homosexuality as a Vector of Morbidity in Africa: Tracing the Public Health Implication of Colonial and Neo-Colonial Practices

James D Clark

Over the past thirty-five years, public health in Africa has seen a troubling rise in homophobia. Across the continent, homophobic regimes, laws, and social movements have proliferated due to a variety of circumstances (Chitando and van Klinken 2016.) Former British colonies continue to live with the legacy of homophobic colonial laws. Although Napoleonic France abolished "anti-sodomy" laws across continental Europe, religious and political justifications for homophobia have proliferated (Hellweg 2015.) Yet, pre-Colonial African history gives evidences of multiple same-gendered erotic practices (Msibi 2011). In this paper, I suggest that the causes of current homophobic violence in Africa lie in the post-colonial dynamics that have given rise to the anxieties about Africa's place in the world.

One flashpoint for homophobic violence has been the issue of gay marriage. Three years ago in Senegal, police arrested eleven alleged participants in a gay marriage event, and a Senegalese journalist was sentenced to six months in prison for alleged "acts of homosexuality" (CBC 2015.) In Tanzania, police arrested a woman after a video of her alleged same-sex marriage proposal spread on the internet (Reuters 2017.) Most notoriously of all,



## Abstracts | Undergraduate Oral Presentations

Uganda passed legislation mandating life imprisonment for so-called “aggravated homosexuality” (BBC 2014), although the country’s Constitutional Court later rescinded the law.

Such incidents have multiplied after the passage of gay marriage in France and the United States in 2013 and 2015, respectively. Already vulnerable to economic and political interference from overseas, the citizens of many African nation-states have read gay marriage as one more perceived threat to their cultural autonomy, one over which however, they have some measure of control: they can stigmatize and punish those to seem to support gay marriage (Hellweg 2016.)

Examining homophobic violence means exploring the socio-political vectors of morbidity in ways that implicate public health in the realm of political economy as much in biomedical domains. Without focusing on such circumstances, African public health agents will miss opportunities for expanding the horizons of public health practice.

UO57

“Biomedicine and Indigenous Healing in Africa: Steps toward Collaboration for Better Public Health”

Madeline Miconi

Physicians, nurses, and public health practitioners increasingly embrace the promise of medical pluralism. They recognize that good public health means meeting communities first in their own healing worlds (Johannessen and Lázár 2006). This is as true in Africa as anywhere, particularly amid challenging economic circumstances (Eggertson 2015; Olsen and Sargent 2017).

Across Africa, collaborative treatment initiatives combine biomedicine and indigenous healing, proving that “traditional medicine” is dynamic and that physicians and nurses often recognize the efficacy of non-biomedical approaches (Mulemi 2017). South Africa has taken the lead in this area, approaching HIV and AIDS and other illnesses through mixed approaches (Cullinan 2009).

This paper examines the mutual perceptions of biomedical and indigenous healers, arguing that indigenous healers are more willing to collaborate medically than their biomedical counterparts. I hypothesize that this is so because of the extent to which biomedicine is beholden to a set of assumptions we might well call “religious” even as indigenous healers, often presumed to be slaves to ritual, have a more cosmopolitan position.

Mngqundaniso and Peltzer (2008), for example, have found that South African sangomas referred patients to nurses, but nurses were unwilling to do the reverse. Such tensions have led to public dissent, as when 500 indigenous healers protested the Treatment Action Campaign for shutting them out

from collaborative care for patients living with HIV and AIDS. In contrast, healer Prudence Mabele had lobbied hard for patient access to antiretrovirals (AllAfrica.com 2017). In short, mutual perceptions between alternative healers are as determining of the opportunities of medical pluralism as are patients’ differential impressions of them.

UO58

Thermal stress in artificial cavity-nesting Eastern Bluebirds: killing them with kindness?

William J. Zahran, Angelica N. Reed, and Susan B. McRae

Artificial nest boxes were introduced to help cavity-nesting species with declining populations that were competing for limited nest sites. Nest boxes have been shown to lower predation rates and ectoparasite loads. However, nest boxes do not provide the insulation benefits of natural cavities and may be increasing thermal stress on cavity-nesting species. Recent studies have found evidence for the effects of extreme ambient temperatures on hatching and fledging success in passerines. Therefore, I hypothesized that clutches experiencing the highest mean temperatures would have a greater likelihood of hatching failure. I expected that broods exposed to high mean temperatures during the nestling period would influence nestling growth and survival rates. I studied multiple-brooded Eastern Bluebirds breeding in nest boxes at ECU’s West Research Campus. I collected temperature data from a consistent position within nest boxes using programmable thermochron iButtons to measure temperature at 10 minute intervals continuously during the incubation and nestling periods. I recorded data on hatching success, nestling size, and fledging success. I found that high mean temperatures during incubation impacted the proportion of unhatched eggs in a nest. Some late broods tolerated prolonged temperatures above 40° C where boxes remained in full sun because no natural shading was available. My results suggested that some nest boxes reached temperatures above a tolerable threshold for some bluebird embryos to survive. To mitigate the effects of heat stress, nest boxes should be designed with insulation properties or placed where they receive natural shading to provide a stable microclimate for cavity-nesting passerines.

UO59

Lithological and Foraminiferal Characteristics of Shoreface and

Shallow Shelf Facies off Bogue Banks, North Carolina

Lillian Howie<sup>1</sup>, Stephen Culver<sup>1</sup>, David Mallinson<sup>1</sup>, Kathleen Farrell<sup>2</sup>



# Abstracts | Undergraduate Oral Presentations

1Department of Geological Sciences, East Carolina University

2North Carolina Geological Survey

Fossil foraminiferal assemblages are used by paleontologists to determine the depositional environment of the strata in which the assemblages are found. This allows for the reconstruction of past environments and climates working under the assumption that specific foraminiferal assemblages are diagnostic to the depositional environment. However, foraminiferal assemblages of several coastal subenvironments (e.g., beach, shoreface, ebb tide

delta, inner shelf) have yet to be extensively studied. In this study, Holocene sediments from vibracores taken off the coast of Bogue Banks, NC, were analyzed for their lithology and foraminiferal assemblages to study the differences between shoreface and inner shelf environments. Two 3 m vibracores from each environment were logged using a method that is independent from composition, and samples of sediment from Holocene units were taken for foraminiferal analysis. Sand and mud content were determined by sieving. The 63-710 micron fractions of the samples were floated in a sodium polytungstate solution to concentrate foraminiferal tests. Approximately 100 specimens were randomly picked from each sample and the relative percentages of three major foraminiferal taxonomic groups were recorded. In shelf sediment samples, assemblages comprised 95% to 100% *Rotaliina*. In comparison, shoreface assemblages comprised 85% to 90% *Rotaliina*, with 10% to 15% *Miliolina*. These results suggest that a potential method for distinguishing the two subenvironments could be found in the number of specimens within the suborder *Miliolina*.

UO60

Can an invasive species help save a threatened population of King Rails?

Weston L. Beamon, Katie M. Schroeder, Susan B. McRae

Department of Biology, East Carolina University

Invasive species are frequently harmful to native species and to ecosystem stability. Yet, in a few cases, alien species have been found to benefit native residents. I investigated the possible benefit of a deliberate introduction of the Red Swamp Crayfish *Procambarus clarkii* over two decades ago into Mackay Island National Wildlife Refuge (NWR). The refuge hosts one of the largest breeding populations of King Rails *Rallus elegans* on the east coast of the United States. The King Rail is mainly carnivorous and feeds in the shallows on fish, crustaceans, and other aquatic life, but have a fondness for crayfish. Dietary constraints may have contributed to the decline of King Rail populations across its range, and this could explain its extirpation from suitable areas and Near Threatened status. The invasive crayfish is fast-growing and a prolific breeder. It could be

providing these rare birds a resource that allows them to prosper here relative to other sites. Over the summer breeding season, I measured crayfish and rail abundance and distributions to see whether they were correlated in space and time. I captured crayfish using food-baited traps at eleven predetermined sites being surveyed for rail breeding density as part of an ongoing study. In addition, carapace remains from consumed crayfish were collected as a representative sample of the segment of the population that fell prey. To estimate relative abundance, the King Rail population was surveyed via passive recording of calls using autonomous recording devices (Wildlife Acoustics). This method was new to this study, and was calibrated to callback surveys and nesting activity to determine population distribution. Partially-automated analysis of 1 TB of audio files was achieved using Kaleidoscope spectrogram detection software. Based on operator-entered parameters, the software recognizes signature wavelengths and intensities in a sound and clusters them with similar sounds. Clusters are user-validated. Measurements of carapace fragments indicated that the largest size class was consumed. This size class began to appear in trapped samples around the time the king rails began to breed, and numbers of the largest size class peaked during the late

nesting period. Preliminary data shows both species preferred areas of natural marsh compared to impoundments. Analyses are underway to determine if the spatial distribution of breeding king rails favored areas of the refuge where crayfish were most abundant.

UO61

Fibrinolysis and the Affects of Cross-Linking Within a Network

Andrew Fuquay

Mentor: Dr. Nathan E. Hudson

Hemostasis, the process of stopping blood flow, is a complex process which plays a fundamental role within many biological systems. During the process of hemostasis major issues such as thrombosis, myocardial infarctions, or ischemic strokes can easily lead to complications or death with ischemic strokes alone killing over 100,000 Americans every single year. Although much is known about the larger process of blood clot coagulation and decomposition, many questions remain unanswered on a fundamental level of fibrin interaction, which could potentially shed light upon many of these major complications. Within the body, fibrin, an insoluble glycoprotein, is formed through the combination of thrombin and fibrinogen, which results in a network of fibers and platelets at the site of vessel damage. While thrombin is converting fibrinogen to fibrin, fibrin stabilizing factor (Factor XIII) is simultaneously converted into FXIIIa by thrombin. FXIIIa forms crosslinks between fibrin molecules, allowing the fibers to form an insoluble clot.

## Abstracts | Undergraduate Oral Presentations

Currently, what we know about fibrinolysis is there are two final states of fibrin fibers during the breakdown process, elongated and transected. During the degradation process in a healthy individual a clot should entirely decompose, allowing the body to continue function as normal without remnants of clots floating throughout the circulatory system. However, experiments in the past have shown single fibrin fibers introduced to plasmin in lab settings have a mixed rate of elongation versus transection. Following up on single fibrin fibers, two dimensional networks of fibrin fibers without FXIII were observed. The observations have shown a drastically higher rate of elongation, with extremely minimal rates of transection in two dimensional networks compared to single fibrin fibers. With my first set of preliminary data, it seems an increase in network density causes an increase in elongation with a severe reduction of transection. The next step of my experiment, and the second set of data that will be presented, is to test the effects of FXIII on two-dimensional fibrin networks and compare the rates of elongation and transection versus fibers without FXIII.

UO62

Developing procedures for OSL dating of halite deposits

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 explore basic luminescence properties of halite to see if OSL can be used for dating halite and then to find the ideal measurement conditions. Dating these samples would provide information as to age of extremophile microbial organisms that may at one point have existed within the crystalline structure of the halite.

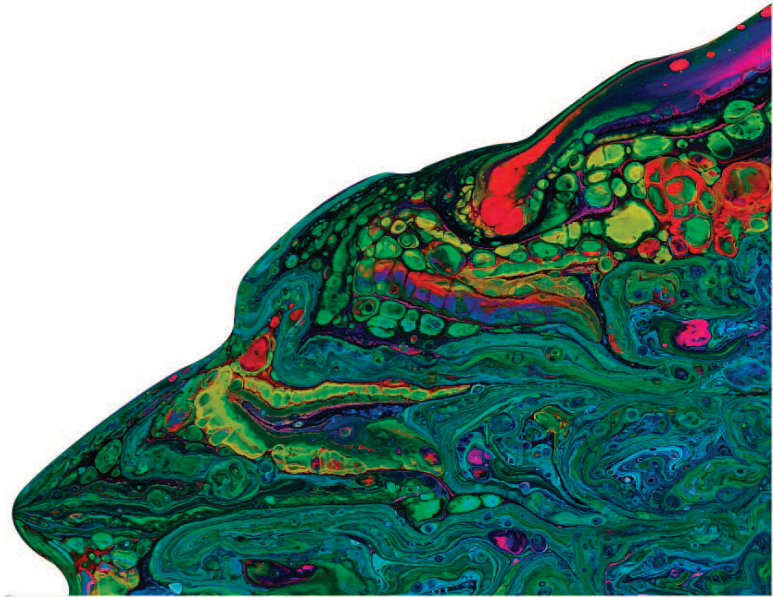
We explore parameters for using the orange and a blue luminescence emissions of the material to see which method is more accurate. Optimum pre-heat temperatures for the release of electron traps, ideal heating rates, and experimental irradiation limitations will be investigated. A dose-response of the material to known doses of radiation will be measured to compare the accuracy of the two methods. Eventually x-ray powder diffraction will be conducted to test the purity of halite samples.

UO63

Graviton Theory: Using Quantum and Classical Mechanics to Describe the Nature and Mechanics of Graviton Particles

Noah M. MacKay, Aaron M. Bain, Dr. Michael Dingfelder

Gravitons are the particles of gravity that would connect quantum mechanics with those of gravitation. As particles, they travel at the speed of light ( $c$ , or  $3 \times 10^8$  m/s); and the detection of gravitational waves is a step closer to potentially acknowledge the particle's existence. For this theoretical project, both quantum and classical physics are used to answer the following questions of consideration: 1) Aside the knowns, what are gravitons, truly? 2) How can they affect the way we see and understand the universe? 3) How, in what way, do they influence gravitational mechanics, spanning from the gravitational field to waves?



# Abstracts | Undergraduate Poster Presentations

UP1

Design of a Graphic User Interface for InfoSec Learning Network Environment

Wesley Hotalen

This research will discuss a graphic user interface (GUI) used in an infrastructure for cyber security education. The infrastructure includes a set of identical student network environments that will be implemented by using virtualization technology with each environment emulating a realistic network. Multiple virtual machines (VMs) will be implemented in each environment and those machines will serve both tasks of attack and defense. In addition, the infrastructure allows interaction among students' network environments, thus making it more similar to a realistic world network.

Each student will manage his/her own network environment and the GUI application will provide access to the environment. A series of labs will be designed to help students learn the knowledge of network security assessments, computer systems' vulnerabilities exploitation, and intrusion detection and prevention. The application will provide a link to all required tools, introductions, and instructions to help students perform the attack and defense lab activities. The proposed infrastructure will be accessible through a secure Internet connection. With the help of virtualization technology and designed GUI application, both on-campus and distance education students are capable of accessing the infrastructure anytime and anywhere in the world to practice attack and defense techniques. Upon completion of these activities, students will be well-prepared and ready to contribute their knowledge and hands-on experiences of cybersecurity to a high demand workforce.

UP2

Improvements in Process Monitoring for Defect Reduction

Cory D Cavallero

The project entails utilization of proven lean six sigma methodologies to save money and reduce wasted effort and resources for Thermo-Fisher Company. We will be restructuring current data collection methods to establish a real-time reporting system to reduce defect rates on their production lines. A root cause analysis exercise will be undertaken to identify reasons for high defect rates for products

manufactured. The DMAIC method of lean six sigma will be utilized to proceed on this project. In this method, first we will define the problem, measure the output in quantifiable terms, analyze the collected data, implement a new method for monitoring, and ultimately control the process. The ultimate goal of our efforts will be in aiding to reduce the overall defects on the production line and providing input on methods for reporting-response procedure. The types of waste we anticipate reducing in this project are: information waste, transportation waste, and waste in the form of avoidable defects.

UP3

Water Reclamation system for Hyster-Yale manufacturing plant

Andrew Mckeithan

Ben Sheridan

Water Reclamation system for Hyster-Yale manufacturing plant

Ben Sheridan, Andrew McKeithan

Department of Technology Systems, East Carolina University

Abstract:

This project is to establish a rainwater reclamation system for the Hyster-Yale production facility in Greenville, North Carolina. Hyster-Yale currently has a 5,000-gallon hydraulic tank that has been professionally cleaned and approved for water storage. They would like to use this tank for the purposes of collecting and reusing rainwater from the production facilities. The task at hand is to design and implement a system to efficiently collect and distribute captured rainwater from the facility that can be used in the production line. Our goal is to determine the optimal location for this storage tank and the best purpose for the recycled water. This will include designing a filtration and distribution system for the reclaimed water. The facility currently uses water from Greenville Utilities Commission in processes such as; main painting, powder painting, paint burn-off, cooling tower for air conditioning, and irrigational systems. This rainwater reclamation could potentially save the company thousands on utility payments as well as reducing the environmental footprint. This system of water reclamation will be a valuable addition to the environmentally sustainable culture that Hyster-Yale strives to uphold.

## Abstracts | Undergraduate Poster Presentations

UP4

Dissecting Convolutional Neural Networks for Automatically Classifying Biomedical Images

Justin Daniel Whitaker

Junhua Ding

The focus of my research is to automatically classify cytological images as cancerous or non-cancerous. I am using a supervised, deep-learning convolutional neural network (CNN) to classify the images with the machine learning framework TensorFlow. In order to clearly understand how CNNs work and to customize my network for classifying the biomedical images, my first step is to examine each hidden layer of a convolutional neural network. I built a CNN for classifying MNIST handwritten digits in TensorFlow, and developed an approach for viewing how backpropagation affects each node in the activation maps of hidden layers by visualizing their outputs as images across training epochs on a given input. This can allow one to look inside the black box of neural networks and gain a deeper understanding of their mechanics. Going forward, I will apply this technique in classification of the cytological images. I will first transform each image into a group of labelled images for the CNN inputs, and then develop a way to produce balanced large scale cytopathology images to train the network.

UP5

Increasing Slot Time Availability in Product Thaw

Chancery Smitherman, Tyrus Keen

Patheon is a contract company that works with scientist and investors to create pharmaceutical drugs. Currently, to be in accordance with FDA guidelines their process time for creating experimental drugs requires an average of 48 hours of wait to allow for the controlled thaw of potential new mixes. Due to this, Patheon is wanting to implement a solution for allowing parallel processes in order to have more fill slots available.

To accomplish this, our first goal is to create a process map that shows the overall time for the complete process, from receiving order to batch storage, as well as the individual processes. By creating a process map, we should be able to accurately reflect the times and flow. From there, we can take this information and create an ideal future state that would reflect the amount of time created for these new process batches as well as a measurable amount of new fill slots created. One of the potential problems that we are checking for is to check for

bottlenecks if the thawing processes was to be mitigated.

UP6

Interior Design: Technological Marketing Strategies for the Profession

Rebecca Lynn Culvahouse

Marlyn Alexis Stevenson

Susan Martin Meggs

This presentation will compare the use of technology in the interior design profession to educational programs. A technology-based marketing scheme is proposed for students seeking employment as interior designers. Digital graphic programs have been used for decades to develop design materials such as graphics, pictures, 3D models, etc.. Design is taught throughout schools and institutions to let students develop their creativity by hand, and now it is developed through technology as well. The technological applications used in the industry will be analyzed to align with curricular instruction in interior design. Design and architectural firms will be surveyed to provide statistics on hand drafting practice, digital program usage and frequency, and the perception of graduates' skills for professional applications. Educational institutions will be contacted as well with similar inquiries on digital program applications and student outcomes. A comparative analysis will provide information determining whether certain program knowledge is necessary to obtain prior to graduation, or if this is a skill best learned through the professional environment. Interior design is an ideal example of the importance of technology for future employment. In order to find the perfect job, students need a high level of expertise. The use of technology in the pedagogy of interior design programs is compared to the use within the profession to determine the alignment of needs for the industry. This alignment will help determine a marketing scheme for interior designers that seek fulfilling employment opportunities.

UP7

The accurate computational evaluation of ionization potentials in the geometric isomers of phenylenediamine

Hanna L Kosnik<sup>1</sup>, Dr. Andrew Sargent<sup>2</sup>

<sup>1</sup>Department of Biology, East Carolina University



# Abstracts | Undergraduate Poster Presentations

2Department of Chemistry, East Carolina University

Phenylenediamine is a well-known electron-rich molecule that can be readily functionalized through the amine groups to form interesting new compounds. When appended to hoop-shaped macrocyclic molecules, for example, the phenylenediamine group enables the aggregate to act as a selective ion receptor or transport agent, properties that are critical to applications such as chemical sensing and drug delivery. The specific electron-rich molecule of interest to us, tetramethylphenylenediamine (TMPD), has three structural isomers defined by the positions of the dimethyl amine groups in para, meta, or ortho orientations, and the electrochemical response of these three isomers has been clearly established through experimentation. Within the para isomer, there are two reversible one-electron oxidation waves to form the radical cation, and dicationic species, respectively. The ortho isomer also displays two reversible one-electron oxidations but the potentials are closer together. The meta isomer reveals a single oxidation wave that is irreversible. Even though these molecules are small and seemingly simple, the computational modeling of their redox behavior has been elusive; to date, modeling studies have been unable to reproduce the simple trends in the ionization potentials. In order to mimic the experimentally known potentials, we have performed density functional theory calculations in which the density functional, solvent reaction field, and the number of solute particles are varied. Only electron density from the density functional had been previously studied along with its effects on the ionization potentials of the TMPD isomers. The modeling studies reported in the literature were performed in the gas phase, meaning that interactions between the phenylenediamine solute and its solvent, or with other molecules of solute, are neglected. In our calculations, all interactions are taken into account as well as their effect on the ionization potentials in order to better understand the properties of the TMPD isomers and why each isomer reacts in respect to the other isomers. Our hypothesis is that the inclusion of these subtle interactions will result in ionization potentials that mirror those found from experiment. Details regarding the impact of these factors on the molecular structure, total energy, and ionization potentials, will be presented.

UP8

SR-BI Expression protective against IL-17-dependent neutrophilic asthma

Andrea Gilliard<sup>1</sup>, Sky W. Reece<sup>2</sup>, Brita Kilburg-Basnyat<sup>2</sup>, Myles Hodge<sup>2</sup>, Bin Luo<sup>2</sup>, Kymberly M. Gowdy<sup>2</sup>

1. Department of Biomedical Engineering, East Carolina University, Greenville, NC 2. Department of Pharmacology & Toxicology, Brody School of Medicine, East Carolina University, Greenville, NC

In the United States, approximately 26 million people have asthma. Asthma is a heterogeneous disease characterized by airway obstruction and various phenotypes. Nearly 50% of patients have a neutrophilic phenotype and are resistant to current therapeutics. In asthma, neutrophils accumulate in the airways resulting in potentially fatal exacerbations. Potential mechanisms underlying neutrophilic asthma remains limited. Initially, our laboratory identified the role of scavenger receptor class B type I (SR-BI) in pulmonary innate immune response during bacterial pneumonia. SR-BI is a cholesterol receptor, albeit the primary role of SR-BI within asthma remains unknown. Interleukin-17A (IL-17A) producing cells also play important roles in allergic asthma. Studies suggest that higher levels in the lung have been associated with severe asthma and increased neutrophils. Our preliminary data indicated a lack of SR-BI results in significant increase in airway neutrophilia and IL-17 in a house dust mite (HDM) induced allergic asthma mouse model.

We hypothesize that SR-BI expression on pulmonary macrophages is protective against HDM-induced IL-17-dependent neutrophilic asthma. To

further investigate, SR-BI<sup>+/+</sup> and SR-BI<sup>-/-</sup> mice were sensitized through the airways on days 0 and 7 by oropharyngeal aspiration of 10  $\mu$ g HDM. They were challenged on days 14, 15, and 16 with oropharyngeal aspiration of 2  $\mu$ g HDM. Airway inflammation and cytokine production were quantified on day 17. Cellular sources of pulmonary IL-17 were identified by flow cytometry. After HDM challenge, SR-BI<sup>-/-</sup> mice had increased neutrophils in

BAL and decreased eosinophils compared to SR-BI<sup>+/+</sup> mice. Additionally, SR-BI<sup>-/-</sup> mice presented increased pulmonary IL-17A production and decreased IL-5 production. IL-17A was secreted by neutrophils and alveolar macrophages. However, IL-17A was not secreted by Th17 cells. These data indicate that SR-BI expression on pulmonary macrophages is protective against HDM-induced IL-17 dependent neutrophilic asthma.



## Abstracts | Undergraduate Poster Presentations

UP9

EphrinA1-Fc Attenuates the Progression of Ischemic Cardiomyopathy in Chronically Non-reperfused WT mice but not EphA2-R-M

K'Shylah Whitehurst, Heather Estes, Robert C. Chase, Uma Sharma, and Jitka A. I. Virag PhD

Each year an estimated 750,000 US citizens have a heart attack, resulting in the loss of an estimated 116,000 American lives each year, nearly a sixth of all healthcare spending, and a significant public health threat. Many patients that are victims of an acute myocardial infarction, are also high risk for developing other conditions such as diabetes mellitus. Myocardial Infarction (MI) results in a signal cascade that triggers the loss of functional cardiomyocytes, subsequent left ventricular remodeling, fibrotic collagen buildup, and decreased cardiac function. Eph receptors and their Ephrin ligands are regulators of various metabolic signaling pathways. In our previous studies, EphrinA1-Fc (EA1) was found to relieve the maleffects of cardiac remodeling 4 days after permanent occlusion in B6 mice via modulation of the metabolic signal cascade. After acute MI (30 min) and reperfusion (24hr and 4 days) in B6 mice, EA1 demonstrated anti-inflammatory effects coupled with complete preservation of ejection fraction. The present study aims to verify the maintenance of salvage effects over time (4 weeks) in nonreperfused B6 and EphA2-R-M mice following MI. In EA1 treated B6 mice, improved cardiac function was assessed by echocardiography, while decreased left ventricular remodeling was evidenced by decreased compensatory flux in cardiac morphology and myocyte cross sectional areas in analysis of histological H&E stains. Decreased interstitial fibrosis was found in treated tissue by staining with picosirius red/fast green.

In order to investigate the effects of ephrinA1-Fc directly on fibroblast function, we have isolated and cultured primary mouse cardiac fibroblasts to determine the direct effects of ephrinA1-Fc on phenotype, collagen production, and cytokine synthesis with and without pro-fibrotic TGF- $\beta$  stimulation. The results of these experiments will be presented.

These studies demonstrate a novel use for EA1 and its potential to attenuate ischemic cardiomyopathy and resultant progression to heart failure.

Further studies are in progress to understand the precise mechanisms by which this occurs to validate its translational capacity.

UP10

The role of the viral protein HBZ in formation of Human T-cell Leukemia Virus Type 1 Biofilms

Georgina Boateng<sup>1</sup>, Kimson Hoang<sup>2</sup>, Nicholas Polakowski<sup>3</sup> and Isabelle Lemasson<sup>4</sup>

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

Human T-cell Leukemia Virus Type 1 (HTLV-1) was the first human retrovirus to be discovered. It is an oncogenic retrovirus that is responsible for the development of a fatal leukemia known as Adult T-cell Leukemia virus (ATL). In addition to ATL, viral infection can lead to a variety of neurological pathologies, including a progressive neurodegenerative disease known as HTLV-1 associated myelopathy spastic paraparesis. Studies on HTLV-1 have showed that the virus is transmitted via cell-containing body fluids such as blood products, semen, and breast milk. The transmission of the virus requires cell-to-cell contact with its target cell. Once an HTLV-1 infected T-cell establishes contact with a target T-cell, a biofilm containing virions on the surface of the infected cell is transferred to the target cell. Although the viral biofilm has been found to be composed of certain extracellular matrix proteins and carbohydrate moieties, its precise composition is not well characterized. We found that one of the viral proteins produced by HTLV-1, known as HBZ, enhance cell-cell infection. HBZ is located in the nucleus where it affects transcription of cellular genes. We hypothesize that HBZ affects the expression of genes responsible for the formation of the viral biofilm. To begin to test this hypothesis, we are first using indirect immunofluorescence microscopy to identify glycan moieties that are associated with the viral biofilm. Second, we are using flow cytometry and lectin blot analysis to determine whether HBZ increases glycan moieties associated with the viral biofilm.

UP11

Therapeutic effects of Y-27632 in chemotherapy-induced peripheral neuropathy from cisplatin

Zachary Elliott, Taylor Leposa, Yi Zhu, Christi Boykin, and Qun Lu.

Cisplatin often causes loss of touch sensitivity in the hands and feet of cancer patients as well as tingling, numbness, and a shooting or burning pain; these clinical symptoms are referred to as chemotherapy-induced peripheral neuropathy

## Abstracts | Undergraduate Poster Presentations

(CIPN). CIPN frequently results in a reduction or cessation of chemotherapy, and there is currently no effective intervention or prevention for CIPN. Therefore, it is important to understand the mechanism of CIPN pathogenesis and determine associated signaling pathways to identify potential therapeutic targets. Previous *in vitro* studies generated by other labs indicated that aberrant activity of RhoA signaling pathway was involved in the onset of CIPN. In order to fully capture the clinical situation, in this study, we created a CIPN mouse model in 4 months old C57/BL6 mice by intraperitoneal injections of 6 mg/g cisplatin weekly for 4 weeks. To investigate the potential therapeutic effect of RhoA signaling pathway inhibition in CIPN, Y-27632, which selectively inhibits ROCK (a downstream effector of the RhoA signaling pathway), was applied to selective group of mice. The peripheral nerve function of mouse hind paw was evaluated by

Von Frey monofilaments and acetone evaporation assay. Our data indicated that Y-27632 treatment could potentially protect mice from cisplatin-induced peripheral nerve damage. Supported by grants from NIH CA111891 and NIH CA165202 as well as the Harriet and John Wooten Laboratory for Alzheimer's and Neurodegenerative Diseases Research.

UP12

Using Elastography to Examine Material Properties of the Interosseous Membrane

Ashley N Kubit

Dr. Zac Domire  
Chris Curran

The distal interosseous membrane is a membrane in the wrist and forearm. It is used heavily in wrist extension and can bear loads almost equivalent to that of the ACL. However, chronic extension has been shown to affect this membrane and lead to injury and instability of the radio-ulnar joint. Without proper healing, changes in both the wrist to elbow load and forearm rotation mechanisms are compromised.

Evidence from previous studies shows that thickness, stiffness, and length of the distal interosseous membrane (DIOM) varies substantially on an individual basis. These properties have previously been measured using invasive technique on cadavers and with ultrasound technology. No study has used elastography, a specialized ultrasound technique particularly adept for measuring stiffness, to examine this particular membrane.

We intend to use ultrasound elastography to locate and examine the material properties of the interosseous membrane of several normal healthy individuals. Each individual will be tested on three occasions.

The purpose of this study is to determine whether ultrasound elastography is a reliable way to evaluate the properties of the interosseous membrane in a live population. Precision of the results will establish a protocol for future studies involving this membrane and its healing potential. Establishing reliability of this technique will also pave the way for studies of this membrane in specific populations and open discussion for safety and injury recovery.

UP13

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  
Department of Chemistry, East Carolina University

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. In order to prepare for NEB calculations, each optimized species has been or is in the process of being re-ordered and re-numbered to match its adjacent species so that a set of interpolated

## Abstracts | Undergraduate Poster Presentations

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.

UP14

Objective Quantification and Diagnosis of Edema through Air Edema Reporting (AERO)

Keith Richard Williams

Muhong "Kevin" Han

Antonia Dingeman

Dr. Jianchu "Jason" Yao

Dr. Stephanie George

Dr. Sonya Hardin

Peripheral Edema is a condition where an abnormal buildup of fluid occurs in the legs, feet or ankles. This buildup of fluid leads to significant swelling in the affected areas. Currently, doctors diagnose patients with edema by pushing on the swollen area of a patient. Peripheral pitting edema is then classified on a scale of one to four, based on pit depth and pit duration. The difficulty with this method is the inaccuracy of the diagnosis between different physicians. The proposed solution is Air Edema Reporting (AERO), a mobile, handheld device consisting of a micro camera, led light, compressed air, and a program developed in Matlab to record and analyze data to objectively determine the correct level of edema of a patient.

Our research indicates that the use of a micro camera and compressed air in conjunction with Matlab provides a setup that can distinguish the difference between Edema level on Lifeform skin samples used to train nurses in Edema diagnosis. While steps need to be made to create a more robust system, the current setup also proved to be repeatable. This could lead to a true "gold standard" that can be used to help quantify and diagnose the buildup of fluid under a patient's skin. A handheld device could also be used in both a clinical and home setting, allowing patients to monitor their edema level over a period of time. This would lead to less time spent in a clinic or hospital along with an increase in data on a patient's overall health.

UP15

The Effects of ZCL278 on Cerebellar Cell Number in a Mouse Model of Alzheimer's Disease

Mary Madison Wolfe<sup>1,2</sup>, Candice Discepolo<sup>1</sup>, Hayleigh Maynard<sup>2</sup>, Tuan D. Tran, PhD<sup>1,2</sup>

<sup>1</sup>Multidisciplinary Studies Program in Neuroscience, East Carolina University, Greenville NC

<sup>2</sup>Department of Psychology, East Carolina University, Greenville, NC

**BACKGROUND and OBJECTIVE:** Alzheimer's disease (AD) is a neurodegenerative condition characterized by disruptions in important cognitive functions, such as learning difficulties and memory loss. These cognitive dysfunctions are the result of AD-related pathology in a handful of memory systems, including the cerebellum. In this study, we examined the potential benefits of a small molecule modulator (SMM), ZCL278, in improving neurobehavioral outcomes in the triple-transgenic mouse model of AD (3xTg-AD). ZCL278 is a Cdc42 inhibitor that has been shown to inhibit tumor cell growth, but no current reports have examined its effect on animal AD models. Because cell degeneration is a main source of mental deterioration in AD, it is possible that ZCL278 could slow down or stop brain degeneration in AD mice.

**DESIGN:** Six-month-old 3xTg-AD or wild-type mice received either ZCL278 (20 micrograms/g) or sesame-oil (200 microliters), respectively, every other day for 60 days. Within 2 days of receiving the last injection, they received bromodeoxyuridine (BrdU, 50 µg/kg IP) – a marker for neurogenesis

- every other day over 6 days. As part of a separate study, they then underwent 6 days of trace eyeblink classical conditioning (ECC), a form of hippocampal-dependent associative learning. Afterwards, the cerebellum was examined for cerebellar cell number using unbiased stereology.

**PRELIMINARY RESULTS:** We have completed the ZCL injections and are awaiting the final results from the stereology data.

**DISCUSSION:** This data is anticipated to elucidate our understanding of the potential benefits of small molecule modulators, particularly in their capacity to alter synaptic function within the cerebellum, a neural region that is susceptible to degeneration in AD.

## Abstracts | Undergraduate Poster Presentations

UP16

High Fat Diet-Induced Insulin Resistance Negatively Impacts Cardiac Structure and Function in Mice

Brinda Sarathy, Omar Sharaf, K'Shylah Whitehurst, Uma Sharma, Luke Weyrauch, Carol Witzczak, Jitka A. I. Virag PhD

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

Type 2 Diabetes affects nearly 6% of the US population and more than 65% of diabetic patients die due to cardiovascular complications. Clinical evidence and experimental studies using high-fat diet animal models to mimic hyperglycemia and insulin resistance have found that consuming a high-fat diet resulted in larger infarct size and death following myocardial infarction. EphrinA1 is a membrane-bound receptor tyrosine kinase expressed in the cardiomyocyte cell membrane. Previous studies using an intramyocardial injection of recombinant EphrinA1-Fc at the time of permanent left anterior descending (LAD) coronary artery ligation substantially reduced infarct size at 4 days post-MI in mice via modulation of the inflammatory, autophagic, and apoptotic signal cascades as well as interstitial fibrosis. Given the predominance of and poorer prognoses associated with heart disease in the diabetic population, understanding the effects of a high-fat diet on baseline cardiac architecture and function would enable us to predict the potential therapeutic utility of ephrinA1-Fc in the diabetic, ischemic heart. Specifically, we assessed the cardiac effects of insulin resistance induced by 12 weeks of 60%kcal high fat diet (HFD) feeding in two groups of male mice (one control normal chow diet and one insulin resistant HFD group). We performed echocardiographic analyses on conscious mice to measure effects on cardiac function, histological analysis to measure interstitial fibrosis, and immunohistochemical analysis to determine macrophage density. We observed a trend toward impaired cardiac function and altered structure as demonstrated by a 72% increase in fibrosis and a 36% increase in inflammatory cell density in the heart. Experiments to determine global changes in cardiac wall thickness and chamber dimension, cardiomyocyte hypertrophy, as well as the presence, size, number, and composition of damaging lipid droplets are currently underway. These findings demonstrate that diabetes makes the heart more vulnerable to ischemic injury and suggests that ephrinA1-Fc treatment could be a plausible treatment for the diabetic, ischemic heart.

UP17

Claudin-7 Plays a Critical Role in Maintaining the Number of Intestinal Stem Cells

Stephiya Sabu<sup>1</sup>, Tiaosi Xing<sup>2</sup>, Yan-Hua Chen<sup>2</sup>

<sup>1</sup>Department of Health Education and Promotion, College of Health and Human Performance

<sup>2</sup>Department of Anatomy and Cell Biology, Brody School of Medicine

**Background** – Claudins are cell adhesion proteins that localize at tight junctions. Claudin-7 is a member of the claudin family and has a stronger basolateral distribution than the other claudins. Our previous study has shown that mice without claudin-7 in the whole body could not survive for more than 12 days. Deletion of claudin-7 severely disrupted the normal architecture of the small intestine and induced inflammation. To further investigate the role of claudin-7 in intestines, we have recently created an intestinal-specific claudin-7 knockout mouse model. We hypothesize that claudin-7 is essential for maintaining the normal structure and function of intestinal epithelium.

**Methods** – Tamoxifen-inducible intestinal-specific knockout mice (Cldn7<sup>-/-</sup>) were generated using 2-3-month-old claudin-7 Villin-CreERT2 mice. Their intestinal tissues were collected and examined by hematoxylin & eosin (H&E) staining and immunofluorescent analysis. Each experiment was repeated three times. Student t-test was used for statistical analysis.

**Results** – Compared to the wild type (WT) mice, Cldn7<sup>-/-</sup> mice had fewer villi in the intestinal epithelium. Immunofluorescent analysis showed that the proliferating cells in WT intestines were localized in the crypt area of the intestinal epithelium. However, there was a significant increase of the

proliferating cells in Cldn7<sup>-/-</sup> intestinal epithelium. More importantly, these proliferating cells were no longer restricted in the crypt area and they were expanded into the villous area in Cldn7<sup>-/-</sup> intestinal epithelium. In addition, in the crypts area of the Cldn7<sup>-/-</sup> intestines, there was a significant decrease

in stem cells, detected with the stem cell marker OLFM4. This study demonstrates that deletion of claudin-7 decreases the intestinal stem cells, which could lead to the disruption of the normal intestinal structure and function.

**Conclusion** – Claudin-7 affects intestinal epithelial cell proliferation and plays a critical role in maintaining intestinal

## Abstracts | Undergraduate Poster Presentations

stem cell survival.

This work is supported by the National Institute of Health grant DK103166.

UP18

Functional Outcomes of Different Semitendinosus Tendon Insertion Sites

Michaela Shea Dunlap

The anterior cruciate ligament (ACL) is the most common ligament to rupture in the knee, especially among athletes whose sports are multidirectional (Buller et al.). 1 in every 3000 Americans tears an ACL each year, which results in between 100,000 and 300,000 reconstruction surgeries every year (Macaulay et al.). Common reconstruction surgeries often use an autograft taken from the injured leg, but there is no consensus on which graft is the

best option. A commonly used autograft is the semitendinosus tendon of the hamstring. After surgery, the semitendinosus tendon often regenerates, but it has a different location of insertion. It is not well known how this change in insertion site affects and changes the functions of the knee, which means that it is not known if this is the best reconstruction option. Because the insertion site of the regenerated semitendinosus tendon could change the functional outcome of the patient, it could also change the rehabilitation process. It is important to conduct more research in order to better understand the change in the functional outcome. The purpose of this research is to evaluate the functional outcomes of the semitendinosus muscle when the tendon inserts in different locations. Understanding the functional outcomes could help determine if using a hamstring autograft for ACL reconstruction surgeries is the best choice, and it could also help improve rehabilitation treatments. Because it is hard to find enough participants who have had ACL reconstructions using a semitendinosus autograft and it would be expensive to take MRI scans to see where the regenerated tendon attached, this project will be a simulation study using literature data and an online program called OpenSim. This program can be used to model several different human movements including walking, running, and jumping. For this project, OpenSim will be used to see how the insertion location of the semitendinosus tendon affects the muscle moment arm as well as muscle function. A jumping model will also be used to see how function is affected in a sport task.

UP19

Cloning, Expression, and Characterization of a Biocatalyst in *P. pastoris* and *E. coli*

Nathaneal Thomas Green

Robert M. Hughes, Ph. D.

Transition-metal based catalysts have revolutionized the world of synthetic chemistry, enabling exquisite control of stereochemistry, promoting the formation of previously intractable chemical bonds, and bringing challenging molecular scaffolds firmly within the grasp of synthetic chemists. Despite these unparalleled achievements, both cost and toxicity remain drawbacks to their widespread use. In search for an alternative solution, biocatalytic methods have begun to blaze a new trail within the chemistry industry. These biocatalysts are low in toxicity, environmentally friendly, and are rapidly produced using standard molecular biology methods. We plan to investigate the catalytic promiscuity of one of these biocatalysts, a lipase (Porcine Pancreatic Lipase (PPL)), in non-aqueous media for three classes of carbon-carbon bond forming reactions: the Robinson annulation, the Morita-Baylis-Hillman reaction, and the Knoevenagel condensation. Our work will focus on mutagenesis of the lid domain of PPL in order to better understand its role in both the yields and stereoselectivities of biocatalytic transformations. Here we report our efforts to express and purify PPL in both *P. pastoris* and *E. coli* and measurement of its catalytic activity.

UP20

Examining Factors Associated with Physical Activity During Cardiac Rehabilitation

Meagan R. Grogan, Patricia B. Crane

College of Nursing, East Carolina University

Recurrent myocardial infarctions (MIs) account for a third of the incident rate for all MIs. Physical activity (PA) is an important part of preventing a recurrent MI. Fatigue, sleepiness, anxiety, and depression are all barriers to PA. The purpose of this study was to examine how fatigue tolerance, sleep, depression, and anxiety influenced PA in those attending cardiac rehabilitation (CR) after an MI or coronary artery bypass surgery.

Using a repeated measure design, we interviewed a pilot sample of 8 adults who were beginning CR. Each participant completed a demographic and health status form. A 100mm



## Abstracts | Undergraduate Poster Presentations

visual analog scale (VAS) was used to determine fatigue tolerance. Sleep was measured using the Epworth Sleepiness Scale (ESS), the Patient Health Questionnaire-9 (PHQ-9) measured depression, and anxiety was measured using the Generalized Anxiety Disorder-7 (GAD-7). Participants wore a Garmin activity tracker for one week and step data (PA) were calculated on full days of activity. All data were analyzed using Statistical Package for Social Sciences (SPSS) 25.

Most of the participants (N = 8) were White (88%), women (62.5%), with a mean age of 70.5 (SD = 10.5). All had high cholesterol, 88% had high blood pressure, and 38% had a history of smoking. The mean depression score was 7 (SD = 4.3; range 1-15) indicating mild depression. Sleep (M = 7.1; SD = 6) and anxiety (M = 4.88; SD = 5) were in normal ranges. Average number of daily steps was 6000 (SD = 2517; range = 2863-9526). The average fatigue that they could tolerate (M = 59; SD = 26.7) and the average fatigue that slowed them down (M = 49.6; SD = 24.7) were lower than their perceived normal fatigue level for people similar to them (M = 70.4; SD = 24). Average daily steps were negatively associated with fatigue level that slows them down ( $r = -.78$ ) but none of the other fatigue tolerability measures correlated with PA.

Most are not reaching the amount of PA deemed to be cardio protective. Because most indicated lower fatigue tolerance than what they perceived as normal, further study of fatigue tolerance and PA is warranted. A larger sample size is needed to determine the relationship of fatigue tolerance, sleep, depression and anxiety on PA.

UP21

Investigating the role of Tnpo-SR and its cargo in germline stem cell function

Virginia Vasquez-Rios<sup>1</sup>, Taylor D. Hinnant<sup>1</sup>, and Elizabeth T. Ables<sup>1</sup>

<sup>1</sup>East Carolina University, Department of Biology, Greenville NC 27858

In 2017 alone, the CDC reported that over 6.1 million women in the United States experienced difficulties in getting pregnant or carrying a pregnancy to term. Improving reproductive health lies in understanding the cellular processes that enable the production and maintenance of gametes. Although scientists have made many advances in understanding tissue growth and development, many developmental signaling pathways and gene functions are not fully understood. Our lab approaches this topic further by studying how various hormones, receptors,

and their downstream target genes regulate the proliferation and differentiation of multipotent germline stem cells located in *Drosophila melanogaster* ovaries. Due to the abundance of homologues in *Drosophila* for human genes, new research findings in the *Drosophila* ovary can be applied to the human germline.

My current research investigates the role of Tnpo-SR, a nucleocytoplasmic transport protein thought to control germ cell fate and proliferation. Our lab previously identified Tnpo-SR in a reverse genetic screen for genes that may control germ cell proliferation. I hypothesize that Tnpo-SR regulates germline stem cell self-renewal and proliferation, and the proliferation of early germ cells. I will knockdown the expression of Tnpo-SR specifically in the germline (stem cells and their daughters) using interfering RNA (RNAi) gene knockdown. The total numbers of germline stem cells and cysts (clusters of early germ cells) will be counted in the absence of Tnpo-SR, as compared to controls that have normal levels of Tnpo-SR. In the absence of Tnpo-SR, changes in cyst morphology, average cyst numbers, and germline stem cell fusome location will impact oocyte formation and provide evidence in support of my hypothesis.

In addition, RNAi will be used to knockdown various proteins that Tnpo-SR is predicted to transport. Any genes whose knockdown results in decreased numbers of germline stem cells and/or cysts can lead to a decrease, or even nullification, of oocyte production. By determining the role of this nucleocytoplasmic transport protein and its cargo, we can further understand the intricacies of stem cell regeneration and growth as well as categorize crucial genes in fertility. These discoveries will yield a more in depth understanding of specialized tissue growth and development; information which can be further useful in research and clinical applications.

UP22

How fibrin fiber transection during fibrinolysis affects the rate of further degradation

Sean Justin Cone

To better understand how to combat or prevent illness related to blood clots such as venous thromboembolism, the study of the dissociation of these clots is necessary. Fibers of fibrin are an important structural component of blood clots; this insoluble protein acts as a mesh that holds the clot together. Studying the behavior of this protein during degradation will help shed light on the nature of blood clot dissociation, as little research has been done in the past on how the rate of

## Abstracts | Undergraduate Poster Presentations

fibrinolysis changes throughout the process of degradation. The objective of this project is to investigate if the degradation of fibers influences the speed at which remaining fibers degrade. This will be studied by observing how the transection of fibers affect the state of other fibers, as well as measuring the speed of their degradation.

Samples of fibrin fibers are visually observed using microscopy at different time intervals of degradation to see how transected fibers affect the state of intact fibers. The amount of degradation for each sample is quantified by measuring the presence of d-dimer, a fibrin degradation product. Fibrinogen is incubated at body temperature with thrombin for an hour to polymerize fibrin samples, and fluorescence staining is used to visually observe the fibers through microscopy. Degradation is initiated with the application of plasmin, and different samples are quenched at various intervals of time using benzamidine hydrochloride, a competitive plasmin inhibitor. An enzyme-linked immunosorbent assay (ELISA) is used to measure the presence of d-dimer in each sample of fibrin after degradation is quenched. Data from the ELISA is used to determine how the rate of d-dimer production changes through the course of fibrinolysis. The data gathered from the ELISA is correlated with the rate of fiber degradation and d-dimer production; this data will be presented.

UP23

Claudin-7 is Required for the Epithelial Differentiation of Mouse Intestinal Organoids

Lesley Benderman, Tiaosi Xing, Yan-Hua Chen

Claudin-7 is a tight junction (TJ) membrane protein sealing the neighboring cells of intestinal epithelium. Based on our previous studies, Claudin-7 deletion has been shown to cause intestinal defects such as mucosal ulcerations, epithelial cell sloughing and inflammation. However, little is known about why claudin-7 deletion causes these defects. To further investigate the role of claudin-7 in intestines, in vitro organoid cultures were created using the intestinal stem cells isolated from wild type (WT) and claudin-7 knockout (KO) mice. Five different cell types present in the intestinal epithelium were identified and visualized using histological and immunostaining analyses. Enterocytes were marked with FABP-1, goblet cells with alcian Blue, Paneth cells with lysozyme, tuft cells with DCAMK-1 and enteroendocrine cells with chromogranin A. In addition, the proliferating cells were revealed by PCNA (proliferating cell nuclear antigen) marker. In comparison to WT organoids, KO organoids possessed

significantly decreased numbers of enterocytes, Paneth cells, enteroendocrine cells and tuft cells. However, the number of goblet cells remained the same between WT and

KO organoids. More importantly, the number of PCNA-positive cells was substantially increased in KO organoids compared to that of WT organoids. Our study demonstrates that claudin-7 plays an essential role in regulating the epithelial cell proliferation and differentiation in small intestines and is required for maintaining intestinal epithelial homeostasis. This work is supported by the National Institute of Health grant DK103166.

UP24

Reducing EDC Induced Birth Defects with Prenatal Supplementation

Ariel A Fricke, Ciro M Amato, Krista A McCoy

All humans are exposed to toxins throughout their life through ingestion, inhalation or dermal contact. Exposures to these toxins deregulate several physiological processes and are especially impactful on the developing fetus. Several congenital malformations such as hypospadias and cryptorchidism, and adult diseases, such as cardiovascular disease, developmental immunotoxicity, and obesity, are linked to developmental exposure to endocrine disrupting chemicals (EDCs). Hypospadias is a congenital abnormality of the penis and occurs when the urethra does not open at the distal tip of the penis but rather ventrally along the shaft. Given that there is currently no accepted preventative therapy for pollutant-induced malformations, identifying a prenatal regimen to protect the fetus from environmental EDC exposure will be vital. Sulforaphane, a chemical found in cruciferous vegetables such as broccoli, has been proposed as an ideal candidate for detoxification because of its ability to activate Nrf2, a transcription factor that upregulates detoxifying and antioxidant enzymes. The McCoy laboratory the mouse model to study the mechanisms through which EDCs induce hypospadias and how we can reduce it. We have explicitly tested the hypothesis that sulforaphane can protect the fetus from the effects of vinclozolin. We found that supplementing vinclozolin dosed pregnant mouse dams with sulforaphane significantly increased anogenital distance, an established biomarker of masculinization, and decrease hypospadias severity and incidence. Using this sulforaphane dose response we identified the most effective dose of sulforaphane for reducing vinclozolin induced hypospadias as 45mg/kg. A vinclozolin dose response study was conducted, using the 45mg/kg dose of sulforaphane, to determine the combination

## Abstracts | Undergraduate Poster Presentations

of sulforaphane and vinclozolin doses that lead to the strongest rescue effect. The results of this dose response indicated the vinclozolin induced hypospadias incidence and severity can be significantly reduced in the mouse model

when supplemented with 45mg/kg of sulforaphane. These results strongly suggest sulforaphane rescues embryonic androgen signaling following exposure to a model anti-androgen EDC.

UP25

Expression of a Protein Kinase A-Streptavidin Fusion Protein

William Michael Taylor, Robert M. Hughes

Department of Chemistry

Streptavidin-Biotin binding represents one of the strongest natural non-covalent interactions, and thus has many applications in biotechnology. This study is focused on the expression and characterization of a protein fusion between streptavidin and the catalytic subunit of cAMP-dependent protein kinase (PKAc). The protein fusion will be tested for its expression level, solubility, kinase activity and its biotin binding affinity. A series of linkers between PKAc and streptavidin will enable testing of the relationship between kinase activity, linker length, and linker flexibility. Once an optimal linker sequence has been identified, we will test the catalytic properties of our streptavidin-PKAc fusion when bound to a biotinylated solid support, with the goal of creating reusable, sequence specific kinase beads for use in various biochemical applications.

UP26

3D Visualization of Biomedical Systems

Christopher Jacob Rhodes

Justin Ryan Honda

Virtual and augmented reality technologies are being widely used for 3D visualization in gaming and mobile industries. Unlike Virtual Reality, Augmented Reality (AR) changes the visual perception of the real world using the virtually created 3D objects, without replacing the real-world scene.

Microsoft HoloLens is a powerful AR headset that is equipped with Windows-based embedded computing. The HoloLens

system utilizes a spatial mapping system, which allows the system to know its exact location in any given room. With dedicated virtual processing unit, the HoloLens can understand its environment in real time, without being tethered to an additional computer. 3D models known as holograms are visualized in combination with the spatial mapping.

We are currently developing and integrating software components for the HoloLens systems to visualize organic systems in both static and dynamic states. This research effort is focused on the 3D demonstration of human organ systems in an educational environment. For example, human organ systems can be hard to visualize in a 2D space. HoloLens is able to demonstrate the details of these systems in a 3D space, such as the complexity of the human eye. Traditionally, in-depth understanding to a system such as the human eye is very challenging without the use of a real or model system. The visual aid software tools developed based on HoloLens can replicate the 3D eye model, and project it into the real-world. They will enable virtual or remote classroom applications in medical, biology and engineering programs.

UP27

Cortical Brain Organoids Model the Development of Autism Pathology

Pranaya Pakala

Autism is a genetically complex neurodevelopmental disorder in which patients exhibit social deficits in both verbal and non-verbal forms of communication and display restricted and repetitive behaviors. Emerging evidence suggests that altered neural connectivity, particularly at the level of synaptic connections, contributes to disease pathology. In idiopathic autism cases, postmortem patient brain samples exhibit increased numbers of excitatory synaptic connections in cortical brain regions that govern social behavior (PMID: 21346746). However, the use of post-mortem brain samples prevents researchers from capturing the development of this altered brain circuitry. Thus, we set out to develop a physiologically relevant model of idiopathic Autism that recapitulates defective neuronal circuitry at the level of both neurite and synapse formation. We began by reprogramming Autism patient fibroblasts into human induced pluripotent stem cells (hiPSCs), which we subsequently differentiated into 3-D cerebral organoids ('mini-brains') using a low-attachment protocol (PMID: 26005811). Similar to the in vivo cerebral cortex, these 'minibrains' contain diverse brain cells, including neural progenitor cells, both excitatory and inhibitory neurons, and supporting glial cells. Additionally, brain ventricles

## Abstracts | Undergraduate Poster Presentations

develop. However, in Autism iPSC-derived mini-brains, we observe dramatic differences in 'mini-brain' organization. In neurotypic controls, neurons develop around brain ventricles and their neurites associate with one another to form a patterned organization within cortical layers. By contrast, Autism-

derived 'mini-brains' have negligible ventricle formation and their neurites form a disorganized meshwork throughout the organoid. Furthermore, Autism-derived 'mini-brains' exhibit increased levels of excitatory synapse formation. Thus, we describe a model that recapitulates the development of altered brain circuitry associated with idiopathic Autism. Importantly, this model will enable us and other researchers to dissect out the molecular mechanisms contributing to Autism pathology and to test whether specific pharmacologic intervention can rescue altered neurite and synapse formation associated with Autism.

UP28

Alterations in respiration kinetics of skeletal muscle mitochondria from offspring of mothers with polycystic ovarian syndrome (PCOS).

Ananya Koripella<sup>1</sup>, Michael D. Tarpey<sup>2</sup>, Melissa R. Iñigo<sup>2</sup>, Carrie McCurdy<sup>3</sup> and Espen E. Spangenburg<sup>1,2</sup>

<sup>1</sup>East Carolina Diabetes and Obesity Institute, East Carolina University, <sup>2</sup>Department of Physiology, East Carolina University, <sup>3</sup>Department of Human Physiology, University of Oregon.

Polycystic Ovarian Syndrome (PCOS) is a condition that affects younger women resulting in infertility and increased risk of miscarriage. PCOS is characterized by the development of cysts on the ovaries, high levels of circulating androgens, and an irregular menstrual cycle. The cause of PCOS is unknown, however complications associated with PCOS include type 2 diabetes, obesity, and other metabolic conditions. Recent evidence indicates that the in utero environment of females can have significant long term effects on their offspring. Here, we hypothesized that in offspring of mothers with PCOS, skeletal muscle mitochondria will exhibit reduced rates of respiration in response to metabolic substrate delivery. Adult female monkeys (Japanese macaques) with or without PCOS were exposed to either a control or a high fat diet (HFD, 37% kcal/fat). Females were allowed to breed seasonally with gestational age determined by ultrasound. Prior to completion of gestation, offspring were born via cesarean with biopsies of the skeletal muscle taken at that time

In offspring born to mothers with PCOS, gastrocnemius muscle fibers exhibited elevated fatty acid substrate-supported complex I respiration, regardless of diet. Similarly, fibers from the same groups exhibited elevated pyruvate and malate substrate-supported complex I, and complex I+II respiration.

In offspring born to mothers exposed to a HFD independent of PCOS status, soleus muscle fibers displayed blunted fatty acid-supported complex I and complex I+II respiration compared to control animals. In addition, all treatment groups exhibited blunted pyruvate and malate-supported complex I+II respiration and FCCP-induced maximal respiration compared to the control group.

In conclusion, the data suggest that PCOS and/or diet exposure affects the in utero environment altering the mitochondria respiration kinetics in skeletal muscle of the offspring. Overall, the data suggest the in utero environment could influence physiological and metabolic function of skeletal muscle in offspring.

UP29

Recombinant FtrA binds Cu<sup>2+</sup>

Yasmene H Odeh<sup>1</sup>, Jacob J Negron-Olivo<sup>1</sup>, Sambuddha Banerjee<sup>1</sup>, Ryan J. Garrigues<sup>2</sup> and R. Martin Roop<sup>2</sup>

<sup>1</sup> Department of Chemistry, East Carolina University, <sup>2</sup> Department of Microbiology and Immunology, East Carolina University, School of Medicine

This research project aims to investigate the divalent metal binding abilities of recombinant FtrA protein. FtrA is the periplasmic part of a four-component iron uptake system, found in Gram-negative *Brucella* spp.. Iron is essential for the survival and growth of virtually all organisms, serving a variety of biological functions. Although iron is an essential element in biology, it is sparingly soluble and toxic under neutral pH

and oxic conditions. Hence, biological systems uptake this essential nutrient by sequestering it with proteins or small molecules, which slow down or stop the toxic redox reactions, as well as make the biological iron soluble. Pathogenic bacteria requiring iron for survival and virulence use dedicated uptake mechanisms to hijack this essential nutrient from its hosts. *Brucella* spp., a bovine Gram-negative bacteria, expresses an iron responsive

protein cassette, FtrABCD, which is shown to play a crucial role in Fe<sup>2+</sup> uptake under acidic conditions. In addition, homologs of FtrA have been crystallized with Cu<sup>2+</sup> bound to the protein.

## Abstracts | Undergraduate Poster Presentations

Our preliminary isothermal titration calorimetry (ITC) data indicates low micromolar affinity for FtrA towards Cu<sup>2+</sup> at physiological pH. ITC data also suggests that Cu<sup>2+</sup>-free FtrA cannot bind to Mn<sup>2+</sup>, an iron mimic. However, Cu<sup>2+</sup>-treated FtrA can bind to the iron mimic, indicating a yet to be understood key role that Cu<sup>2+</sup> might play in Fe<sup>2+</sup> transportation in *Brucella*.

UP30

Estrogen receptor alpha does not influence skeletal muscle fiber type, but has nominal effects on muscle size in female mice.

Serena N. Mooney<sup>1</sup>, Brittany C. Collins<sup>3</sup>, Tara L. Mader<sup>3</sup>, Christine A. Cabelka<sup>3</sup>, Melissa R. Iñigo<sup>2</sup>, Dawn A. Lowe<sup>3</sup> and Espen E. Spangenburg<sup>1,2</sup>

<sup>1</sup>East Carolina Diabetes and Obesity Institute, East Carolina University, <sup>2</sup>Department of Physiology, East Carolina University, <sup>3</sup>Department of Biochemistry, University of Minnesota.

Reductions in circulating estrogens in women due to menopause onset can lead to declines in muscle strength and power output. Estrogens are thought to influence skeletal muscle via estrogen receptor- $\alpha$  (ER $\alpha$ ), albeit the mechanistic role ER $\alpha$  plays in skeletal muscle is largely unknown. Skeletal muscle strength and power output are largely influenced by the fiber type composition and size of the muscle cells. Thus, we sought to test if

reductions in ER $\alpha$  function specifically in skeletal muscle would affect the fiber type composition and/or the size of the skeletal muscle cells. We developed a conditional ER $\alpha$  knockout (ER $\alpha$ KO) mouse model where the ER $\alpha$  gene was silenced resulting in loss of ER $\alpha$  function only in the skeletal muscle. We investigated the differences in skeletal muscle fiber type and fiber size in the gastrocnemius and soleus muscles from age-matched ER $\alpha$ KO and control (WT) female mice. Skeletal muscle fiber type composition was determined through immunofluorescence analysis of Myosin-Heavy Chain (MHC) isoforms and the individual muscle cell cross-sectional area was determined through microscopic measurement of dystrophin stained cells. We found minimal differences in the fiber type composition of soleus and gastrocnemius muscles between the WT and ER $\alpha$ KO. We also found no differences in the cross-sectional area (CSA) of the individual fibers in the soleus muscle. However, we found a lower CSA of type I and IIb fibers in the gastrocnemius muscles from the ER $\alpha$ KO compared to the WT mice. Our data would suggest that loss of ER $\alpha$  function does not lead to appreciable differences in fiber type composition and muscle size. Overall, our data suggest

that ER $\alpha$  does not likely mediate changes in muscle strength and/or power output via modulation of the skeletal muscle physiological phenotype.

UP31

Dopamine Receptor D3 Participates in Age-dependent Left-Ventricular Hypertrophy and Fibrosis and This Effect is Sex-Specific

Hamilton Joseph Stoffel\*, Caleb Anthony Morrow\*, Gabriel A. Grilo, Patti R. Shaver, Kylie R. Kennedy, Rugmani P. Iyer, Stefan Clemens, and Lisandra E. de Castro Brás

\*Equal contribution

Cardiovascular disease has been shown to increase with age and this increase is associated with left ventricular remodeling. The myocardial extracellular matrix (ECM) provides support, structure, and contributes to the function of the heart, including cardiomyocyte organization and integrity. Increases in collagen deposition and cardiomyocyte size can lead to cardiac dysfunction by increasing myocardial stiffness. With age, the levels of dopamine (DA) decline by 10%/decade, supporting a role for DA in age-related disorders. However, very little is known on the impact of age on the peripheral dopaminergic system. The purpose of this study was to determine the role of dopamine receptor D3 (DRD3) in age and sex-dependent cardiac remodeling. We used 3, 6, 12, and 18 month old (mo) wild type (WT) and DRD3 knockout (D3KO) male and female mice (n=6/sex/age/genotype). All animals were in a C57/Bl6 genetic background. Left ventricular remodeling was assessed by harvesting the left-ventricles (LV), and performing collagen expression and myocyte cross-sectional analysis using histological methods. LVs were cross-sectioned and the middle piece was fixed in 10% formalin for 48h. All samples were processed, paraffin embedded, and sectioned at 5 $\mu$ m thickness. Sections were stained using picrosirius red and positive stain (red color r) and cardiomyocyte areas were quantified with Image-pro Premier software. Only cardiomyocytes that showed cross-sections were measured. A minimal of 10 myocytes were measured per animal. In D3KO, we observed a significant increase in cardiac fibrosis at 18 mo of age for both sexes. The data also showed that male but not female WT showed a tendency for increased fibrosis at 18 mo compared to all other ages. In correlation with the collagen quantification, the myocyte cross-sectional analysis showed a significant increase in both D3KO sex groups when compared to the WT. Both genotype groups displayed significant increases in myocyte cross-sectional area at 18mo; however, this age-dependent increase was more pronounced on the D3KO. Importantly, there was no difference between males at



## Abstracts | Undergraduate Poster Presentations

18 mo, while D3KO females robustly showed higher myocyte cross-sectional area compared to WT counterparts. It can be inferred from this data that the D3KO females display cardiac fibrosis and hypertrophy at a much younger age compared to the males. Our data suggests that the DRD3 plays a gender-specific role in left-ventricular cardiac remodeling.

UP32

### Changes in Cardiac Function and Mitochondrial Respiratory Capacity in B6 I/R Treated Mice

Omar Sharaf, Maria Torres, Kelsey McLaughlin, Julie Horton, Randall Renegar, Smrithi Valsaraj, Uma Sharma, Darrell Neuffer, and Jitka Virag

EphrinA1 is a receptor tyrosine kinase ligand that is expressed in the plasma membrane of healthy cardiomyocytes. In a murine model of acute myocardial ischemia/reperfusion injury, previous studies have suggested that ephrinA1-Fc injection at the time of a simulated ischemic event by ligation of the left anterior descending coronary artery (30min) and subsequent reperfusion (24hrs) reduces infarct size by 46% and completely preserves cardiac function. This is accompanied by reduced inflammation, attenuation of apoptosis, enhanced autophagy, and modulation of metabolic pathways that promote more efficient energy utilization. Presumably this is due to the impact of this treatment on mitochondrial function but this has not yet been elucidated.

In the present study, we performed I/R (30min/24hrs) on wild-type B6129 mice and obtained M-mode and B-mode echocardiographic traces from conscious mice. Our data shows preservation of cardiac function in ephrinA1-Fc-treated mice is comparable to that of uninjured control mice. Afterwards, we used a small portion of tissue from the infarct margin (the region at risk of injury) to isolate permeabilized cardiac fibers from uninjured, MI+ IgG-Fc-treated, and MI + ephrinA1-Fc-treated mice to assess the potential for ephrinA1-Fc to preserve mitochondrial respiratory capacity. Another small portion of tissue from the infarct margin was used to examine the ultrastructure of the mitochondria using transmission electron microscopy (TEM).

Our results show that ephrinA1-Fc rescued the 30% loss in mitochondrial respiratory capacity. TEM images of cardiac mitochondria in control and ischemia/reperfusion mice with either control IgG-Fc or ephrinA1-Fc were analyzed using ImageJ to measure area, perimeter, circularity, Feret's diameter, roundness, aspect ratio, and the number of IMJs. The results of these analyses will be presented.

As the primary pump for delivering nutrients to the rest of the body, the heart must have a steady source of energy that is not compromised by physical activity. Mitochondria, the main source of ATP, are especially abundant in cardiac tissue to sustain this need. The results of these studies demonstrate the robust potential for ephrinA1-Fc to preserve mitochondrial structure and function and validate its use as a therapeutic cardioprotective agent.

UP33

### Rho GTPase Modulators ZCL278 and ZCL279 Impact Neurobehavioral Outcomes in a Mouse Model of Alzheimer's Disease

Hayleigh Maynard<sup>1</sup>, Jalen Ware<sup>1</sup>, A. Candice Discepolo<sup>1,2</sup>, Keith Dolman<sup>1,2</sup>, Justin Martin<sup>1,2</sup>, Tuan D. Tran<sup>1,2</sup>, PhD  
<sup>1</sup>Multidisciplinary Studies Program in Neuroscience, East Carolina University, Greenville, NC <sup>2</sup>Department of Psychology, East Carolina University, Greenville, NC

**Background and Purpose:** This study was conducted to explore the impact of Rho GTPase modulators, ZCL278 and ZCL279, on neurocognitive function using a triple-transgenic mouse model (3xTg) of Alzheimer's disease (AD). ZCL278 inhibits Cdc-42 and

the growth of tumor cells, while ZCL279 activates Cdc42, which in turn elicits dendritic growth and promotes cell communication. Dendritic growth during learning is key to neuroplasticity underlying proper memory storage. Growth-morphology is governed by actin-regulatory-proteins (ARPs), which are regulated by Rho-GTPases like Cdc42. This study is very novel because ZCL's effects on modulating neurocognitive function in the 3xTg AD model are unexplored.

**Methods:** We hypothesize that ZCL279 enhances hippocampal neurogenesis and facilitates learning and memory in 3xTg mice by stimulating cellular activity through Cdc-42 activation, while ZCL278 reduces cellular activity, which may not be facilitative for new learning and memory. 9-month-old 3xTg or wild-type mice received ZCL278 or ZCL279 (20 micrograms/g) or sesameoil (130 microliters) every other day for 60 days. Two days afterwards, they received bromodeoxyuridine (50mg/kg) – a marker

for neurogenesis – every other day for 6 days. To examine hippocampal-dependent learning and memory, they underwent either Morris water maze testing (MWM; 4 trials/day x 4 days) or trace eyeblink classical conditioning (ECC; 6 days). Hippocampi were examined for neurogenesis using immunohistochemistry (IHC).

## Abstracts | Undergraduate Poster Presentations

**Results:** Results indicate that 3xTg mice treated with ZCL279 showed modest but significant improvements in acquiring both the learning and memory components in MWM, and the associative learning requirements in ECC, while ZCL278 did not improve nor impaired learning in these behavioral assays. Whether or not neurogenesis is enhanced and correlates with sparing of deficits in ZCL279-treated mice is still under investigation.

**Discussion:** ZCL278 and 279 may produce synaptic changes in areas of the brain affected by Alzheimer's disease, particularly the hippocampus. Our results indicated that at minimum, spatial and associative learning impairments typically observed in 3xTg mice were spared by chronic treatment with ZCL279. Findings from this study may help elucidate the link between cellular changes and AD pathology, by identifying treatment targets that positively alter synaptic function underlying learning and memory storage.

UP34

Methodology for the extraction, sectioning, and antibody staining of dorsal root ganglia (DRGs) in animal models of RLS

Arden Vessie<sup>1</sup>, Michael Aunw<sup>1</sup>, Mai-Lynne Dinkins<sup>2</sup>, Stefan Clemens<sup>2</sup>

<sup>1</sup>Department of Biology, East Carolina University

<sup>2</sup>Department of Physiology, Brody School of Medicine

Restless Legs Syndrome (RLS) is a sensorimotor disorder of the nervous system that is characterized by the uncontrollable urge to move the limbs, especially in the evenings, thereby perturbing falling asleep. Several animal models have been developed to assess the role of altered gene expression, dopamine receptor dysfunction, or iron deficiency in RLS. While these models provide insight into some of the underlying mechanisms, none of them can distinguish between peripheral sensory and central motor effects.

Dorsal root ganglia (DRGs) are sensory ganglia that contain the sensory neurons that convey the 'uncontrollable urge to move' from the periphery to the spinal cord and the brain. While DRGs play a key role in the production of sensorimotor responses associated with RLS, a comparative study of the distribution of the potential proteins in the different RLS models is missing.

Here, we present a modified protocol for the extraction, sectioning, and staining of DRGs. We show how DRGs can be extracted from a fixed mouse spinal column and then

sectioned using a Cryostat to be placed on slides for staining. There are 2 major types of staining that we focus on when looking at DRGs: antibody staining and Cresyl Violet staining. Antibody staining can be used for the detection of identified proteins, while Cresyl Violet staining can be used to ensure that the correct tissue has been extracted, and to demonstrate the presence of Nissl substance in neurons and cell nuclei. We will be able to use this series of processes in ongoing research projects to detect inter-strain similarities and differences in the DRGs of the different genetically-modified RLS animal models.

UP35

Benzoic Acid: A Food Preservative's Hidden Role in Obesity

Austin J. Allen\*, Elizabeth R. LaFave\*, Aaron H. Robinson, Jack E. Pender, David N. Collier, Allison S. Danell

**Introduction-** Caloric intake from excess consumption of sugar-sweetened beverages is a known contributor to weight gain and maintenance. However, there may be additional ingredients of concern found in these and even in reduced-calorie beverages. Specifically, consumption of benzoic acid, a common preservative, may act as an endocrine disrupting chemical that promotes obesity. Several lines of evidence, including feeding studies in livestock, in vitro studies with adipocytes, and indirect evidence from human studies, suggest a correlation between benzoate and obesity.

FDA regulations prohibit benzoic acid levels from exceeding 1000 mg/L (0.1% w/v) of a beverage, and the FAO/WHO set an Acceptable Daily Intake (ADI) of benzoate at 5 mg/kg of body weight/day.

**Methods-** A high performance liquid chromatography (HPLC) method has been developed, allowing for accurate and precise detection and quantitation of benzoate in beverages. This HPLC method consists of a 5-minute isocratic analysis utilizing a 0.2% formic acid/15% acetonitrile mobile phase and a 100x3.0 mm, 3.5 µm Agilent Zorbax Eclipse Plus Phenyl-Hexyl column.

**Preliminary Data-** The concentration of benzoate has been determined in nearly 150 drinks. Data from these HPLC analyses has been used to compare benzoic acid concentrations in different types of beverages (e.g. regular v. diet) and to rank relative concentrations into low, moderate and high risk (concentration) ranges. Trends in two main groups of beverages have been recognized as statistically significant ( $p < 0.05$ ) for unequal variance. Bottled soda contained a higher concentration of benzoate in 80% of circumstances, when also incorporating 'diet' varieties when compared to fountain drinks.

## Abstracts | Undergraduate Poster Presentations

Carbonated beverages contained a higher concentration of benzoate in comparison to non-carbonated fruit beverages, when comparing five main flavors.

Discussion- Based on the benzoate concentration of drinks analyzed, many children seeking weight-loss treatment at the ECU Comprehensive Healthy Weight Clinic may consistently meet or exceed ADI of benzoate. The effect of this ADI consumption is currently being evaluated in a clinical benzoate exposure study, utilizing the quantitation of benzoate concentrations to verify surplus consumption of benzoate. Future work will demonstrate consistency in benzoate concentration for each product type tested and will search for additional statistically significant trends across beverage types (e.g. diet sodas).

UP36

### A Role for Interleukin-6 Trans-Signaling in Cardiac Ischemia/ Reperfusion

Troy J. Dennis, Nathan A. Holland, David A. Tulis

Cardiovascular disease (CVD) is the leading cause of morbidity and mortality in the United States, with acute myocardial infarction (AMI), one of the primary forms of CVD, occurring every 40 seconds. Interleukin-6 (IL-6) is a multifunctional cytokine with inflammatory and proliferative capacities previously implicated in CVD pathogenesis; however, our understanding of its role in regulating severity of CVD and specifically AMI remains incomplete. Classical IL-6 signaling is mediated directly through interaction with its membrane receptor (IL-6r), which activates the downstream effector STAT3, in turn promoting inflammation and proliferation. Interestingly, cardiac tissue lacks the IL-6r, yet IL-6 can still function in cells lacking an IL-6r through a process known as IL-6 trans-signaling. In IL-6 trans-signaling, IL-6 binds to a soluble IL-6 receptor (sIL-6r) which then can be inhibited by a soluble GP130 (sGP130). Unfortunately little is known regarding the biological role for IL-6 trans-signaling in cardiovascular tissues. In the current study we hypothesize that IL-6 trans-signaling plays a pivotal role in the inflammatory response following AMI by release of IL-6 and mediation of sIL-6r and sGP130. To test this hypothesis we used an experimental murine model of AMI with ischemia/ reperfusion (I/R) injury on the left anterior descending artery (LAD) for 30 minutes and analyzed the ventricular tissues for elements in the IL-6 trans-signaling cascade. Ischemic tissue of the left ventricle (LV) and whole serum were harvested and used for detection of IL-6, sIL-6r, sGP130 and STAT3 phosphorylation at the Y705 and S727 residues, indicative of an activated STAT3. Preliminary findings using a multiplex assay

provide evidence that I/R injury induces both IL-6 and serum sIL-6r and reduced sGP130 levels relative to uninjured, control mice. Additionally, increased levels of cardiac pSTAT3 on the Y705 residue were observed in I/R injured hearts compared to uninjured controls, suggesting activation of the STAT3 pathway following AMI. Further studies will assess the impact of IL-6 trans-signaling on injured vascular tissues as a complement to cardiac I/R interventions. These initial findings suggest that the response to AMI involves IL-6 and the potential for activation of the unique IL-6 trans-signaling pathway. Once completed, we hope that these results will highlight IL-6 trans-signaling as a novel therapeutic target in the battle against CVD.

UP37

### Synaptic Circuitry in a 3-D Mini-Brain Model of Autism

Adrienne Orbita<sup>1</sup>, Karen Litwa<sup>1</sup>

Autism is one of the fastest growing developmental disabilities, currently affecting 1 in 58 children in North Carolina (Christensen et al., 2016). Thus, there is a pressing need to understand the molecular mechanisms leading to the development of Autism. Autism is a cognitive disorder characterized by social deficits and the presence of restricted and repetitive patterns of behaviors or interests. At a cellular level, post-mortem patient brains exhibit increased excitatory synapses. The underlying mechanisms for this increase are still unclear. However, decreased inhibitory signaling may affect synaptic refinement. In order to capture synapse formation during early brain development, we culture cortical brain organoids from Autism patients.

Our Autism-derived cortical organoids exhibit increased excitatory synapse formation. These Autism-derived organoids, together with neurotypic controls, will be used to assess whether Autism brain organoids have fewer inhibitory synapses than neurotypic controls. Thus, cortical organoids provide a unique opportunity to observe the development of Autism pathology and to test our hypothesis that decreased inhibitory synapses result in increased excitatory synapse formation.

## Abstracts | Undergraduate Poster Presentations

UP38

### Macrophage Activation by TNF-alpha is Attenuated by EphrinA1-Fc

Eleftherios G. Vlahos, Uma Sharma, Smrithi Valsaraj, Jitka A. I. Virag

The EphrinA/EphA receptor tyrosine kinase family are highly-conserved and exhibit bidirectional signaling. It is known that cardiomyocytes express the ephrinA1 ligand as well as EphA1-A4, A7 receptors. In a model of acute ischemic injury in mice, injection of recombinant ephrinA1-Fc reduces myocardial infarct injury by 50% at 4 days post myocardial infarction (MI). Following an MI, inflammatory cells originating from the spleen, thymus, and bone marrow migrate from the peripheral circulation into the heart. These infiltrating leukocytes recruit additional inflammatory cells to the injury and clear the infarcted area of dead cells to promote tissue remodeling. Despite this necessary function, these leukocytes are also a cause of additional damage due to oxidative stress and cytokine release. Oxidative stress and cytokine release can exacerbate inflammatory cell infiltration and worsen tissue injury. The density of neutrophils (Ly6G+) and macrophages (CD45+) correlates to the severity of cardiomyocyte injury. This injury leads to loss of functioning cardiomyocytes, decreasing the ability of the left ventricle to function effectively, ultimately resulting in heart failure and mortality. Cardiomyocytes are nonmitotic, so it is essential to salvage as many cardiomyocytes as soon as possible post-MI in order to preserve normal function. Our data shows that tissue treated with ephrinA1-Fc at the time of injury onset results in a 40% decrease in neutrophil infiltration and 21% decrease in CD45+ leukocyte density. The mechanisms with respect to the EphrinA/EphA signaling system and how the inflammatory cells interact with injured versus noninjured cardiomyocytes are yet unclear. Recent evidence suggests that the EphrinA/EphA system can influence differentiation and maturation of monocytes. We have recently performed experiments to determine how activation of inflammation with the pro-inflammatory cytokine TNF- $\alpha$  influences the EphrinA/EphA expression profile in the presence and absence of ephrinA1-Fc. These results will provide information that could lead to identification of potential new targets to reduce post-MI inflammation and promote myocardial tissue repair post-MI.

UP39

### Field Measure to Estimate Vertical and Leg Stiffness

Margaret E. Marshall<sup>1</sup>, Richard W. Willy, PT, PhD, OCS2

<sup>1</sup>Department of Kinesiology, East Carolina University;  
<sup>2</sup>Department of Physical Therapy, University of Montana, Missoula, East Carolina University

Achilles tendinopathy is a common injury in male athletes, especially those frequently involved in sports that require hopping. Athletes with Achilles tendinopathy jump with reduced vertical and leg stiffness. High levels of vertical stiffness are thought to be related to greater jumping and running economy (Maquirriain, 2012). Vertical stiffness ( $K_{vert}$ ), defined as the body's resistance to vertical displacement upon addition of ground reaction force, and leg stiffness ( $K_{leg}$ ), defined as the leg's resistance to change in length upon addition of internal or external forces (Serpell, 2012), are readily

calculated in laboratory settings as the gold standard (Dalleau, 2004). However, these techniques require an expensive 3D motion capture system and force plate. A surrogate measurement for calculating vertical stiffness using just a contact mat and flight times from 2D video while hopping has been developed (Dalleau, 2004). We sought to determine if vertical stiffness and leg stiffness during hopping could be accurately predicted using high speed 2D video and open source software alone.

Thirteen healthy males (21.8 yrs + 2.6) who regularly participated ( $\geq 3x/week$ ) in activities that involve running and jumping completed a series of hopping trials. Kinematic data were sampled with a 10 camera 3D motion capture system (200Hz, Qualysis, Gothenburg, SWE) and a 2D high speed camera (100 Hz, Basler, Austin, TX, USA), while ground reaction forces were sampled via force plate (1000 Hz, Bertec, Columbus, OH, USA). The gold standard measurements for vertical and leg stiffness were calculated using 3D motion capture, a force plate and custom written LabVIEW software. The surrogate measurements were calculated using 2D video and Kinovea (kinovea.org) open source software.

Calculation of vertical and leg stiffness using 2D video yielded acceptable estimates compared with the gold standard. These methods will enable clinicians to estimate vertical and leg stiffness in the field. Potential applications include providing in the field feedback on vertical stiffness to enhance jumping performance and identify athletes with low leg stiffness who are at-risk for Achilles tendinopathy. These methods can be incorporated in mobile phone applications for widespread implementation. Future research will apply these methods to running or other dynamic tasks.

## Abstracts | Undergraduate Poster Presentations

UP40

Understanding HPV-related Content in Schools of Medicine and Osteopathic Medicine Curricula

Author: Mackenzie Stoney, Lillie Malpass, Alice Richman, PhD, MPH, Essie Torres, PhD, MPH

Department of Health Education and Promotion, East Carolina University

Human Papillomavirus (HPV) is the most common sexually transmitted infection in the United States. There are currently three HPV vaccines licensed in the U.S., Gardasil, Cervarix and Gardasil9. These vaccinations have the potential to prevent approximately 90% of cervical, vulvar, vaginal, and anal cancers. Healthcare provider recommendation is the single best predictor of adolescent vaccination against HPV. Factors that may be associated with recommendation practices among providers is their HPV health literacy and their attitudes towards vaccination, as attitudes have been shown to predict recommendation behavior. Medical students are a key audience for HPV-related communication and training because of their impending role as health care providers.

The purpose of this research is to better understand what accredited schools of medicine and osteopathic medicine are teaching in terms of HPV, the HPV vaccine, and recommendation practices. This study will review curricula used to teach about HPV and HPV prevention practices among all accredited Schools of Medicine and Osteopathic Medicine in the United States. Medical education chairs, or curriculum chairs will be contacted via email using the Dillman tailored design method which will include 3 contacts: a pre-notice email, an abbreviated informed consent form and survey email, and a thank you/reminder email.

All participants will answer a 4 question survey about HPV-related content in their curricula. The surveys will be completed through a software program called Qualtrics. An information page will be provided at the beginning of the survey. No identifying information will be collected, and all data will be reported in aggregate form.

This research will inform current efforts of the scientific community to understand and reduce the rise of HPV-related cancers. It will also provide a timely opportunity to expand existing medical school curricula, and effectively train medical students on primary HPV-related prevention. Thus, informing the larger grant in the development of an enhanced training curricula for medical students to increase HPV health literacy, and provide primary HPV prevention to patients

UP41

Under Fire: Understanding the Associations between Stress, Communication, and Relationship Satisfaction in Law Enforcement Officers and their Romantic Partners

Brenna E. Hicks and Kelley J. Moore and Andrew S. Brimhall

Work and Family are two of the most vital aspects of a person's life and it can be extremely challenging to find a balance between them. When an individual endures high levels of job demand and persistent stress, studies show that this can be a predictor of negative outcomes for their family dynamic. Within these two components of work and family, the stress created from each can easily spill over in to the other area causing strain on the individual's relationships. Law Enforcement Officers (LEOs) experience high levels of stress in the work place making it challenging for them to emotionally and physically engage with those around them, especially their romantic partner. Studies show that when LEO's feel stressed they tend to suppress feelings and become emotionally guarded (Roberts et al, 2013; Kirschman, 1997). Stress minimizes secure bonds when partners are lacking interactions and communication between them. Study participants included 54 male officers and their romantic partners. Using dyadic data, the purpose of this research project is to explore the associations that exist between stress and communication, and relationship satisfaction among LEO's and their partners. Our anticipated outcomes for LEO's and their partners when stress is present include lower levels of mutually constructive

communication, higher levels of demand-withdraw communication, and lower levels of relationship satisfaction. Recommendations for LEOs and their romantic partners will be provided in order to help them decrease stress, increase positive communication, and improve relationship satisfaction.

References:

Kirschman, E. (1997). *I love a cop: What police families need to know*. New York: Guilford Press.

Roberts, N. A., Leonard, R. C., Butler, E. A., Levenson, R. W., & Kanter, J. W. (2013). Job stress and dyadic synchrony in police marriages: A preliminary investigation. *Family Process*, 52(2), 271-283. doi:10.1111/j.1545-5300.2012.01415.x



## Abstracts | Undergraduate Poster Presentations

UP42

Current State of Research in Anatomical Causes of Hearing Loss: A Review of the Literature

Shana K. McCusker<sup>1</sup>, Julia Skinner<sup>1</sup>, Katelyn J. Kotlarek<sup>1</sup>, Jamie L. Perry<sup>1</sup>

<sup>1</sup>Department of Communication Sciences and Disorders, East Carolina University

Common anatomical causes of hearing loss include malformations and malfunctions of the tensor veli palatini (TVP) muscle, which causes middle ear problems. Without a properly formed and functioning TVP muscle, the Eustachian tube will not open and close properly, causing fluid to build up in the middle ear (Gyanwali et al., 2016). Children with cleft palate are more likely to have middle ear problems due to the cleft itself, as the opening in the palate results in a more lateral placement of the TVP muscle bundles (Lithovius et al., 2015). Some individuals with cleft palate show improvement of TVP muscle function after the primary palatoplasty, however other individuals continue to have middle ear issues throughout childhood and into adulthood (Guneren et al., 2000). Although TVP dysfunction is common in those with cleft palate, any individual with TVP muscle dysfunction is at risk for middle ear problems, and thus hearing impairment.

A review of the literature was performed to evaluate current research literature pertaining to anatomical causes of hearing impairment and how different surgical and non-surgical treatments affect this hearing loss. Studies that measured anatomical roles in Eustachian tube function were considered, as well as studies that measured the effect of cleft palate repair surgeries on middle ear function and hearing loss. After reviewing these articles, it is clear that the TVP muscle has a significant impact on middle ear function and hearing loss, but more research is required to find other anatomical causes of middle ear problems and hearing loss. Further research should be performed to determine the effect of specific cleft repair surgical techniques on TVP muscle form and function, middle ear problems, and hearing issues in individuals with repaired cleft palate.

UP43

Stroke Survivors' Dietary Compliance and Recommendations- Racial/Ethnic Differences

Sruthi Boddapati, Nutrition Science Department

Charles Ellis, PhD, Communication Science and Disorder

Toyin Babatunde, PhD, MPH, RDN (Mentor), Nutrition Science Department

In the United States, stroke contributes to nearly 140,000 annual deaths while greater than 795,000 adults have a stroke. It is also the fifth leading cause of death amongst Americans (CDC 2017). Optimal nutrition and dietary behavior changes are considered important to post-stroke outcomes (Hankey 2017, Kerman et al 2014). The recent dietary recommendations from the American Heart Association/ American Stroke Association based upon research evidence provide clinicians with dietary recommendations, which include reducing fat and sodium in the diet, to achieve target blood pressure goals and target lipid levels for secondary stroke prevention (Kernan et al 2014, Goldstein 2010). Given the dietary recommendations, the present study examines stroke survivors' (individuals who responded "yes" that they had been told by a health professional that they had a stroke) compliance with recommended dietary restrictions to prevent further coronary complications, and, if physicians provide these recommendations to their clients. Racial differences were also examined for these variables of interest.

A secondary analysis of data from the National Health and Nutrition Examination Survey (NHANES) was conducted to investigate secondary stroke prevention dietary habits and doctor's recommendation (i.e. to reduced salt/sodium and fat/calories) among our population of interest. Descriptive and Chi square statistics were conducted using SPSS 24 with significance set at 0.05.

The sample had a total of 431 individuals of which 54% were female, mean age 66.6 years (S.D 12.7). Mean age of stroke onset was 57.9 years ((S.D 15.8). Majority, approximately 61% rated their diet as "Very good/Good" with only 12% rating their diets as "Excellent". There was no significant gender difference in how individuals rate their diet or for any of the recommended dietary restrictions (i.e. reduced salt/sodium and fat). However, a significant difference was observed across racial group when asked if "doctor told you to reduce salt in diet" ( $p=0.03$ ) There was also a significant difference between "now reducing fat in diet" question ( $p=0.001$ ). Hispanics received the least doctors' dietary recommendations when compared with other racial groups. Observed findings highlight the importance of post-stroke nutrition practices, and the need for physicians to make effort to maintain equity in making recommendations to client to reduce health disparities in stroke outcomes.

## Abstracts | Undergraduate Poster Presentations

UP44

### Morphology of the Orbicularis Oris Muscle in Adults Using MRI

MaryElizabeth Waterman<sup>1</sup>, Katelyn J. Kotlarek<sup>1</sup>, Jamie L. Perry<sup>1</sup>

The orbicularis oris (OO) muscle is a complex and intricate muscle of the lips that surrounds the mouth. Previously thought to have been a sphincter, the OO is actually composed of four independent quadrants, two on each side of the mouth (upper and lower). Each quadrant originates at the corner of the mouth and meets with its adjacent quadrant at midline. The meshing of fibers that takes place at midline is one of many insertion points for the OO muscle. Superficial fibers insert into dermis and mesh with neighboring facial muscles. The deep layer of the OO muscle takes on an L-shape, which becomes strong and dense at the vermilion border and inserts to facial structures, such as the anterior nasal spine. Upon contraction, the OO muscle acts to pucker the lips. The OO muscle plays a significant role in the speech sound production of individuals, specifically for the production of /u, o, y, b, p, w, m/ (Stavness et al., 2013). Collecting data on specific OO muscle dimensions provides information about the ideal anatomy and physiology for this muscle. Ultrasound has traditionally been used to visualize the OO muscle; however, complications arise when participants present with smaller lip systems and/or scar tissue (Zhang et al., 2015). Volk et al. (2014) demonstrated that MRI can provide insight into the musculature of this region void of any external compression, such as that from an ultrasound transducer, but calls for an establishment of quantitative measures from a larger cohort.

The purpose of this study is to establish normative structural measures of orbicularis oris muscle using high resolution MRI. This study analyzed healthy adults from a preexisting MRI database. Participants were imaged in the supine position with their lips at rest. Muscle borders were segmented by hand from surrounding tissue in the sagittal plane. Measures to be analyzed include muscle thickness (in mm) at designated points along the muscle and total muscle volume (in mm<sup>3</sup>). Future directions include application to individuals with cleft lip. Previous studies have shown that establishing a normal musculature system for surgical reference is optimal for cleft lip repair (Bo & Ningbei, 2015).

UP45

### Comparison of Slow-Releasing vs. High Glycemic Carbohydrate Supplementation to Improve Mental Performance Following Exhaustive Exercise

Callie N. Herman, Jaclyn P. Farrior, Rachel H. Dodson, Nicholas P. Murray  
Department of Kinesiology, East Carolina University

Sports require a combination of physical and mental endurance, as athletes make split second decisions under stress. Tactical performers within the military face an even greater challenge as military operational training requires sustained endurance, frequently in austere environments. Previous research has shown that mental fatigue impairs endurance performance, but the effect of physical fatigue on mental performance remains unknown. Mental workload can be measured behaviorally through changes in task performance and is related to physiological response within the central and peripheral nervous systems. Researchers have frequently utilized endocrine, cardiovascular, biometric indicators such as electroencephalogram (EEG) spectral analysis and muscle activity to examine the relationship of mental workload and performance. While high energy expenditure warrants nutrition intake during activity, increased weight and bulk discourages many tactical and traditional athletes from carrying adequate calories. Traditional maltodextrin (MAL) solutions contain high glycemic carbohydrates that spike blood glucose. A novel development in carbohydrate supplementation is hydrothermally modified starch (HMS), a slowly digested substance initially developed for treatment of glycogen storage disorders. The purpose of this study is to compare consumption of a hydrothermally modified starch (HMS) to a high glycemic maltodextrin (MAL) sports beverage on mental performance and metabolic variables (glucose, lactic acid, cortisol, heart rate variability) in competitive cyclists following an exhaustive cycling bout. Cognitive performance, event related spectral perturbations, heart rate variability, cortisol, blood glucose, and lactic acid were the dependent measures. Overall, results demonstrated differences ( $p < .05$ ) in the dependent measures pre to post exhaustive bout and difference in cognitive performance and changes ERSP in response to HMS supplementation. The results are discussed in light of the supplementation influence on mental and physical fatigue.

## Abstracts | Undergraduate Poster Presentations

UP46

### The Effect of Previous Hamstring Injuries on ACL Injury Risk

Elizabeth Andrews<sup>1</sup>, Tony Kulas<sup>1</sup>, Joseph Armen<sup>2</sup>, Jacob Moore<sup>3</sup>

<sup>1</sup>Department of Health Education and Promotion

<sup>2</sup>Department of Family Medicine

<sup>3</sup>Department of Athletics

**Background:** Hamstring muscles are protective of the anterior cruciate ligament (ACL), but following previous injury, these protective effects on the ACL may be compromised. Despite clinical criteria dictating return to sport following hamstring injury, evidence suggests complete hamstring injury resolution does not occur at the time of return. Thus, previous hamstring injury may lead to compromised muscle function and future ACL injury risk.

**Purpose:** To determine if athletes with a prior hamstring injury are at a relative higher risk of ACL injury compared to athletes without hamstring

injury. **Methods:** Retrospective study design: 274 players (710 player-seasons) over a 6-yr period. Relative risk (RR) and 95%CI was computed as the proportion of individuals with a previous hamstring injury and who later sustained an ACL tear relative to the proportion of individuals without a hamstring injury who sustained an ACL injury. Hamstring injury diagnoses were established by medical health care professionals. **Results:** In individuals with a history of hamstring injury (n=69), zero ACL injuries occurred afterward. 9 ACL injuries occurred in individuals without a previous hamstring injury (n=196). The RR of sustaining an ACL injury in individuals with a history of hamstring injury compared to the number of individuals suffering an ACL injury without a history of hamstring injury was 0.16 (95%CI= 0.01, 2.63), p=.198. Supplemental analysis of the data showed five individuals suffered a hamstring injury after an ACL injury and reconstruction; therefore, when a history of ACL injury was treated as the index injury, the RR of sustaining a future hamstring injury was 1.25 (95%CI= 0.59, 2.63, p=0.57) compared to individuals sustaining a hamstring injury without any ACL injury history. **Discussion:** Regardless of whether the hamstring injury occurred before or after an ACL injury, hamstring injuries do not appear to alter ACL injury risk. Overall, this preliminary retrospective study is limited to male football players. Other high-risk sports, such as basketball or soccer, particularly in women, where hamstring and ACL injuries are more common should be considered

for a future prospective study. A larger population should be also considered to support or refute our current findings. **Conclusion:** While a hamstring injury and ACL injury do not appear to be related in the male football population, future studies should look to evaluate sports of high risk such as soccer.

UP47

### Development of a Clinical Tool for the Self-Assessment of Anxiety in Non-Sedated Pediatric Magnetic Resonance Imaging

Payton A. Nall<sup>1</sup>, Katelyn J. Kotlarek<sup>1</sup>, Jamie L. Perry<sup>1</sup>

Magnetic resonance imaging (MRI) is rapidly becoming the most reliable and commonly used noninvasive medical imaging technique for analyzing the structural pathology of the body. It is seen as superior over other techniques, such as X-ray, due to the lack of ionizing radiation (Harris, Cumming, & Menzies, 2004). Even though there are benefits to choosing MRI, research has shown that some patients cannot complete the examination due to high levels of anxiety and claustrophobia (Katz, Wilson, & Frazer, 1994; Quirk, Letendre, Ciotto, & Lingley, 1989). According to Lukins, Davan, and Drummond (1997), these psychological side effects stem from the confining nature of the MRI machine itself, as well as volume level during the scan. Since children are more prone to these anxieties, it is important to adapt interventions for a more pleasant experience (Viggiano et al., 2015). Based on a review of the literature, administering a survey of a one's emotional state before and after the MRI will best help to determine what interventions are most useful in reducing patient stress without the use of sedation (Viggiano et al., 2015).

Our laboratory uses MRI to examine the anatomy of the velopharyngeal mechanism and differences therein between individuals with cleft palate and noncleft anatomy. Our laboratory has developed a child-friendly MRI protocol to image pediatric participants without the use of sedation during rest and speech tasks (Kollara & Perry, 2014). The participants are provided with a number of options to reduce anxiety and ensure comfort during the scan, including receiving a coloring book regarding the exam steps and listening to a recording of MRI noise prior to the scan. During the scan, a parent or caregiver is allowed in the exam room with the child, and the participant has the option to watch a movie and/or listen to music while the scan is in progress (Kollara & Perry, 2014). Although we have achieved high levels of success with this protocol, the effectiveness of this protocol in reducing patient-reported anxiety has yet to be reported. The purpose

## Abstracts | Undergraduate Poster Presentations

of this project is to develop a survey using REDCap to assess anxiety levels before and after implementation of our child-friendly MRI protocol.

UP48

The Incidence and Outcomes of Electronic Cigarette use in Pregnant Patients at Brody School of Medicine

Ankita S. Mishra<sup>1</sup>, Charles A. Hodson<sup>2</sup>, Sarah E. Smith<sup>2</sup>

<sup>1</sup>Department of Health and Human Performance, East Carolina University

<sup>2</sup>Department of Obstetrics and Gynecology, Brody School of Medicine

This research study investigates the incidence and outcomes of electronic cigarette use in pregnant patients at Brody School of Medicine through a retrospective analysis of medical records and a prospective survey. The need for this research is evidenced by the lack of knowledge in this topic area as seen through the duration of a concise literature review entailing the history, contents, FDA concerns, addictive properties, and the comparison of cigarettes versus e-cigarettes. Through data analysis, plausible correlations between the usage of e-cigarettes and pregnancy outcomes will be detailed. These findings will lead to greater awareness of complications due to e-cigarettes in the medical community which is especially important in the nicotine-dependent region of Eastern North Carolina.

UP49

Comparison of Bacterial Contamination of Organic Versus Conventionally Produced Leafy Vegetables

Kasandra Hoffman, Amanda Squires, and Ayanna Wofford

Over the past 30 years, contaminated vegetables have led to an increase in foodborne illnesses. An increasing amount of individuals are consuming more organic versus conventionally grown produce believing organically grown vegetables are healthier. Organic farming practices include the use of animal manure as fertilizer. It has been demonstrated that these fertilizers may contain harmful bacteria such as *E. coli*, *Salmonella*, and *Listeria*, which are able to grow on a variety of vegetables. The goal of this research project was to examine differences in the amount of bacterial contamination in organically versus conventionally grown vegetables. The

vegetables tested were romaine lettuce, spinach, and bean sprouts. Bacterial contamination was assessed by growth characteristics on selective/differential plate media, colony counts, and Gram stain. As well as, relevant biochemical tests, including indole, catalase, and oxidase were used to assist with bacterial identification.

UP50

Assessing Content of Food Boxes Provided to Patrons at an Eastern North Carolina Food Pantry: A Nutrient Analysis

Chelsea Thompson, Delaney Kapec, Toyin Babatunde (Mentor)

According to the United States Department of Agriculture (USDA) about 12.3% of households in the United States are considered food insecure (inconsistent access to adequate food for an active, healthy life style) (Coleman-Jenson, 2017). The quality of foods readily accessible to these food-insecure households are often generally high in refined grains, added sugars, and saturated or trans-fat, which increases the risk of developing chronic diseases (Laraia, 2013). Food-insecurity in North Carolina from 2014-2016 was significantly higher than the national average at 15.1% (Coleman-Jenson, 2017). Access to a sufficient amount of food is a concern for all food-insecure households, it is often enhanced among rural residents in food deserts, such as Eastern North Carolina. Households that are food-insecure often rely on food pantries for food assistance. The purpose of this study was to assess the nutrient content of the food provided to low-incomes at a rural food pantry for the adequacy of the nutrients and food groups compared to the national Dietary Guidelines for Americans (DGA).

A nutrient analysis was conducted on contents of food boxes provided to food pantry patrons on three different distribution days to determine how contents compared to the DGA. Food box contents were cataloged for nutrient analysis using information from food labels, USDA food Composition Databases, and National Nutrient Databases for Standard Reference (USDA Agricultural Research Service, 2016). Findings indicated that, on average, the contents in each box would last an average of 14 days for a one-person household (adult), about 7 days for two-person households, and about 4 days for three-person households. On average, the boxes contained 168% of the USDA RDA of carbohydrates, 147% of fat, 130% of fiber, and 151%

of protein, which shows an abundance of macronutrients consumed. All food groups were included in the box, except dairy. Sweets, such as cakes, were also not included. When comparing the boxes, data showed that differences between

## Abstracts | Undergraduate Poster Presentations

nutrients were minimal.

The findings showed that foods provided at this pantry contain sufficient amount of nutrients and variety in food groups, though the boxes are only provided once a month and on average will not last an entire month. This helps our understanding of the challenges that food-insecure households face with their food intake and choices. More research from other food pantries is needed to see if the data remains consistent.

UP51

Prevention of HPV-related Oral Cancer: A review of dental school curricula

Lillie Malpass, Mackenzie Stoney, Alice Richman, PhD, MPH, Essie Torres, PhD, MPH

Department of Health Education and Promotion, East Carolina University

Human Papillomavirus (HPV) is the most common sexually transmitted infection in the United States. By 2020, Oropharyngeal Cancer (OPC) will become the new face of human papillomavirus (HPV)-related cancers, expected to reach epidemic proportions in the US. In fact, the number of HPV-related OPCs is expected to surpass that of HPV-related cervical cancers. Among all US states, North Carolina (NC) has the third highest HPV-

associated OPC rate among men (9.25 per 100,000), just behind Kentucky and Florida. NC also ranks 8th highest for persons with HPV-associated OPC among women in the US (2.01 per 100,000). Therefore, it is especially important that dentists in NC have the knowledge, skills, and self-efficacy to engage in OPC prevention efforts with their patients, including HPV vaccine recommendation (and potential HPV vaccine provision in the near future). Dental students are a key audience for HPV-related communication and training because of their impending role as health care providers.

This study will review curricula used to teach about HPV and HPV prevention practices among all accredited Schools of Dental Medicine in the United States. Academic deans, dental education chairs, or curriculum chairs will be contacted via email using the Dillman tailored design method which will include 3 contacts: a pre-notice email, an abbreviated informed consent form and survey email, and a thank you/reminder email. In addition, faculty that are identified as teaching HPV-

related content will also be contacted for information on content and teaching approaches.

All participants will answer a 4 question survey about HPV-related content in their curricula. The surveys will be completed through a software program called Qualtrics. An information page will be provided at the beginning of the survey. No identifying information will be collected, and all data will be reported in aggregate form.

This research will inform current efforts of the scientific community to understand and reduce the rise of HPV-related cancers. It will also provide a timely opportunity to expand existing dental school curricula, and effectively train dental students on primary HPV-related prevention (i.e. education and recommendation). Thus, informing the larger grant in the development of an enhanced training curricula for dental students to increase HPV health literacy, self-efficacy, and intention to provide primary HPV prevention to patients.

UP52

Influence of dialect and stimulus audibility on LiSN-S performances

Julia Moore Skinner, Andrew J. Vermiglio, Elizabeth Bonilla, Elizabeth Garner, Emery Bulla, Keerthana Velappan, Paige Heeke

The main objectives were to investigate the effect of dialect on Listening in Spatialized Noise-Sentences (LiSN-S) performances and to assess the relationship between pure tone threshold averages (PTAs) and LiSN-S performances. Participants were young adults with normal audiograms with self-identified American Southern or non-Southern dialects. No significant LiSN-S threshold differences were found between groups. Across all participants, the strongest significant correlations were found between PTAs and the LiSN-S +/-90 degree conditions.

UP53

Examining the Relationship Between Reading Comprehension Level and Keyboarding Ability

Mackenzie Thorley

When students are learning keyboarding skills for computer writing, they are often given individual letters and passages of writing to transcribe. However, if the reading level of those



## Abstracts | Undergraduate Poster Presentations

passages is above what the child can comprehend, it might negatively affect the child's keyboarding abilities. In order to help children, both in the education system and in therapeutic settings, reach the optimum skill level in keyboarding, this study will examine the relationship between reading skill level and keyboarding abilities of children in kindergarten through second grade. There is a gap in the research on the topic of the relationship between reading skill level and keyboarding abilities. The existing research does examine related topics to keyboarding and reading, but not specifically the relationship between reading comprehension abilities and keyboarding skill level. A study examining this relationship does not exist. Students in kindergarten through second grade at a rural school in Mississippi will be participants in this study. This study will examine the relationship between children's standardized reading scores (Star Early Literacy for kindergarten and Star Reading for first and second grade) and their keyboarding skills (as measured in correct words per minute) in order to determine whether or not there is a relationship between the child's reading level and keyboarding ability. Keyboarding skills will be measured on the transcription of a first grade and fourth grade reading sample. The reading scores and keyboarding skills were assessed at approximately the same timeframe within the academic year. Data will be provided and prepared by a SPSS file that will contain the scores, demographics, grade levels, and classroom assignments of the students. Data analysis will compare the relationship between the correct words per minute and reading level per grade. The findings of this research will be used to help inform educators and practitioners of the expectations that they should have for their students and clients when it comes to their keyboarding skills and activities. Outcomes of this study will be imperative to improving and expanding this area of research.

UP54

Effects of Family Influence on the Patient Planning to Undergo Bariatric Surgery

Kelsey Sloan<sup>1</sup>, Donna Roberson<sup>2</sup>

<sup>1</sup>College of Nursing, ECU

<sup>2</sup>College of Nursing, ECU

Background: Obesity is a health issue with more than one-third of adults in the United States being considered obese (Odgen, Carroll, Fryar, & Flegal, 2015). Obesity can cause serious health problems such as diabetes but having bariatric surgery can remit the condition. Despite the known benefits, some wait many years before deciding to have surgery (Roberson Neil,

Pories & Rose, 2016). Since many rely on family for decision-making the purpose of this study was to determine what influence a patient's family has on the decision to choose bariatric surgery.

**Methodology:** For this qualitative descriptive study, a secondary analysis of previously collected de-identified interview data was conducted. There were 24 participants who were interviewed during an appointment at the bariatric surgery clinic where they decided to undergo bariatric surgery.

**Data Analysis:** The researcher and the mentor read the transcripts literally, first to gain a flavor of the conversations and then to mark comments thought to be related to family influence on surgery decisions. After individual review, the two met to organize the data. Lastly, there was consensus and the themes finalized.

**Results:** Four main themes of influence were identified. Participants were influenced by their desire to improve quality of life with their family and to be a role model for their children. One said, "I want to be there for my kids." There was a prevalence of family/marital factors that could be positive or negative influences and were often described as a family member previously against, but now supporting surgery. Finally there was motivating influence from successful other contacts that had had bariatric surgery.

**Conclusion:** There is a considerable difference in the number of obese patients who are eligible to undergo bariatric surgery and the number who actually undergo the surgery. For this sample, family could influence the decision to choose surgery when the patient wanted to improve quality of life, be a healthy example for children and when the family supported the patient, encouraging their success. The influence of others who had bariatric surgery was noted and should not be discounted. Including the family and significant others in the patient pre-operative counseling may be helpful and may aid the nurse's ability to create an individualized care plan for the patient and their family.

UP55

Fashion Trends and Communications--The Royal Family

Casey Nicole Tripodi

The royal family has been in the media since the beginning; everything from the political aspects to the clothes they wear on a daily basis. The media always finds a way to fantasize over or criticize the royal families fashion choices. With their

## Abstracts | Undergraduate Poster Presentations

choices, they set trends and define the standards of fashion because the whole world is interested in the royal's lives. Many media outlets characterize the royal family as popular culture, alongside Hollywood celebrities. The media is fascinated with fame and observing the lives of those in the spotlight. The royal family is repeatedly covered on popular culture media outlets and also traditional media outlets. My study will be on how these media outlets use the royal family's style to influence the world. Fashion is ever changing and so are the style choices of the women within the royal family. I will go in-depth on how a specific piece from each of the four women's wardrobe was publicized and replicated throughout media. I will also go on about how the style of the powerful women has evolved over time. I begin with Queen Elizabeth's fashion choices in her early days in her monarchy. I follow with coverage of Princess Diana and her sons, Prince William and Harry, along with their partners. I evaluate the reporting's of Prince William's wife, Kate. I later observe the newest addition to the royal family, Prince Harry's fiancé Meghan Markle, the first American, bi-racial actress for the English royals. I will focus on specific communications theories that the outlets use when publishing about the royal families fashion. To collect data, I will use online media coverage, blog posts, and books about each royal woman. I believe that my findings will be that the world is fascinated with high fashion but also bargains. The media coverage will present the actual fashion piece and find replicas of it for a cheaper value. Like said before, fashion is ever changing and people want to follow the trends, the media is allowing the reader to follow and adapt to the trends of the royal family.

UP56

Acceptability of Activity Monitor Use During and After Hospitalization in Older Patients with Heart Failure

Rosa Caroline Roberson

Theresa Ann Floegel

Background: Current research verifies the validity and acceptability of many activity monitors to track physical activity levels (PA) in the adult population, however there is little information about acceptability in clinical populations such as older adults with heart failure. Health tends to decline as people age and makes it more difficult to perform activities of daily living and to get the recommended amount of daily exercise. Getting daily exercise for heart failure patients is essential because it can potentially improve the patient's condition. Activity monitors could help older adults with heart failure track their PA levels and even encourage increased

engagement in PA, but only if the older adults are willing to wear the monitors.

Purpose: The purpose of this study was to determine acceptability of activity monitor wear in older adults hospitalized with heart failure and 30 days after discharge.

Methods: The study was performed with 27 participants (age  $78.0 \pm 9.8$  years). Participants were given an activity monitor to wear on the ankle during their hospital stay and for 30 days after discharge. Average daily steps in the hospital and at home were recorded and wear time was calculated. Participants were asked for their opinions about wearing the activity monitor. Steps and wear time were analyzed by age group (60-79 years and  $>80$  years).

Results: Those 60-79 years had a longer length of stay in the hospital ( $5.8 \pm 4.7$  days) than those  $>80$  years ( $4.2 \pm 2.5$  days); the 60-79 age group took more daily steps on average in the hospital ( $1,801 \pm 1460$ ) compared to the  $>80$  age group ( $1,005 \pm 465$ ). Average daily step count for the cohort during the 30 day post-discharge period was  $4,851 \pm 2,253$ , but the 60-79 age group had a higher average count ( $5,083 \pm 2,401$ ) than the  $\geq 80$  age group ( $4,412 \pm 2,005$ ). The percentage of activity monitor wear time for all participants was 99% for hospital stay and 92% during the 30 days after discharge. The participants stated they did not notice the activity monitors in the hospital nor did they interfere with care. Themes identified were remembering to wear (e.g. after bathing) and curiosity. Four participants (15%) were interested in wearing the monitor for personal use after study conclusion.

Conclusion: There was high acceptability of monitor wear both during and after hospitalization. Overall there were no difficulties in wearing the monitors however there was little personal interest to adopt the activity monitor for personal use.

UP57

The Effect of Speech Bulb Usage During Speech Therapy to Improve Velopharyngeal Function: A Systematic Review

Ashley K. Ayscue<sup>1</sup>, Katelyn J. Kotlarek<sup>1</sup>, Jamie L. Perry<sup>1</sup>

<sup>1</sup>Department of Communication Sciences and Disorders, East Carolina University

During typical speech, the soft palate (or velum) elevates and retracts to contact the posterior pharyngeal wall, closing off the nasal cavity from the oral cavity. This is called velopharyngeal (VP) closure. Adequate VP closure prevents the movement of air and sound into the nasopharynx from the oropharynx during

## Abstracts | Undergraduate Poster Presentations

speech (Aram & Subtelny, 1959). Velopharyngeal dysfunction (VPD) occurs when the velum, lateral pharyngeal walls, and posterior pharyngeal walls do not adequately separate the oral cavity from the nasal cavity during speech, resulting in an unintentional VP gap. A speech bulb (or speech prosthesis) is a plastic ball made out of a combination of hard acrylic and soft lining. The ball is attached to a plastic plate that is fitted to the roof of the mouth and held in place by a wire clasp that connects to the upper teeth. The hard acrylic area of the speech bulb covers the hard palate area while the soft silicone lining material covers the soft palate area (Dhingra, 2016). The size of the bulb is custom tailored depending on the size of the VP gap and the amount of movement from the velum and pharyngeal walls during attempted VP closure. Its purpose is to aid in obtaining VP closure by closing off the space between the velum and pharyngeal walls during speech production. A speech bulb has traditionally been used as is a permanent solution to VPD for individuals who are not candidates for further surgical intervention. However, some studies have shown the success of using a speech bulb pre-surgically to improve pharyngeal wall movement and reduce the degree of VPD (Ko & Shin, 2015).

A systematic review was conducted to evaluate current research literature pertaining to the effect of speech bulb usage during speech therapy to improve velopharyngeal function. Seven databases were reviewed, including PubMed, Medline, Cochrane, Google Scholar, Psych INFO, Scopus, and CINAHL. Articles were limited to those published in English or with English translations available. Articles were not limited by participant age group or year of publication. The population of interest included individuals with a history of velopharyngeal dysfunction secondary to cleft palate. The

systematic review yielded 60 articles, 11 of which fell within the 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.

UP58

Exploring the Use of Integrative Therapies During Pregnancy

Taylor Brooke Nelson

Background: Most pregnant women experience common discomforts during gestation such as low back and pelvic pain (LBPP), nausea and vomiting (N/V), and depressed mood or anxiety. About 60% of women experience back pain while pregnant (Jayson, 2016). Additionally, it is known that “morning

sickness” affects about 80-90% of pregnant women (Viljoen, Visser, Koen, & Musekiwa, 2014). Furthermore, studies have shown that stress and anxiety during pregnancy can cause negative effects such as fetal growth restriction and preterm delivery (Effati-Daryani, Mohammad-Alizadeh-Charandabi, Mirghafourvand, Taghizadeh, & Mohammadi, 2015). Integrative therapies, such as yoga, aromatherapy, and others, have been used to reduce stress, pain, and other symptoms individuals may experience (Kalyankar, Attar, & Shinde, 2012). This research focuses specifically on the use of integrative therapies by pregnant women. Purpose: The purpose of this research is to (1) explore the published literature regarding the use of integrative therapies during pregnancy for LBPP, N/V, and depressed mood or anxiety, and (2) to survey ethnically and racially diverse pregnant women receiving prenatal care at a birth center in North Carolina about their use of integrative therapies to alleviate common discomforts of pregnancy, including LBPP, N/V, and depressed mood or anxiety. Methodology: A convenience sample of 60 will be obtained by requesting participation in a survey from pregnant women at a birth center in North Carolina, which will assess their use of integrative therapies during pregnancy. Pregnant women in all trimesters will be included in the study, and women of all races will be included in the study; however, ethnically diverse women will be targeted due to the discovered gap in the current research related to integrative therapy use by women of color during pregnancy (Holden, Gardiner, Birdee, Davis, & Yeh, 2015). Only those women who are unable to speak and read English will be excluded from this study. Data Analysis: Descriptive statistics will be used to describe the characteristics of the sample and their responses to items in the questionnaire. Implications: The findings of this research will be used to understand what integrative therapies women are using to alleviate LBPP, N/V, and mental health concerns during pregnancy and if there is a difference in the reported use of integrative therapies during pregnancy based on race/ethnicity, trimester, level of education, and/or age.

UP59

The Use of Adipose Tissue in Reconstructive Surgery Related to Cleft Palate: A Review of the Literature

Lindsey H. Bates<sup>1</sup>, Katelyn J. Kotlarek<sup>1</sup>, Jamie L. Perry<sup>1</sup>  
<sup>1</sup> Department of Communication Sciences and Disorders, East Carolina University

Cleft palate is an orofacial congenital defect in which an individual is born with a hole in the roof of the mouth. Cleft palate is one of the most common congenital abnormalities, occurring in approximately 17 per 10,000 live births in the United States (Parker et al., 2010). An individual with

## Abstracts | Undergraduate Poster Presentations

cleft palate typically undergoes an average of 8.6 surgical procedures, ranging anywhere from 4-13 surgeries (McIntyre et al., 2016). Adipose tissue is occasionally used in various repairs related to cleft palate when tissue deficiency is present. The two sources of adipose tissue most commonly utilized in these circumstances include autologous fat and buccal fat pad. Autologous fat transfer refers to a procedure in which an individual's own body fat is used in the repair, either via injection or graft. The buccal fat pad is an encapsulated fat mass located in the cheek between the buccinator muscle and several other superficial muscles of facial expression. In the literature, usage of these fat sources has been documented during both primary repair of the cleft palate and secondary palatal surgeries, including closure of palatal fistulae and management of velopharyngeal insufficiency.

The purpose of this project was to perform a review of the literature relative to different uses of adipose tissue in cleft palate repair. PubMed and Medline were reviewed using the set criteria "cleft palate AND fat." 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 71 articles identified, 26 of the articles were selected after an abstract review. 14 articles pertained to velopharyngeal insufficiency, 8 pertained to primary palatoplasty, and 4 pertained to fistula closure procedures. Proceeding this review, various studies have documented that adipose tissue is available for use in cleft palate repair. However, more research is required regarding non-biased surgical outcome measures and long-term speech results of these procedures.

UP60

Progressive loads in the tibia during exercise related activity

Breanna M Hall

Andrew Newnam

John Willson, PT

Stacey Meardon, PT PhD

Physical activity has been shown to greatly improve bone strength. High impact activities, such as court sports, drive bone strengthening and remodeling. However, high levels of activity can also negatively impact bone health, resulting in a bone stress injury (BSI). BSIs represent 5% to 10% of injuries associated with sports and exercise. A BSI typically results in a prolonged period of recovery, costly diagnostic medical imaging, and exercise participation attrition. Unfortunately, a

BSI also increases the likelihood of a subsequent BSI up to 3.7 times, underscoring the importance of a rehabilitation process that addresses the proximate cause of the initial injury. While the initial management of bone stress injury involves a phase of reduced physical activity to limit BSI progression, an ensuing progressive exposure of bone to mechanical loads during rehabilitation is required to condition bone for a safe return to activity and decrease the risk of re-injury.

Bone loads across a continuum of exercises that athletes experience prior to and following return to play have not been previously described. The purpose of this study is to quantify bone specific loads across a spectrum of sports and exercise-related activities using a validated model of bone stress. Specifically, bone stress will be estimated at the distal 1/3 tibia, one of the most common sites of BSI in physically active populations.

Lower extremity joint motion and ground reaction forces of 20 males and 20 females (18-45 years) during walking, running, sprinting, cutting, double leg take-off and landing, and single leg take-off and landing will be collected using 3D motion capture. 3D kinematics and kinetics during these tasks will be input to a series of musculoskeletal models, including a cross-sectional finite element model (FEM) of the tibia to estimate tibia stress. Peak tibia compression, tension, and shear stress and stress impulse will be extracted for comparison across activities using repeated measures analysis of variance ( $\alpha=0.05$ ).

Knowledge of bone stress across progressive task demands will enable the development of evidence-based training routines to optimize bone strength while minimizing potential for bone injury and re-injury.

UP61

Risks and Prevention of Bacterial Contamination on Cosmetics

Dana Billy

Janet Leon

Bacterial contamination of cosmetics poses a risk to consumers as it is responsible for many eye and skin infections. Contamination of cosmetics occurs during manufacturing, due to ineffective preservatives, or during consumer usage from improper storage, sharing, or use of the products beyond the expiration date. *S. aureus* is a pathogenic organism of concern regarding makeup products as it can cause a variety of skin disorders, such as acne, boils, and impetigo. This investigation

## Abstracts | Undergraduate Poster Presentations

was conducted to better understand bacterial contamination of cosmetics and its prevention. The first study component tested 25 used cosmetics to determine whether bacterial growth is commonly found from consumer usage, focusing on the prevalence of *S. aureus*. The second study component investigated the most beneficial method for disinfecting *S. aureus* from several types of cosmetics such as mascara, a liquid foundation, a powder foundation, and their applicators. The cleaning methods tested were an alcohol prep pad, a name brand makeup brush cleanser, and baby shampoo. Because there is insufficient research concerning cosmetic sanitation, these studies provide valuable insight for future analysis into cosmetic contamination and sanitation, and support the need for future analysis.

UP62

### Environmental Hospital Sampling

TaNidra DeQuan Chester

Stephen Paschal Ammons

Ahmed Mahdi A Hakami

Hospitals play an important role in continuing the health of its community. All health team members are held to a high standard of responsibility. It is their job to keep patients healthy and satisfied while in their care. While this is the main goal, bacterial contaminants are always present and pose an infection risk. Our research project consists of working with the infection control department at Vidant Medical Center to sample selected areas of the hospital for analysis of potential infectious bacteria. We aim to prove the existence of these organisms to show the need for disinfection. Using saline moistened swabs we sampled a three inch by three inch square area. We then inoculated plates, recorded growth, performed biochemical testing, and

applied data to a graph. The study took a week to complete and was cost efficient. The results of this project provided data about the cleanliness of the hospital environment and the potential need for improvement.

UP63

### Assessing medical providers HPV-related health literacy

Chelsea Thompson, Molly Robinson, MPH, Alice Richman, PhD, MPH and Essie Torres, PhD, MPH

Department of Health Education and Promotion, East Carolina University

Human Papillomavirus (HPV) is the most common sexually transmitted infection in the US. HPV can cause genital warts and other strands can lead to cancers in both men and women. It's been a decade since the HPV vaccine was approved, yet there is still a lack of widespread uptake of this cancer-preventing vaccine. In 2014, 40% of adolescent girls (age 13–17) and 22% of adolescent boys in the US received all 3 doses of the vaccine. Healthcare provider recommendation is the single best predictor of adolescent vaccination against HPV. Lack of recommendation by providers could be related to their own understanding of HPV and the vaccine. This study will help identify barriers that can affect providers' HPV recommendation and vaccination practices.

The purpose of study is to assess HPV health literacy skills, prevention practices (or intended practices) of current and future physicians in pediatrics and family medicine in North Carolina (NC). Currently, we are developing the survey which will include the following constructs: provider communication, HPV-related health education practices for with adolescents, HPV health literacy, personal attitudes about HPV and vaccine, perceived social pressures around HPV prevention, and perceived behavioral control over HPV prevention.

A random sample of licensed and practicing providers will be identified from the mailing addresses procured from the NC Medical Board, NC Medical Society, and NC Pediatric Society. A paper-based survey will be mailed to a random sample of active licensed physicians who meet inclusion criteria. We will employ an abbreviated Dillman method sending 3 mailings: 1) a prenotice, 2) a survey packet with self-addressed stamped return envelope, and 3) a reminder post card. Inclusion criteria includes all physicians who are registered and have an accurate mail address on file with the North Carolina Medical Board.

Upon completing this research, we expect to provide important state-level data regarding HPV-related health literacy skills and practices of medical health providers and medical students in NC. This data, along with curriculum based data also being collected, will help to identify geographic and demographic trends in medical school training regarding HPV-related content.



## Abstracts | Undergraduate Poster Presentations

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

### The Effectiveness of Battlefield Acupuncture in Reducing Pain

Allison Nicole Beachum, Aaron Craven, LRT/CTRS; Carmen Russoniello, PhD., LRT, LPC, BCB, BCN (Mentor), Matthew Fish, Ph.D., LRT/CTRS, LPCA, BCB (Mentor)

Acupuncture (AP) is a technique attributed to Chinese medicine (NCCIH, 2013) that benefits many people suffering from chronic pain. AP can increase individuals pain threshold and change the perception of pain in laboratory settings (Murray, 1995). AP involves practitioners stimulating specific points on the body through the process of inserting needles through the skin (NCCIH, 2016). The Department of Defense (DoD, under the guidance of Dr. Richard C. Niemtzow, and the support of the Samuelli Institute, have trained physicians throughout the Air Force and within the DoD for the past decade in this technique that involves five points on the ear (Bart-Knauer, & Friedl, 2013). Currently, there is little information on the physiological changes that take place when a person receives Battlefield Acupuncture (BA). Knowing more about these changes may help further understand its pain reducing effects. Thus, the purpose of this exploratory study is to report on heart rate variability (HRV) changes during AP and compare them with subjective reports of reductions in pain. At a demonstration hosted at East Carolina University, a certified BA practitioner asked students if they had pain and whether they wanted to volunteer to receive BA. The BA practitioner implemented the technique while researchers recorded HRV data. BA involves a participant receiving five (1cm) studs placed sequentially in each ear for a total of ten studs: cingulate gyrus, thalamus, omega 2, point zero, and shen men. The researchers collected HRV data as follows: (a) five-minute baseline, (b) placement of AP studs, and a (c) five-minute post-measurement. Participants were asked to rank their pain on a scale of 1 to 10 before and after BA. Descriptive data, correlations, and repeated measures ANOVA will be used to compare pain and HRV changes. Information will assist clinicians and researchers understand the psychophysiological benefits of BA.

UP66

### Argument Driven Inquiry: A Chemistry Laboratory Implementation

Meghan Ashley Lower, Joi Walker

This project proposes a two semester study that focuses on the evaluation of an innovative instructional model called

## Abstracts | Undergraduate Poster Presentations

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, for whom, 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 from different linguistic, cultural, economic, and educational backgrounds 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. Dependent measures will include students' (a)

ability to articulate and justify an explanation through group discussion, (b) ability to articulate and justify an explanation in writing, (c) ability to articulate and justify an explanation on an individual performance task.

\*This project is currently in progress

UP67

Do Head Start Parents Encourage Young Children to Practice Healthy Behaviors? Examination of Self-Report Parenting Practices related to Diet and Physical Activity

Dara Forrest<sup>1</sup>, Amy Lee<sup>2</sup>, Archana Hedge<sup>2\*</sup>, Virginia Stage<sup>1\*</sup>

<sup>1</sup>Department of Nutrition Science, East Carolina University

<sup>2</sup>Department of Human Development and Family Science, East Carolina University

\*Co-mentors

Studies have shown that parents are important role models for teaching children to develop healthy lifestyle choices. It is unclear whether parenting practices are associated with children's obesogenic behaviors; however, some research indicates feeding and physical activity practices can influence factors related to weight status such as self-regulation and self-efficacy. The purpose of this study was to explore common practices utilized by Head Start (HS) parents to encourage their children to adopt healthy dietary and physical activity choices. Researchers conducted 13 semi-structured, in-depth telephone interviews. All interviews were audio recorded and transcribed verbatim. Participants were parents of children aged 4-5 years old enrolled for a second year in a HS program in a single, rural county in Eastern North Carolina. Data were coded, and a constant comparative analysis was utilized to identify the various themes that emerged from the data. Three emergent themes related to how parents encouraged children to lead

healthier lifestyles were identified: (1) modeling, (2) engagement, and (3) the division of responsibility. Results revealed parents modeled healthy eating by enthusiastically consuming vegetables to encourage their disinterested children to try healthy food options. Multiple parents provided examples of engaging in dietary activities by grocery shopping and cooking with their child. Few parents acknowledged that they engaged in physical activity outside with their children. Parents practiced division of responsibility by following a nutritionist's advice to not force the children to eat foods and instead allow the children to make their own food choices. Findings suggest that HS children may benefit from parents modeling healthy behaviors, engaging in activities to promote healthy eating and physical activity, and practicing division of responsibility. These methods may help children develop self-efficacy and regulation skills related to making healthy food choices and being physically active. More in-depth research is required to determine how effective parents' practices are in promoting healthier lifestyles in their children. Results of this study will be used to aid HS in developing more effective ways to support and educate parents in engaging preschool children in healthy dietary and physical activity choices.

UP68

Insects and Persistent Misconceptions

Emma Rae Wester

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

## Abstracts | Undergraduate Poster Presentations

beginning.

UP69

Acquisition of Financial Education Among College Students: How Attitudes and Future Expectations Shape Desire for Personal Finance Education

Haley Michelle Smith

Jaclyn Beierlein

This study used a sample of undergraduate students at a public university to determine students' interest in and views of personal finance. Students who were surveyed responded that personal finance topics are important, but they are not taking the initiative to learn about such issues. Additionally, we found that females may be less motivated to learn about personal finance topics and that their male counterparts were more likely to expect to handle finance issues on their own, rather than together with their spouse, in the future.

UP70

Using Universal Design for Learning Principles to Renovate Cellular Physiology Course Curriculum

Christopher Consolo<sup>1,+</sup>; Anna Kaminski<sup>1,+</sup>; Jean-Luc Scemama<sup>1</sup>; Jennifer Williams<sup>2</sup>; Sarah Carver Williams<sup>3</sup>

<sup>1</sup> Department of Biology, East Carolina University, Greenville, North Carolina 27858, USA

<sup>2</sup> College of Education, East Carolina University, Greenville, North Carolina 27858, USA and

<sup>3</sup> STEPP Program, East Carolina University, Greenville, North Carolina 27858, USA + these authors contributed equally to this work

This study aims to redesign a traditional, moderate sized, lecture-based, life science course to examine the impact on student success of select instructional practices and course resources based on the principles of Universal Design for Learning. We developed multiple means of representation of information (lecture notes, power points, case studies, and supplemental videos with closed captioning) as well as resources for student self-performance evaluation to analyze the student's overall retention of knowledge and engagement in a junior-level Cellular Physiology course. Student impact will be evaluated based on rubric scores on free response exams,

performance on in-class collaborative assignments based on primary literature relevant to the topic of study, Blackboard analytics, and in-class formative assessment questions. Pre and post survey measures are being utilized to assess student perceptions about effectiveness of instructional practices implemented.

UP71

Using an affordable cellphone attachable microscope in identifying molds.

Rouzbeh Beig Heidari

The current technological development of smartphones makes it possible to use them in identifying environmental health hazards. Based on the known information about mold types and their reproductive routines, economically affordable smartphone attachable microscope were used in detecting mold types. This microscope kit is designed in compatibility with most of the popular smartphones and it is simple to install. The microscope macro lens system is capable of producing 200X magnification with a satisfying sharpness and resolution. Four categories of sample images, each with various moisture level (wet/dry), surface coarseness (smooth/coarse), and lighting condition (bright/dark) combinations were taken from three different locations and analyzed to fully examine the capabilities of the microscope to identify molds. This design will make mold detection process more convenient and cost beneficial for consumers such as flooding victims.

UP72

Embedded computer system integrated within autonomous vehical.

Authors: Benjamin Jason Lawrence, Tyler Joseph Laurange

Embedded computer systems are powerful tools that enable devices to efficiently perform a wide array of tasks. Embedded systems are comprised of hardware and software components that perform specialized tasks and relay information back to a central unit to be logged. These systems are constrained by real world factors that must be accounted for through careful planning and prototyping. Constraints for embedded computing include communication between components, accuracy of measurements, and physical limitations of hardware. This project will incorporate embedded

systems that will perform navigational tasks and data logging. Organizations like NASA currently rely heavily on embedded

## Abstracts | Undergraduate Poster Presentations

systems for their complex vehicles. NASA's Mars Rover uses this technology to operate independently where repairs and errors cannot reasonably be serviced. To gain a deeper understanding, we propose an autonomous vehicle equipped with GPS and a non-contact laser scanner. This project will illustrate a simplified embedded system that can be related to more complex autonomous vehicles.

Vehicle design will consist of a 4-wheel drive frame that is portable but large enough to support all required equipment. The GPS and laser scanner will be attached to the top of the vehicle's frame. Directional movement will be provided by a servo motor and forward movement will be provided by a brushless DC motor. To control the motors, a microcontroller setup is utilized that can make the vehicle autonomous. The microcontroller controls the directional movement directly and the amount of throttle given to the motors through a programable speed controller module. Power to the system will be provided by means of two lithium polymer batteries.

Sensors on the vehicles will be continuously obtaining data while the vehicle is operating. The GPS antenna and receiver will provide the microcontroller with positional information that will allow for autonomous navigation. From the information provided the microcontroller will determine where to go and how fast to go. Serial data from the GPS will be continuously recorded to an SD card through a separate microcontroller for later analysis. The contactless laser scanner will be mapping locations of objects along its horizontal axis.

This project will allow for further insight into how the components of embedded computer systems perform and how they are utilized within the system itself.

UP73

Improving Public Safety by Measuring Bacteria Levels in Real Time

Morgan Randolph<sup>1</sup>, J. Randall Etheridge<sup>2</sup>

<sup>1</sup>Department of Engineering, East Carolina University

<sup>2</sup>Center for Sustainability, East Carolina University

Bacteria is a primary contaminant in stormwater runoff that can cause areas to be closed to swimming or to shellfishing. For example, Falls Lake near Raleigh and Durham shuts down temporarily every summer due to high levels of bacteria. The hazardous health effects of bacteria include vomiting and diarrhea, among others. It can take hours or days to receive

results when officials use current methods of measuring the number of bacteria in a sample. By the time the population is informed of the contaminated river or stream, citizens may have already been exposed to the bacteria. The development of UV-Visible spectrometers has made possible the collection of many different water quality parameters in real time following the development of site specific calibrations. The calibrations are developed using statistical models such as partial least squares regression or lasso regression. The statistical models relate the absorbance measured at different wavelengths to the concentrations of the contaminant being measured. More than one hundred samples from Town Creek in Greenville, North Carolina have been collected and analyzed using a traditional lab method for the indicator bacteria *Escherichia coli* (*E. coli*). Absorbance spectra from the samples were also measured using a UV-Visible spectrometer. The lab measured concentrations were compared to the spectra to determine whether this method can be used to estimate concentrations in seconds instead of hours. If spectrometers can measure bacteria levels in real time, measurement systems can be set up so communities can be informed of the potential health hazard much quicker. Preliminary results from the analysis will be presented.

UP74

Mod Tech Utilization

Wesley Allen Foy and Rishaun Harrell

For our Capstone project we are working with Hyster-Yale in order to better improve the mod tech utilization. One of the largest bottlenecks in the assembly line process of the forklifts that Hyster-Yale manufactures is the mod tech area. A mod tech area is basically an area where forklifts that have just come off the production line go in order to repair items that have been damaged during the assembly process or to add an option that was not added during this process. One of the problems with this process is that sometimes the area for the mod techs can become overflowed with excess forklifts, therefore putting them in an overflow zone and getting the forklifts out to the customer later than originally planned. It is important to streamline this process so that Hyster-Yale can be able to put out their products on time and in some cases ahead of time so that they can satisfy their customers, as well as be able to produce more forklifts if there are less issues occurring and therefore maximizing and possibly increasing profits. Our approach to tackling this issue is to keep a record of problems that forklifts in the mod tech area have. Once we do this we can trace the problem back to where it happened on the production line and try to reduce this error from occurring frequently. We realize that errors and problems will occur,

## Abstracts | Undergraduate Poster Presentations

but our goal is to be able to track down common issues and put measures into place to make sure we can reduce as many errors as possible. The goal for the mod techs is that clean and almost errorless forklifts come into their area so that they can process forklifts quickly and not have to incur a great amount of overflow. Many of the different errors that occur take various amounts of time to complete varying from 15 minutes up to a full 8 hour shift. Therefore if we can help reduce these long periods of repair, it will allow for more forklifts to flow through the factory. In conclusion, this streamlining of the mod tech area will allow Hyster-Yale to be able to make sure forklifts are shipped on time and possibly to manufacture a larger number of forklifts, therefore yielding larger profits.

UP75

Simple Quality Control Test for 3D Printed Materials

Author: Angel N Chukwu

Mentor: Dr. William Howard

3-D printing processes have similarities to laminated composite structures in that they are created layer by layer. Typically, the strength of 3-D printed structures between layers is significantly less than the in-plane strength. In laminated composite structures, the short beam shear test (ASTM D2344) is used extensively as a quality control method. Variabilities in resin mixing, cure temperatures, and layer orientation will usually be reflected in the results of the short beam shear test. In comparison, 3-D printing process variables may include extrusion temperature, fill density, printing speed, and/or degradation of the material in storage. Typically, the effects of these variables are evaluated cosmetically, with no regard for the strength of the finished part. As 3-D printed parts are more frequently used as functional, load bearing parts, controlling the processing variables becomes more essential. The goal of this project was to create a simple test to evaluate the impacts of changing these variables on a material's laminar strength. Using various ASTM standards for rigid plastics and additively manufactured parts, specimens used in this study were built with the most commonly used plastics in 3-D printing: ABS and PLA. These plastic parts were designed to produce tensile failures between layers, while also minimizing the amount of material, supports, and build time. Mechanical testing was performed using specimens built in different orientations with varied extrusion temperatures to demonstrate that the effects of process variabilities on part strength can be measured by this test. Results of this study determined that

an decrease in extrusion temperature decreases PLA part strength in compression, regardless of the build orientation.

For ABS specimens, there was also a direct correlation between extrusion temperature and strength for parts built normal to the build plane.

Keywords: 3-D Printing, quality control, in-plane strength, process parameters, ABS, PLA

UP76

Evaluating Psychosomatic Response of Education Students Conducting Virtual Classroom Sessions

Justin Ryan Honda

A link exists between human interaction and physiological response, which is referred to as the psychosomatic response. Stress and anxiety are typical psychological responses observed in certain social settings, such as teaching. A positive correlation can be drawn between these responses and a person's heart rate; therefore, collecting and analyzing biological data such as heart rate is a method to evaluate this connection. The purpose of this study is to use heart rate processing technology to discover relationships between heart rate and social exchanges as education students conduct a lesson plan for a virtual classroom. Taking advantage of the conveniences and precision of modern technology, heart rate data collection is performed using a personal wearable device, namely the Apple Watch, designed by Apple Inc. This device collects heart rate data using what is known as photoplethysmography. The basis of this technology is due to the fact that blood is red; therefore, all other colors are absorbed. Paired with photo-sensitive diodes, the watch emits green light from light-emitting diodes at approximately 100 times per second. As blood flow increases, more green light is absorbed, and the photo-sensitive diodes sense this change as less blood flows between beats. As the device collects this data from the subject, another device, an Apple iPhone, is receiving the information to process it. A software program, or app, is required to wirelessly connect the devices to collect heart rate data. Development of the app is performed with Apple's integrated development environment (IDE) Xcode. The application is primarily designed to capture heart rate and synchronized time data to calculate relative parameters such as average, minimum, and maximum heart rate during a student's lecture session. Secondly, the app serves as a medium to access a secure database where students' information and their conducted sessions are stored. Both functions of the software program will be highlighted in a poster presentation focusing on the development process of the application, and the preliminary results of the data collected.



# Abstracts | Undergraduate Poster Presentations

UP77

The Best Foot Forward: How Design Representation Affects Consumer Judgment

Tanner Guin

The purpose of this experiment was to analyze how product representation affects consumer judgment. This was done by asking a group of participants to evaluate a series of consumer products. The products were presented in three different categories of representation: onscreen, virtual reality, and physical models. While the participants evaluated each product, their gaze patterns were monitored and analyzed using software and hardware developed by TobiiPro. The results of this experiment should lend to a better understanding of how consumer judgment is affected by choice of product representation.

UP78

Best Practices for Printing a PCB using a Squink

Martin A. Simmons, Ricky T. Castles

Department of Engineering, East Carolina University

Traditionally, fabricating circuit boards requires that the specifications be sent to a manufacturer. Circuit boards are typically designed in multiple layers of alternating conductive and insulating layers to allow traces in complicated schematics to cross over each other without shorting the circuit. Circuit board evaluation requires multiple steps and remote manufacturing adds weeks of turnaround time to the development process. This process is not conducive to prototype design where rapid iterations are required to efficiently develop a reliable circuit.

New technology allows electronics developers to print circuits locally, facilitating rapid prototype development. ECU has recently acquired a Squink, a prototype circuit printer developed by BotFactory. This printer uses both conductive and insulating inks to build up a circuit layer by layer laying down conductive traces and establishing insulation between layers. Printing a circuit board "at home" is a new concept; therefore, the best practices for printing circuits with a Squink must be established.

An experiment was designed to determine the best practices for printing circuits with a Squink. Settings such as the conductive trace width and number of print iterations were

manipulated to minimize time to print the circuit. Preliminary data suggests approximately 2 hours is required for a simple 2-layer circuit measuring 1x2 in. Another important feature influenced by altering the above settings is the quality of the finished circuit. Quality is measured by ensuring the traces have resistances similar to industry standards and appropriate current carrying capacity.

This circuit prototyping machine is being implemented to develop a wearable circuit capable of measuring physiological data from the human body. Wearable electronics are becoming mainstream, such as fitness trackers, smart watches, and medical monitors. The use of a circuit printer allows researchers to rapidly develop and evaluate wearable electronic technology. In addition to experimenting with circuit printing techniques, this project also involves ergonomic evaluation of wearable electronics. A literature review has been conducted to understand the fundamentals of ergonomics and human factors involved with the design of a monitoring device that can be worn on the hand, wrist, or foot and how they affect the layout and requirements of the circuit boards necessary for its reliable function.

UP79

Capstone Abstract

Keith R Gaier

Scott B Brown

Thermo Fisher Scientific is a multinational biotechnology product development company. The tray process flow problem affects the efficiency and time of the pharmaceutical drugs that Thermo Fisher scientific produces. Without trays the pharmaceuticals can't get from point A to point B. At Thermo Fisher Scientific the tray process flow problem affects their efficiency to produce the products on time and how the products get transported from each stage of its manufacturing process. We plan on using a SIPOC (suppliers, inputs, process, outputs, and customers) diagram in order to determine all the relevant elements in the process. This will allow us to see how each stage of the process can be improved and help fix the problem at hand. We hope the results in the end of the project is to fix the tray process flow. If the tray process flow is solved, Thermo Fisher Scientific will save a lot of money in the manufacturing process while saving time figuring out where the trays have gone and have trays ready to be used at all times of production.

# Abstracts | Undergraduate Poster Presentations

UP80

Pressure Evaluation of Tracheal Suction Catheters to Reduce Damage to Respiratory Airways

Marcus Moody, Dr. Veeranna Maddipati, Dr. Stephanie George  
Department of Engineering, East Carolina University  
Department of Internal Medicine, Brody School of Medicine

Tracheal Suction Catheters (TSC) 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 main 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 basis for this experiment is to determine if various catheter tip designs, which have side holes of different shape, size, and orientation, will show decreased pressure when the main inlet has been obstructed simulating contact with tissue. To evaluate the pressure change exerted on airway tissues and fluids, the following TSC models Whistle Tip, Gentle-Flo, and Tri-Flo are being studied using Computation Fluid Dynamics (CFD) software (ANSYS). Solid models of each catheter were created using SolidWorks and represent a 14 French catheter, which is an average sized used in adults and measures 4.7mm in diameter. Simulations are conducted by using ANSYS Fluent to apply a negative pressure to represent at vacuum and determining the pressure at the main inlet. Based on the simulation results, the three models will be constructed and tested in a 3D representation of the bronchial tree with synthetic mucus.

UP81

Lean Six Sigma Improvements at Spirit AeroSystems

Colby Wallmow, Elvis Bonilla, Roy Howard, Jordan Martin

RCAW Abstract: Spirit Aero systems

Elvis Bonilla, Bonillae13@students.ecu.edu; Roy Howard, Howardro14@students.ecu.edu; Jordan Martin, Martinjo14@students.ecu.edu; Colby Wallmow, Wallmowc14@students.ecu.edu

East Carolina University

January 30, 2018

The improvement made on Spirit Aero-systems' production process will create greater efficiency for the company. The findings will provide Spirit Aero-systems with data and possibilities for changing the process, or adding more MGVs. We will be attempting to increase the rate of production at Spirit Aerosystems.

Spirit Aero-systems wants to track the efficiency regarding the use of Manually Guided Vehicles (MGV). The goal is to provide the company with data that will help them make improvements in the future. This future improvement will increase production from Rate 9 production capacity to a Rate 12 production.

The first step in our process improvement plan is to identify constraints by recording time and mapping MGV routes. Once we identify the constraint, the goal is to exploit the constraint and enable the constraint to become successful. Then, we must make sure we elevate the constraint by adding resources to turn the constraint into a secure process step. Afterwards, we must re-evaluate the constraint and the whole process to find more areas for improvement.

Our data should help the company decide to change the current state of the process. The possible outcomes include adding more MGVs, changing the routes of the MGVs, or MGV's working simultaneously. These outcomes will be the catalyst for transforming Spirit Aero's production into a Rate 12 output.

Our research on Spirit Aero's current production will help the company determine if the increase in output is probable. We will perform tasks that will help us reach these conclusions. The hope is to result in a production the is close to the theoretical maximum capacity of Rate 13 (100%). The hope is that the company will appreciate our involvement.

UP82

Improving Clinical Diagnostic Methods for Group 1 Pulmonary Hypertension with ECHO and MRI-Derived Parameters

Daniel Patterson Pearce<sup>1</sup>, Dr. Veeranna Maddipati<sup>2</sup>, Dr. Bogdan Marcu<sup>3</sup>, Dr. Stephanie George<sup>1</sup>

<sup>1</sup>Department of Engineering, East Carolina University

<sup>2</sup>Department of Internal Medicine Pulmonary, Brody School of Medicine

## Abstracts | Undergraduate Poster Presentations

3Department of Cardiovascular Sciences, Brody School of Medicine

Pulmonary hypertension (PH) is divided into five clinical diagnostic groups (Groups 1-5). The treatment for Group 1 PH can be life-threatening for those with non-Group 1 PH; therefore, there is an urgent need for novel methods of diagnosis that minimize invasiveness, differentiate between the various PH groups, and allow for early detection, which is critical for increased long-term survival rates. Additionally, PH is a condition which disproportionately affects African Americans. Safer and cheaper clinical diagnosis methods will allow for this health disparity to be reduced and will improve the quality of life of those affected.

Previous research in the lab analyzed echocardiograms (ECHO) of PH patients and concluded that spectral density and average flow rate were significantly different between Group 1 and non-Group 1 PH. Another study examined magnetic resonance (MR) scans of PH patients; it determined a correlation between pulmonary artery waveform and the mean pulmonary arterial pressure, as well as discovered lower wall shear stresses (WSS) in Group 1 cases than non-Group 1. The proposed study would combine the MR and right heart catheterization results from the two previous studies by applying ECHO analysis to the prospective patient cohort. This would be the first time that ECHO, MRI, and MRI-derived WSS data would be looked at together in the sample of 20 patients. Based on the past studies, it is hypothesized that spectral density (ECHO), pulmonary artery waveform (MR), and wall shear stress (MR) will be significantly different enough to distinguish between Group 1 and non-Group 1 PH. The confirmation of these parameters will allow for a novel diagnostic process that minimizes invasiveness and patient-risk while promoting early detection of the disease.

UP83

Pain in Inpatient Hospice

Deanna M Pilkington

Cancer is the second leading cause of death in the United States. In those with cancer, pain is one of the most common, feared, and distressing symptoms associated with the end of life (EOL). Pain at EOL can be difficult to manage. Health care disparities exist in cancer care and in cancer pain management. African Americans with cancer are more likely to be diagnosed at a later stage and have decreased access to treatment. We know minorities report more severe pain than non-Hispanic

whites, and are more likely to have their pain inadequately assessed and undertreated. The increase in late-stage diagnoses and decreased access to care may lead problems with pain management at EOL. Disparities in pain associated with cancer during the final days of life are not well understood. This study will examine pain during the final days of life and will explore potential disparities in the pain experience among those with cancer who die in an inpatient hospice facility. A retrospective chart review will be conducted to collect the following data: demographics, disease information, pain medications, and nursing pain scores. All data will be stored in REDCap. The faculty mentor will review a minimum of 10% of selected charts to ensure accuracy of collected data. The highest and lowest daily pain scores will be analyzed and comparisons of pain scores will be made between race, gender, age, insurance status, and geographic location of residence using a repeated measures ANOVA. I hypothesize that the data will show the greatest disparities in pain in African American patients. The study will be completed to gain knowledge on the subject and to fill gaps within the literature. As data is currently being collected, there are no present findings from the study thus far.

UP84

Object Stories Through Visual Prints

Jennifer L Bornheimer

Introduction

The beauty of objects is not limited to their past interactions, but extends to the hope of future stories, and the imagination with which we see them. The artifacts we interact with on a daily basis hold the stories we created with them, but these items also have a broader cultural significance, along with stories of how they were made and where they came from. The common cultural view of these objects often does not line up with the intended understanding of the item, and as we gained interest in one area of life or another, our views on seemingly ordinary objects evolved.

Background

Letters are no more than several, connected, abstract markings, yet through them, through the sounds a culture ascribes to them and the words and sentences they become a part of, meaning is conveyed. Similarly, the objects we interact with everyday gain meaning within the cultures of which we belong. Even items that derive their form with a specific purpose in mind, such as a spoon, generally develop greater

## Abstracts | Undergraduate Poster Presentations

unity in size, shape, and materials as a culture decides what design elements are most desirable. Decorative markings on a spoon can connect it to a set, designer, era, or place of origin, each of which is related to a sub-culture of individuals who use spoons. One particular spoon within a household may have marks and dings, each with a story of how it got there. These stories, if memorable, become part of culture contained within a household, family, or group of individuals who use that particular spoon. Other cultural understandings between only a few people may include an inside joke or particular story related to an object. Outside of these groups, the joke is stupid and the object tells a more common story. The stories within the groups make the objects valuable. This project will study how the stories interact with one another, the culture, and the individuals that compose them.

### Purpose

I will study how meaning is created and carried by objects and symbols (semiotics) to influence an individuals' evolving interactions with cultural artifacts. Using letterpress printing, screen printing, photography, scanning, and found object printing I will tell a story of each individual through the memories, sights, smells, tastes, and sounds the artifact has meant to them through out their life, along with the semiotics and cultural significance of the object. I will study what this means for image making and story-telling as a designer and artist.

### UP85

College Students' Personal Finance Skills and the Role of External Influences

Kaleigh Lynn Launsby

### Abstract

This study examines the methods college students use to become financially literate and the manner in which they will approach unfamiliar financial situations in the future. Using survey responses from 192 undergraduate students at a large, public university, this study investigates what students know about personal finance, where they obtained their current knowledge, and where they plan to go to in the future when they have financial questions. The results show college students tend to be, on average, financially literate. Results also show that students learn about personal finance from their parents and their own experience more than any other sources and that they will seek financial knowledge primarily from their parents, online, and from financial advisors when they have financial questions in the future.

### UP86

Efficiency Analysis of Women's Collegiate Athletics

Meenal Mahesh Nandwani, Dr. Mauro Falasca

Allegations of lack of institutional control, unethical conduct and out-of-control spending by university athletic departments has prompted the necessity to investigate the efficiency of collegiate sports programs. This investigation develops a novel analytical model to measure the efficiency of university athletic departments. This study specifically focuses on the three primary indicators of intercollegiate athletic success (total revenues generated, student-athlete graduation rate, and athletic performance) within the context of women's athletics programs. The findings of this study suggest that certain women's athletic programs are more financially efficient than others and provide potential solutions to increase the efficiency of athletic departments.

### UP87

Effects of Physical Characteristics on Initial Listing Price, Time On Market, and Ultimate Selling Price

Meredith B Jones

A house is comprised of many different attributes that may affect how well it performs when listed for sale on the market. This study examines how certain physical characteristics of a house affect its listing price, time on market, and ultimate selling price. The physical characteristics in this study include age of the house, size of the house, number of bedrooms, number of bathrooms, presence of a fireplace, number of stories, and whether the home was waterfront. Data were collected from an Eastern North Carolina county and regression analysis was performed. The findings indicate age, size, number of baths, and whether a fireplace is present in a house all have a significant impact on the list price and sold price. The physical attributes of a house have no clear effect on the total number of days the house is for sale on the market.

### UP88

Disorders Undergraduate Social Sciences Poster Presentation

Tense/Lax Vowel Ratio in citation speech in African American English

## Abstracts | Undergraduate Poster Presentations

Monica Beingolea, Morgan Widdowson, Carmen Love

African American English (AAE) has been observed to vary from both General American English (GAE) and regional varieties of White American English (WAE) in word order (syntax) and word shape (phonology) in systematic ways. Relatively little research has evaluated the acoustic phonetic variation between AAE and local WAE to determine if the underlying phonetic structure of citation speech varies in a consistent manner. Previous research by Holt, Jacewicz, and Fox (2016) observed systematic variation in speech timing of AAE speaking males living in eastern North Carolina (Pitt County). They found that male AAE speakers produced vowels of significantly longer duration than their WAE speaking peers. They also found the tense/lax duration between the vowel pairs in the words heed/hid; heyd/head; and whod/hood, was lessened for AAE compared to WAE males. These findings suggest that AAE speakers may use speech timing (vowel duration) differently than WAE speakers. To date, no research has attempted to validate these findings with female AAE and WAE speakers completing a citation speech task. This paper evaluated the tense/lax distinction for AAE and WAE speakers reading the words listed above. This research question is important in understanding if vowel duration is used contrastively in AAE as it is hypothesized in WAE. Results will be discussed as they relate to previous research on the possible effects of final consonant deletion and voicing alternations in AAE.

UP89

The Tense/Lax Ratio in Read Speech of African American English

Yolanda Feimster Holt, PhD., CCC-SLP, Abaigeal Jeanne Styring, Aliah Nicole Austin, Justice Allysa Baker, and Megan Alexandra Jackson

Previous research has evaluated temporal aspects of African American English (AAE) speech production to determine if there are significant differences in vowel duration for the tense/lax vowel pairs heed/hid; heyd/head; whod/hood. Holt, Jacewicz and Fox (2016) analyzed male speakers from Pitt County NC found differences in vowel duration for the AAE speakers compared to White American English (WAE) speakers. Results indicated AAE males produced vowels of longer duration. The tense/lax distinction, used to mark the identity of the following consonant, was decreased for the AAE speakers. This decrease could lead to listener confusions of the following consonant segment as syllable final consonant identity (e.g. t/d) is supported by the length of the preceding vowel. If the AAE speaker produces all vowels longer in all contexts than

WAE peers, a listener unfamiliar with the dialect may mistake productions that should be perceived as /t/ in the word hoot, as /d/ or the word whod. Minimal research has evaluated acoustic phonetics characteristics of AAE speaking women. This study attempted to answer the question; Is there a difference in the tense/lax vowel duration for AAE and WAE speaking women in a read speech task. Sixteen Pitt County women, ages 21-57, completed the read speech task, Comma Gets a Cure. Tense/lax vowel pairs preceding syllable final voiced and voiceless consonants were evaluated to determine the existence in vowel duration between AAE and WAE women speakers completing the read speech task. Results will be discussed in relation to vowel duration and prosodic variation in AAE.

UP90

Adapting to Changing Resources: A Petrographic Analysis of Iron I Pottery from Tel Migne-Ekron

Kristen Marie Rozier, Doctor Laura Mazow (Department of Anthropology at East Carolina University), Doctor Heidi Luchsinger (Department of Anthropology at East Carolina University)

The arrival of foreigners to the southern Levant at the beginning of the Iron Age (1200-1000 BCE) has been recognized in the material culture, as have changes in this material culture over time. These developments, resulting from interaction with the local population, have been interpreted as assimilation, acculturation, creolization, and most recently entanglement. In this poster, we examine these transformations through the lens of technological style, i.e., those aspects of pottery manufacture that reflect shared technical choices and transmitted knowledge. At the site of Tel Migne-Ekron, morphological analysis has defined two distinct but contemporary potting traditions: a non-local and an indigenous one. In this study, petrographic analysis of ceramic thin sections is used to first test these observations. Secondly, we examine geological inclusions within the clay to identify temper use. As raw material use is tightly linked to almost all other aspects of the ceramic production process, e.g., drying time, firing, manufacturing style, and vessel function, many observed stylistic changes in the non-local ceramics probably resulted from the need for foreign potters to adapt to local resources. Recognizing shifts in raw materials, and thus resource acquisition, should provide new insights into understanding the working relationships between these two co-habiting populations.



## Abstracts | Undergraduate Poster Presentations

UP91

Identifying Subjective Value in Women's College Golf Recruiting Regardless of Socio-economic Class

Victoria Leigh Allred

College athletics have grown into a major industry and athletic departments are pushing coaches to recruit the top talent. To recruit golfers, college coaches depend on multiple ranking systems. These systems are bias towards more expensive, national tournaments over inexpensive, state tournaments. In response, players who come from a lower socio-economic class will have fewer financial aid opportunities than someone from a higher economic class. Analyzing junior girls' golf statistics, has led to the creation of an objective methodology to compare golfers without regard to socio-economic imbalances.

UP92

Understanding health literacy in the context of preventative cancer screening among female college students.

Cindy Sierra, Keisha Okeiga, Molly Robinson, MPH, Alice Richman, PhD, MPH, Essie Torres, PhD, MPH Department of Health Education and Promotion, East Carolina University

Within the context of health, health literacy is defined as "the degree to which individuals have the capacity to obtain, process, and understand basic health information needed to make appropriate health decisions and access healthcare services to prevent or treat illness" (IOM, 2004, p. 1). Health literacy influences the utilization of healthcare services including preventative services such as mammography and Pap smear screenings. Cancer has become the leading cause of death in North Carolina (NC); unfortunately, Eastern North Carolina (ENC) is experiencing a greater cancer burden than the remainder of the state.

Low health literacy has shown to be a contributing factor to lack of preventative cancer screenings for both breast and cervical cancer. Health literacy is content and context specific, and this study focused on health literacy in the context of preventative cancer screening among female college students.

Quantitative surveys will be administered to participants to assess breast and cervical cancer knowledge, communication style, and health information receptiveness. This proposed study will target 100 female college students across East Carolina University's campus. Participants will receive a \$10 Starbucks gift card for their contribution in the study.

The results from this study will assist us to better understand; (1) the current knowledge of cervical and breast cancer among female college students, (2) the current health literacy skills among female young adults and (3) the current prevention cancer behavior among female college students.

Increasing breast and cervical health literacy and prevention can impact health decision-making skills and improve preventive health seeking behaviors. The results from this study will expand our understanding of the potential impacts and feasibility of a health literacy intervention among female college students.

UP93

The *Fundulus diaphanus* Species Complex: Convergent Evolution?

Tyler Dale Walston, Jeff McKinnon (Mentor), Michael Brewer (Co-mentor)

Similar morphologies can arise in nature through common descent or convergent evolution. Distinguishing the two is important both to understand natural selection and to manage biodiversity. The *Fundulus diaphanus* (banded killifish) species complex of Eastern North Carolina streams and Carolina bays provides a possible case study of convergent evolution with important conservation implications. It was originally believed that the *Fundulus* in Lake Phelps were *Fundulus waccamensis* that had been introduced from Lake Waccamaw—a very distinctive recent descendant of *F. diaphanus* and a federal species of concern and state endangered species. It is now hypothesized that these two species/populations independently evolved shallow, terete body shapes due to similar environmental and selection pressures. The specific aim in this study is to test the hypothesis that the terete *F. diaphanus* (in Lake Phelps) and *F. waccamensis* (in Lake Waccamaw) are independently derived from ancestral stream *F. diaphanus*, with their similar forms a result of convergent evolution. This is being done by sampling the two lake populations and a stream population adjacent to each, extracting DNA from fin clips and/or livers, and sequencing the resulting DNA to obtain single-nucleotide polymorphism (SNP) genotypes. These SNP genotypes are being analyzed and an evolutionary tree (phylogeny) generated for the four populations. Understanding the status of the *Fundulus diaphanus* complex could have a critical impact on the conservation status of members of the complex.

## Abstracts | Undergraduate Poster Presentations

UP94

The Impact of Climate Change on Interbasin Transfers in North Carolina

Evan Butler

Department of Geography, Planning, and Environment

Interbasin water transfers have become a necessity in modern society to meet the water needs of the population, industry, and agriculture. As climate change occurs, it is projected precipitation levels will occur which will have an impact on the availability of water to be transferred. Through three case studies in North Carolina on the Catawba River (Mecklenburg County, NC), Haw River (Chatham County, Wake County, NC), and Tar River (Pitt County, Greene County, NC), the transfer agreements for each study are analyzed through interbasin transfer (IBT) certificates, state laws, local laws, IBT reports, and problems caused by or resolved by these transfers. As climate change projections have suggested precipitation will vary in amount as well as type as rainfall is getting heavier, the water levels in the local rivers and lakes will change not only in North Carolina but other places as well. By analyzing North Carolina's IBT certificates and reports relative to each other as well as those of neighboring states, South Carolina and Virginia, along with the climate impacts expected on the case study areas, recommendations will be made with respect to changes to the agreements that may be necessary to incorporate expected climate change.

UP95

In Lead and Bone: The Battle of Fort Neoheroka

Madeline Sage Midyette

Dr. Charles Ewen

Department of Anthropology, East Carolina University

The final battle of the Tuscarora War was fought at Fort Neoheroka on March 21 – 23, 1713. Fort Neoheroka, near modern day Snow Hill, was a syncretic mix of Native and European architecture. Besieged by colonial militia and Native mercenaries from South Carolina, Fort Neoheroka fell after a three-day assault, ending of the Tuscarora hegemony in coastal North Carolina.

Archaeological excavations, under the supervision of the late Dr. David Phelps of East Carolina University, were carried out from 1990 to 2001. The excavations recovered tens of

thousands of artifacts currently housed at the department of Anthropology. Due to Phelps' untimely death, little further analysis on the assemblage was undertaken, though some artifacts had been sent out for specialized analysis and conservation. However, a complete inventory does not exist for the collection.

The current analysis of the Neoheroka collection is necessary for the completion of a final site report. To that end, this project will gather and organize field notes and site maps so that site interpretation is possible. Those that have remained on campus have been digitized, so that they are easily accessible to students and researchers. On-going tasks include curation of the artifacts in archival quality bags and available storage bins, inventorying their location for easy reference, assessing the condition of the artifacts for conservation, and the recall of artifacts on loan (external analysis and museum display). Once artifact repackaging and evaluation have been completed, the composite catalogue, containing the material remains of the Neoheroka Fort and final battle, will provide the status and location of all artifacts and supplemental notes or maps and be available for research. The completion of the composite catalogue will mark significant progress toward the understanding of the history of Fort Neoheroka, and the final battle that resulted in the death of men, women and children and the containment of the survivors in a short term, local reservation. The information we wish to present at the Research and Creative Achievement Week is the relationship the Tuscarora had with English settlers based on archaeological data, as seen by the co-mingling of native and colonial goods. The catalogue will be kept on the lab's Pirate Drive once complete, and serve of the basis of the author's future thesis project.

UP96

Koru: A Mindfulness-Based Program for College Students

William Guiler<sup>1</sup>, Erin Haley<sup>2</sup>, Christyn Dolbier<sup>2</sup>

<sup>1</sup>Honors College, East Carolina University

<sup>2</sup>Department of Psychology, East Carolina University

Background: College students are at risk of facing a significant amount of stress throughout their educational years. An abundant amount of research has recently gone into the effects of mindfulness on stress levels, but less has been done to understand the effects of mindfulness in college students. Mindfulness is the observation of one's own thoughts, emotions, and sensations through a nonjudgmental and

## Abstracts | Undergraduate Poster Presentations

accepting view. To aid students in learning mindfulness, two psychiatrists developed Koru, a 4-week mindfulness-based intervention (MBI) tailored to college students.

Specific aims: 1) To determine the feasibility of offering Koru to East Carolina University (ECU) students; and 2) to test Koru's effectiveness in decreasing stress and emotional distress and increasing mindfulness.

Methodology: The research team established recruitment, Koru implementation, and data collection protocols and put them into practice. Students are being recruited through emails to student organizations, advisors and program directors; flyers on campus; and referrals from the counseling center. Interested students are randomly assigned to an experimental (Koru) group or a waitlist control group. Prior to Koru starting, students from both groups are invited to complete an online pre-survey and then, after Koru ends, an online post-survey. The surveys consist of mindfulness and psychological distress measures. Koru is co-taught by a health psychologist, counselor from the counseling center, and/or clinical health psychology doctoral student. Koru consists of: four 75-minute meetings that include psychoeducation, mindfulness training, and processing of practice; readings from a free corresponding book; practice at home for ten minutes a day and recording of that practice via a free Koru app.

Progress: Specific aim 1: Preliminary results indicate it is feasible to provide Koru to ECU students. Eight Koru courses were offered across four semesters. Students are interested in Koru, the majority who start Koru complete it, and all who evaluated Koru did so favorably. Specific aim 2: The feasibility of collecting data to evaluate Koru effectiveness is less certain. Survey completion rates have been low. Efforts to address this issue will be discussed. Once we obtain a sufficient sample size, we will test our hypothesis that the Koru group will show greater increases in mindfulness skills and decreases in stress and anxiety symptoms compared to the waitlist control group.

UP97

Dietary Acculturation: a likely factor in the risk of Type 2 Diabetes among the Gullah tribe

Chelcie A Kurzontkowski<sup>1</sup>; Dr. Toyin Babatunde<sup>1</sup>, Dr. Kyle Summers<sup>2</sup>, Dr. Keith L. Keene<sup>2</sup> <sup>1</sup>Department of Nutrition Science, East Carolina University <sup>2</sup>Department of Biology, East Carolina University

The prevalence of type 2 diabetes (T2D), the most common form of diabetes, continues to rise in the United States contributing to racial and ethnic health disparities (American

Diabetes Association, 2015). Approximately 30.3 million (9.4%) of the American population have T2D, of which 12.7% are African American (AA) (ADA, 2015). An increase in prevalence has also been noted among the indigenous populations, which is possibly due to dietary acculturation (Misra and Ganda, 2007). Dietary acculturation includes changing to Western dietary behaviors in the population group, thus increasing consumption of diets high in calories, fats, refined grains, and low in dietary fiber, all of which are associated with increasing the risk of developing T2D (Deed et al., 2015). The purpose of this project was to understand the effect of acculturation and evolutionary influences on dietary habits of the Gullah tribe, an AA sub-group. This may explain the reason for the increased prevalence of T2D and shed light on strategies to reduce this rate and promote optimal health among AA. Low admixture rates and isolation from Western dietary influences until the 1960's (Spruill, Magwood, Nemeth, Williams, 2015), make the Gullah tribe an ideal population to study. The project involved two steps: First, a scientific and ethnographic literature review was conducted to gather background information and historical data. Second, a visit to St. Helena Island in November 2017 to initiate connections with key informants and observe the community first hand during a heritage festival. Findings of the literature review indicated an absence of dietary records to assist with constructing a database of nutrient consumption to achieve the objective of the study (investigate the influence of dietary acculturation on the prevalence of T2D in the general AA population). Additionally, information gathered during a key informant interview revealed that a lack of physical activity and increased intake of calorie-dense foods might play a role in the T2D epidemics seen among the Gullah and AA population. Based on our findings, there is a need for further study to gather dietary data from this target population and construct a nutrient database. Doing so will likely help us better understand cultural influences on dietary intake and its impact on health promotion and chronic disease management in this hard-to-reach minority population group.

UP98

Effects of Observers on Athletic Performance: an Investigation of Male Sexual Displays

Jessica Anne Beringer

The notion that people alter their behavior in the presence of others has been supported by a great deal of social psychological research. However, there are competing hypotheses regarding exactly why these behavioral changes occur. Hypotheses derived from costly signaling theory suggest that behaviors performed in the presence of potential mates can serve a sexual display function, allowing one to signal

## Abstracts | Undergraduate Poster Presentations

that they possess desirable traits (Farthing, 2007). Conversely, hypotheses derived from social facilitation theory predict that performance of simple well-practiced tasks improves in the presence of an observer, regardless of the nature of that observer or motives of the actor. In this study, we examine how the presence of a same-sex or opposite-sex observer affects male weightlifting performance. We predicted, based on costly signaling theory, that men would perform more repetitions of a weightlifting exercise in the presence of an attractive female observer than a male observer, particularly if those men were highly motivated to find a mate. Male undergraduate students (N=30) performed two weightlifting exercises: the chest press using two 45lb dumbbells and the bicep curl using two 25lb dumbbells. Each participant performed the exercises twice (once in front of each observer) over the course of two sessions, while the number of repetitions the participant was physically able to complete was recorded. To measure mate-seeking motives, participants answered questions from the mate-seeking subscale of the Fundamental Social Motives Inventory (FSMI). Results indicated no significant main effect of the female observer but a significant interaction between the effect of the female observer and participants' mate-seeking motives for the chest press exercise, but not the bicep curl exercise. Probing this interaction revealed a significant positive correlation between the increase in repetitions performed in the presence of the female observer (compared to the male observer) and participants' mate-seeking motivation. Consistent with our prediction, men with higher levels of mate-seeking motives completed more repetitions of the chest press exercise when in the presence of the female observer. Therefore, the study suggests that men with higher levels of mate-seeking motives increase their performance while performing a strenuous athletic activity in the presence of a female observer (but not a male observer), to display the desirable quality of physical strength.

UP99

One session of mindfulness meditation and reported anxiety, stress and depression.

Kendell Thornton, Victoria Koors, and Adrienne Steele  
Department of Psychology, East Carolina University

The practice of mindfulness meditation is currently receiving widespread attention as a possible way to manage one's thought process and reduce the negative effects of stress. This is important as college students are consistently faced with ongoing stressors and regularly report experiencing anxiety, stress, and depression. Mindfulness Meditation (MM) has been defined as the practice of paying attention

in a particular way, on purpose, in the present moment, and nonjudgmentally (Kabat-Zinn, 1994). MM is an approach based upon concentrating on one's own breathing, thereby allowing thoughts of one's internal dialogue to "simply pass" (Zeidan, Johnson, Gordon & Goolkasian, 2010). Recent research has found that one brief session of mindfulness practice reduced participants' tension, anger, fatigue and confusion (Johnson, Gur, David & Currier, 2015).

Unfortunately, an attempt to replicate these "one session" effects resulted in an increase, rather than a decrease, in reported stress, anxiety and depression (Thornton, 2017).

In a second attempt to replicate and extend the research of Johnson, et al. (2015), the MM script was pre-recorded, as it was in Johnson et al.'s original study. Rather than having the script read aloud by student assistants for each experimental session (Thornton, 2017), participants were led through a 20-minute session by listening to a pre-recorded version of either the Mindfulness Meditation script, a Sham meditation session, or a no meditation Control session. Mindfulness Meditation (MM) participants were found to report more stress than Sham participants, and Control participants reported more stress than the Sham group. Unfortunately, LSD post-hoc analyses revealed that the Control group did not report significantly higher stress than the MM participants. There were no differences between groups in reported anxiety, or depression. These mixed results will be explored to determine reasons for the obtained increase, rather than decrease in stress, as has been previously found (Johnson, et al., 2015).

UP100

The Intersections of Oral Language and Spelling: A Literature Review

Autumn Scales and Kayla Hudson

Phonological Awareness is the foundation of spoken and written language (ASHA, 2008). Phonological Awareness is the ability to analyze spoken language into small segments (Cheung et al., 2001) and it typically influences early reading and writing (Stahl & Murray, 1994). Research suggests phonological awareness contributes to the development of spelling (Nation & Hulme, 1997) which is a component of written language. The present literature review relates the intersections of spoken language and written language regarding the foundational skills of language and literacy in middle-school students. The target population of adolescent students is essential to study because of the increasingly difficult academic selections middle school presents (Buly, M.



## Abstracts | Undergraduate Poster Presentations

& Valencia, S.W., 2002). Speech language pathologists have the clinical experience to develop programs for adolescents that help the development of reading and writing for the remainder of their academic journeys and beyond. Within the speech language pathology scope of practice, providing general education to teachers, parents, and students is imperative for advocacy and advancement of literacy (ASHA, 2001). Addressing this concept is important to determine evidence-based practice strategies for remediating spoken and written language difficulties in middle school students.

UP101

Effect of Biophilic Design in the Lodging Industry

Brittany Marie Burk

Seung Hyun Lee

The lodging industry is constantly creating a variety of innovative improvements in order to produce distinctive environments for their guests to experience. Biophilic design refers to design that seeks connections with nature and other forms of life, view of nature and use of large windows, greenery, and plants. The concept of biophilic design is used to connect consumers to natural environment and enhance engagement in the space.

Previous studies show the impact that atmospheric design has on individuals; the physical environment is rich in cues and can be extremely influential in communicating the firm's image and purpose to its consumers. In line with argument, biophilic design can have a positive impact on how guests perceive the hotel and their overall evaluation with their stay. While adding biological and ecological elements into a design of a hotel can create an added advantage, there is lack of studies on the effect of physical (biological and ecological elements) design in lodging industry. In addition, individual personality traits can influence a person's reaction to his or her physical surroundings (Bitner, 1992). The goal of this study is to examine how biophilic design and personal traits affect guest experience and overall attitude toward the hotel. A 4 (biophilic design) x 2 (arousal-seeking tendencies: arousal-seekers vs. arousal-avoiders) quasi-experiment design will be used. To assess the manipulation of biophilic design contents, respondents will be given a scenario out of four biophilic designs and rate each based on their personal attitude toward the design and within the hotel. This study will provide significant information needed for owners, managers and investors within the industry as they attempt to implement biophilic design within their hotels.

UP102

Mastering Branding Application: The Relationship Between University Branding and MBA Program Enrollment

Allison Renee Flowers

In recent years, university enrollment, in particular that of Master of Business Administration programs (MBA), has experienced a noticeable decline. Though there are a number of factors that may affect enrollment rates, a university's marketing and branding are two facets of its persona that may have a significant impact. The purpose of this study is to define the characteristics of the ECU MBA brand and to develop a strategy that can be utilized to increase the quality of its perception from the viewpoints of current students. In terms of methodology, qualitative and quantitative data was gathered by implementing surveys among current ECU College of Business students. It can be concluded that the ECU MBA program is seen to be a cost-effective and valuable opportunity for advanced business education by undergraduate students surveyed. This study suggests ECU may combat negative enrollment trends by focusing marketing efforts around these student perceptions.

UP103

Examining Health Related Experiences of Adolescents with Sickle Cell Disease

Tiwalade Kogbe

Health-related stigma is defined as the stigmatization of populations and individuals who have an identified health problem or chronic illness (Jenerette & Brewer, 2010). The negative social judgement surrounding health-related stigma often leads to a major source of stress for the stigmatized and disadvantages them (Hatzenbuehler, Phelan, & Bruce, 2003). Furthermore, health-related stigma is characterized by poor health outcomes, such as poor quality of life, decreased utilization of health care services, and negative pain management experiences (Wesley, Zhao, Carroll, & Porter, 2014). Patients with sickle cell disease (SCD) may be at risk of experiencing high incidents of health-related stigma given that there are stereotypes that portray them as manipulators or "drug-seekers" (Jenerette & Brewer, 2010). The current study is focused on investigating the general patterns of self-reported health-related stigma in adolescents with SCD. To date there is little research concerning adolescent experiences with health-related stigma. The study will also examine how SCD stigma affects other aspects of the adolescents' lives, including



## Abstracts | Undergraduate Poster Presentations

their health-related quality of life, self-efficacy, and functional disability. It is hypothesized that most of the participants will report experiencing moderate levels of stigma, and that higher health-related stigma will be related to poorer health outcomes for adolescents with SCD. The data collection of this study is ongoing.

UP104

Public Perception of Tax Avoidance

Rachel M Eker, Dr. Linda Quick

Many conversations about business ethics involve the question of if something is legal, is it ethical? This research study examines participant's personal ethical beliefs about tax havens, tax avoidance, tax evasion. It also compares how participants react to media biases and if the factors presented affect the participant's ethical views of tax decisions.

Participants believe that tax avoidance, while legal, is slightly unethical. Biases in media sources can also affect a participant's viewpoint of a company or person. These companies and people should use this evidence in determining the harm of their reputation if there were to be a scandal involving tax avoidance strategies.

UP105

Fat Talk and Internalized Weight Bias

Nicole Marie Powell, Chelsey Solar, Robert Carels

Psychology Department, East Carolina University

Weight stigma is a prevalent form of discrimination in Western cultures. This type of stigma is unique in the sense that weight gain is seen as a personal responsibility, therefore creating negative connotations. For example, people who are overweight are attributed characteristics such as "laziness" and "unmotivated". While weight stigma can affect both men and women, women have been shown to experience greater negative consequences as compared to men. Similarly, women experience greater internalized weight bias (IWB), a form of weight-based self-stigma that has been found to be related to poorer body satisfaction, increased eating disordered behavior and increased distress. Also, women have been shown to engage in fat talk which involves voicing negative remarks about one's self-image among close female friends or family. In fact, research has shown a correlation between

the frequency of mothers' and daughters' use of fat talk. However, no prior research has examined the relationship between women's current engagement in fat-talk, their experience of internalized weight bias, and their perception of their mother's use of fat talk. The purpose of the present study is to examine the relationship between current fat talk, internalized weight bias, and memory of mother's fat talk in undergraduate women. Three hundred college aged women will be recruited to complete an online survey through their PSYC1000 course at East Carolina University. Participants will answer questions about current internalized weight bias, current fat talk, recollections of their mother's past and current fat talk, as well as body image and symptoms of distress. Survey questions were adapted to be inclusive of previously identified racial differences in body image and body satisfaction. We hypothesize that participation in fat talk and perception of mothers' use of fat talk will be positively related to internalized weight bias. Additionally, we hypothesize that African American women will engage in less fat talk and demonstrate less IWB compared to their white classmates.

UP106

An Examination of Infant Feeding Practices of Latina Immigrants

Kaylan Y Galloway

Kim L Larson

Over 50% of the children in Guatemala are malnourished, and food security, due to poverty, is a critical problem (Davis, Fischer, Rohloff, & Heimbürger, 2014). Some investigators have found that malnutrition has become the norm in the poorest Mayan communities in Guatemala (Chary et al., 2011). As a result of a 30-year civil war and widespread political corruption, many Guatemalans have immigrated to the United States (US) to work and establish a better life for their families. Guatemalans are now the sixth leading Latino sub-group in the US (Motel & Patten, 2012).

One of the nursing science priorities for 2017 is global health, which includes nursing care with populations from under-resourced countries, such as Guatemala (Eckardt et al., 2017). During a study abroad program in Guatemala, I worked with malnourished children and became interested in cultural feeding practices. Cultural feeding practices may be greatly altered by relocation to a new environment. When Guatemalan mothers and children immigrate to the US, they are eligible for the Women, Infants and Children (WIC) Program. The WIC Program strongly encourages exclusive breastfeeding.

## Abstracts | Undergraduate Poster Presentations

However, when the WIC Program provides free milk formula to immigrant women with limited resources, breastfeeding practices may change in favor of formula feeding (Hohl et al., 2016).

The purpose of this senior honors project was to explore cultural feeding practices among Latina women following immigration to the US. This project was conducted at a rural health department in eastern North Carolina in collaboration with a public health nurse and a bilingual nutritionist. Preliminary data have been evaluated on six Latina women, three of whom were from Guatemala, who on average lived in the US 5.75 years. Most were single mothers, between the age of 20 and 37 years. Infants were between 3 months and 1 year. All mothers had breastfed their current child and participated in the WIC program. Cultural feeding practices included: using milk formula through the child's second year of life, a combination of formula and breastmilk for children one year and younger, and the use of several types of teas for colic or gastrointestinal upset. Implications for practice may include developing short messages that promote breast-feeding and reduce formula feeding among toddlers, and query new mothers on use of teas and herbal supplements.

UP107

Factor models for ordinal data: Comparing categorical and continuous approaches

Victor R. Hudson, Alexander M. Schoemann Ph.D. Department of Psychology, East Carolina University

Psychological constructs are frequently measured on ordinal scales such as Likert scales. Determining proper methods for analyzing data from ordinal scales is important when using these measures. Issues for ordinal scales are particularly relevant for techniques using item level analysis, e.g. Confirmatory Factor Analysis (CFA). We propose a method to empirically compare two CFA models; one that treats ordinal variables as continuous and another that treats the same variables as categorical variables. As the categorical and continuous models are not nested, information criteria and model fit indices are used to compare models. Using Monte Carlo simulations data were generated using an ordinal CFA model with 4 categories per variable and analyzed using both an ordinal CFA model and a continuous CFA model using ML and WLS estimation. We provide preliminary evidence of an empirical method to determine if ordinal variables should be treated as categorical or continuous in CFA models. By fitting models treating the data as categorical and continuous, researchers can use information criteria and model fit

indices to compare models and select the best approach. Further evaluation of the method is required, considering additional factors, e.g. differing sample sizes, models, number of categories and other estimation methods, e.g. Bayesian estimation.

UP108

An Examination of Nursing's Contribution to Global Health

Jacqueline R Curtis

Kim Larson, RN, PhD, MPH

Nurses provide a large portion of front-line global healthcare, but little is known about the unique contribution that nursing has made to global population health. Part of this problem lies in a lack of reliable tools and evaluation methods. Another concern are ethical issues focused on international aid by the health disciplines in general. For example, are nurses functioning within their scope of practice in global health settings? The nursing profession has recently developed consensus on four priorities for the future of nursing science, and global health is one of the four priorities. The purpose of this study was to understand the contribution of nursing to global health in two developing countries, Guatemala and Nicaragua.

A qualitative descriptive study was conducted with nursing students who participated in one of the college of nursing study abroad programs, either in Guatemala or Nicaragua, during 2017. Interviews were conducted in a private location, recorded, and transcribed verbatim. A content analysis approach was used to assess transcripts for commonalities and differences within and between cases. Preliminary data is available on four participants who completed the Guatemala program. Three themes were identified that describe nursing's contribution to global health: Reciprocal learning, Mutual understanding, and Community improvement. "Reciprocal Learning" was an occurrence among students and community members. For students it described knowledge gained about culture and language, which increased students' ability to provide culturally competent care. For community members it was an outcome of the student-led charlas (informal health talks). "Mutual Understanding" described students' and community members' appreciation of and challenges to health care access. This understanding serves as a framework for developing and implementing nursing interventions tailored to the needs and resources of unique global communities. Finally, "Community Improvement" described physical and developmental changes observed in malnourished children and a decrease in gastrointestinal health problems in a rural

## Abstracts | Undergraduate Poster Presentations

village following the

distribution of water filters. Participants had difficulty identifying the actual measurement of specific outcomes or goals. Data collection will continue through March 2018.

UP109

Sex Differences in ICD Patients: Do Cardiac Self-Care and Shock Anxiety Predict the Adoption of Smartphone-ECG Technology?

Elisabeth Hope Lee<sup>1</sup>

Caley Kropp, M.S.<sup>1</sup>

Samuel F. Sears, Ph.D.<sup>1-2</sup>

<sup>1</sup> Department of Psychology, East Carolina University

<sup>2</sup> Department of Cardiovascular Sciences, East Carolina University

Cardiovascular disease (CVD) is the leading cause of death in the United States (US), but women have traditionally been underrepresented in studies of CVD-associated health outcomes (Lundberg, Dunbar, & Wenger, 2016). One form of CVD is atrial fibrillation (AFib), which can significantly increase stroke risk (Khaji & Kowey, 2017). Implantable cardioverter defibrillators (ICDs) are devices often used in the treatment of arrhythmias like AFib, and can prevent sudden cardiac death. Patients with ICDs often have device-related shock anxiety, and research has shown that women are at higher risk for these symptoms (Vazquez, Conti, & Sears, 2010). One way patients with AFib can improve their quality of life is by utilizing patient engagement strategies for cardiac self-care. Novel technologies, like the Kardia Mobile device, can allow patients to have health insights at their fingertips. The Kardia Mobile device is a 1-lead, smartphone-enabled ECG that allows users to monitor their heart rhythm with their fingertips in just thirty seconds, and track their cardiac symptoms over time (Garabelli et al., 2017). The primary purpose of the current study is to determine sex differences in symptoms of cardiac anxiety and reported cardiac self-care in an ICD patient population. Because women with CVD are at higher risk of developing symptoms of anxiety or depression (Vazquez et al., 2010), it is hypothesized that women will report higher levels of both cardiac anxiety and self-care. ICD patients will be asked to use a Kardia Mobile device at least once per day for thirty days. The Florida Shock Anxiety Scale (FSAS) and the Self-Care of Heart Failure Index (SCHFI) will be administered at baseline and thirty-day follow-up. An independent samples t-test will be employed to

determine sex differences. The secondary purpose of this study is to examine the correlation between cardiac anxiety, cardiac self-care, and Kardia Mobile device usage over a 1-month period of use. It is hypothesized that higher levels of self-care will be correlated with increased Kardia Mobile usage in both men and women. Pearson correlations will be employed to determine the relationships between cardiac anxiety, cardiac self-care,

and Kardia Mobile use. This study will provide insight into sex differences found in CVD patient populations that may lead to more targeted treatment strategies aimed at improving quality of life in both men and women.

UP110

Secondary analysis of the effects of mobility on bariatric patients having weight loss surgery

Danielle C Williams

ECU College of Nursing Student

Janice A. Neil, PhD, RN, CNE

Associate Professor, College of Nursing

Abstract

Weight loss surgery has been shown to improve the health of severely obese individuals who have tried many other resources for losing weight. Bariatric surgery is recognized as the most effective treatment for severe obesity. This study is a secondary analysis of a study, "Tipping point: factors influencing a patient's decision to proceed with bariatric surgery". The parent study outlined the most common reasons why 24 bariatric patients decided to undergo major weight loss surgery. In addition to the factors found in the study, the present study was conducted to uncover issues related to the mobility of the patients because it was one of the more common themes seen in several interviews. The present study analyzed the impact of excess

weight on the mobility of individuals with a body mass index (BMI) greater than 40 kg/m<sup>2</sup> or 35 kg/m<sup>2</sup> with co-morbid conditions who had made the decision to have weight loss surgery. A literature review was conducted related to the effect that extra weight has on the mobility of the body. There were two research questions leading this analysis: "What mobility issues exist for morbidly obese individuals" and "What mobility problems led obese individuals to choose

## Abstracts | Undergraduate Poster Presentations

to undergo a bariatric surgical procedure”? Several steps were involved in the analysis, and IRB approval was obtained. Next, data was synthesized from the interviews conducted during the parent study. A data analysis was conducted using a modification of Colaizzi’s procedural steps of analysis. The research team individually and jointly analyzed the data and grouped significant statements into themes. There were four themes uncovered. These included “getting up and down”, “walking back and forth”, “difficulty functioning”, and “slowing you down”. At the Research and Creative Achievement Week we would like to present the possibility that mobility has an extensive and complex impact on the lives of morbidly obese individuals. Discovering more about the correlation between mobility and the path to weight loss surgery can lead to more effective patient care and education in all healthcare settings. Nurses should be cognizant of the possible mobility issues that severely obese people face.

Keywords: Bariatric, mobility, secondary analysis

UP111

Identifying Disparities in Family Centered Care, Care Coordination, and Financial Strain for Parents of Children with Special Health Care Needs

Brianna E Traynor, Michele A Mendes, PhD

Department of Baccalaureate Education, East Carolina University College of Nursing

Significance: Caring for a child with special health care needs requires increased emotional and physical resources from parents. Many parents do not have access to vital resources essential to caring for these children without facing difficulties. To maintain wellness of both the parent and the child, parents of children with special health care needs (CSHCN) must find positive ways to cope with the challenges presented to them. A review of the literature revealed several factors that support parental coping including family centered care, care coordination, social support, and financial support. This project is a part of Dr. Mendes’ research program into the needs of parents and families of CSHCN, particularly those from diverse racial and ethnic groups.

Research Question: How do Black and Hispanic parents of CSHCN differ from their White counterparts on measures of family centered care, care coordination, and financial strain?

Methodology: The research question will be answered through a secondary analysis of the data in the National Survey of

Children with Special Health Care Needs (NS-CSHCN). Feeling listened to by medical providers, being included in their child’s care, receiving coordination assistance for their child’s care, and the potential for financial strain are all variables that address this research question. Descriptive statistics including frequencies and comparison of means appropriate to the variable’s level of measurement will be used to examine coping and support mechanisms across racial and ethnic groups.

Implications: By identifying and analyzing different coping mechanisms among racial and ethnic groups, the nurse can be more culturally aware in the way he/she educates, assists, and enhances coping among parents with CSHCN.

UP112

Perceptions and Opinions of Sustainability in North Carolina Wineries

Emma Caitlynn Plyler

When thinking about sustainability in the wine industry there are many aspects to the definition and practices that are available to owners and growers in the industry. The purpose of this study is to better understand the perceptions and opinions about sustainability and the use of sustainable practices in the North Carolina wine industry. To investigate this, a contact at the NC Wine and Grape Council will be providing contacts for the population. An online survey with a variety of questions about sustainability, sustainable practices, and other information will be used. Overall, the responses of each question will be compared to the location and size of the winery to investigate any correlations among opinions and perceptions about sustainability, or of sustainable practices being used in North Carolina. This project is funded in part by the NC Space Grant and the East Carolina University Honors College. This study is being conducted with the Center for Sustainability and with the cooperation of the NC Wine and Grape Council.

UP113

Why Not West Greenville: Stories towards Sustainability

Ani Anoush Kerjilian

When Urban Planners discuss sustainability, there are always three major elements brought up: the Environment, Ecology, and Economy. Otherwise known as the “Three Es of Sustainability,” it is by finding a balance between them that Planners consider a community sustainable. But how can

## Abstracts | Undergraduate Poster Presentations

Planners know for certain that a community is on the right path to sustainability? Knowing how a community reacted in the past to certain changes in their urban environment may have an important part in moving them forward to a more sustainable future.

By implementing “Snowball” sampling, ethnographic research and locational surveys of West Greenville, past changes to the area and how the community reacted to them can be recorded. In this case, the method of “Snowball” sampling is used to recruit interviewees who have lived in West Greenville for more than twenty years based on the recommendation of their peers. The questions asked during the interview are geared to encourage the interviewees to share their stories of how West Greenville has changed from their point of view. They may reference certain buildings or streets that have had a large impact on their lives. Any photos they may provide as a visual aid may also be used to further prompt them in letting a new story or explanation as to why the image is important, thus creating what is called a “photovoice,” in context of the interview. The primary methodology is based on Kevin Lynch’s Five Elements of an Image of the City. By using Lynch’s Five Elements, a chronology of changes can be made and put into perspective from the interviewees point of view.

By doing so, this allows their stories to be broken down and categorized between Lynch’s Elements to create a physical representation of their image of the city in the form of a GIS Story Map. This is one of two expected outcomes for this project. The other is to create an archive of the interviewed residence’s stories so that future generations of West Greenville can know and understand how their community has changed from the point of view of a resident.

The best way to implement the outcomes are to account for what modifications have had greatest reactions, try to build upon them.

UP114

Purple to Green: Stormwater, Green Infrastructure, and Retrofitting

Thomas Bradshaw<sup>1</sup>, Kellen Long<sup>1</sup>, Nick Musarra<sup>1</sup>, Chloe Pearson<sup>1</sup>, Jordan Reedy<sup>1</sup>, Kenneth Staton<sup>1</sup>

<sup>1</sup>Department of Geography, Planning, and Environment

The 2017 Fall semester Planning Studio, composed of six Urban and Regional Planning undergraduates, developed a plan to retrofit areas on the East Carolina University campus for the

purpose of stormwater mitigation. Green infrastructure is becoming the norm in progressive modern development plans, due its direct social, environmental, and economic benefits. Green infrastructure is any “cost-effective resilient approach to managing wet weather impacts that provide many community benefits” (EPA, 2016). Through the analysis phase, our team recognized three key areas that were identified as a priority for storm water management. These sites include the parking lot at the bottom of College Hill Drive (“Flood Lot”), the courtyard in the Brewster building (“Brewster Courtyard”), and the green area outside of the Science and Technology building along 10th street (“Sci-Tech Bowl”). Our team completed an analysis of three scenarios for each site that included implementation practices that would reduce storm water and improve water quality. This in-depth analysis used Geographic Information System, the EPA’s storm water calculator, historic content of each site, and a site visit. By adding green infrastructure such as permeable pavement, constructed wetlands, and bio-retention cells, East Carolina University could potentially create these changes on campus to create a more sustainable and safer environment. By making these changes on the campus it also creates a chain reaction, producing a safer environment for the local community that surrounds the ECU campus. Purple to Green will serve as an example for other campuses in low, flat regions to achieve effective storm water management practices that are resilient and sustainable; include aesthetically enhanced area that provide greater enjoyment and educational opportunities, as well as an area composed of low impact development practices that will provide numerous environmental benefits over their life-cycles.

UP115

Visual Design in Modern Structures

Matthew Devoe Klettner

Many structures in the modern world are being built to meet certain building rating systems to provide a sustainable and efficient space that can utilize the most of itself. One of these rating systems buildings should strive for is the LEED certification, as it is one of the most popular. LEED, or Leadership in Energy and Environmental Design, is the most widely used green building rating system in the world. Available for virtually all building, community and home project types, LEED provides a framework to create healthy, highly efficient and cost-saving green buildings. LEED certification is a globally recognized symbol of sustainability achievement. Today, at East Carolina University, many buildings are in the process of becoming LEED certified, but only one building has so far been certified. Many buildings are underway



## Abstracts | Undergraduate Poster Presentations

to becoming LEED certified but The Croatan is East Carolinas first LEED certified building with a silver certification from the United States Green Building Council. The Croatan is a dining facility on campus and provides many amenities to its inhabitants. The East Carolina dining services department states that they are working together to continually develop and implement sustainable solutions through "Green Thread", the environmental sustainability platform. The Croatan follows this platform and utilizes many green options in its construction such as green cleaning with non-toxic chemicals and products, and water and electricity conservation methods to keep the buildings consumption low. Special lighting, water cisterns in the courtyard and ecologically friendly landscaping are planned to further boost the buildings sustainability. According to the ECU News Service, the Croatan is constructed of bricks that were reclaimed from an old demolished tobacco warehouse. This means that money was saved on construction costs, and that the job crew had to spend less time obtaining materials. The reused bricks also accredit to the LEED certification. Along most of the walls one can find large sprawling windows that let in loads of natural light to enhance the space. In addition, the ceiling was raised in the main dining area, and with such a large amount of natural light, this fits well. This combination of the elevated ceiling and large windows gives the Croatan a modern and natural look. Outside areas provides sitting and relaxation areas, which are complimented by lush greenery and plants surrounding the structure.

UP116

Characterization of tcp38 in Maize

Serena Alexandria Mitchell

Jessica Wilson

Beth Thompson

In the Thompson lab we study the inflorescences of maize because of their importance in reproduction and the production of seeds that are consumed as food. Therefore, researching the function of the genetic pathways in normal inflorescences is crucial. One mutant we study is the fuzzy tassel (fzt) mutant. fzt, has severe inflorescence defects including fewer silks, undeveloped stamens and is completely sterile. The phenotype of fzt is due to a mutation in the dicer-like1 (dcl1) gene. dcl1 encodes an enzyme that is required for microRNA (miRNA) biogenesis. miRNAs are involved in posttranscriptional gene regulation in both plants in animals. Several miRNAs are severely reduced in fzt, including miR319. MiR319 targets RNAs which encode TCP transcription factors.

TCP transcription factors are plant-specific transcription factor that have roles in multiple aspects of development including floral development. My project focuses on the miR319-target tcp gene, tcp38. We have obtained two different putative mutants, both of which have transposon insertions located upstream tcp38 RNA coding region. The overall question being tested with my research is if tcp38 RNA levels are changed these tcp insertion lines. I have isolated homozygote individuals from families segregating tcp38 insertion alleles. To determine if the insertion affects the expression of tcp38 mRNA, I extract RNA from tcp38 homozygous mutants and normal siblings. I will then reverse transcribe the RNA to obtain cDNA. I can use tcp38 gene-specific primers to perform PCR on this DNA to determine if tcp38 mRNA is present or absent. If tcp38 RNA is reduced or absent in the homozygous mutants, then the tcp38 mutation is loss-of-function or a null allele.

UP117

In Situ Meteorological Observations of Atmospheric Responses to the 2017 Solar Eclipse in Easter North Carolina Tori Barefoot

A solar eclipse (as seen from the planet Earth) is a type of eclipse that occurs when the Moon passes between the Sun and Earth, and when the Moon fully or partially blocks the sun (Wikipedia 2018). On August 21, 2017 North America experienced a total solar eclipse from coast to coast. This event not only caused visible changes on Earth but also affected things that cannot be seen, such as atmospheric phenomenon. The sun provides major energy to drive atmospheric processes and an event like this can cause major changes in variables such as air temperature in the lower and upper levels, and in coastal regions like ours, sea breezes, which are dominant local atmospheric circulations driven by land-sea differential heating during the daytime. This project will use data collected at the UNC Coastal Studies Institute (UNC CSI) in Manteo, North Carolina, which included mobile weather stations and eddy-covariance flux systems on the ground, and balloon borne radiosonde(rawinsonde) systems for upper air measurements. The

main focus in this project will be on changes in the atmosphere from near the surface to upper levels, including sea-breeze in the coastal areas in response to the solar eclipse. Skew-T diagrams will be plotted using data collected by our ECU research team as well as data from other teams across the country. Radar data will also be analyzed for additional evidence on sea-breezes along the coast of North Carolina that are identified from our in situ measurements at the UNC CSI. Overall this study will help provide meteorologists around the world with a better understanding of the effects of a solar

## Abstracts | Undergraduate Poster Presentations

eclipse on our atmosphere and help future research in this field. UP119

UP118

Zooplankton community composition and size structure throughout river herring nursery areas in the Chowan River, North Carolina

Adriana Vanesa Villasenor, Deborah Ann Lichti

Anadromous fish, such as river herring (blueback herring (*Alosa aestivalis*) and alewife (*Alosa pseudoharengus*)), return to freshwater to spawn in nursery habitat throughout estuaries. River herring populations have declined throughout their range, and we are investigating what characteristics of nursery areas could affect the population. Zooplankton are an important food source for larval fish, but little is known about how zooplankton size structure affect larval river herring in the Chowan River. Zooplankton size structure can affect the survival and growth by resulting in a match/mismatch hypothesis. The timing of first feeding for larval fish could be mismatched to the zooplankton community structure. We hypothesized that the zooplankton size structure would be different based on the community composition between the five sites sampled along the Chowan River over two field seasons. Our research consisted of determining the size structure for the dominant zooplankton for five different sites throughout the Chowan River. We collected zooplankton each week from the months of March to April for two years (2016 and 2017). Zooplankton community composition was determined before individual zooplankton measurements were taken. We then took photographs using a microscope equipped with a high-resolution camera. We measured the total length of 30 individuals of each zooplankton taxa present in each sample. We saw changes in the zooplankton community composition between locations and years. Our data suggest a variation in size based on the zooplankton community composition for the five collection sites and over the two years. The results will allow us to determine the zooplankton structure during the residential time of larval fish in the Chowan River. By relating larval fish size to zooplankton size structure and zooplankton community structure, we can determine how nursery areas could affect the growth and survival of larval river herring.

The Effects of Pharmaceuticals on Mosquitoes Oviposition Site Choice and Predator Detection

Tara Lynn Edwards

Samantha Parrish

Dr. Michael McCoy

The products that humans use every day to shower, drink, prevent sickness, protect their crops, etc. are affecting the environment. Pharmaceuticals and personal care products, or PPCPs, have been becoming notable threats to the environment for several decades now. In this study, the effects of caffeine (a stimulant), DEET (a common insect repellent), triclosan (an antibacterial compound), and a mixture of the three were tested in water with *Gambusia kairi* to determine whether the PPCPs are having an effect on a mosquito's ability to detect a predator's presence in a body of water. Although this study is still in progress, it was predicted that the various species would collect more frequently in the predator treatments when a PPCP was present. This indicates that the PPCPs are having a direct effect on the mosquitoes' oviposition site choice by masking the kairomones of the predators present. Masking a predator's presence could lead to population depletion of mosquitoes causing damage in the trophic cascade of the local ecosystems.

UP120

Does variation in nest weight predict parental condition in Eastern Bluebirds?

Angelica N. Reed, William J. Zahran, and Susan B. McRae

Does variation in nest weight predict parental condition in Eastern Bluebirds?

Angelica N. Reed, William J. Zahran, and Susan B. McRae

Department of Biology, East Carolina University

Bird nests are remarkable for their complex architecture. Nest construction takes several days as each piece of nest material is individually collected and carried to the nest where it is woven in with the others. The effort invested by parents is therefore significant, and likely entails significant energetic costs. Cavity-

## Abstracts | Undergraduate Poster Presentations

nesting Eastern Bluebirds *Sialia sialis* build nests of dry grass and pine straw in uniform nest boxes we install at ECU's West Research Campus. However, nest sizes are dramatically variable in size (weight range = 23.9g – 146.3g). We hypothesized that nest size may be an indicator of parental quality or condition, and that it would correlate with reproductive success. Bluebird pairs produced one to three broods per season, and typically use the same box each time. We removed all old nests, so that a new nest was built for each. We analyzed the relationship between reproductive success of each Eastern Bluebird breeding attempt and the weight of the nest. We expected that pairs that built taller, heavier nests would fledge more offspring per brood. Parents of both sexes contributed to building, though the female only completes the lining. Therefore, we also looked for an effect of relative female body condition on nest weight. We discovered that females in better body condition did not, in fact, build smaller nests. However, nest weights significantly decreased with each consecutive brood. The possibility that more experienced parents spend less time nest building will be considered.

UP121

Hickory Shad Stock Identification: X-ray Analysis

Tommy Joseph Davis

Dr. Roger Rulifson

Jordan Smith

The Hickory Shad *Alosa mediocris* is an anadromous species, which means it spends its adult life in the ocean but spawns in coastal streams. It is often mistaken for a closely related species, the American Shad *Alosa sapidissima*. The original description of the species by Mitchill (1814) was incomplete: he described several meristic counts of finrays and scales, but not features of the skeleton. We are using X-ray methodology to assist in counting the internal features of the skeleton as a possible method of identifying different and unique spawning populations in coastal watershed of the US east coast. Adult fish specimens were collected from coastal watersheds ranging from Florida to more northern areas of Maryland. The fish were taken to the ECU Medical Campus for x-ray. The digital images were uploaded to a Microsoft file and examined by counting the fin rays of the pectoral, ventral, anal, and dorsal fins and the total number of vertebrae. A pilot study was conducted on adult fish from the Altamaha River, Georgia, by physically counting all characters on dead specimens using two methods (fins attached to the fish and then again with the fins excised and examined under a dissection microscope), and then

x-rayed to validate counts from the x-ray with counts from the dead specimen. Results of the pilot study were applied to all x-rays of specimens collected from watersheds through the range of the species. X-rays provided additional information not available from counting meristic characters visible on dead specimens.

UP122

Ecological Role of *Gobiosoma bosc* on Biodiversity

Corey Allen Winkler

Christopher Moore

Dr. April Blakeslee

Protected areas such as national parks are often assumed to be areas of high biodiversity; however, few studies have been completed in order to confirm this assumption. This is because traditional methods of assessing biodiversity within a community are often costly and require a long period of time in order to be completed (Bates et al. 2007). Parasite diversity, on the other hand, has been shown to have a positive correlation with overall community health (Hudson et al, 2006; Hechinger et al. 2007). The principle concern with this proposed method of biodiversity estimation is the possibility that the hosts for these parasites are ranging widely. If this case, the hosts could have acquired their parasites anywhere, and parasite diversity would not be a reliable metric for answering questions about local biodiversity. The study of the dispersal capability of the parasites' host organisms would thus provide the information needed to ensure that parasite richness could be used as a proxy for overall community diversity.

The host organism for the proposed study is the naked goby (*Gobiosoma bosc*): a scale-less fish that is highly abundant in estuaries from Massachusetts to Mexico (Able & Fahay 2010; D'Aguillo et al. 2014). Based on preliminary data collected by the Blakeslee Lab, *G. bosc* hosts a plethora of parasite species along a salinity gradient (Moore & Blakeslee unpub.). It is assumed that these fish do not stray far from their sheltered habitat since as adults they are benthic fishes, although as larvae they are pelagic and dispersed somewhat stochastically (Breitburg 1989; Breitburg 1991), yet no study has been completed that confirms the habitat range of adult naked gobies. In order to learn more about their dispersal ability – and that of their parasites – a tagging study is necessary to document the range of *G. bosc*.

Visible implant elastomer (VIE) tagging will be used to mark

## Abstracts | Undergraduate Poster Presentations

populations of gobies. The VIE tags being used are of a medical grade, have very few biological side effects, and are commonly used in tagging studies involving fish (Northwest Marine 2008). Frederick (1997) did note that tagging individuals under 20mm with VIE resulted in significantly higher mortality, therefore only fish over 20mm in length will be used in this study. Catalano et al. (2001) also recommend that bright marks not be placed on conspicuous areas as it would compromise the organism's ability to hide from potential predators.

UP123

Impacts of exposure to Talstar insecticide on measures of *Aedes albopictus* (Diptera: Culicidae) vector competence for Zika virus

Alexis Sarreal Parale, Dr. Stephanie Lynn Richards

Mosquito-borne illnesses are a global issue, and the emergence of Zika virus (ZIKV) as a public health issue has brought increased attention to these issues. As mosquito control has increased due to public health risks of ZIKV and other arboviruses, the probability of mosquitoes' exposure to insecticides increases. Insecticide exposure may impact mosquitoes' ability to become infected with and transmit viruses (i.e., vector competence).

This could be due to mechanisms of insecticide resistance affecting the immune response leading to impacts (enhancement/reduction) on vector competence. The aim of our study is to examine the relationship between sublethal mosquito exposure to a formulated product containing an insecticide and ZIKV vector competence. To accomplish this, we exposed a colony of *Aedes albopictus* from NC (5-7 days old) to a sublethal dose

(0.128 µg/mL) of the commonly used product Talstar (active ingredient bifenthrin) to study its impacts on infection and dissemination for ZIKV. We incubated the mosquitoes at 28°C for 14 days. After a 14-d incubation period, neither infection rates (87-100%) nor body titers differed between groups. Dissemination rates for Talstar-exposed mosquitoes (87%) were not significantly different than control (96%) mosquitoes. However, Talstar-exposed mosquitoes ( $3.1 \pm 0.3$  PFUeq ZIKV/mL) showed significantly ( $P < 0.05$ ) higher virus titers in their legs than control ( $0.5 \pm 0.3$  PFUeq ZIKV/mL) mosquitoes. These results highlight the need for additional research to elucidate the significance of sublethal doses of insecticides on mosquitoes in relation to their effects on measures of vector competence. We expect this relationship to change under different environmental conditions, in different mosquito populations, and for different active ingredients and

formulated products.

UP124

Microbiologically Influenced Corrosion (MIC) of Pappy's Lane Shipwreck

Kyra A. Price<sup>1</sup>, Cody E. Garrison<sup>1</sup>, Nathan Richards<sup>2,3</sup>, Erin K. Field<sup>1</sup>

<sup>1</sup>Department of Biology, East Carolina University, Greenville, NC 27858, <sup>2</sup>Program in Maritime Studies, Department of History, East Carolina University, Greenville, NC 27858, <sup>3</sup>Maritime Heritage, UNC-Coastal Studies Institute, Wanchese, NC 27981

When shipwrecks degrade over time, their history and importance can't be studied. Shipwrecks provide a large surface area of food and shelter for microbes. Previous studies have shown differences in microbial communities that colonize and corrode steel surfaces. These studies suggest iron-oxidizing bacteria (FeOB), particularly those classified as Zetaproteobacteria, prime the environment for sulfate-reducing bacteria (SRB) to ultimately influence corrosion. After acknowledging the presence and estimating the abundance of FeOB in the community, the microbial contribution to corrosion and degradation of shipwrecks can be understood. FeOB use iron from the ship for metabolism, influencing steel corrosion. To understand how these microbes may contribute to the corrosion of the Pappy's Lane shipwreck, samples were collected from 7 locations across the shipwreck to then identify presence of FeOB through Most Probable Number (MPN) growth studies. Samples were selected based on color differences, which are hypothesized to be indicative of the microbial community types present. Positive MPN growth results suggest FeOB were present in greater relative abundance on the samples that contained orange iron oxides, indicating that FeOB are widespread across the shipwreck. Currently, the microbial community composition is being characterized through 16S genomic sequencing to identify these organisms, and their proportion in the entire microbial community. By understanding the diversity and abundance of iron-oxidizing bacteria within these microbial communities, we can ultimately understand their influence on corrosion and degradation of shipwrecks.

## Abstracts | Undergraduate Poster Presentations

UP125

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. In non-evolution classes, 36.5% of non-evolution students would not treat the patients (n=74). In the evolution classes, 61.6% of evolution students would not treat the individuals (n=107). Significantly more ( $p=0.0008$ ) students chose not to treat in the evolution class, indicating that the course topic may have influenced their answer and was a strong enough influence to over-ride accepted medical

ethics, a philosophy they have ascribed to themselves in light of their assertion to become medical professionals.

UP126

Optimizing the Synthesis of Diquinones

Chase Michael Neese

Quinones are a class of molecules from which many biologically active derivatives can be synthesized. Diquinones, which contain two quinone rings bonded to each other, appear in a number of natural products such as phoenicin, oosporein, and parvistemin A as well as the highly desirable popolohuanone E, shown to exhibit anti-cancer activity. The synthesis of diquinones can be problematic in that the reaction typically proceeds in two different directions. The first produces the simple quinone, whereas the second direction leads to the diquinone. Using 2-t-butyl-1, 4-dimethoxybenzene as a starting material, various optimization strategies have been studied in order shift the synthesis to favor the diquinone and will be discussed.

UP127

Undergraduate Natural Sciences Poster Presentation

Blood Steroid and EDC Metabolite Concentrations in Exposed Mice Plasma

Lawrence Barnoski \*

Johnsua Mogus\*

Krista McCoy\*

\*Department of Biology, East Carolina Univeristy

Sex steroids are critical for fetal development and sexual differentiation. Disruption of steroid signaling and function during these critical periods can lead to malformation. Humans are exposed to an astounding number of environmental pollutants that disrupt endocrine function. In fact, the rise in reproductive developmental disorders can be linked to these chemicals, collectively known as endocrine disrupting chemicals (EDCs). Vinclozolin, an agricultural fungicide, is a model EDC in rodents used to induce the congenital penis deformity, hypospadias. Hypospadias is a malformation of the male reproductive organs resulting in altered urethral placement. Vinclozolin and its metabolites (M1 and M2) can bind the androgen receptor induc-



## Abstracts | Undergraduate Poster Presentations

ing downstream cascades ultimately masculinizing the genitalia. Although this mechanism is well known, the influence of vinclozolin on hormone concentrations is unknown. Here, we test the hypothesis that vinclozolin alters sex hormone concentrations in both male and female fetuses, and quantify and compare vinclozolin and its metabolite concentrations in both sexes. Pregnant mice were dosed with 125 mg/kg of vinclozolin or corn oil the solvent control. Dam and fetal plasma were collected at embryonic day 16.5. Samples of the mother and embryo blood plasma were collected and analyzed for free and bound steroids as well as metabolites using high-performance liquid chromatography and mass spectroscopy (HPLC-MS). Preliminary results suggest that sex hormones are affected by vinclozolin and that vinclozolin and its metabolites are distributed differently in male and female fetuses. Analysis of blood steroid levels provides a better understanding of the molecular action of EDCs.

UP128

Bogue Banks, North Carolina shoreface and inner shelf foraminiferal assemblages

Ashley Sara Lynn, Nina M.E. Shmorhun, Stephen J. Culver, David J. Mallinson, Kathleen M. Farrell

Four vibracores were selected to determine whether Holocene shoreface and inner shelf sediments off Bogue Banks, North Carolina can be distinguished by their benthic foraminiferal assemblages. Sample locations within the four cores were determined to complement a previous foraminiferal study. From these cores, nine samples were soaked in a dilute sodium hydroxide and sodium hexametaphosphate solution to disaggregate the sediment. The samples were wet sieved over a nest of 63  $\mu$  and 710  $\mu$  sieves to remove mud and coarser sediment. The remaining sand fractions were floated using the heavy liquid sodium polytungstate to concentrate specimens of foraminifera. Approximately 100 specimens were picked at random from the float and identified, if possible, to the species level.

Results indicate minimal differences in foraminiferal assemblages for the shoreface and inner shelf cores. The foraminifera are mostly Holocene (56-100%), but up to 7% of shoreface assemblages and 13% of inner shelf assemblages consist of reworked Miocene fossils. Holocene shoreface assemblages contain 86% to 90% *Rotaliina*, 14% to 31% *Miliolina*, and 0% *Textulariina*. In contrast, Holocene inner shelf assemblages have 69% to 100% *Rotaliina*, 0% to 31% *Miliolina*, and 0% *Textulariina*. Compared to the inner shelf samples, the shoreface samples contained more *Ammonia parkinsoniana*,

*Ammonia tepida*, *Elphidium mexicanum*, and *miliolids*. Planktonic foraminifera are rare. In the shoreface species diversity (Fisher's alpha) increases up-core, ranging from 8.238 to 17.442. The results of this study indicate that inner shelf and shoreface environments are not easily distinguished by their sedimentological characteristics. However, there are slight differences in foraminiferal assemblages between the two environments.

UP129

Creating an Effective Cultural Competency Program for Health Characterization of a Particle Microbeam by Confocal Imaging of Fluorescent Nuclear Tracks

Alicia Jiyun Kwon<sup>1</sup>, Yanping Xu<sup>1</sup>

<sup>1</sup> Department of Physics, East Carolina University

Coupling confocal microscopy with fluorescent nuclear track detectors (FNTD) is a novel way to investigate radioactive dosimetry. The intensity of the resulting fluorescent light is related to the concentration of the fluorescent compound and thus can be related to the dose absorbed in a particular part of the system. The advantage of this method is that it is applicable to wide doses and dose rate range with great sensitivity. Confocal microscopy is useful compared to other radioactive measuring methods (using chemicals) because it can be done in real-time.

A confocal fluorescent microscope (CFM) will be built using various optical parts and a template from ThorLab Inc., and an FNTD will be measured with this CFM after particle microbeam irradiation. A proton microbeam with an energy of 2MeV will be used. The purpose of this project is to measure the true beam profile of this 5  $\mu$ m diameter proton microbeam, which is used to radiate single mammalian cells. This is also applicable for dosimetry because the radioactivity can be measured in real-time as opposed to traditional CR39 etching methods. With 633 nm laser excitation beam,

the FNTD - Ag<sub>2</sub>O<sub>3</sub>:C,Mg (aluminum oxide doped with carbon and magnesium) crystal sample will emit fluorescence light at wavelength 750nm and it will be measured with a confocal fluorescent microscope. The confocal pinhole along with the proper filter, blocks out unnecessary wavelengths emission light and improves the fluoroscopy detection. All the fluorescent tracks observed by the CFM will then be analyzed to find the exact diameter of the microbeam.

## Abstracts | Undergraduate Poster Presentations

UP130

Early Ontogeny of *Alosa mediocris* from Egg to first-feeding Larva.

Student: Jon H Sherman II  
Mentor: Dr. Roger Rulifson  
Affiliations: Tom Fink

Abstract

Early Ontogeny of *Alosa mediocris* from Egg to first-feeding Larva.

The adult Hickory Shad, *Alosa mediocris*, is an anadromous fish species that live in the ocean but migrates to coastal freshwater rivers to spawn, and then returns to the sea. The eggs are semi-buoyant and slightly adhesive immediately after hatch. The early life stages of development are not fully described in literature sources. During the spring of 2017 the developing eggs of hatchery-spawned Hickory Shad were photographed periodically through ontogeny (development) to the post-yolk sac stage. Those photographs have been enhanced for visual inspection. The goal of this project is to fully describe these various stages of development from fertilization of the egg through post yolk-sac. For each hour of observation, photos are selected depicting the range of characteristics developed, or forming, at that time. Characteristics are noted, measured, and annotated for verbal description. Representative photographs will be selected and displayed serially through ontogeny along with the verbal and measurable characters.

UP131

Genes that Determine Nickel Susceptibility in *Caenorhabditis Elegans*

David Rudel, Eli Hvastkovs, Nicholas Schaaf, Ryne Turner, Cecily Thompson, Christopher Whittington, Simon Vuchev, Meghan Nadig, Pujan Patal

The broader purpose of this research is to identify the genetic pathways in animals that play a role in nickel toxicity. Nickel is a significant anthropogenic allergen and carcinogen. Previous findings by published undergraduate researchers in the Rudel laboratory include strong data addressing the effects of nickel exposure on life history traits and cellular physiology as well as the molecular mode of DNA damage due to nickel exposure. In particular research in the lab has indicated nickel exposure

in animals directly damages genomic DNA. In nature, nickel is released by volcanism and weathering. The Bristol strain of the nematode *Caenorhabditis elegans* is a major animal model that was isolated from a non-volcanic region of England and is susceptible to nickel toxicity. In comparison, the Hawaiian strain isolated from a volcanic region is little affected by nickel exposure. This work will begin to provide understanding of how animals can abrogate nickel toxicity, i.e. why Hawaiian strains have a sort of resistance to mutation while the Bristol strain does not. We have received 50 recombinant inbred lines (RILs) from Dr. Erik Anderson at Northwestern University, with 100 more yet to arrive. Each RIL is a clonal homozygous population with a unique combination of Bristol and Hawaii alleles. Each of these RILs will therefore give a different response to nickel exposure. Our role in this research will be to culture these populations with and without nickel, isolate DNA from them, and determine their nickel susceptibility (with the Hvastkovs laboratory). Strains exposed will be used for a genome wide association study to identify genes that make animals either susceptible or resistant to the toxic effects of nickel.

UP132

Evaluating Wash Performance of Laundry Detergents Using Reflectance

Oluwatosin Rebecca Ayinde<sup>1</sup>, Ryan Cotroneo<sup>2</sup>, Allison Danell<sup>1</sup>

<sup>1</sup>Department of Chemistry, East Carolina University

<sup>2</sup>UNX Incorporated, Greenville, NC

In this study, a method for assessment of soil removal by detergent formulas was created. This method of wash performance evaluation involves the use of fabric reflectance before and after a wash procedure. These readings were taken using a portable spectrophotometer and the values were computed in a Soil Removal Index Equation to give the percent soil removal. SRI values were calculated for two different types of fabric. The average percent relative standard deviation from the SRIs derived for the two fabrics was 1.20%. Given the small value of relative standard deviation derived from this testing procedure, it was concluded that this method of evaluation gives reproducible results. Along with the reliability and consistency of results, this testing procedure provides a method of assessing and comparing wash performance of detergents on different types of fabric.

## Abstracts | Undergraduate Poster Presentations

UP133

Examination of Supercritical CO<sub>2</sub>-Rock Interactions in Sequestration

Jonelle Romero<sup>1</sup>, Rohan Parekh<sup>2</sup>, Dr. Yu Yang<sup>2</sup>

<sup>1</sup>Department of Health Education and Promotion, East Carolina University

<sup>2</sup>Department of Chemistry, East Carolina University

The objective of this research is to improve carbon dioxide (CO<sub>2</sub>) sequestration technology by monitoring the interaction of minerals with supercritical CO<sub>2</sub> enclosed in a simulated underground geological reservoir. This process has the potential to reduce atmospheric CO<sub>2</sub> through the isolation and

deposition of the gaseous compound. A method has been developed to prepare calcium, magnesium, and iron mineral samples as well as simulate an underground geological reservoir through the use of an oven. Evaluation of the samples has been conducted through titrimetry and the results are being further examined. The findings of this innovative research will be presented.

UP134

Synthesis of Biembelin

Mitesh J Patel

A natural product known as embelin has been found to have anti-wound, antibiotic, and anticancer activity. A dimer of embelin, known as biembelin, has also been identified, but has never been isolated in meaningful amounts in order to test its biological activity. Our work to synthesize biembelin by following a synthetic scheme used successfully to prepare a structurally similar compound will be discussed.

UP135

The effects of mowing and fertilization on the clonal growth of switchcane

Jada Williams<sup>1</sup>, Carol Goodwillie<sup>1</sup>

<sup>1</sup>Department of Biology, East Carolina University

Switchcane (*Arundinaria tecta*), a once-common rhizomatous

grass species of the southeastern United States, has significantly declined over time. Switchcane is ecologically significant because birds, small mammals and other wildlife use it for cover and food. Despite its importance, we know relatively little about the factors that affect its clonal growth and abundance.

A long-term study at the ECU West Research Campus is focusing on the independent and combined effects of mowing and fertilization on the plant community, which includes large populations of switchcane. In an ongoing study initiated by other students, we are examining the effects of the treatments on clonal growth of switchcane. Samples were collected from mowed, fertilized, mowed and fertilized, and control plots, and genetic material was extracted. AFLPs (amplified fragment length polymorphisms), PCR-based genetic markers, were analyzed to distinguish different genetic clones. I have expanded the study by adding more genetic markers and filling in missing data to provide more robust clonal identification. Results of our study will provide insights into the decline of switchcane and contribute to solutions to this ecological problem.

UP136

A Climatology Analysis of Monsoonal Impacts on the Ganges-Brahmaputra-Meghna Region

Mohin Patel

Dr. Scott Curtis

The Ganges-Brahmaputra-Meghna (GBM) is a wide river network that crosses the boundaries of India, Nepal, and Bangladesh. This large river basin is impacted by monsoonal rainfall each year and the discharge primarily empties into the Bay of Bengal. This basin is divided into a hierarchical set of sub-basins following the topological concept of the Pfafstetter coding system. At level 3 there are three sub-basins, level 4 divides the GBM into eight sub-basins, and level 5 has the smallest hydrologic unit with 34 sub-basins. Understanding the dynamics of monsoonal precipitation can give a better idea of the geographic distribution of the most intense rains, which can ultimately be an indicator of annual erosional impact in the GBM delta region. The study will use the satellite-based PERSIANN precipitation data set that extends from 1983 – 2015. According to a study by Curtis et al (2017), "an analysis of global precipitation indicates that the rainfall patterns obtained within the GBM are localized." Therefore, the first question we hope to answer is, do some of the individual sub-basins have more control over river bank erosion than others

## Abstracts | Undergraduate Poster Presentations

on a regional scale? Another question, do any of these time-series relate to ENSO (El Niño Southern Oscillation)? How does ENSO impact rainfall within the individual sub-basins? There have not been many studies on this specific topic before. The approach to answer the first question is by using GIS to extract precipitation within the level 4 river basins for each monsoon season. The precipitation climatologies of the sub-basins will be intercompared and compared to the GMB as a whole, and a measure of annual river bank erosion. To answer our second question, we will do an analysis on the ENSO variability within the time period of 1983 – 2015 and match the data with the basin precipitation time series to see if there is any form of correlation.

### References

Curtis, S & Crawford, Thomas, Munshi, Khaled & Paul, Bimal. (2017). Monsoon Dynamics in the Ganges-Brahmaputra-Meghna Basin. 4865.

10.3390/CHyCle-2017-04865.

### UP137

#### Fibrin Network Alignment Within Different Flow Rates

Miranda Susan Lee

Fibrin is an insoluble protein and a major component of blood clots. When a wound occurs a protein within blood plasma, known as fibrinogen, is converted into fibrin monomers by the enzyme thrombin. These fibrin monomers aggregate 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 fibrin under static conditions, but little has been investigated on what effect flow has on fibrin networks. It is hypothesized that when the fibrin network polymerizes under flow, the fibers align in the direction of flow, and when the network polymerizes under static conditions, the fibers are randomly oriented. However, it is unknown why the fibers align this way, and what influence flow has on fibrin monomers and protofibrils.

To gain understanding on the effect flow has on fibrin monomers and protofibrils, fibrin networks will be formed in different fluid flow rates and placed into our custom built microfluidic device. While in the microfluidic channels, we can examine their structural makeup with a microscope. During observation, we will facilitate a change in fluid flow rate causing the fibrin network to react to different habitual stimuli. These

reactions will reveal how fibrin monomers and protofibrils react inside fiber where the fibers have polymerized into a network under flow. Observing fibrin under flow change will enable us to observe what influence flow has on the network formation at its most basic levels, and lead to an understanding of why fibrin fibers align the way they do. Preliminary results will be presented.

### UP138

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

Julia Brown, Matt Chilton, Katie Clements, Yong Zhu, Fadi Issa  
Department of Biology, East Carolina University

The effect of steroid hormone receptors in reproductive success has primarily been studied in females. However, how these steroid hormone receptors affect male behavior and reproduction is an additional avenue to explore. Currently, there is circumstantial evidence that steroids, such as androgens (testosterone) and progestins, play roles in aggression and social behaviors in vertebrates. However, genetic evidence underlying these behaviors needs to be further elucidated. We generated zebrafish knockouts and examined aggression and social dominance in male zebrafish. Wild Type (WT), Androgen receptor Knockouts (ArKO), and Progestin Knockouts (Pgr KO) were taken from a group-housed environment and were isolated for one week to remove any potential pre-existing social behaviors. After the isolation period, males were paired (age and size-matched) with a fish of the same genotype for two weeks. During the two-week pairing period, each pair of fish was observed for five minutes. During observation, aggressive behaviors (attacks) and submissive behaviors (retreats) were recorded. Filming of pairs occurred on the first and last day of pairing to analyze if swimming patterns diverged between fish of different social roles. Motion tracking analysis was used to generate heat maps of the swimming patterns and localization of fish in the tank.

ArKO (n=17) males were overall less aggressive than the WT(n=11) group. Data shows a significant decrease of attacks in ArKO fish compared to WT fish. Currently, there is no significance in aggression between PgrKO and WT lines; however, this may be due to a low sample size with the PgrKO group (n=4). Preliminary analysis of motion tracking videos indicates that the swimming behaviors of ArKO fish lack formation of a robust social hierarchy otherwise seen in the WT and PgrKO groups.

## Abstracts | Undergraduate Poster Presentations

We plan on further investigating how these knockout lines affect aggressive behavior and how this may influence reproductive success

UP139

Applying data science to a dense network of precipitation observations in rural Jamaica: 2014-2015

Calie Hemgen<sup>1</sup>

Walter Curtis<sup>2</sup>

<sup>1</sup>Mathematics BS Intended Major, East Carolina University

<sup>2</sup>Department of Geography, Planning, and Environment, East Carolina University

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 year can help rural communities better prepare for water management in a drought situation. We want to determine whether the climate or location of the farm influences the precipitation delivery locally. The main goal is to analyze the relationship between intensity and duration of rainfall. If these scatter plots show that geography has an effect on the intensity vs. duration plot, this will benefit the farmers in understanding about rainfall in their area and could enhance their resilience to drought. Tipping bucket rain gauges were used to collect the data for this study. The gauge records rainfall in 0.254 mm increments continuously. If it is a more intense rainfall, the gauge will move more quickly, but with a drizzle or a short rainfall period, the gauge will tip back and forth slowly and have small precipitation totals for that rainfall event. Rain events must be separated by 6 or more hours. We can also compare seasonal rainfall changes for these fifteen farms. Because there is data over a whole year, we can see how rainfall during the winter compares to rainfall over the summer. We will create a linear fit for the intensity versus duration graphs of each rainfall period for all farms. We will analyze which farms have similar linear fits, and the resultant slopes will be related to the latitude, longitude, and elevation of each farm. Even the short rainfall periods will be included for completeness in this study. Information from this study will help us better assess the vulnerability and resilience of not only farms in Jamaica, but 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.

UP140

Influence of Parasites on Predator-Prey Relationships in NC Estuaries

Christofer A Brothers

Parasites are known to affect behavior and physiology of hosts, influencing how hosts interact with biotic and abiotic factors of the community (Wood et al 2007). A specific parasitic barnacle, *Loxothylacus panopaei* (loxo), has been documented as a parasite that alters the sexual behavior of its host, and is adapted to infect panopeid crabs as their hosts (Foffonoff et al, 2003). Belgrad & Griffen (2015) found that loxo infection reduced crab activity, causing indirect effects on predator-prey relationships, and it has been found that there is a significant increase in hiding behavior in infected crabs compared to uninfected crabs. The purpose of our research is to determine how salinity and temporal gradients influence parasitism in an ecologically-important group of native mud crabs in North Carolina estuaries. Collected crabs were sub-sampled (n=15 per site) and examined for external and internal parasites, most notably loxo, using a compound microscope. Overall and species-specific parasite prevalence were recorded and analyzed across salinity and temporal gradients. Behavior of infected vs uninfected crabs was observed in the presence of predatory pressures in different habitats to determine how the parasites affect the hosts' behavior. Simple and complex habitat variables were manipulated using oysters and predatory pressures came from larger predatory crabs. Data obtained from both parts of the project were analyzed to determine the overall effect of the loxo parasite on organisms with North Carolina estuaries.

UP141

Larval river herring abundance and morphological characteristics at five sites on the Chowan River

Morgan Elizabeth Dianis\*<sup>1</sup> and Deborah A. Lichti<sup>1</sup>  
<sup>1</sup>Department of Biology, East Carolina University

Estuaries are nursery areas for many important fish species. River herring (blueback herring (*Alosa aestivalis*) and alewife (*Alosa pseudoharengus*)) were an important fishery until populations began to decline leading to the closure of the river



## Abstracts | Undergraduate Poster Presentations

herring fishery in 2006 in North Carolina. Possible reasons for the decline in river herring are overfishing and water quality issues at the nursery areas. River herring populations have not rebounded and are still considered depleted in North Carolina. We wanted to investigate the larval river herring population for five sites on the Chowan River, which were designated Strategic Habitat Areas by the Division of Marine Fisheries. We hypothesized that we would find increased abundances in the three tributaries compared to the open water sites on the Chowan River, and the morphological characteristics (total length, body width, and mouth gape) would differ between all five sites. Larval river herring were collected once a week during the months of March to April in 2016 and 2017 at five different locations on the Chowan River. We determined abundance of river herring by identifying and counting individual in each sample, and then

calculating individual  $m^{-3}$  with the boat distance and speed. We measured total length, body width, and mouth gape of the larval river herring. Larval river herring abundances among the five sites differed with Catherine Creek having the highest abundances, and the lower Chowan River site having the least abundance. Results from the study showed that the overall fish total length differed between the two years. We expect larval fish total length and mouth gape to differ between the five sites. Mouth gape differences can result in larval river herring consuming different zooplankton species based on size structure, which could have an effect on larval river herring growth. The preliminary data shows evidence that larval river herring population through abundance and morphological characteristics could result in possible changes in recruitment to the juvenile stage. These results will also help us to better describe larval river herring populations at these different nursery areas.

UP142

Hickory Shad *Alosa mediocris* Pilot Study on Gill Raker Analysis and Natal Stream Fidelity Hickory Shad *Alosa mediocris* Gill Raker Analysis and Natal Stream Fidelity

Keturah N. Kovolew<sup>1</sup>, Roger A. Rulifson<sup>1,2</sup>

<sup>1</sup>Department of Biology, East Carolina University, Greenville, NC 27858

<sup>2</sup>Institute for Coastal Science and Policy, East Carolina University, Greenville, NC 27858

Gill rakers of bony fish species are located on the anterior portions of the gill arches and serve as a physical barrier to prey

attempting to escape from the mouth cavity of the predator through the gill flap. The number, length, and diameter of gill rakers can change based on environmental conditions and food availability experienced by the individual. A pilot study ( $n=49$  individuals) was conducted to ascertain the gill raker characteristics on the first gill arches of the Hickory Shad, *Alosa mediocris*, as a possible means to identify spawning populations of adult Hickory Shad throughout its range. Results of gill raker counts and length measurements, along with length of the upper and lower portions of the first arch, identified a strong correlation of the lower arches with head dimensions of the specimen, but not the upper arches, which are less variable. The number of specimens was increased to 10 per watershed, and analyses of ANOVA, MANOVA, Principal Components (PCA), and Quadratic Discriminate Function Analysis (QDFA) were conducted on gill raker attributes. Results indicate that gill raker attributes may be important markers to identify individual adult fish to natal coastal streams, thereby supporting the hypothesis that this species exhibits fidelity.

UP143

Shaking It Up: Optimizing Mechanical Cell Lysis to Improve DNA Extraction from Iron-Oxidizing Bacteria

Dalia Nashed<sup>1</sup>, Chequita Brooks<sup>1</sup>, Erin K. Field<sup>1</sup>

<sup>1</sup>Biology Department at East Carolina University

The identity and function of iron-oxidizing bacteria (FeOB) is elusive due to challenges acquiring sufficient DNA concentrations for sequencing and other downstream applications, which impedes the study of interactions with other microorganisms and the environment. Previous attempts to improve DNA extraction have included adding chemicals that can dissolve the cell membrane. However, the interaction between these chemicals and the product of FeOB metabolism can result in the decreased efficiency of cell lysis. Here we attempt to improve cell lysis by modifying the physical cell lysis prior to performing DNA extraction. To optimize the mechanical shaking for cell lysing, our study used a Digital Disruptor Genie instead of using a Vortex Mixer. Four different treatments were tested using 3, 5, 10, and 15 minute cycles of the Disruptor Genie. DNA was extracted from isolated FeOB and sediment samples. As a control, the Vortex Mixer was used for 10 minutes, following standard protocol. We hypothesized the 10-minute treatment using the Digital Disruptor Genie would yield the highest DNA concentrations. Optimal cycle varied based on the type of sample. The 10-minute cycle worked better for the sediment samples and the 5-minute cycle worked better for the isolates. Further testing will be

## Abstracts | Undergraduate Poster Presentations

done under more consistent and uniform conditions for DNA extraction to confirm these results. Increased DNA yield will result in better studies of FeOB communities, and deepen our understanding of these fascinating microbes.

UP144

Testing the correlation between mechanical properties measured in fibrin and the repeating amino acid sequence in the  $\alpha$ C region of fibrinogen

Robert Christian Moller

The object of this research is to investigate the origin of the extreme extensibility of fibrin fibers. Fibrin gelation is the consummate stage in the coagulation cascade and a fundamental element in blood clots as it acts to bind all the components of a clot together. As such, fibrin has a role to play in many coagulopathic and thrombotic disorders, not the least of which include ischemic stroke and heart attack. Understanding the mechanical properties of clotting proteins like fibrin is necessary for the understanding of thrombosis and the pathophysiology of the host of disorders associated with clotting. Fibrin is a long fibrous hierarchical biopolymer formed by the polymerization of the fibrinogen monomer into protofibrils which then laterally aggregate to form the fibrin fiber. Prior work has indicated that it is from the interaction of the  $\alpha$ C regions of the fibrinogen monomers that fibrin gets its impressive viscoelastic properties which enable its function as a clotting net. Fibrinogen consists of two sets of covalently bonded alpha, beta, and gamma chains linked at their N-termini forming a small globular region. They then extend outward as a triple coiled coil with the C-termini of the  $\beta$  and  $\gamma$  chains forming larger globular regions at either end of the protein. The C-terminal end of the  $\alpha$  chain, the aforementioned  $\alpha$ C region and the focus of this research, is a natively unfolded 'wormlike' chain extending from the protein. In this  $\alpha$ C region there is a connector region which is comprised mainly of tandem amino acid repeats which vary in number and length between species with human fibrin having 10 repeats totaling 128 amino acids. A study done across several species has shown a direct correlation between the length of the connector region and the extensibility of fibrin. To test this correlation in human fibrin, previous work in the lab used protein engineering techniques to delete certain sections of the repeats. The modified protein DNA was successfully expressed by means of transfection into mammalian cells. In this project we will engineer fibrin variants with elongated  $\alpha$ C regions and determine a method to express and purify recombinant proteins on a large scale. The viscoelastic properties of the different fibrin mutants will then be quantified and compared

to the wild type using a method of nanomanipulation involving fluorescence and atomic force microscopy.

UP145

Mycorrhizal fungi and horizontal gene transfer: A look into the importance of transferred genes in a symbiosis

Tyler Zachary Sink

Dr. Jinling Huang, Department of Biology, East Carolina University

The significance of horizontal gene transfer (HGT) in eukaryotic evolution has attracted tremendous attention in the scientific community, but remains not thoroughly understood. It has long been suggested that physical association (e.g., symbiosis) among organisms often facilitates gene transfer. Mycorrhizal fungi partake in symbiosis with the root system of various land plants and thus provide an ideal system to investigate HGT between multicellular eukaryotes, but no reported research has been conducted yet. In this study, *Rhizophagus irregularis*, a model mycorrhizal fungus, is chosen to understand the role of HGT in the evolution of this species. Prescreened candidate genes were subjected to phylogenetic analyses to identify horizontally transferred genes in *R. irregularis*. The possible routes of HGT occurrence and the function of each transferred gene were studied. The importance of HGT in the evolution of mycorrhizal fungi was inferred based on the number and functions of acquired genes in *R. irregularis*. Our analyses identified three *R. irregularis* genes transferred from viruses, and one from bacteria. Several other genes were found to be transferred between proteobacteria and *R. irregularis* or between *R. irregularis*, bacteria and plants. Further research is being conducted on the function of the identified transferred genes to understand their impact on the evolution of mycorrhizal fungi.

UP146

Correlation Between Organophosphate Pesticide Accumulation in ENC Porcine Tissues and Type II Diabetes

Caitlin Diana Palmer

The goal of this project is to determine if organophosphate pesticides (OPs) used in eastern North Carolina (ENC), as well as their common metabolites, accumulate in the kidneys of pigs, and therefore, accumulate in humans. This study is important because it is the first step in analyzing the correlation between

## Abstracts | Undergraduate Poster Presentations

Type II Diabetes and OP exposure in eastern NC. Porcine kidneys were analyzed using MALDI-TOF-MS in CHCA positive ion mode, CHCA negative ion mode, and DHB negative ion mode to determine OP and metabolite identities. In all three modes, key differential m/z peaks were determined to fall within the targeted m/z range of approximately 130-380 Da. More specifically, key m/z peak values corresponded to the molecular weights of targeted OPs coumaphos, diazinon, and malathion (raw m/z values of 350.5, 363, and 330.6 Da, respectively). Therefore, this preliminary data suggests that OPs could be present in the porcine tissues and potentially accumulate in humans to manifest as Type II Diabetes.

UP147

Yeast Antibody-Antigen Bond Engineering Using Centrifuge Force Microscopy

Justin Mikel Litofsky

The long-term goal of this project is to develop yeast display technology to enable the engineering of proteins with mechanically tunable functions. This step of this project will develop the methodology to incorporate yeast cells into the centrifuge force microscope for mechanical testing. We hypothesize we can use yeast antibody display combined with centrifuge force microscopy to engineer stronger antibody-antigen bonds.

The centrifuge force microscope applies force to massive (relative to proteins) objects as they are spun, enabling the determination of the breaking strength of protein-ligand bonds. In the past beads have been used as masses and proteins have had to be independently expressed and purified. This project will use yeast cells directly in the centrifuge instead of beads allowing us to test adhesion molecules expressed on the surface of yeast cells instead of having to independently express and purify the adhesion molecules. To accomplish this a methodology needs to be developed to incorporate yeast cells into the centrifuge force microscope. First, this will involve sorting yeast cells into uniform density to apply the same amount of force on the bond while in the centrifuge. One approach that we will take is to synchronize the yeast growth using temperature dependent suspension at 37 degrees Celsius, which stops each cell at the same phase in the cell cycle. An alternate approach would be applying a chemical alpha factor to suspend the cell cycle of the yeast. After cells reach a uniform size using cell cycle suspension, they will be centrifuged in a density gradient of lactose to retrieve cells that can be tested for uniformity by using differential interference contrast microscopy.

This project is a building block to get to test a revolutionary approach to studying antibody bond strength under variable force. When completed, this project can act as a proof of concept, showing that centrifuge force microscopy is a viable replacement to more time consuming single molecule techniques when studying antibodies. This proof of concept will make available a plethora of research opportunities such as the future goal of our larger project, which is to use the large throughput ability of this technique to increase bond strength by directly evolving the variable region sites on antibodies.

UP148

Simulation of the Formation of a Washover Fan at Pea Island, North Carolina

Madison Lynn Heffentrager and Thad Wasklewicz

Climate change has increased the risk of coastal inundations and coastal change from sea-level rise and more frequent, greater-intensity hurricanes. These changes in coastal dynamics and conditions could lead to more frequent overwash events, resulting in greater amounts of washover deposits. Washover deposits have been noted to cause detrimental impacts such as burial of roads and paths, destruction of property and infrastructure, and loss of property value. There is a dearth of research describing how overwash leads to washover fan formation at temporal scales of a storm. This study aims to explain overwash events on an event-by-event basis by using TLS and SfM to record each individual washover deposit using a physical model. This physical model consists of a tilt-table, whereby the tilting table removes some of the "scaling" effects associated with using actual beach sediments. The formation of the fan is conducted in a physical model scaled to a known washover site at Pea Island, North Carolina. Multiple simulations will be performed using a 3D model of actual dunes from Pea Island taken from airborne laser scanning data. The 3D printed model is packed with sediment to produce consistent boundary conditions across the simulations. A notch is cut into the scaled dunes and the table is tilted allowing water to flow through the notch. Fan formation is captured using video during the event and the topography of the resulting feature is recorded with TLS. I hypothesize the washover fan through time and space will superelevate, causing the movement of sediment from a topographically higher fan segment to sub-elevated portions of the fan. Knowledge of washover fan formation can be used to aid in the planning efforts of coastal residents during overwash conditions as well as provide insight to the academic community on event-by-event overwash processes in relation to the formation of the fan.

# Abstracts | Undergraduate Online Presentations

## UON1

### A Comparison of Elementary Student Curriculum Satisfaction to Performance

Megan Frances Lowry

Elementary students need to learn keyboarding skills in order to keep up with expectations of teachers. The purposes of this study include: to explore if there is any relationship between student satisfaction with the curriculum and improvement in average words per minute (WPM), and between student improvement in WPM and their perception of whether they had improved or not. Two schools were used in this study: a lower elementary (K-2nd

grades) and an upper elementary (3rd-5th grades). A keyboarding instruction program was used, and at the end of the school year two questions were asked: "Did you like the activities you did in computer lab?" and "Do you think you are better at keyboarding now?" Results indicate that the younger students tended to have a higher change in WPM when they reported that they did not enjoy the activities and vice versa for the older students. The

results showed that in relation to the second question, the lower elementary students had no significant difference in improvement in WPM whether they reported "yes" or "no". The upper elementary school showed more improvement if they answered that they thought they had improved. The results give evidence that older elementary students are able to comprehend their improvement more than the others. This may influence their view of how much they like the curriculum; or it could be because they achieve greater improvement when they enjoy the curriculum. More research needs to be done to fully understand the relationship.

## UON2

### The Effects of Sustainable Design Principles on the Engineering Industry

Hayden Sawyer

The objective of this research was to explore the influences of the ideals of sustainable design on the field of engineering. I examined how principles of sustainable design can determine how aspects of the engineering industry operate. Aspects I analyzed include: constructing with environmentally efficient materials, the implementation of more advanced and economical technologies to reduce

pollution and conserve energy, and the overall progression and modernization of the engineering industry to create more sustainable end products. Specifically, the gathered information was applied to analyze how Ross Hall, a building on the East Carolina University campus, was constructed with the intention of acquiring Silver level LEED certification.

## UON3

Infographics: The power of visual communication to improve health literacy of cancer patients.

Maria Magdalena Moreira, Kenan Bridges, Taylor Ruff, Molly Robinson, MPH, Alice Richman, PhD, MPH and Essie Torres, PhD, MPH

Effective cancer communication is a clinical and public health priority. 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 information. For cancer patients, new treatment options (i.e. oral chemotherapy) and complex regimens require increased decision-making and treatment management. However, low health literacy is a factor that affects patients' ability to adhere to their cancer care, and can affect the success of their treatment.

The focus of this research is to develop and evaluate infographic materials for cancer patients currently taking oral chemotherapy medications as part of their cancer treatment. This research will supplement efforts by the "CMAP: Cancer Medication Adherence Research Project." CMAP's goal is to develop and evaluate medication adherence strategies to increase medication adherence and health literacy among cancer patients.

Infographics are data visualizations that present information in a clear and effective manner and will be developed to meet the reading and comprehension level of cancer patients at Leo Jenkins Cancer Center identified from preliminary CMAP data. Key topics for the infographics include:

1. Understanding medication prescription information,
2. How to read and interpret pill bottle labels,
3. Risks associated with the use of alcohol and tobacco while taking oral chemotherapy medication,
4. Concerns about mental and sexual health, and
5. How to manage side effects related to specific oral chemotherapy medications.

We expect to pilot test developed materials with cancer

## Abstracts | Undergraduate Online Presentations

patients and Vidant's Patient Education Committee via focus group discussions. Participants will be asked to review the developed infographics and provide feedback on usefulness, legibility, design, and aesthetics of the infographic. A pre/post-test will be provided to participants for each infographic developed, to see if there was a change in knowledge after infographic interaction.

Upon completing this research, we expect that infographic materials will be successful in increasing cancer health literacy among CMAP participants can improve cancer patients' abilities to adhere to their treatment. Additionally, these tested infographic materials have the potential of being implemented in Leo Jenkins Cancer Center and Vidant's cancer education efforts for cancer patients.

UON4

UNC Coastal Studies Institute's Sustainable Design

Caleb Sanders Hill

The UNC Coastal Studies Institute was examined. The way in which this building relates to a sustainable ECU and sustainable design

and construction in general were studied. The purpose of this effort was to inform our stakeholders and others of ECU's sustainable design efforts using the UNC Coastal Studies Institute platform for the study. The UNC Coastal Studies Institute's campus is full of sustainable features, including the building itself and the landscape design throughout the campus. The UNC-CSI building is LEED Gold certified (the second highest certification possible). LEED stands for Leadership in Energy and Environmental Design and its goal is to ensure buildings are built with "green" technology and in the most sustainable way possible. LEED scores on a point system, the lowest score being 40 (standard certification) all the way up to 80+ points which receives a Platinum certification, which is the highest award given. UNC-CSI was awarded 64 points and a Gold certification in 2014. The designers achieved this by integrating sustainable building materials and sustainable technologies. There are 6 categories in which LEED scores on, UNC-CSI's campus scored in all categories. The first being, alternative transportation. This includes bicycle storage and preferred parking for low emission and carpool vehicles. It also scored well because of its efficient storm-water management and landscape design (71% of the site is open space). The significant cut in typical energy and water consumption is also impressive, energy consumption is reduced by 37% and potable water consumption is reduced by 75%. Building

materials are a huge part of making a building sustainable. 24% of the building materials are recycled and

75% of on-site waste was also recycled. The UNC Coastal Studies Institute also made sure it was designed so that it could be as healthy as possible for its occupants this includes 95% of interior space is exposed to day light.

UON5

Pirate Union

Christopher Sergio Bailey

1Department of Engineering and Technology, East Carolina University

ECU has turned a corner with the construction of its new student union on 10th street. After years of near stagnation concerning design and construction, ECU has finally taken a step toward joining its UNC sister schools in an effort to grow and renew itself. With its predominantly glass facades, horizontal lines and painted steel supporting structures, the new student center stands as a visual statement of the modern prosperity that is to come on ECU's main campus. Its exterior is the perfect blend of contemporary sleek architecture and the more traditional Carolina style of construction with its mostly brick veneer base structure. As an added bonus, the structure features a 24' x 42" "Pirate Vision Digital Display" that will serve as the campus' largest television set. The large display ties in with the campus' already existing Sonic Plaza which features water/mist, moving sculptures and musical pillars. The screen acts as the "missing element" of the sonic plaza by bringing moving light and the ability to sustain musical, performing, athletic and visual arts from the students of ECU. The new student union boasts an impressive 210,000-SF design with a 14,000-SF ballroom, a black box theater, six dining options, lounges, meeting space and study rooms. At a cost of \$122 million, the center is the pre-eminent hub for student synergy. The efforts of this examination were to inform our stakeholders and others of ECU's sustainable design efforts using the new student center as a platform for the study. From a sustainability standpoint, the new student center efficiently saves energy, water, resources, generates minimal waste and has overall been designed to LEED Silver status. According to Dr. Virginia Hardy, ECU vice chancellor for student affairs, "The student center will strongly enhance the quality of life on campus for our students, providing them with an attractive, open and engaging space that will meet their needs and encourage more congregation and social interaction". As the premier "gateway" to the main campus, the student center serves as the face of ECU.



## Abstracts | Undergraduate Online Presentations

UON6

Minges Auxiliary Gymnasium: LEED Certified

Jacob Michael Griffin

Minges Auxiliary Gymnasium was designed to preform to the standards of the Leadership in Energy and Environmental Design rating system. This system was created to minimize any negative impacts that a building may have on its environment and encourage sustainable design by rewarding compliant projects with points. These points can be acquired by using certain green building practices or materials in an effective nature. The Minges Auxiliary Gymnasium received between 50-59 points during its LEED certification, qualifying the building for a Silver rating. Environmental friendliness is not the only goal of sustainable design; Sustainability also involves the design process and communication between people on all levels of the project to ensure that it will perform through the test of time. The LEED certification is also an indication of higher efficiency systems, resulting in lower operating cost. This presentation will further the viewers understanding of what exactly it means to classify a structure as Sustainable

UON7

A NOVEL TEACHING TOOL FOR UNDERSTANDING MAMALIAN MITOCHONDRIAL BIOENERGETICS and THE ELECTRON TRANSPORT CHAIN

1\*Jose L. Botello, 1\*Jessica Y. Campos, 1\*Katerina E. Koloustroubis, \*1Lauren M. Brady, 2Ronald N. Cortright (Project Site Supervisor) and 1Barbara Muller-Borer (Project Supervisor). \*Authors contributed equally to the project.

1Department of Engineering (ENGR 4010) and 2Departments of Kinesiology, Physiology, Surgery and The ECU Diabetes and Obesity Institute, East Carolina University, Greenville, NC 27858

The mitochondrion is an organelle found in all cells. The major purpose of this project is to understand the biochemical processes of mitochondrial respiration and energy production. Respiration and energy production are dynamic bioenergetic reactions that ultimately produce ATP. It is this multi-step fundamental concept that undergraduate and graduate students have difficulty comprehending in all didactically taught courses. Therefore, a need to develop an interactive teaching/learning tool that enhances the understanding of mitochondrial bioenergetics is greatly lacking in today's curriculum across many biomedical programs. One possible solution to this curricular challenge is described and

demonstrated in this project which aims to adapt a modern teaching method to increase the student's engagement in classroom and/or laboratory settings. This device, constructed by senior undergraduates in the department of engineering, will allow students to obtain a complete and intuitive understanding of mitochondrial bioenergetics. A conceptual understanding of bioenergetics will foster higher order thinking, and increase the ability to solve novel tasks later in the post-graduate arena. Work accomplished includes determining component alternatives for this teaching tool, literature review of bioenergetics, patent search of similar devices, and technical feasibility analysis. The interactive teaching tool is intended to accommodate the four major types of learners (VARK) and ultimately be accessible to universities worldwide. Also, the interactive teaching tool should take variable inputs, instructed by the activity at hand, that will yield and model how the electron transport chain should react under many biological circumstances encountered by all living organisms including humans.

UON8

Southern Asian Post-Breast Cancer Patient Natural Treatment Plans

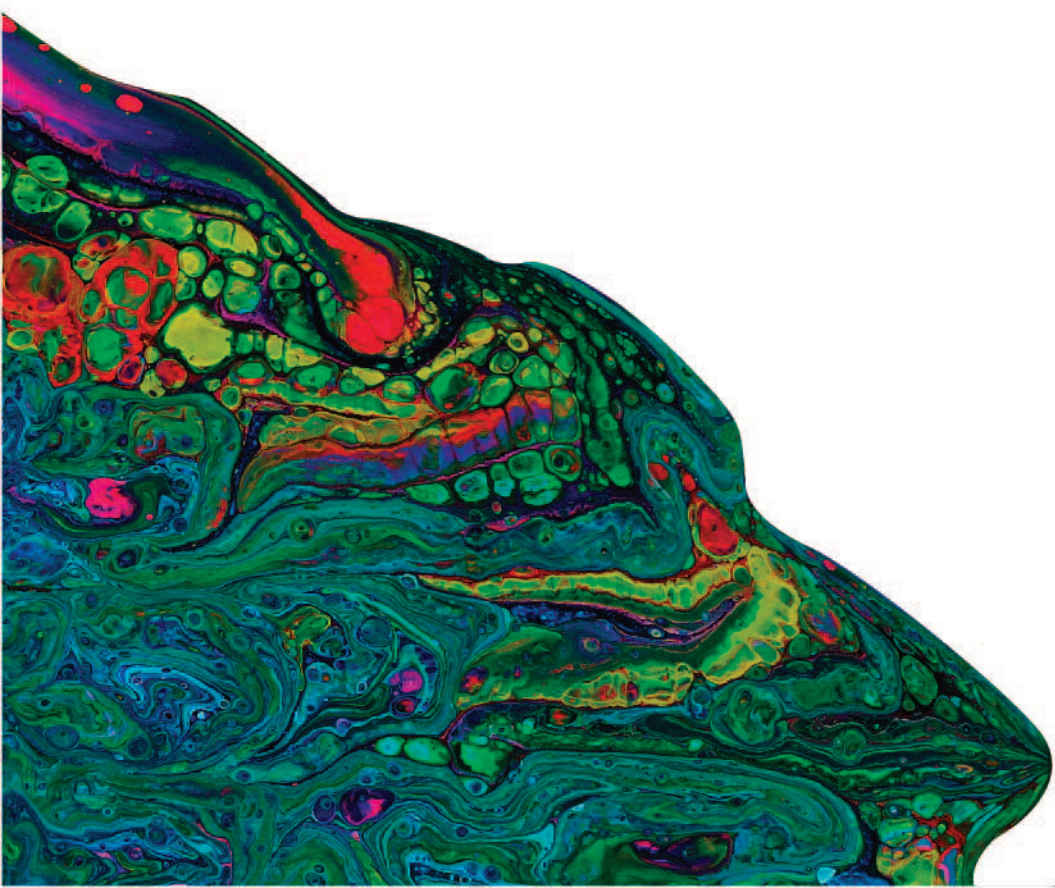
Kirtan Amin

Bhiba M. Das, PhD, MPH

In the last forty years, there has been a tremendous increase in knowledge for all types of cancers leading to different medical treatments and lifestyle intervention plans. Specifically, in the southern Asian community, there has been a notable increase in breast cancer in the past fifteen years. Despite the surprising increase of breast cancer incidence rates, there still is not significant information regarding natural treatment plans after chemo therapy, hormone and radiation treatments. After chemo therapy, hormone or radiation treatments there are usually side effects that occur and affect the quality of life after the treatments are finished. Strasser, Steindorf, Wiskema, and Ulrich (2013) listed the side effects of some cancer treatments which were muscle wasting or atrophy, reduced physical functioning, and unfavorable changes in body composition. The authors also mentioned depression and fatigue as a side effect as well. There are few studies that discuss different natural treatment plans post chemo therapy, radiation or hormone treatment. There is even more of a lack of studies when discussing post breast cancer treatment plans for minorities who are sometimes under represented when conducting these treatment plans. The purpose of the study is

## Abstracts | Undergraduate Online Presentations

to identify the effects of implementing a lifestyle intervention which may help this community prevent non-hereditary breast cancer and decrease the common side effects of cancer treatment. The hypothesis for this pilot is a diet and physical activity intervention will improve the quality of life and fatigue outcomes in Southern Asian women who have non-hereditary breast cancer. There will be twenty-five participants who will be recruited with the following criteria, between the age of thirty-five and sixty-five, female, from the southern Asian community which includes Asian Indian and Pakistani, one to three years after completing chemo therapy and radiation treatment. Participants will be designated a physical activity and a nutrition intervention. There will be pre and post survey which will include a series of questions to determine the participant's quality of life, fitness, diet and health before and after the plans are given. The diet will consist of a high amount of antioxidants, fruits, vegetables, whole grains, legumes and nuts. The everyday fats such as butter the participants will be replaced with healthy fats. The physical activity will complement the diet they have been given.



# 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.

Adhikari, Anil	GP9	<a href="#">24, 80</a>	Butler, Evan	UP94	<a href="#">42, 205</a>	Fox, Nicole	UO41	<a href="#">36, 156</a>
Agarwal, Ritesh	GO3	<a href="#">19, 49</a>	Cabell, Shyla	GO68	<a href="#">22, 72</a>	Foy, Wesley	UP74	<a href="#">41, 197</a>
Akers, Shelby	GP112	<a href="#">30, 124</a>	Carlisle, Erica	UO54	<a href="#">37, 162</a>	Francisco, Jake	GP61	<a href="#">27, 100</a>
Akindahunsi, Olukunle	GP90	<a href="#">28, 113</a>	Carter, Danielle	GP93	<a href="#">29, 115</a>	Fricke, Ariel	UP24	<a href="#">39, 175</a>
Alalawi, Ali	GP72	<a href="#">27, 105</a>	Carter, Nichole	GO74	<a href="#">23, 75</a>	Fuquay, Andrew	UO61	<a href="#">37, 164</a>
Aldhafri, Ahmed	GP66	<a href="#">27, 103</a>	Carter, Robin	GO48	<a href="#">21, 65</a>	Furnari, Sarah	UO36	<a href="#">35, 153</a>
Alexander, William	GO66	<a href="#">22, 72</a>	Cavallero, Cory	UP2	<a href="#">38, 166</a>	Gaier, Keith	UP79	<a href="#">42, 199</a>
Allen, Austin	UP35	<a href="#">39, 180</a>	Cavenaugh, Sean	GP41	<a href="#">26, 91</a>	Galloway, Kaylan	UP106	<a href="#">43, 209</a>
Allen, Hannah	UO51	<a href="#">36, 160</a>	Chandler, Katharine	UO17	<a href="#">34, 146</a>	Gardner, Jennifer	GO57	<a href="#">22, 68</a>
Allred, Victoria	UP92	<a href="#">42, 204</a>	Chaves, Alec	GP71	<a href="#">27, 105</a>	Garrison, Cody	GO72	<a href="#">22, 74</a>
Almond, Lindsey	GP115	<a href="#">30, 125</a>	Chester, TaNidra	UP62	<a href="#">41, 193</a>	Gilleland, Casey	GP33	<a href="#">25, 88</a>
Amir, Kirtan	UON8	<a href="#">46, 229</a>	Christensen, Timothy	GO41	<a href="#">21, 64</a>	Gilliard, Andrea	UP8	<a href="#">38, 168</a>
Amoigroglou, Anastasia	GP43	<a href="#">26, 92</a>	Christiansen, Luke	GO35	<a href="#">21, 62</a>	Glover, Andra	GP117	<a href="#">30, 126</a>
Anderson, Tyler	GP32	<a href="#">25, 88</a>	Chukwu, Angel	UP75	<a href="#">41, 198</a>	Godwin, Walton	UO12	<a href="#">34, 144</a>
Andrews, Elizabeth	UP46	<a href="#">40, 186</a>	Clark, James	UO56	<a href="#">37, 162</a>	Goehmann, Brittany	GP86	<a href="#">28, 111</a>
Ashayer, Alireza	GO1	<a href="#">19, 49</a>	Clark, Kayla	GO36	<a href="#">21, 62</a>	Gonzalez, Gladys Ruby	GP120	<a href="#">30, 127</a>
Atkinson, Adam	GO45	<a href="#">21, 65</a>	Cleghorn, Zachary	GP5	<a href="#">24, 78</a>	Goodman, Jessica	GP128	<a href="#">31, 130</a>
Atkinson, Lakela	GO24	<a href="#">20, 59</a>	Coco, Ryan	GP102	<a href="#">29, 119</a>	Goodrich, Samson	UO27	<a href="#">35, 150</a>
Awojana, Tolulope	GP10	<a href="#">24, 80</a>	Cone, Sean	UP22	<a href="#">39, 174</a>	Gray, Daniel	GP19	<a href="#">25, 83</a>
Ayinde, Oluwatosin	UP132	<a href="#">44, 220</a>	Connolly, Samantha	GP122	<a href="#">30, 128</a>	Green, Brittany	GO49	<a href="#">21, 65</a>
Ayscue, Ashley	UP57	<a href="#">40, 190</a>	Consolo, Christopher	UP70	<a href="#">41, 196</a>	Green, Kayla	GO26	<a href="#">20, 60</a>
Bailey, Christopher	UON5	<a href="#">46, 228</a>	Corbett, Wilson	UO23	<a href="#">35, 148</a>	Green, Nathaneal	UP19	<a href="#">38, 173</a>
Balestrieri, Kassondra	GO13	<a href="#">19, 54</a>	Craven, Aaron	GP83	<a href="#">28, 110</a>	Griffin, Jacob	UON6	<a href="#">46, 229</a>
Bandy, Kristina	GP107	<a href="#">30, 122</a>	Cressman, Amy	GP26	<a href="#">25, 86</a>	Grilo, Gabriel	GP81	<a href="#">28, 109</a>
Barefoot, Tori	UP117	<a href="#">44, 214</a>	Crouch, Miranda	GO5	<a href="#">19, 50</a>	Grogan, Meagan	UP20	<a href="#">39, 173</a>
Barnard, Rebecca	GP30	<a href="#">25, 87</a>	Cruz-Molina, Genesis	GO2	<a href="#">19, 49</a>	Gudivada, Akhil	GO29	<a href="#">20, 60</a>
Barnoski, Lawrence	UP127	<a href="#">44, 218</a>	Culbertson, Brian	GO43	<a href="#">21, 64</a>	Guest, Kali	GO61	<a href="#">22, 70</a>
Bartlett, Brian	GP13	<a href="#">24, 81</a>	Culvahouse, Rebecca	UP6	<a href="#">38, 167</a>	Guiler, William	UP96	<a href="#">42, 205</a>
Bates, Lindsey	UP59	<a href="#">41, 191</a>	Culver, Lauren	UO35	<a href="#">35, 153</a>	Guin, Tanner	UP77	<a href="#">41, 199</a>
Batts, Anna	GP96	<a href="#">29, 116</a>	Curtis, Jacqueline	UP108	<a href="#">43, 210</a>	Gwyn, Mairin	GO42	<a href="#">21, 64</a>
Bayles, Jocelyn	UO44	<a href="#">36, 157</a>	Das, Gourav	GO28	<a href="#">20, 60</a>	Hacker, Kayla	GON3	<a href="#">32, 135</a>
Beachum, Allison	UP65	<a href="#">41, 194</a>	Daughtry, Kayla	UO33	<a href="#">35, 152</a>	Haenssler, Abigail	GP94	<a href="#">29, 115</a>
Beamon, Weston	UO60	<a href="#">37, 164</a>	Davis Armstrong, Nicole	GO12	<a href="#">19, 54</a>	Haibet, Raafat	GP82	<a href="#">28, 110</a>
Beig Heidari, Rouzbeh	UP71	<a href="#">41, 196</a>	Davis, Austin	GP73	<a href="#">27, 106</a>	Haley, Erin	GP131	<a href="#">31, 131</a>
Bellows, Gerald	GP114	<a href="#">30, 125</a>	Davis, Tommy	UP121	<a href="#">44, 216</a>	Hall, Breanna	UP60	<a href="#">41, 192</a>
Benderman, Lesley	UP23	<a href="#">39, 175</a>	de Sousa, Laura	GP20	<a href="#">25, 84</a>	Hamman, Elizabeth	PD2	<a href="#">33, 137</a>
Beringer, Jessica	UP98	<a href="#">43, 206</a>	Dembowski, Edward	GP110	<a href="#">30, 123</a>	Han, Junghoon	GO39	<a href="#">21, 63</a>
Bernath, Nicholas	GP2	<a href="#">24, 77</a>	Dement, Taylor	GO75	<a href="#">23, 75</a>	Hang, Mingqi	GP6	<a href="#">24, 79</a>
Berryman, Glensha	UO14	<a href="#">34, 145</a>	Dennis, Troy	UP36	<a href="#">39, 181</a>	Hargroder, Lacey	GO47	<a href="#">21, 65</a>
Biarrieta, Natasha	GP42	<a href="#">26, 92</a>	Deville, Phillip	GP21	<a href="#">25, 84</a>	Harrup, Matthew	GP133	<a href="#">31, 132</a>
Blackmon, Treshawn	UO45	<a href="#">39, 157</a>	Dianis, Morgan	UP141	<a href="#">45, 223</a>	Hatcher, Alicia	GO23	<a href="#">20, 59</a>
Boateng, Georgina	UP10	<a href="#">38, 169</a>	Dodge Evans, Jaquelin	GP134	<a href="#">31, 132</a>	Hauswald, Carson	GP91	<a href="#">29, 114</a>
Boddapati, Sruthi	UP43	<a href="#">40, 184</a>	Dorgham, Mohammed	GP68	<a href="#">27, 104</a>	Hawkins, Wilson	GP69	<a href="#">27, 104</a>
Bornheimer, Jennifer	UP84	<a href="#">42, 201</a>	Dow, Ashley	GP39	<a href="#">26, 91</a>	Hayes, Alexandra	GP50	<a href="#">26, 95</a>
Botello, Jose	UON7	<a href="#">46, 229</a>	Driver, Robert	GO73	<a href="#">23, 74</a>	Heffentrager, Madison	UP148	<a href="#">45, 226</a>
Bowrey, Briceno	UO37	<a href="#">36, 154</a>	Dunlap, Michaela	UP18	<a href="#">38, 173</a>	Hemgen, Calie	UP139	<a href="#">45, 223</a>
Brackett, Alora	GP125	<a href="#">31, 129</a>	Edwards, Tara	UP119	<a href="#">44, 215</a>	Herman, Callie	UP45	<a href="#">40, 185</a>
Bradley, Burklee	UO40	<a href="#">36, 155</a>	Eischen, Tanner	GP31	<a href="#">25, 87</a>	Hicks, Brenna	UP41	<a href="#">40, 183</a>
Branson, Sydney	GP106	<a href="#">30, 121</a>	Eisenmann, James	GP23	<a href="#">25, 85</a>	Hill, Caleb	UON4	<a href="#">46, 228</a>
Brooks, Chequita	GP15	<a href="#">24, 82</a>	Eker, Rachel	UP104	<a href="#">43, 209</a>	Hilliard, Katina	GP113	<a href="#">30, 124</a>
Brothers, Christofer	UP140	<a href="#">45, 223</a>	Elhassanny, Ahmed	PD4	<a href="#">33, 138</a>	Hilliard, Taylor	GO58	<a href="#">22, 68</a>
Brown, Braden	GP129	<a href="#">31, 130</a>	Elliott, Zachary	UP11	<a href="#">38, 169</a>	Hodge, Myles	GO7	<a href="#">19, 51</a>
Brown, Julia	UP138	<a href="#">45, 222</a>	Ellis, Dillon	GP52	<a href="#">26, 96</a>	Hoffman, Maria Christina	UP49	<a href="#">40, 187</a>
Brown, Mackenzie	GP109	<a href="#">30, 123</a>	Escobedo, Rene	GP57	<a href="#">27, 98</a>	Holland, Nathan	PD1	<a href="#">33, 137</a>
Brown, Mary	GP34	<a href="#">25, 89</a>	Evans, Parker	GP80	<a href="#">28, 109</a>	Holt, Vivian	UO4	<a href="#">34, 141</a>
Bruzzo, Maria	GON1	<a href="#">32, 135</a>	Farah, Mohammad	UP125	<a href="#">44, 218</a>	Homan, Alison	GP84	<a href="#">28, 110</a>
Budhathoki, Dev	GP8	<a href="#">24, 79</a>	Fellows, Jeffrey	UO6	<a href="#">34, 142</a>	Honda, Justin	UP76	<a href="#">41, 198</a>
Bullock, Michael	UO7	<a href="#">34, 142</a>	Flanagan, Magen	UO43	<a href="#">36, 157</a>	Hood, Jeffrey	UO20	<a href="#">35, 147</a>
Burk, Brittany	UP101	<a href="#">43, 208</a>	Flowers, Allison	UP102	<a href="#">43, 208</a>	Hotalen, Wesley	UP1	<a href="#">38, 166</a>
Burkholder, Sarah	UP64	<a href="#">41, 193</a>	Forbis, Kelly	UO38	<a href="#">36, 156</a>	Howie, Lillian	UO59	<a href="#">37, 163</a>
Buss, Carolyn	GO50	<a href="#">21, 66</a>	Forrest, Dara	UP67	<a href="#">41, 195</a>	Hudson, Victor	UP107	<a href="#">43, 210</a>

# 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.

Hudson, Victoria	UO10	<a href="#">34, 143</a>	Mamillapalli, Srivalli Swathi	GO14	<a href="#">19, 55</a>	Patel, Tulsi	UO46	<a href="#">36, 158</a>
Huggins, Hayden	GO11	<a href="#">19, 53</a>	Marella, Swapna Sahiti	UO2	<a href="#">34, 140</a>	Paul, Joanna	UO50	<a href="#">36, 160</a>
Huh, Yurianna	GP51	<a href="#">29, 96</a>	Marshall, Margaret	UP39	<a href="#">39, 182</a>	Pearce, Daniel	UP82	<a href="#">42, 201</a>
Jobe, Robert	GP77	<a href="#">28, 107</a>	Martin, Justin	UO16	<a href="#">34, 146</a>	Pennington, Edward	GO8	<a href="#">19, 52</a>
Johnson, Dylan	GO16	<a href="#">20, 56</a>	Martinez-Borja, Nelson	UO22	<a href="#">35, 148</a>	Phillips, James	UO13	<a href="#">34, 145</a>
Johnson, Jerry	GO70	<a href="#">22, 73</a>	Mauro, Cindy	GP44	<a href="#">26, 93</a>	Phillips, Austin	UO34	<a href="#">35, 152</a>
Johnson, Shawnice	GP119	<a href="#">30, 127</a>	Maxwell, Alexis	GP95	<a href="#">29, 115</a>	Pilkington, Deanna	UP83	<a href="#">42, 201</a>
Johnsrude, Matthew	GP59	<a href="#">27, 99</a>	Maynard, Hayleigh	UP33	<a href="#">39, 179</a>	Plyler, Emma	UP112	<a href="#">43, 212</a>
Jones, Kamara	GP3	<a href="#">24, 77</a>	Mccusker, Shana	UP42	<a href="#">40, 184</a>	Pogue, Joel	GP16	<a href="#">24, 82</a>
Jones, Madison	UO15	<a href="#">37, 145</a>	McDonnell, Jessica	GP104	<a href="#">29, 120</a>	Poindexter, Ashley	UO55	<a href="#">37, 162</a>
Jones, Meredith	UP87	<a href="#">42, 202</a>	Mckeithan, Andrew	UP3	<a href="#">38, 166</a>	Powell, Nicole	UP105	<a href="#">43, 209</a>
Kerjilian, Ani	UP113	<a href="#">43, 212</a>	McLelland, Heather	GO38	<a href="#">21, 63</a>	Powers, Shelby	GO20	<a href="#">20, 58</a>
Khanal, Rabindra	GP11	<a href="#">24, 80</a>	McMains, Jennifer	UO5	<a href="#">34, 141</a>	Pradyumn, Mudit	GO31	<a href="#">20, 61</a>
Kilburg-Basnyat, Brita	PD3	<a href="#">33, 137</a>	McMillin, Shawna	GO10	<a href="#">19, 53</a>	Pray, Caroline	GP101	<a href="#">29, 119</a>
Kim, Youngjae	GO37	<a href="#">21, 63</a>	McSherry, Logan	GP123	<a href="#">30, 128</a>	Price, Kyra	UP124	<a href="#">44, 217</a>
Kirchner, Courtney	UO48	<a href="#">36, 159</a>	Mendenhall, Todd	GP76	<a href="#">28, 107</a>	Prock, Kyle	GP27	<a href="#">25, 86</a>
Kirkland, Kaitlyn	UO24	<a href="#">35, 149</a>	Metz, Alexis	GP87	<a href="#">28, 112</a>	Provan, Mallory	GP124	<a href="#">30, 128</a>
Kirsanov, Oleksandr	GP53	<a href="#">26, 96</a>	Meyer, Steve	UP37	<a href="#">26, 90</a>	Psaltis, Christine	GO9	<a href="#">19, 52</a>
Klettner, Matthew	UP115	<a href="#">43, 213</a>	Miconi, Madeline	UO57	<a href="#">37, 163</a>	Purcell, Lauren	GO40	<a href="#">21, 64</a>
Knebel, Randy	GP135	<a href="#">31, 134</a>	Midgett, Emily	GP130	<a href="#">31, 131</a>	Randolph, Morgan	UP73	<a href="#">41, 197</a>
Knecht, Heidi	GP40	<a href="#">26, 91</a>	Midyette, Madeline	UP95	<a href="#">42, 205</a>	Reed, Angelica	UP120	<a href="#">44, 215</a>
Knedler, Epiphany	GO34	<a href="#">21, 62</a>	Miller, Spencer	GP79	<a href="#">28, 108</a>	Reese, Kellyn	UO52	<a href="#">37, 161</a>
Kogbe, Tiwalade	UP103	<a href="#">43, 208</a>	Miller, William	UO21	<a href="#">35, 148</a>	Reeves, Kelsey	GP89	<a href="#">28, 113</a>
Koors, Victoria	UP99	<a href="#">43, 207</a>	Mishra, Ankitadevi	UP48	<a href="#">40, 187</a>	Resor, Jessica	GO71	<a href="#">22, 73</a>
Koripella, Ananya	UP28	<a href="#">39, 177</a>	Mitchell, Serena	UP116	<a href="#">44, 214</a>	Reyes, Carolina	GO51	<a href="#">21, 66</a>
Kose, Ozlem	GO54	<a href="#">31, 67</a>	Moller, Alison	UP13	<a href="#">38, 170</a>	Rhodes, Christopher	UP26	<a href="#">39, 176</a>
Kosnik, Hanna	UP7	<a href="#">38, 167</a>	Moller, Robert	UP144	<a href="#">45, 225</a>	Rhyne, Megan	GP24	<a href="#">25, 85</a>
Kovolew, Keturah	UP142	<a href="#">45, 224</a>	Moody, Marcus	UP80	<a href="#">42, 200</a>	Richardson, Natalie	GP136	<a href="#">31, 134</a>
Kowalski, Nicholas	UO62	<a href="#">37, 165</a>	Mooney, Serena	UP30	<a href="#">39, 178</a>	Rickett, Timothy	GO44	<a href="#">21, 64</a>
Kresz, Camille	GO65	<a href="#">22, 71</a>	Moore, Christopher	GO76	<a href="#">23, 76</a>	Riddle, Joseph	GP100	<a href="#">29, 118</a>
Kubit, Ashley	UP12	<a href="#">38, 170</a>	Moreira, Maria	UON3	<a href="#">46, 227</a>	Roberson, Rosa	UP56	<a href="#">40, 190</a>
Kurzontkowski, Chelcie	UP97	<a href="#">43, 206</a>	Morgan, Joshua	GP78	<a href="#">28, 108</a>	Rogers, Jessica	UO31	<a href="#">35, 151</a>
Kuyateh, Abu-Bakarr	GO21	<a href="#">20, 58</a>	Morris, Hannah	GO67	<a href="#">22, 72</a>	Romero, Jonelle	UP133	<a href="#">44, 221</a>
Kwon, Alicia	UP129	<a href="#">44, 219</a>	Moulder, Ashley	GP97	<a href="#">29, 116</a>	Rozier, Kristen	UP91	<a href="#">42, 204</a>
Lafave, Elizabeth	UO19	<a href="#">35, 147</a>	Mullis, Erica	UO42	<a href="#">36, 156</a>	Rudisill, Taylor	GP55	<a href="#">26, 97</a>
Launsby, Kaleigh	UP85	<a href="#">42, 202</a>	Murphy, Dasha	UO26	<a href="#">35, 149</a>	Russell, Laura	GP29	<a href="#">25, 87</a>
Lawrence, Benjamin	UP72	<a href="#">41, 196</a>	Musarra, Nicholas	UP114	<a href="#">43, 213</a>	Sabu, Stephiya	UP17	<a href="#">38, 172</a>
Layh, Marlee	GO53	<a href="#">21, 67</a>	Myers, Ariel	GP65	<a href="#">27, 102</a>	Sanderford, Victoria	GP58	<a href="#">27, 99</a>
Leahy, Nicholas	GP85	<a href="#">28, 111</a>	Nall, Payton	UP47	<a href="#">40, 186</a>	Sarathy, Brinda	UP16	<a href="#">38, 172</a>
Lee, Amy	GP108	<a href="#">30, 122</a>	Nancy, Ruby	GO25	<a href="#">20, 59</a>	Saul, Amelia	GP88	<a href="#">28, 112</a>
Lee, Elisabeth	UP109	<a href="#">43, 211</a>	Nandwani, Meenal	UP86	<a href="#">42, 202</a>	Sawyer, Hayden	UON2	<a href="#">46, 227</a>
Lee, Marisa	GP70	<a href="#">27, 104</a>	Nashed, Dalia	UP143	<a href="#">45, 224</a>	Scales, Autumn	UP100	<a href="#">43, 207</a>
Lee, Miranda	UP137	<a href="#">44, 222</a>	Neequaye, Nicole	GP62	<a href="#">27, 101</a>	Scanlan, Lauren	GP118	<a href="#">30, 126</a>
Lee, Timothy	GP12	<a href="#">24, 81</a>	Neese, Chase	UP126	<a href="#">44, 218</a>	Sesemann, Erin	GP127	<a href="#">31, 129</a>
Leon, Janet	UP61	<a href="#">41, 192</a>	Nelson, Taylor	UP58	<a href="#">40, 191</a>	Sharaf, Omar	UP32	<a href="#">39, 179</a>
Leu, Samuel	GO18	<a href="#">20, 57</a>	Nixon, Krista	GO59	<a href="#">22, 69</a>	Shaver, Alexandra	GP48	<a href="#">26, 94</a>
Libby, Nichole	GP63	<a href="#">27, 101</a>	Norris, Jessica	UO8	<a href="#">34, 143</a>	Shell, Cody	GP22	<a href="#">25, 84</a>
Lieurance, Alysha	GP111	<a href="#">30, 123</a>	Odeh, Yasmene	UP29	<a href="#">39, 177</a>	Sherman, Jon	UP130	<a href="#">44, 220</a>
Lim, Seongkyun	GP92	<a href="#">29, 114</a>	Odom, Michael	GO15	<a href="#">19, 55</a>	Shevlin, Casey	UP89	<a href="#">42, 203</a>
Lish, Luke	GP46	<a href="#">26, 93</a>	Orbita, Adrienne Marie	UP37	<a href="#">39, 181</a>	Shultz, Ronson	GO46	<a href="#">21, 65</a>
Litofsky, Justin	UP147	<a href="#">45, 226</a>	Orr, Stephen	GO22	<a href="#">20, 58</a>	Sierra, Cindy	UP93	<a href="#">42, 204</a>
Locke, John	GP45	<a href="#">26, 93</a>	Pakala, Pranaya	UP27	<a href="#">39, 176</a>	Simmons, Martin	UP78	<a href="#">42, 199</a>
Love, Carmen	UP88	<a href="#">42, 202</a>	Palmer, Caitlin	UP146	<a href="#">45, 225</a>	Sink, Tyler	UP145	<a href="#">45, 225</a>
Lower, Meghan	GP66	<a href="#">41, 194</a>	Pandit, Bigyan	GP7	<a href="#">24, 79</a>	Skibieli, Caitlin	GP17	<a href="#">24, 83</a>
Lowry, Megan	UON1	<a href="#">46, 227</a>	Pandya, Shivani	GP116	<a href="#">30, 126</a>	Skinner, Julia	UP52	<a href="#">40, 188</a>
Lynn, Ashley	UP128	<a href="#">44, 219</a>	Parale, Alexis	UP123	<a href="#">44, 217</a>	Sloan, Kelsey	UP54	<a href="#">40, 189</a>
MacKay, Noah	UO63	<a href="#">37, 165</a>	Parekh, Rohan	GP35	<a href="#">25, 89</a>	Sluss, Taylor	GO62	<a href="#">22, 70</a>
Maertz, Eric	GP74	<a href="#">27, 106</a>	Parks, Justin	GP56	<a href="#">27, 98</a>	Smessaert, Dana	GO32	<a href="#">21, 61</a>
Makkia, Rasha	GP64	<a href="#">27, 101</a>	Patel, Bhavin	GP67	<a href="#">27, 103</a>	Smith, Christopher	UO25	<a href="#">35, 149</a>
Maleki Shoja, Babak	GO30	<a href="#">20, 61</a>	Patel, Mitesh	UP134	<a href="#">44, 221</a>	Smith, Haley	UP69	<a href="#">41, 196</a>
Malpass, Lillie	UP51	<a href="#">40, 188</a>	Patel, Mohin	UP136	<a href="#">44, 221</a>	Smith, Julie	UO30	<a href="#">35, 151</a>



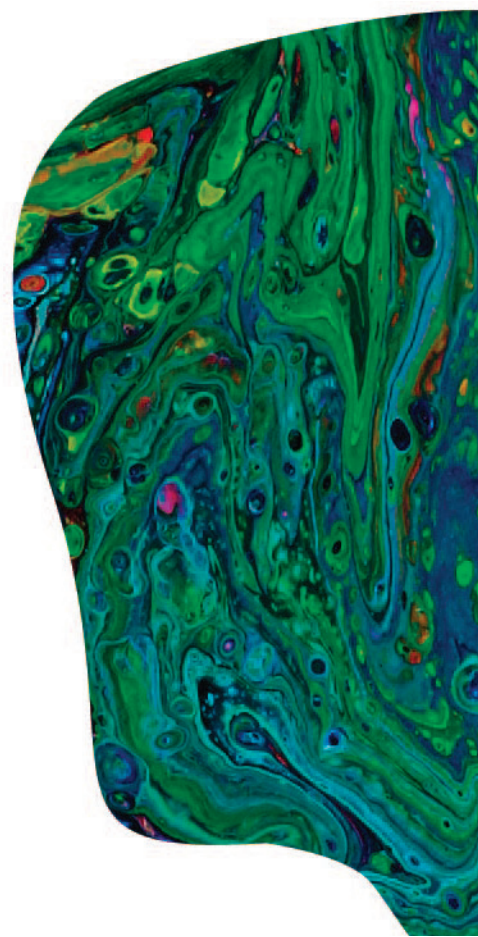
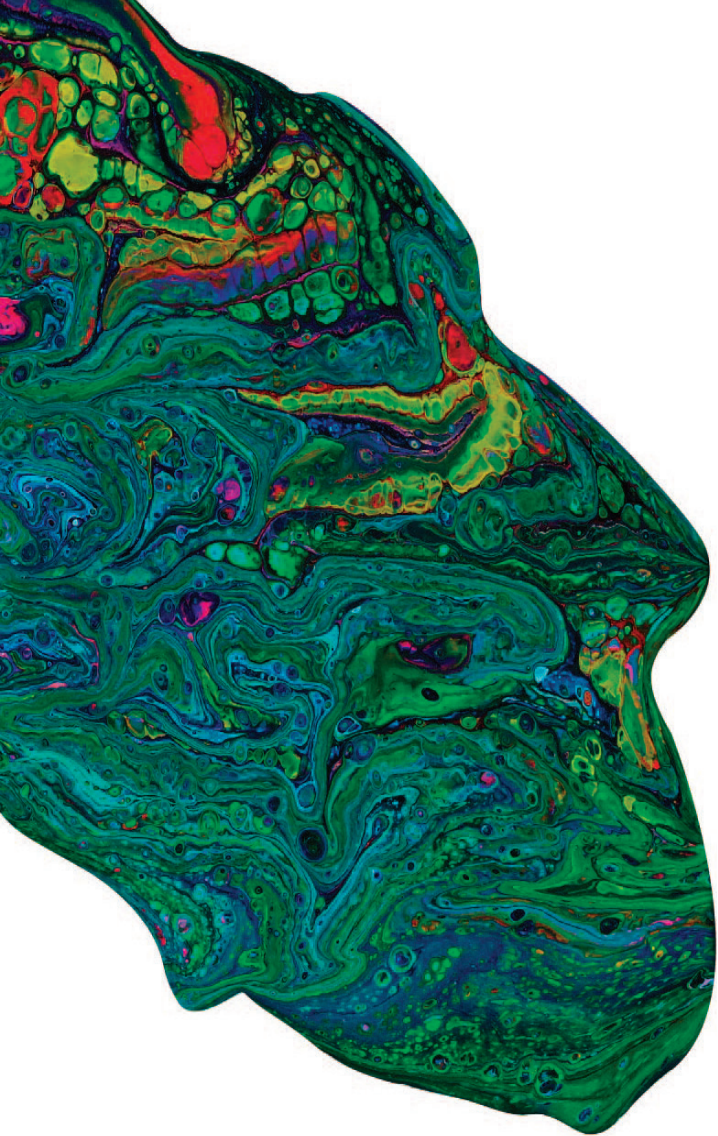
# Presenters' Index

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.

Smitherman, Chancery	UP5	<a href="#">38, 167</a>	Xing, Tiaosi	GO17	<a href="#">20, 56</a>
Solanelas, Pol	GO69	<a href="#">22, 73</a>	Yaeger, Michael	GP1	<a href="#">24, 77</a>
Sonne, Noah	UO28	<a href="#">35, 150</a>	Yang, Hailong	GP14	<a href="#">24, 82</a>
Stalls, Juliann	GO52	<a href="#">21, 66</a>	Yarbrough, Teresa	UO39	<a href="#">36, 155</a>
Stanton, Rebekah	GO64	<a href="#">22, 71</a>	Yeduri, Rishita	UO11	<a href="#">34, 144</a>
Stoffel, Hamilton	UP31	<a href="#">39, 178</a>	Yeomans, Caroline	UO53	<a href="#">37, 161</a>
Stoney, Mackenzie	UP40	<a href="#">40, 183</a>	Yerich, Nadiya	UO32	<a href="#">35, 152</a>
Strom, Cody	GP98	<a href="#">29, 117</a>	Yuvan, Steven	GP132	<a href="#">31, 132</a>
Styring, Abaigeal	UP90	<a href="#">42, 203</a>	Zahrn, William	UO58	<a href="#">37, 163</a>
Sullivan, Collin	UO29	<a href="#">35, 150</a>	Zapanta, Jules	GO4	<a href="#">19, 49</a>
Swain, William	UO47	<a href="#">36, 158</a>			
Tate, Emily	GO77	<a href="#">23, 76</a>			
Tate, Kinsley	GP49	<a href="#">26, 95</a>			
Taylor, William	UP25	<a href="#">39, 176</a>			
Teller, Jacek	GP18	<a href="#">25, 83</a>			
Terman, Ana	UO9	<a href="#">34, 143</a>			
Thaxton, Brian	UO18	<a href="#">35, 147</a>			
Thaxton, William	GP25	<a href="#">25, 85</a>			
Thomas, Christopher	GON4	<a href="#">32, 135</a>			
Thomas, Samuel	GO27	<a href="#">20, 60</a>			
Thompson, Cecily	UP131	<a href="#">44, 220</a>			
Thompson, Chelsea	UP50	<a href="#">40, 187</a>			
Thompson, Mara	GP4	<a href="#">24, 78</a>			
Thorley, Mackenzie	UP53	<a href="#">40, 188</a>			
Thornburg, Thomas	UO3	<a href="#">34, 140</a>			
Traynor, Brianna	UP111	<a href="#">43, 212</a>			
Tripodi, Casey	UP55	<a href="#">40, 189</a>			
Underwood, Candace	GP105	<a href="#">29, 121</a>			
Van Niekerk, Tara	GP126	<a href="#">31, 129</a>			
Vance, Samuel	GP47	<a href="#">26, 94</a>			
Vasquez-Rios, Virginia	UP21	<a href="#">39, 174</a>			
Verhoeven, Nicolas	GP60	<a href="#">27, 100</a>			
Vessie, Arden	UP34	<a href="#">39, 180</a>			
Villasenor, Adriana	UP118	<a href="#">44, 215</a>			
Vixama, Cassandra	UO49	<a href="#">36, 159</a>			
Vlahos, Eleftherios	UP38	<a href="#">39, 182</a>			
Vogel, Thomas	GO63	<a href="#">22, 71</a>			
Wallmow, Colby	UP81	<a href="#">42, 200</a>			
Walls, Eric	GO60	<a href="#">22, 69</a>			
Washington, James	GP54	<a href="#">26, 97</a>			
Waterman, Maryelizabeth	UP44	<a href="#">40, 185</a>			
Weidner, Kara	GP121	<a href="#">30, 127</a>			
Wells, Hannah	GP36	<a href="#">25, 89</a>			
Wester, Emma Rae	UP68	<a href="#">41, 195</a>			
Weyrauch, Luke	GO6	<a href="#">19, 51</a>			
Whitaker, Justin	UP4	<a href="#">38, 167</a>			
White, Avian	GP28	<a href="#">25, 86</a>			
White, Margaret	GO33	<a href="#">21, 61</a>			
Whitehurst, K'Shylah	UP9	<a href="#">38, 169</a>			
Whitman, Austin	GO19	<a href="#">20, 57</a>			
Wilkerson, Kristi	GP99	<a href="#">29, 117</a>			
Williams, Danielle	UP110	<a href="#">23, 211</a>			
Williams, Jada	UP135	<a href="#">44, 221</a>			
Williams, Keith	UP14	<a href="#">38, 171</a>			
Wilson, Emily	GP75	<a href="#">28, 107</a>			
Wilson, Jessica	GP38	<a href="#">26, 90</a>			
Wingate, Sara	GON2	<a href="#">32, 135</a>			
Winkler, Corey	UP122	<a href="#">44, 216</a>			
Wolfe, Mary	UP15	<a href="#">38, 171</a>			
Wood, Aaron	GP103	<a href="#">29, 119</a>			
Worthington, Cameron	UO1	<a href="#">34, 140</a>			





# THANK YOU!

Thank you for your interest in East Carolina University's  
RESEARCH & CREATIVE ACHIEVEMENT WEEK 2018

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 2019!

## FOLLOW US!



ECUGradSchool



@ECUGradSchool

