8th annual RESEARCH & CREATIVE ACHIEVEMENT WEEK

COME SEE WHAT IS INSIDE.

MARCH 31ST—APRIL 4TH
MENDENHALL STUDENT CENTER

THEMINDS
THECREATIV
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OF EAST CAROLINA UNIVERSITY
We would like to give a special thanks to ECU School of Art and Design graphic design undergraduate student Jacqueline McAdams, for her cover design, poster, and program art.

We would also like to recognize ECU College of Education, Master of Adult Education student Laura Taylor, for her development and management of the program.
Greetings!

I am pleased to invite you to participate in the East Carolina University Research and Creative Achievement Week (RCAW). The week of March 31-April 4, 2014, 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, in order to see and hear what our students have achieved.

In addition, 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 Division of Research & Graduate Studies.

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 330 student presentations, an impressive number that reflects the current growth in research and creative activities at ECU in a variety of fields and disciplines. Oral and poster presentations will take place on Monday, March 31 (Graduate Day), Tuesday, April 1 (Postdoctoral Scholar Day), and Wednesday, April 2 (Undergraduate Day) with most posters on display for an additional day each. In addition, we have online presentations for both undergraduate and graduate students.

This year, we are making an emphasis on student and student-faculty collaborative work. New events this year include Intersection of the Arts and Sciences and Postdoctoral Scholars research presentations on Tuesday, April 1. The International Scholars Symposium will also take place on Tuesday afternoon. The College of Education Faculty and Student Research Showcase will be on Wednesday afternoon. The Scholar-Teacher Awards and Symposium at which faculty will be recognized for the integration of research into their teaching will be held on Thursday, April 3. The whole week is capped off with the announcement of the student and postdoctoral scholar award winners on Friday, April 4.

Please consider encouraging your classes to attend specific discipline-related oral student presentations on Monday, Tuesday and Wednesday (March 31, April 1 and 2) 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.

Ron Mitchelson
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  - 36 Undergraduate Oral Presentations
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  - 68 Poster Presentations
  - 106 Online Poster Presentations
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- 112 Undergraduate Abstracts
  - 112 Oral Presentations
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Program Sponsors

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
Division of Research and Graduate Studies
Planning Committee

Tom McConnell: The Graduate School, RCAW Chair
Mary Farwell: Biology, Office of Undergraduate Research, RCAW Co-Chair
Abbie Brown: Mathematics, Science, and Instructional Technology Education, College of Education
Virginia Carraway-Stage: Nutrition Science, College of Human Ecology
Thomas Croskery: President, Graduate & Professional Student Senate, Mathematics, Thomas Harriot College of Arts and Sciences
Nicole Devaul: President, Brody Graduate Association, Anatomy and Cell Biology, Brody School of Medicine
Paul DeVita: Kinesiology, College of Health and Human Performance
Christyn Dolbier: Psychology, Thomas Harriot College of Arts and Sciences
Melani Duffrin: Nutrition and Dietetics, College of Human Ecology
Nehad Elsawaf: Economics, Thomas Harriot College of Arts and Sciences
Rich Franklin: Microbiology & Immunology, Brody School of Medicine
Derrick Isler: The Graduate School
Donna Kain: English, Thomas Harriot College of Arts and Sciences
Margaret Pio: Research & Graduate Studies
Laura Taylor: Adult Education Student, College of Education
Amy Tripp: The Graduate School
Joseph Wilck: Engineering, College of Technology and Computer Science
Guili Zhang: Special Education, Foundations & Research, College of Education

Technical Committee

Josh Brown, Tony Cooke, Wendy Creasey, Laurie Godwin, Derrick Isler, Charlie Justice, Matthew Powell, Ginny Sconiers, John Southworth
March Thirty-First — April Fourth

MARCH THIRTY-FIRST
8:30 am – 5:15 pm | Graduate Student Presentations
Oral sessions in MSC Great Rooms 1+2+3
Graduate Posters in MSC Social Room
Graduate Posters in MSC 221
Graduate Posters in MSC Gallery

APRIL FIRST
7:30 am – 3:00 pm | Graduate Posters | Posters taken down after 3 pm
10:00 am – 12:00 pm | Postdoctoral Scholar Posters | MSC Great Room I
9:00 am – 12:00 pm | Intersection of Arts and Sciences | MSC 244
2:30 pm – 6:30 pm | International Scholars Symposium | MSC 244

APRIL SECOND
8:30 am – 5:00 pm | Undergraduate Student Presentations
Oral Sessions | MSC Great Rooms 1+2
Undergraduate Posters | MSC Social Room
Undergraduate Posters | MSC 221
Undergraduate Posters | MSC Gallery
4:00 pm – 6:00 pm | Invited Faculty Research Lecture
College of Education Faculty and Student Research Showcase | MSC 244

APRIL THIRD
7:30 am – 3:00 pm | Undergraduate Posters | Posters taken down after 3PM
12:00 pm – 1:15 pm | Scholar-Teacher Luncheon *(Invitation Only)* | MSC Great Rooms 2+3
1:30 pm – 3:15 pm | Scholar-Teacher Symposium | MSC Great Room 1 & MSC 244

APRIL FOURTH
12:00 pm – 1:30 pm | Student Awards Luncheon *(Invitation Only)* | MSC Great Rooms 1+2+3
RCAW Awards
Thesis/Dissertation Awards
Faculty Mentor Awards
Carol F. Volkman Recognition
Lectures & Symposia

College of Education Faculty and Student Research Showcase
ECU Scholar-Teacher Awards and Symposium
International Scholars Symposium
Intersection of Arts and Sciences
College of Education Faculty and Student Research Showcase

Date: Wednesday, April 2, 2013
Time: 4:00 PM - 6:00 PM
Location: MSC 244

Presenters and Research Studies:

Faculty invited paper presentation:
Dr. Kaye Dotson & Dr. Hui Bian: Supervision on Site: A Critical Factor in the Online Facilitated Internship

Faculty invited round table presentation:
Dr. Martin Reardon: Crumbling Barriers: A Comparative Study of International Teachers’ Experience of Educational Leadership in the United States and Their Home Countries

Graduate student poster presentations:

Achieving Math Fact Fluency
Casie Cannady

Investigating the Effects of Color-Coded Instructional Materials on Student Retention of Mathematical Concepts
Emily Coggins

The Effects of Reading Logs on Accelerated Test Scores
Gena Covington

Finding Control and Freedom through the Use of Voodoo in New Orleans 1860-1880
Lauren Fagan

Oral Reading Fluency: WhisperPhones™
Chelsea Green

The Effect of Daily Five/Café on Second Grade Reading Skills
Katie Langston

The Effect of Interactive Writing on Phonological Awareness and Writing Development
Susan McCollam

Increasing Legible Handwriting in Kindergarten
Buffy Moore

Blogging to Impact Written Comprehension in First Grade
Debra Pagona

Will 6th grade math students who use computer games score higher on an assessment than students who do not?
Marvin Smith

Will traditional teacher-assigned spelling homework produce a higher rate of word mastery vs. non-traditional student-chosen spelling homework?
Kathryn Suddreth

Examining the Impact of Semantic Mapping and Multiple Exposures on Fifth Grade Students’ Science Vocabulary Achievement
Stephanie Woolard

How Does Varied Multiplication Fact Instruction Impact Fact Recall?
Winston Wray
The ECU Scholar--Teacher Award recognizes outstanding faculty members who integrate scholarship and teaching. Each year the colleges in Academic Affairs and colleges and schools in Health Sciences recognize one or more scholar--teacher(s), based on the number of faculty in the unit. During the symposium, each scholar--teacher provides a succinct presentation (approximately 15 minutes) concerning his/her integration of scholarship in teaching. Each recipient also develops a poster presentation or display for viewing during the symposium. This year the symposium will be held during the Annual Research & Creative Achievement Week: March 31 – April 4, 2014. Prior to the symposium, 2014 Scholar--Teachers and their guests will be hosted by the Provost at an awards presentation and reception. This year two concurrent sessions will be held in the Mendenhall Great Room 1 and Room 244. Faculty, staff, students, and community friends are encouraged to attend all or parts of the afternoon symposium and to enjoy another wonderful celebration of scholarship and teaching at ECU!

**2014 ECU Scholar -Teacher Awards and Symposium**

Thursday, April 3, 2014 – 12:00 - 3:30 - Mendenhall Student Center

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<tr>
<th>Time</th>
<th>Location</th>
<th>Presentation</th>
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<tr>
<td>12:00 - 1:15 pm</td>
<td>Awards Presentation and Reception for Recipients and Invited Guests</td>
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<tr>
<td>1:30 – 3:15 pm</td>
<td>Presentations in Mendenhall Great Room 1 and 244</td>
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<tr>
<td>12:00 – 3:30 pm</td>
<td>Poster Display – Mendenhall Great Rooms</td>
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**Great Room 1**

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<tr>
<th>Time</th>
<th>Speaker</th>
<th>Presentation</th>
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<tbody>
<tr>
<td>1:30</td>
<td>Dr. Matthew Mahar</td>
<td>Professor of Kinesiology&lt;br&gt;College of Health and Human Performance&lt;br&gt;The Chance to Work Hard at Work Worth Doing</td>
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<tr>
<td>1:50</td>
<td>Dr. Zi Wei Lin</td>
<td>Associate Professor of Physics&lt;br&gt;Thomas Harriot College of Arts and Sciences&lt;br&gt;Integration of Physics Research and Education</td>
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<tr>
<td>2:10</td>
<td>Dr. Susan B. McRae</td>
<td>Teaching Associate Professor of Biology&lt;br&gt;Thomas Harriot College of Arts and Sciences&lt;br&gt;Infusing Teaching with Scholarship: Taking the Student Out of the Classroom and into the Real World</td>
</tr>
<tr>
<td>2:30</td>
<td>Dr. Bryce L. Jorgensen</td>
<td>Assistant Professor of Child Development and Family Relations&lt;br&gt;College of Human Ecology&lt;br&gt;Improving the Financial Literacy of College Students through Active Learning: A Student--Centered Approach</td>
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<tr>
<td>2:50</td>
<td>Dr. Jay Juchniewicz</td>
<td>Assistant Professor of Music Education&lt;br&gt;College of Fine Arts and Communication&lt;br&gt;Examining the Influence and Development of Social Intelligence on Effective Music Teaching</td>
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**Mendenhall 244**

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<tr>
<th>Time</th>
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<th>Presentation</th>
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<tbody>
<tr>
<td>1:30</td>
<td>Dr. Nicholas G. Rupp</td>
<td>Associate Professor of Economics&lt;br&gt;Thomas Harriot College of Arts and Sciences&lt;br&gt;Homework and Student Learning</td>
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<tr>
<td>1:50</td>
<td>Dr. Jason Oliver</td>
<td>Associate Professor of Marketing&lt;br&gt;Marketing and Supply Chain Management&lt;br&gt;College of Business&lt;br&gt;Customer Experience Marketing</td>
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<tr>
<td>2:10</td>
<td>Dr. Junhua Ding</td>
<td>Associate Professor of Computer Science&lt;br&gt;College of Technology and Computer Science&lt;br&gt;Merging in a Seamless Blend of Computer Science Teaching and Research</td>
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<tr>
<td>2:30</td>
<td>Dr. Steven W. Schmidt</td>
<td>Associate Professor of Higher, Adult and Counselor Education&lt;br&gt;College of Education&lt;br&gt;Professors as Students: How Faculty Learn to Teach Online</td>
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<tr>
<td>2:50</td>
<td>Dr. Pamela J. Reis</td>
<td>Assistant Professor of Graduate Nursing Science&lt;br&gt;College of Nursing&lt;br&gt;The Virtual Community Clinic Learning Environment: A Web--Based Approach to Interprofessional Education</td>
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# International Scholars’ Symposium – 2014

## Program


### Session 1: Session Chair – Dr. Nehad Elsawaf

<table>
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<tr>
<th>Time</th>
<th>Event</th>
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<tr>
<td>2:45-3:10</td>
<td><strong>Making Connections: Using the Course Organizer Routine in a University Setting</strong>, Morgan B. James, MAT, Instructional Specialist, Project STEPP, Bryce L. Jorgensen, Ph.D., Department of Child Development &amp; Family Relations, Sarah C. Williams, Ph.D., Department of Special Education, Foundations, and Research, and Vera Tabakova, Ph.D., Department of Economics, East Carolina University, Greenville, NC 27858.</td>
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<tr>
<td>3:10-3:35</td>
<td><strong>Investigating women's plus-size body measurements and hip shape variation based on SizeUSA data</strong>, Marina Alexander &amp; Andrada Ivanescu, East Carolina University, Interior Design and Merchandising, College of Human Ecology, Greenville, 27858, USA &amp; Department of Biostatistics, East Carolina University, College of Allied Health Sciences, Greenville, 27834.</td>
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<td>3:35-4:00</td>
<td><strong>Results from a Study of Faculty Use of Clickers at East Carolina University</strong>, Karen A. Mulcahy, Ph.D., Department of Geography, Vera Tabakova, Ph.D., Department of Economics, Subodh Dutta, Ph.D., Department of Chemistry, East Carolina University and Grant Gardner, Ph.D., Department of Biology, Middle Tennessee State University.</td>
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4:00 PM - 4:30 PM | BREAK

### Session 1: Session Chair – Dr. Nehad Elsawaf

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<th>Time</th>
<th>Event</th>
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<tr>
<td>4:35-5:00</td>
<td><strong>Analysis of Hydrodynamic Forces on a human tooth and surrounding tissues during Oral Irrigation-A 3D Computation Fluid Dynamics (CFD) Analysis</strong>, Rana Abdel-Salam, Department of Engineering and Ranjeet Agarwala, Department of Technology Systems, East Carolina University, Greenville, NC, 27858</td>
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<tr>
<td>5:00-5:25</td>
<td><strong>FtrABCD is a low-iron and acid-induced ferrous iron specific transporter that is required for the virulence of Brucella abortus 2308 in mice</strong>, Ahmed Alhassanny, Ph.D. candidate, Department of Microbiology, East Carolina University, Greenville, NC, 27858</td>
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<tr>
<td>5:50-6:00</td>
<td>Concluding remarks</td>
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2014 | RCAW 19
Welcome to the Intersection: A collection of ten brief talks that illuminate scientific research in the service of art, unveil creative activity that inspires breakthrough and/or showcase novel solutions found through interdisciplinary conversations.

Identifying Proper Screening Protocols for Injury Prevention in Collegiate Dancers
Teal Darkenwald, Assistant Professor, School of Theatre and Dance; with Matthew Becker, MS candidate, Department of Kinesiology; and Amy Parrish and Noel Smith, BFA candidates

Is Politics an Art or a Science? American Politics Through Music
Bonnie G. Mani, Professor, Department of Political Science

Scientific Imaging in a Fine Art Gallery: Microscopy and Portraits
Daniel Kariko, Assistant Professor, School of Art and Design

Salt Fired Ceramics: History, Science and Application in Vapor Glazing
Devin McKim, MFA candidate

Curricular Connections: Linking Dance and Science Concepts for Young Learners
Marissa Nesbit, Assistant Professor, School of Theatre and Dance

Connecting Innovative Middle School Students in Rural Communities: Building a Regional Network of Creative Talent to Address 21st Century Challenges
Wayne Godwin, Associate Professor, School of Art and Design

The Arts and Math Integration: Perceptions of K-12 Art Teachers in North Carolina
Borim Song, Assistant Professor, School of Art and Design, and Jungmin Choi, Assistant Professor, Department of Mathematics

Impossible Beauty Standards? Photoshop to the Rescue
Anna Hill, BFA candidate

The Power of Stories: Folklore, Urban Legends, and Medicine
Andrea Kitta, Assistant Professor, Department of English

The Art of Cool: Data Collection and Visualization, a Generative Art Installation Presentation
Jed Watson and Kevin Bednar, BFA candidates

Presenter order subject to change. No talk lasts longer than 12 minutes.
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<th>Mentor Name</th>
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<tr>
<td>Abdel-Rahman, A.</td>
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<td>Abdel-Salam, Tarek M</td>
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<td>Ables, Elizabeth Tweedie</td>
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<td>Adu-Gyamfi, Kwaku</td>
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<td>Aebly, Victor G</td>
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<td>Anderson, Eric Shawn</td>
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<td>Ardon-Sayao, Marcelo</td>
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### Graduate Oral Presentations

**MSC Great Room 1 | Natural Sciences**

8:30 am — 12:15 pm

| GO1 | 8:30-8:45 | Larval Otolith (Earbone) Formation and Development in the Striped Bass (Morone saxatilis), Brie Elking |
| GO2 | 8:45-9:00 | Analysis of a 41-year data set: Do environmental parameters influence the fish community of Albemarle Sound, North Carolina, Zachary Gillum |
| GO3 | 9:00-9:15 | Spatial Ecology of King Rails (Rallus Elegans) in Northeastern North Carolina, Jaan Kolts |
| GO4 | 9:15-9:30 | The Striper Dance: How That Bass Move…along with the other fishes, Jillian Osborne |
| GO5 | 9:30-9:45 | Commercially Important Prey Species Sustaining Adult Red Drum Sciaenops ocellatus Production along the Atlantic Coast, Tyler Peacock |
| GO6 | 9:45-10:00 | Effects of Saltwater Incursion on the Growth of Bald Cypress (Taxodium distichum) Forested Wetlands, Amanda Powell |
| GO7 | 10:00-10:15 | Physical and Psychological Risks of Texting While Walking Among College Students, Ogaga Tebehaevu |
| GO8 | 10:15-10:30 | Nutrient addition increases the effects of competition in a plant community: evidence from a removal experiment in a long-term fertilization study, Joshua Thigpen |
| GO9 | 10:30-10:45 | Icthyoplankton community patterns in Beaufort Inlet, North Carolina, Transgenic, Nicholas Tolopka |
| | 10:45-11:00 | BREAK |
| GO10 | 11:00-11:15 | Mapping potential coastal shark habitat within Pamlico Sound, North Carolina, Charles Bangley |
| GO11 | 11:15-11:30 | Marsh Habitat Mapping and Potential Responses to Sea-Level Rise in the Rachel Carson Reserve, Margaret Garner |
| GO12 | 11:30-11:45 | What Does the River Say? Utilizing Water Chemistry to Establish Spatial and Temporal Variability in the Albemarle Sound/Roanoke River Management Areas, Coley Hughes |
| GO13 | 11:45-12:00 | Boat Noise Alters Reproductive Communication in the Oyster Toadfish (Opsanus tau), Cecilia Krahforst |
| GO14 | 12:00-12:15 | How do differences in species hatching phenology and the presence of predators affect population and ecosystem level properties of aquatic food webs?, Lauren McCarthy |
Graduate Oral Presentations

MSC Great Room 2 | Biomedical Sciences 8:30 am — 12:30 pm

GO15 8:30-8:45  Monoamine Oxidase is a Major Determinant of Redox Balance in Human Atrial Myocardium and is Associate with Postoperative Atrial Fibrillation, Timothy Darden

GO16 8:45-9:00  Circulating miRNAs as Biomarkers for mTBIs and Related Cognitive Deficits, Dorothy Dobbins

GO17 9:00-9:15  Evaluation of microRNA expression in alveolar macrophages from a multiwall carbon nanotube (MWCNT) murine granuloma model, Matthew McPeek

GO18 9:15-9:30  Retinoic Acid Induces Multiple Hallmarks of the Prospermatogonia-to-Spermatogonia Transition in the Neonatal Mouse, Jonathan Busada

GO19 9:30-9:45  FtrABCD is a low-iron and acid-induced ferrous iron specific transporter that is required for the virulence of Brucella abortus 2308 in mice, Ahmed Elhassanny

GO20 9:45-10:00  The Pentose Phosphate Pathway is Stimulated by Activation of CaMKK Signaling in Mouse Skeletal Muscle, Jeremie Ferey

GO21 10:00-10:15  3D Structural Differences between CD4+ and CD8+ T lymphocytes, Wenhuan Jiang

GO22 10:15-10:30  ABSTRACT WITHDRAWN FOR IP PROTECTION

10:30-10:45  BREAK

GO23 10:45-11:00  The activity of the iron-responsive regulator Irr is modulated by cellular iron levels and ferrochelatase activity in Brucella, David Martinson

GO24 11:00-11:15  Role of CheD in Borrelia burgdorferi: Bacterial Chemotaxis and Pathogenesis, Kihwan Moon

GO25 11:15-11:30  Depletion of Cap-Dependent Protein Synthesis and Its Affect on Germ Cell Tumor Progression, Julia Morrison

GO26 11:30-11:45  -catenin/NPRAP/Neurojungin mutation promotes prostate tumorigenesis in mice overexpressing Myc oncogene, Jongdee Nopparat

GO27 11:45-12:00  Dose reconstruction technique for retrospective analysis of radiation therapy treatment of pediatric patients, Christopher Pelletier

GO28 12:00-12:15  Novel J-series prostaglandin-ethanolamides are crucial for the cannabinoid receptor-independent effect of anandamide in non-melanoma skin cancer cells, Eman Soliman

GO29 12:15-12:30  A Trans-generational ripple: How a puff during early development lead to a global huff in microRNA profiles as well as grand-offspring addictive behavior in Caenorhabditis elegans, Faten Taki
### Graduate Oral Presentations

**MSC Great Room 3 | Fine Arts & Humanities**

**Monday 3.31.14**

8:30 am — 4:15 pm

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<thead>
<tr>
<th>Time</th>
<th>Presentation</th>
<th>Presenter</th>
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<tbody>
<tr>
<td>8:30-8:45</td>
<td>The Human Element: Characters and Relationships in Fiction Writing</td>
<td>Timothy Buchanan</td>
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<td>8:45-9:00</td>
<td>Closed for Repairs, a stage play</td>
<td>Gaiselle Cambra</td>
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<td>9:00-9:15</td>
<td>Traditional Crafts In Saudi Arabia</td>
<td>Samirah Alotaibi</td>
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<td>9:15-9:30</td>
<td>Patterned Fabrics and Their Ability to Evoke Nostalgic Experiences</td>
<td>Alison Bailey</td>
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<td>9:30-9:45</td>
<td>Jazz on broadway</td>
<td>Gregory Bailey</td>
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<td>9:45-10:00</td>
<td>Pottery: Identity, Function, and Place (I’ve Got a Pot for That)</td>
<td>William Bailey</td>
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<td>10:00-10:15</td>
<td>Paths to Abstraction</td>
<td>Emily Branch</td>
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<td>10:15-10:30</td>
<td>Looking Back to the Futurists</td>
<td>Mohammad Goudarzi</td>
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<td>10:30-10:45</td>
<td>BREAK</td>
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<td>10:45-11:00</td>
<td>Reliquaries: Childhood Relics</td>
<td>Sarah Harvell</td>
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<td>11:00-11:15</td>
<td>Flowering</td>
<td>Patrick Hutti</td>
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<td>11:30-11:45</td>
<td>A Craze for Paisley</td>
<td>Mary Klacza</td>
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<td>11:45-12:00</td>
<td>Killa Beez (cross-pollination)</td>
<td>Zachery Lechtenberg</td>
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<td>12:00-12:15</td>
<td>Nature and Industry in the Urban Environment</td>
<td>Sarah Loch-Test</td>
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<td>12:15-12:30</td>
<td>Salt Fired Ceramics: History and Application in Vapor Glazing</td>
<td>Devin Mckim</td>
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<td>12:30-2:00</td>
<td>The Spaces Between</td>
<td>Aisling Millar</td>
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<td>2:00-2:15</td>
<td>Historical Techniques and Modern Issues</td>
<td>Dru Patrick</td>
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<td>2:15-2:30</td>
<td>Wanderings, A Childhood Introspective</td>
<td>Cathy Perry</td>
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<td>My Art Object as Memorial</td>
<td>Amber Watts</td>
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<td>2:45-3:00</td>
<td>The Role of Shrines Within Our Artistic and Religious Belief Systems</td>
<td>Erin Younge</td>
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<td>3:00-3:15</td>
<td>Memory, Place, and Processes</td>
<td>Christine Zuercher</td>
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<td>3:15-3:30</td>
<td>Art and the Tools of Energy Healing</td>
<td>Steven Hall</td>
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<td>3:30-3:45</td>
<td>Needle Felting and Digital Print: From Factory to Artistry</td>
<td>Mary Jones</td>
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<td>3:45-4:00</td>
<td>Eyes Wide Open</td>
<td>Ernest Wesley Akins</td>
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Graduate Oral Presentations

MSC Great Room 1 | Technology and Computer Sciences 2:00 pm — 3:30 pm

GOS3  2:00-2:15  Designer’s Perceptions of Safe Design and Its Potential for Innovation, Ronan McAleenan
GOS4  2:45-3:00  Generalizing Lamport’s Bakery Algorithm to Solve Group Mutual Exclusion Problem, Yuan He
GOS5  3:00-3:15  A Method for the Guitar Fingering Problem, Arman Samavatian
GOS6  3:15-3:30  Secure Fly Over The Coulds, Verifiable secure outsourcing to the clouds, Ali Shahbazi

MSC Great Room 1 | Human Health 3:30 pm — 4:30 pm

GOS7  3:30-3:45  Determination of Breathing Resistance Across Activated Carbon Fiber Respirator Cartridges Using Sinusoidal Airflow, Adepeju Adesina
GOS8  3:45-4:00  Prediction of Athletic Injury with a Functional Movement Screen™, Tyler Hall
GOS9  4:00-4:15  Influence of Exercise Mode on Maternal and Fetal Health Outcomes, Carmen Moyer
GOS10 4:15-4:30  Biomedical Research Training Opportunities at the National Institutes of Health for Students, Faculty, Clinicians, and Staff: A General Overview with a Focus on the National Institute of Nursing Research Summer Genetics Institute, Kristin Wainwright

MSC Great Room 2 | Social Sciences 2:45 pm — 5:15 pm

GO61  2:45-3:00  Ending FGM – A Case Study in Advocacy, Purity Kimaiyo
GO63  3:00-3:15  Gender Perception and Participation in the Hawaiian Cultural Renaissance Movement, Shannon Chrstsy
GO64  3:15-3:30  “Did you Heart?” Gossip as a Manifestation of Trait Aggression, John Granecki
GO65  3:30-3:45  Mapping the “Wastescape” of Hog Farming in North Carolina, Calvin Harmin
GO66  3:45-4:00  Evaluating perceptions and impacts of differential access to water resources: A review of water management strategies in St. Elizabeth, Jamaica, Alex Moulton
4:00-4:15  BREAK
GO67  4:15-4:30  Living Learning Community Effects on Student Mental Health, Health Behaviors and Academic Performance, Anne Carroll
GO68  4:30-4:45  Formative Assessment in the Mathematics Classroom: Finding the Right Opportunities for Success, Angelina Knies
GO69  4:45-5:00  Examining the impact of interactive writing on kindergarten students’ phonological awareness and writing, Susan McCollam
GO70  5:00-5:15  Examining the Impact of Semantic Mapping and Multiple Exposures on Fifth Grade Students’ Science Vocabulary Achievement, Stephanie Woolard
Graduate Poster Presentations

MSC Social Room | Human Health

8:30 am — 10:30 am

GP1 Leisure as a Self Management Practice to Manage Arthritis, Susan Anderson

GP2 Exposure to a Food-Based Science Curriculum Results in Dietary Behavior Changes among Fourth-Grade Children, Stacey Bala

GP3 The Effect of Prenatal Obesity and Prenatal Depression on Gestational Weight Gain, Hemadhanvi Chagarlamudi

GP4 Exploring the Psychological Impact of Breast Cancer Treatment among African American Women in Rural North Carolina, Crystal Ellis

GP5 Bottle or Breast?: A Needs Assessment of Greenville North Carolina’s Breastfeeding Support Services and the Perceptions, Attitudes and Preferences of Low-Income Prenatal Care Recipients, Julia Fout

GP6 The role of federal and local emergency managers in post-disaster mosquito control in North Carolina, Jonathan Harris

GP7 Conceptual Framework for Recreational and Sport Skill Development through the Use of Video Feedback, Charles Harvey

GP8 Effects of a Before-School Physical Activity Program on Musculoskeletal Fitness in Children, Noelle Knight

GP9 Associations between biologic samples of breath alcohol concentration (BrAC) and hazardous drinking behaviors in those identified as members of a social fraternity or sorority, Justin Sharpe

GP10 Joint Torque and Power Redistribution During Accelerated Walking in Older Adults, Shane Rabideau

GP11 How Do We Accelerate While Running?, Daniel Schuster

GP12 Youth Alcohol Accessibility in Five Eastern North Carolina Counties, Jamie Troutman

GP13 Differences in Patellofemoral and Tibiofemoral Knee Joint Loads with increasing BMI, Ann Tullock

GP14 Dengue in Pan America 2001-2012: Trends in Cases Imported into the United States, Caitlin Van

GP15 Strength Training Versus Strength Training with Whole-Body vibration on Plantarflexor Strength and Gait Biomechanics in Older Adults: Preliminary Data, Christopher Wendt

GP16 Maximizing Student Development Through Recreation Employment, Taylor Yancey

GP17 Postural Responses Perturbations in People with Diabetic Peripheral Neuropathy: A Research Proposal, Matthew Becker

GP18 Fatigue as it Relates to Automobile Accidents, Marc Bitner
### Graduate Poster Presentations

**MSC Room 221 | Social Sciences**  
8:30 am — 12:30 pm

| GP19 | Across Porous Frontiers: Movements, Exchanges & Hidden Histories of Slavery and Freedom in 19th century United States, Mexico & the Caribbean, Maria Hammack |
| GP20 | Factors that Prevent Participation and Retention in a Diabetes Self-Management Education Program, Kenley Turney |
| GP21 | Patriotism and Religion: How the ‘Fight for Freedom’ unites Americans, Zachary Parker |
| GP22 | Exploring Quality of Life at Petra through Paleopathology, Courtney Canipe |
| GP23 | ESL at a Refugee Agency, Katherine Drake |
| GP24 | Revisiting the work of Stanley South: Excavation at the Palmer-Marsh House, Bath, NC from 1960-2013, Eva Falls |
| GP25 | An Investigation of the Taphonomic Effects of Animal Scavenging, Alexander Garcia-Putnam |
| GP26 | A Bayesian Approach to Investigating Age-at-Death of Subadults in a Forensic Context, Kelsey Roepe |
| GP27 | The Analysis of Mississippian Settlement Patterns in the Town Creek Area, North Carolina, Taryn Ricciardelli |
| GP28 | An Assessment of a Leadership Development Program and the Influence on Student Leadership Learning Outcomes, Brittany Hopewell |
| GP29 | Park-based Physical Activity among City Residents with Varying Socioeconomic Levels, Emily Pineda |
| GP30 | Perceptions of Safety Survey in the Technology and Computer Science Departments at ECU, Abigail Sweet |
| GP31 | Financial Education and Debt: The Key May be Confidence, Karen Vajda |
| GP32 | I'm with her: An examination of Old Lesbian relationship status and its association with health conditions, health behaviors and health perceptions, Christina Hall |
| GP33 | Art is Good Medicine Program, Lindsey Harrell |
| GP34 | Youth Outreach in Pitt County: The Youth Public Arts Program, Vanessa Hines |
| GP35 | Perceptions of Biologists by Undergraduate Students: Are we reinforcing negative stereotypes?, Kristi Walters |
| GP36 | Media Reporting on Crimes Committed by Individuals with Mental Illness: Effect on Public Perception, Lucy Wilmer |
| GP37 | An Analysis of Digital Assessment of Crown Preparations Using CADCAM Technology (E4D), Hannibal Crisp |
| GP38 | Improving Outreach Regarding Contamination in North Carolina Self-Caught Fish, Elizabeth Brown-Pickren |
| GP39 | Semantics Use in Discourse: The Influence of Age and Cognition, Stephen Kintz |
| GP40 | Workplace Mentoring: The Impact of Humor Style and Frequency, Zachary Love |
| GP41 | The Financial Behavior of Emerging Adults: A Family Financial Socialization Approach, John Schweichler |
| GP42 | Self-Discrepancies in Wife and Mother Roles in Relation to General and Role-Specific Well-Being, Meghan Sharp |
| GP43 | Substance Use Patterns in ADHD Patients Seeking Outpatient Substance Abuse Treatment, Marina Stanton |
# Graduate Poster Presentations

## MSC Social Room | Human Health

**GP44** Stress & Health: Medical Students’ Training Perceptions, Knowledge, & Intentions to Address Stress Management, as a Specific Application of the Biopsychosocial Model, Summer Anderson

**GP45** The Influence of Foot Type and Orthotic Device Use on Frontal Plane Motion at the Ankle During a Single Leg Landing from a Jump, Kristen Garrison

**GP46** Body Mass and Motor Skill Performance in children 7-10 Years, Danielle McKinnis

**GP47** A Pilot Study of Using 3D Ultrasound to Measure Intrinsic Foot Muscle Parameters, Erica Bell

**GP48** An Ergonomics Evaluation and Repetitive Motion Analysis Conducted at a Manufacturing Facility in Eastern North Carolina, Justin Raines

**GP49** Comparing Active and Sedentary Female Workers: A Study of Physical Function and Quality of Life, Christopher Marion

**GP50** Comparison of Strength, Range of Motion, and Pain Between Active and Sedentary Female Workers, Erin Bostic

**GP51** Effects of Individual Factors On Lower Extremity Strength Changes in Adolescents Who Are Obese, Julie Jones

**GP52** The Effects of Ankle Mobilizations On Hip Strength, Nathan Watts

## MSC Social Room | Humanities

**GP53** Oceans of Oil: History and Archaeology of Whaling on the Outer Banks, Ryan Bradley

**GP54** Material Culture Analysis of the Cargo from Modern Greece, Chelsea Freeland

**GP55** Examining Lynx as Material Culture, Nicholas Nelson-DeLong

**GP56** Stone and Speed: The Development of the Self-Unloading Schooner-Barge, Adriatic, Caitlin Zant

**GP57** A Qualitative Examination of the Experience of Geriatric Care and Medicine in Aging Adults in Cusco, Peru, Megan Brock

## MSC Gallery | Biomedical Sciences

**GP58** Analysis of cell cycle dynamics in the D. melanogaster ovarian germ-line stem cells, Arturo Alvarez

**GP59** TMEFF2 acts as an AR activator in prostate cancer cells, Joshua Corbin

**GP60** Notch-1 Regulates Epithelial to Mesenchymal Transition in Colorectal Cancer, Alexander Fender

**GP61** Cardiac Ischemic Reperfusion Injury Remains Expanded 7 Days After Intratracheal Instillation of Nanosilver, Nathan Holland

**GP62** Avian Synaptopodin 2 (Fesselin) Stabilizes Myosin Filaments and Actomyosin in the Presence of ATP, Nathaniel Kingsbury

**GP63** Levator veli palatini muscle morphology in adults with repaired cleft palate, Jillian Nyswonger

**GP64** Investigating the Interaction of RecQL4 and Mcm10 in Drosophila melanogaster, Wayne Rumnings

**GP65** Shear Modulus of Architecturally Different Hamstring Muscles, Kayla Seymore

**GP66** A Molecular Dynamics Study on the impact of the S27E and S27A Point Mutations on the Structure, Stability, and N-terminal Orientation of Annexin A1, Bradley Simpkins
Graduate Poster Presentations

MSC Gallery | Biomedical Sciences cont.  I:00 pm — 5:00 pm

GP65  Reperfusion arrhythmia is prevented by preserving mitochondrial membrane potential: The effect of exercise adaptations, Rick Alleman

GP66  Skeletal muscle function during high intensity contractions is improved by increased AMP Deaminase expression, Patrick Davis

GP67  PPP1R42 regulates PPI to control centrosome dynamics, Nicole Devaul

GP68  Changes in Running Mechanics Following a Prolonged Run Among Males and Females, Katherine Edwards

GP69  Role of the Human T-cell Leukemia Virus type-I encoded Protein HBZ in Cell Adhesion and Migration, Ana Fazio-Kroll

GP70  Persistent neuronal morphological changes after chronic CBI receptor antagonist SR141716A or antidepressant treatment in developing and adult zebra finches, Tessa Holland

GP71  Comparative analysis of the effects of shear stress on vascular smooth muscle cell migration using two novel in situ wound assays, Andrew Holt

GP72  Peroxisomal Biogenesis Occurs in Response to Obesity and to a High Lipid Environment in Human Skeletal Muscle, Tai-Yu Huang

GP73  Unaltered dopamine D1, D2, and D3 receptor expression in the spinal cord after intrathecal block of D3 receptors, Agnes Jensen

GP74  Influence of Race on Velopharyngeal and Craniometric Morphology in Children, Lakshmi Kollra

GP75  Synthesis and Evaluation of the Novel Prostaglandin, 15-Deoxy, α12,14Prostaglandin J2–Ethanolamide, as a Potent and Selective Inducer of Tumor Cell Death, Daniel Ladin

GP76  The Role of Dicer in the Restorative Macrophage Phenotype, Sherri Moore

GP77  Pretreatment with a GMCSF-peptide fusion protein inhibits myocarditis in a mouse model of EAM, Sherri Moore

GP78  Evaluating the requirement of Mcm10’s expanded CTD in D. melanogaster, Michael Reubens

GP79  Central Nicotinic Acid Administration Increases Blood Pressure in Conscious Rats, Samar Rezq

GP80  Sexual Dimorphism of the Levator Veli Palatini Muscle in Typically Developing Infants, Graham Schenck

GP81  Speech-Language Pathologists’ Perceptions Toward Normal Speakers and People with Communication Disorders Before and After Completion of Therapy, Lin Sun

GP82  The onset and decay of heterologous tolerance to morphine after subcutaneous (sc) injection for varying lengths of time, Benjamin Thompson

GP83  Mitochondrial Capacity is Decreased in Skeletal Muscle with Estrogen Depletion, Maria Torres

GP84  Mechanistic insights into retinoid-based therapies for inflammatory skin diseases—reprograming of integrins, Lei Wang

GP85  Investigation of the Immunosuppressive Function of the Vaccinia Virus Protein OIL, Anastasia Weeks

GP86  Identification of novel HTLV-I Basic Leucine Zipper Factor (HBZ) binding partners and evaluation of cellular protein complex reorganization, Amanda Williams

GP87  Inhibition of histone acetyltransferase (HAT) activity by HBZ extends beyond the p300/CBP HAT family, Diana Wright
Graduate Poster Presentations

MSC Room 221 | Natural Sciences I:00 pm — 5:00 pm

GP88 Interaction of Basin Wide Climate Oscillations on Indian Ocean Tropical Cyclone Genesis and Strength, Dicky Armstrong

GP89 Elucidating Genetic Factors Influencing DNA Replication/Compaction, Garrett Ransdell

GP90 Netrin expression in Pristionchus pacificus, Kelly Mahoney

GP91 Synthesis and stability of aromatic ureas from from 4,4-Methylenedibenzoyl isocyanate and secondary 4,4’-methylenebis(N-alkylaniline)s, Jason Atkinson

GP92 Development of an OSL instrument to measure the radiation dose from teeth after a nuclear event, Carlos Cardenas

GP93 The role of microRNA 159 in reproductive development of Zea mays, Sterling Field

GP94 The Thermodynamics of Cadmium (II) Binding to Full length and Truncated (1-89) Human Cardiac Troponin C (cTnC); Investigating new Mechanisms of Cadmium (II) Toxicity, Lindsay Fulcher

GP95 Characterizing the expression patterns of miR 167-regulated arf3 and arf30 in maize inflorescences, Caitlin Johnson

GP96 Role of MiR319 in Maize Inflorescence Development, Katherine Novitzky

GP97 Leaf litter breakdown rates across a salinity gradient in natural and restored wetlands, Patrick Korn

GP98 You are what you eat: determining the zooplankton fatty acid composition in western Albemarle Sound and Chowan River, North Carolina, Deborah Lichti

GP99 Effects of temperature and climate on inter-annual variation of striped bass (Morone saxatilis) in the Albemarle Sound, NC, Tracy McCulloch

GP100 Maturation and Fecundity of the North Carolina Central Southern Management Area Striped Bass Stock, Evan Knight

GP101 Parent-offspring communication in the biparental care system of mimic poison frog Ranitomeya imitator, Miho Yoshioka

GP102 Population Structure of River Herring in the Albemarle Sound, North Carolina: Does morphometric analysis agree with other stock identification methods?, Walter Rogers

GP103 A GIS-Based Analysis of Precipitation Organization and Regional Hydrology in North Carolina, Christopher Zarzar

GP104 Juncus roemerianus patch stability and community shifts across a marsh, Sherer Etheridge

GP105 Otolith Microchemistry Illuminates Possible Movement of North Carolina Striped Bass between Management Areas, Daniel Zurlo
Graduate Poster Presentations

MSC Room 221 | Natural Sciences cont.  I:00 pm — 5:00 pm

GP106  Spatial and Temporal Translational Control of Germ Cell mRNAs by an eIF4E Isoform, IFE-I, Andrew Friday

GP107  Does exposure of individuals to predators early in development affect the performance of those individuals later in development?, Scott Jones

GP108  Unveiling the hidden and potential values of citizen science, Michael Smith

GP109  Testing predictions of the Müllerian mimicry hypothesis in Peruvian poison frogs, Adam Stuckert

GP110  Analysis of Electron Beam Spectrum of Medical Linear Accelerator, JiHyung Yoon
Graduate Online Presentations

Online Poster Presentations | General

GDP1  A Multi-Method Usability Evaluation of the Facebook Social Network Involving Blind Users, Julian Brinkley
GDP2  The Difference between Gender BMI Levels for 8th Grade Students, Adam Tew
GDP3  Exploration of Mental Health Aspects of Women’s Reproductive Health, Christopher Dougherty
GDP4  Accelerated lipid oxidation increases the rate of mitochondrial H2O2 production in skeletal muscle, Cody Smith
GDP5  Types of Forecast and Weather-Related Information Used among Tourism Businesses in Coastal North Carolina, Emily Ayscue
Postdoctoral Scholar Presentations

MSC Great Room I  |  Biomedical Sciences  
10:00 am — 12:00 pm

pp1  Examination of the Differential Impacts of ATP vs. Shock on Patient Activity in the EMPIRIC Study, Amanda Whited

pp2  Cancer chemotherapy impairs mitochondrial function in non-tumor-bearing tissue, Laura Gilliam

pp3  S-phase factors are required for germ cell tumorigenesis and somatic cell fate transformation by GLP-1/Notch signaling in C. elegans, Youngchul Kwon

pp4  Bidirectional transcription regulation in Human Immunodeficiency Virus type I, Sylvain Laverdure

pp5  Inactivation of the chemotaxis gene, cheY3, in Borrelia burgdorferi and the effects its has on the enzootic cycle, Elizabeth Novak

pp6  Ethanol facilitates Estrogen-Enhanced Translocation of Estrogen Receptor to the Cell Surface in Rat Myocardium, Rebecca Steagall

pp7  Estrogen Attenuates Cannabinoid Receptor 1-evoked Pressor Response in Rostral Ventrolateral Medulla in Conscious Rats, Fanrong Yao

pp8  Laminin-111 Improves Skeletal Muscle Repair Following Eccentric Exercise-Induced Damage, Kai Zou
Undergraduate Oral Presentations

MSC Great Room 2 | Engineering and Technology 8:30 am — 10:15 am

UO1 8:30-8:45 Analysis of Hydrodynamic Forces on a human tooth and surrounding tissues during Oral Irrigation-A 3D Computation Fluid Dynamics (CFD) Analysis, Rana Abdelsalam

UO2 8:45-9:00 Landing Biomechanics: The Role of Load Placement, Joseph Patterson

UO3 9:00-9:15 Automated Assessment of ER, PR, and HER-2 Status through Computer-Based Image Analysis, Amos Cao

UO4 9:15-9:30 Characterization of Parts Produced by 3-D Printers, Sarah Gurganus

UO5 9:30-9:45 Grady White Forklift purchase vs. lease, Steven Watson

UO6 9:45-10:00 Effects of Layer Orientation of Different Activated Carbon Fibers on Pressure Drop Across Respirator Cartridges, John Longa

UO7 10:00-10:15 City of Greenville Sustainability, Scott Barber

MSC Great Room 3 | Humanities 8:30 am — 10:45 am

UO8 8:30-8:45 The Multifaceted Cultural Attainments of the Twelfth-Century Renaissance during Oral, Sarah Cox

UO9 8:45-9:00 The Personified Cultural Contrast in “Blancanieves,” Anna Lawrence

UO10 9:00-9:15 Blancanieves: The True Hero, Laura Pons

UO11 9:15-9:30 Exploring Feminism in the Tijaniyya Sufi Order in Senegal and Nigeria, Hannah Potter

UO12 9:30-9:45 Comparison and Contrast of Sethe and Scarlett as Independent Women, Sandra Ross

UO13 9:45-10:00 The Evolution of Women’s Roles in the US Air Force, Kathleen Tcherkezian

UO22 10:00-10:15 The Traveling Tale, Kathryn Ervin

UO29 10:15-10:30 The Aztec Calendar Stone’s Significance in the Aztec Culture, Jose Grande-Gomez

UO30 10:30-10:45 An Investigation of Generation Y’s Willingness to Pay More for Eco-Friendly Apparel Products, Natalie Huntley
### Undergraduate Oral Presentations

**MSC Great Room 2 | Natural Sciences**  
**10:30 am — 12:00 pm**

<table>
<thead>
<tr>
<th>U014</th>
<th>10:30-10:45</th>
<th>Educational engagement: Investigating service learning in the nonhuman sciences, Taylor Abernethy</th>
</tr>
</thead>
<tbody>
<tr>
<td>U015</td>
<td>10:45-11:00</td>
<td>Components of Reproductive Isolation between Subspecies of an Annual Plant, Evan Arthur</td>
</tr>
<tr>
<td>U016</td>
<td>11:00-11:15</td>
<td>Proposed origin of “black mats” found at the Younger Dryas boundary, Abigail Maiorana-Boutilier</td>
</tr>
<tr>
<td>U017</td>
<td>11:15-11:30</td>
<td>Do neotropical flycatcher species exhibit morphological variation among populations consistent with competitive exclusion by similar-sized sympatric species?, Bradley Moore</td>
</tr>
<tr>
<td>U018</td>
<td>11:30-11:45</td>
<td>Assessing morphological variability in silversides from the Albemarle and Pamlico Sounds, North Carolina, Stephen Parker</td>
</tr>
<tr>
<td>U019</td>
<td>11:45-12:00</td>
<td>The Genetic Basis of Pigmentation Variation in Domesticated Zebra Finches, Shaivya Pathak</td>
</tr>
</tbody>
</table>

**MSC Great Room 3 | Social Sciences**  
**1:30 pm — 3:30 pm**

<table>
<thead>
<tr>
<th>U020</th>
<th>1:30-1:45</th>
<th>Female Middle Schools Students Living in Eastern North Carolina Have Higher Nutrition Knowledge Compared to Males, Caroline Hodges</th>
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</thead>
<tbody>
<tr>
<td>U021</td>
<td>1:45-2:00</td>
<td>Teacher and Administrator Perceptions of Nutrition Education During Mealtime in Head Start Preschools, Amanda Peterson</td>
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<tr>
<td>U023</td>
<td>2:00-2:15</td>
<td>Puppet Shows That Make a Difference, Shayna Meyers</td>
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<tr>
<td>U024</td>
<td>2:15-2:30</td>
<td>Nothing to Lose: Deviant Behavior Before and After Surpassing Adolescent Early Fatality Expectations, Sarah Brickels</td>
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<tr>
<td>U025</td>
<td>2:30-2:45</td>
<td>Erasing the Mark of a Criminal Record: Examining the Effect of Education on Ex-Offender Employment, Milton Joyner</td>
</tr>
<tr>
<td>U026</td>
<td>2:45-3:00</td>
<td>Analysis of Paralinguistic and Nonlinguistic Codes of PTSD, Kristin Moran</td>
</tr>
<tr>
<td>U027</td>
<td>3:00-3:15</td>
<td>A Social Commentary of Women Comediennes on Saturday Night Live and the ‘Weekend Update’ Sketch, Kathryn Mullins</td>
</tr>
<tr>
<td>U028</td>
<td>3:15-3:30</td>
<td>Connective Leadership: A New Approach to Civic Leadership and Engaged Citizenship, Tori Rodriguez</td>
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## Undergraduate Poster Presentations

**MSC Room 221 | Human Health Sciences**

**8:30 am — 10:00 am**

| UP1 | Knee Joint Loading During Running in Individuals Who Are Post-Partial Meniscectomy, Wesley Brown |
| UP2 | Effect of Walking Speed on Patellofemoral Joint Loads Per Unit Distance, Chelsea Hollingsworth |
| UP3 | Early Childhood Caries: An Overview and a Combative Effort in Eastern North Carolina, Joshua Lovick |
| UP4 | Differences in Load Effect on Knee Compressive Forces and Quadriceps Forces in Incline and Decline Walking, Leela Goel |
| UP5 | Relationship Between Cardiovascular Disease Risk and Fast Food Consumption in Undergraduate Honors College Students, Maidah Atta |
| UP6 | What is Nutrition Education? Teacher and Administrator Perceptions of Nutrition Education for Preschool Children in North Carolina Head Start Classrooms, Noam Bechar |
| UP7 | Understanding the Relationship Between Physical Activity Levels, Physical Education, and BMI Status among United States High School Students, Shelby Cook |
| UP8 | Exercise Slows the Development of Early Non-cognitive Symptoms in the Triple-Transgenic Mouse Model of Alzheimer’s Disease, James Jackson |
| UP9 | Exercise Effects on Body Composition in Male and Female Prepubescent Children, Rachel Jenkins |
| UP10 | Implementing the Suitability Assessment of Materials (SAM) to improve health literacy at a rural health center, Stephanie Lewis |
| UP11 | Understanding the Role of Schools in Community Prevention of Childhood Obesity, Kaitlyn Braun |
| UP12 | Physical Activity Assessment by Accelerometers and Commercially Available Activity Monitors, Thomas Mahar |
| UP13 | Muscle Stiffness as a cause of Reduced Muscle Volume in Older Adults, Amanda McEar |
| UP14 | A Comparison of Usual Versus Best Practice in Preventing and Managing Low Back Pain, Joshua Moskowski |
| UP15 | Falls in the Independent Living Glenaire Community, Katherine Reese |
| UP16 | Health Services for Children with Special Health Care Needs in a Public School: A Program Evaluation, Rachel Schillo |
| UP17 | Best practices to use in the Emergency Department when attending to patients with suicidal ideations, Kaitlyn Svagr |
| UP18 | Usual Care Versus Best Practice for Fall Risk Assessment: A Program Evaluation, Cori Wright |
Undergraduate Poster Presentations

MSC Social Room | Social Sciences 8:30 am — 10:00 am

UP19 The Relationship Between Physical Activity, Obesity Levels, and Motor Skills in 3-6 Year Old Children, Morgan Chilton

UP20 Are Long-acting Reversible Contraceptives a Viable Solution for Adolescents in Rural Eastern North Carolina?, Ashley Stacy

UP21 What Explains Getting a Tattoo? The Role of Religious Belief in Body Adornment, Rachel Johnson

UP22 Did Federal Reserve Policy Cause the Housing Crisis? A Time Series Exploration, Katherine Kirk

UP23 School Sports Programs and Their Effect on Obesity in Adolescents, Cameron Little

UP24 Qualitative Analysis of Student Perceptions of Science and Science Careers in Eastern North Carolina, Allender Lynch

UP25 Can a medical specialty camp become a venue of providing reinforcement education regarding transfer from pediatric to adult healthcare? A pilot study with young adults with congenital heart defects, Sarah McEarl

UP26 Food Ecology Promotes Efficient Use of Science Education Community Resources, Sarah Sykes

UP27 Understanding Pre-service Early Childhood Educators Feelings of Preparedness to work with Chronically-Ill Children, Juliann Stalls

UP108 An Analysis of the Influence of Nuclear Weapons on International Affairs, Kevin Kearney

UP28 The Effects of Implementing Authentic Materials in a Foreign Language Classroom, Jennifer Moser

MSC Social Room | Social Sciences 10:30 am — 12:30 pm

UP29 Influence of High Stakes Testing on Individual and Group Competition, Joshua Thomas

UP30 Quality of cross-cultural interactions in a Global Understanding course influence perspective-taking and communication anxiety, Melvenia Truehill

UP31 Comparing the rape scripts of hazardous drinking and non-hazardous drinking college women, Jade Quintero

UP32 Peer Mentoring and the Relationship with Classroom Perceptions, Kelly Reburn

UP33 Implicit Theories of Intelligence and Academic Persistence in First-Generation College Students, Dayna Rodriguez

UP34 Medical Student Stress, Stress Management, and Perceptions Regarding Patient Care, David Sager

UP35 Personal Factors Affecting Oral Hygiene, Heather Sloan

UP36 A Gender Issue: Job satisfaction in the Tunisian informal sector, Sarah Best
Undergraduate Poster Presentations

**MSC Social Room | Social Sciences**  
10:30 am — 12:30 pm

- **UP37** Enhancing Recruitment, Enrollment and Retention of Pregnant, Low-Income Women for a Prenatal Stress Management Intervention, Gillian Carney
- **UP38** A Sustainability Literacy Assessment of Students at East Carolina University, Kelsey Wenzel
- **UP39** Gender Differences in the Impact of an Early Warning System and Tutoring in College, Benjamin Wigand
- **UP40** Time Perspective and Illicit ADHD Medication Use Among East Carolina University Students, Hannah Woolard
- **UP41** Success Perception Differentiation within the African American Community, Chantel Miller
- **UP42** New Technologies in the Public Library, Jessica Chirico
- **UP43** Illustrating the Appreciation of Hermeneutics Through Mark 5, Tyler Beasley
- **UP44** The Psychology of Interior Design, Rajih Alshareif
- **UP45** Fresh Eyes: Image Based Social Media and Interior Design Enrollment, Nicole Lobell
- **UP46** The Ripple Effect: an Interior Design Concept for a Cancer Clinic, Lindsey Westphal

**MSC 22I | Education**  
10:30 am — 12:30 pm

- **UP47** Teacher as Researcher: Case study of a Multimodal Communication Intervention in a Special Education Classroom, Katherine Engeman
- **UP48** Green Spaces, Great Places: The Importance of Green Spaces in Urban Cities, Zane Gray
- **UP49** Availability and Use of Nutrition Resources Education in North Carolina-based Head Start Preschool Programs, Sarah Lisson
- **UP50** Trends in Dietary Intake among Middle School Students in Eastern North Carolina, Elizabeth Radford
- **UP51** Head Start Administrator and Teacher Perceptions of Parental Influence on Preschool Children’s Nutrition Education, Kristi Wilkerson
- **UP52** Eastern North Carolina Middle School Students Physical and Life Science Knowledge: Does Gender Make a Difference?, Julian Williams

**MSC Social Room | Natural Sciences**  
1:00 pm — 3:00 pm

- **UP53** Quantifying Erosion Rates on a Salt Marsh Platform, Cape Cod, Massachusetts, Kailey Adams
- **UP54** Developmental Transitions of Otoliths in Zebrafish, Taylor Bailey
- **UP55** Subcritical Water Extraction of Salvia Miltiorrhiza, Jessica Biller
### Undergraduate Poster Presentations

**MSC Social Room | Natural Sciences (Continued)**

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<th>Presentation ID</th>
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<td>UP56</td>
<td>Mitigation of Organophosphate-Induced Neurobehavioral Impairments Using Naltrexone in Rats</td>
<td>JoColl Burgess</td>
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<tr>
<td>UP57</td>
<td>Conservation and Expression of SNF2 Proteins in Chondrus crispus</td>
<td>Ethan Caudell</td>
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<tr>
<td>UP58</td>
<td>Mathematics in Image Processing</td>
<td>Kenneth Chilcoat</td>
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<tr>
<td>UP59</td>
<td>Co-Teaching Introductory Biology with Dr. Jason Gee</td>
<td>Jason Hance</td>
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<tr>
<td>UP60</td>
<td>Dietary Diversity of Adult Red Drum (Sciaenops ocellatus) feeding in Marine Coastal Zones</td>
<td>Trent Kennedy</td>
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<tr>
<td>UP61</td>
<td>Is Aggression Mediated by Androgens in Females that Possess Male Ornaments?</td>
<td>Brittney Lee</td>
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<tr>
<td>UP62</td>
<td>Using Mosquitofish Gambusia affinis as Bioindicators for the Presence of Endocrine Disrupting Compounds</td>
<td>Allyson Middleton</td>
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<tr>
<td>UP63</td>
<td>Creating a research tool to illuminate the pathway of cholesterol metabolism within Mycobacterium tuberculosis</td>
<td>Amanda Morgan</td>
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<tr>
<td>UP64</td>
<td>An assessment of the polytypic status of the Namib darkling beetles Onymacris unguicularis and Onymacris rugatipennis</td>
<td>Rachel Pollard</td>
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<tr>
<td>UP65</td>
<td>Investigation Into Possible Intermolecular Interactions of Gd3N@C80(OH)n Using Fluorescence Spectroscopy</td>
<td>Kyle Purrman</td>
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<tr>
<td>UP66</td>
<td>Identification of Cholesterol Metabolites from Mycobacterium spp.</td>
<td>Jordan Stanley</td>
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<tr>
<td>UP67</td>
<td>GIS as a Conservation Tool: Measuring Distribution and Abundance of the Rare Herb, Thalictrum cooleyi</td>
<td>Clark Williams</td>
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**MSC 221 | Engineering**

<table>
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<tr>
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<th>Title</th>
<th>Presenter</th>
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<tbody>
<tr>
<td>UP68</td>
<td>Impact of Disease Location on Wall Shear Stress in the Tibial Vessels Using Computational Fluid Dynamics</td>
<td>Alexandrina Podolski</td>
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<tr>
<td>UP69</td>
<td>Study in Fiber Morphology and Characteristics in Electrospinning Nano-Fibers</td>
<td>Richard Steiner</td>
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<tr>
<td>UP70</td>
<td>An Alternative Solution for the Energy Future of the Outer Banks</td>
<td>Charles Hegler III</td>
</tr>
<tr>
<td>UP71</td>
<td>Design and Analysis of an MRI – Compatible Exercise Device</td>
<td>Jade Olaoye</td>
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<td>UP72</td>
<td>Assessment of Cooling Systems for Engine Testing</td>
<td>Chris Phipps</td>
</tr>
</tbody>
</table>
Undergraduate Poster Presentations

MSC 221 | Engineering (Continued)  
I:00 pm — 3:00 pm

UP73 Magnetic Resonance Imaging of the Pulmonary Artery in Pulmonary Hypertension, Megha Sinha

UP74 The Current State of the Sonic Plaza, Rakan Abobakr

MSC 221 | Technology and Computer  
I:00 pm — 3:00 pm

UP75 Utilizing Lean Manufacturing Principles to Optimize the Customer Returned Hardware Process at AAR Cargo Systems, Joseph Crowder

UP76 Re-Designing the Common Belt Buckle Using 3-D Printing, Elza Green

UP77 Innovative All-In-One Safety Glasses-Product Design and 3D Printing, Brandon Jenkins

UP78 Blooming Technology for an Efficient Future, Christopher Lawson

UP79 Rehabilitation of Instron Testing Machine, Jacques Ray

UP80 NCLR Information System, Miranda Rogers

UP81 Design and 3D Printing of an Innovative Interchangeable Wrench Set with Integrated Shield, Bryan Tucker

MSC Gallery | Biomedical Sciences  
I:00 pm — 3:00 pm

UP82 Investigating the role of Trl in germline stem cells of the Drosophila ovary, Kaitlyn Allen

UP83 Investigation of Mcm10 Heterochromatic function in C-Terminal Domain, Sidney Bedsole

UP84 Synthetic Ion Channels with Relevance to Cystic Fibrosis, Radwa Behairy

UP85 The role of Mcm 10’s C-terminal domain in S-phase progression of Drosophila embryogenesis, Megan Biller

UP86 Role of Mitochondria in Skeletal Muscle Fatigue caused by Cancer Chemotherapy, Canden Byrd

UP87 Evaluating the effects of prenatal exposure to anti-androgens on genitalia development, Ross Cumoletti

UP88 The Effects of a High Fat and High Sucrose Diet on the Development of Oxidative Stress Markers in Peripheral Sensory Neurons, Alyssa DaVolio

UP89 N-Glycans Effect on E-Cadherin, Sahil Dayal

UP90 Evaluating the role of Mcm10’s C-terminal domain in the Drosophila endoreplication cycle, Lucas Hopkins

UP91 Screening for Novel Antibiotic Compounds in Soil Samples, Winnie Hui
Undergraduate Poster Presentations

MSC Gallery | Biomedical Sciences (Continued) 1:00 pm — 3:00 pm

UP92  Do markers of Alzheimer’s disease arise from a susceptible genetic makeup and early life exposure to an environmental agent?, Dakota Johnson

UP93  N-Glycan Structures Contain Information for the Spatial Arrangement of E-cadherin in the Plasma Membrane, Sidhant Juneja

UP94  Role of Integrin Linked Kinase in Liver Fibrosis Resolution, Emily Lafella

UP95  An Information-Theoretic Approach to Cellular Decision-Making Strategies, Joshua Mangum

UP96  Exploring Alternative Regression Models on Pediatric Peripheral Intravenous Catheter Data, Jennifer Mann

UP97  The Effects of the FTZ-F1 Nuclear Hormone on Cell Proliferation and Self-Renewal in Drosophila Stem Cells, Kendra Meares

UP98  Insight into the Location of DNA Xenobiotic Damage by Mass Spectrometry, Megan Mehaffey

MSC Gallery | Biomedical Sciences (Continued) 3:00 pm — 5:00 pm

UP99  ABSTRACT WITHDRAWN FOR IP PROTECTION

UP100  Vaccinia Virus A35R Virulence Gene and Leukocyte Migration, Shayna Mooney

UP101  Transcriptional inhibition of the GATA transcription factors by the HTLV-I encoded protein HBZ, Stephanie Nguyen

UP102  The role of claudin-7 in human lung cancer cell migration, Michael Shea

UP103  Pulmonary exposure to multi-walled carbon nanotubes decreases cardiac cAMP concentrations, Nicole Sheehan

UP104  Identification of Damaged DNA Adducts from Exposure to Benzo[a]pyrene in the TP53 gene, Lea Taylor

UP105  Protein PA3433, a potential transcriptional repressor of holin genes in Pseudomonas aeruginosa, Tafadzwa Hlangabeza

UP106  Identification of Bacteroides fragilis proteins targeted by the Thioredoxin superfamily, Ferys Warren

UP107  Epigenetic Effects of a High-Fat-Diet on Drosophila Melanogaster Metabolic Phenotype, Ajay Ajmera
Undergraduate Online Presentations

Online Poster Presentations | General

UDP1  Student Knowledge of Sustainable Design Solutions, Aidan Cruz

UDP2  Proposed Sustainable Parking Deck for East Carolina University, Jordan Korzelius-Klein

UDP3  Saving Energy in Brewster, Kimberly Lockhart

UDP4  Effects of blood meal source on Aedes albopictus life table characteristics and vector competence for dengue virus, Joshua Tippett
GO2

Analysis of a 41-year data set: Do environmental parameters influence the fish community of Albemarle Sound, North Carolina, Zachary D. Gillum and Anthony S. Overton, North Carolina Center for Biodiversity and East Carolina University, Greenville, NC

Estuaries are coastal ecosystems inhabited by a wide range of taxa and serve several economic and biological functions. North Carolina both historically and currently still maintains one of the most productive fishery resource basins in the nation and has placed considerable effort towards maintaining its’ fisheries. Fish species are spatially and temporally variable in abundance and distribution in estuarine ecosystems and can be influenced by changing environmental factors. Fishes and environmental data were collected monthly by the North Carolina Division of Marine Fisheries from 1972 to present in Albemarle Sound, North Carolina. A combination of trawls and seines were used to collect samples. Over 50 families and 132 fish species including freshwater, estuarine, and marine species were all represented in the samples. The most frequently occurring species in the seineing samples were Anchoa mitchilli, Menidia beryllina, Notropis hudsonius, and Brevoortia tyrannus. The most frequently occurring species in the seining samples were Leiostomus xanthurus, and Morone Americana. Water quality variables including depth, salinity, temperature, dissolved oxygen, and wind speed were weakly correlated with species abundance, seine (R=0.154, p=0.001) and trawl (R=0.176, p=0.001). Salinity had the highest correlation with patterns in species abundance for the seine species (R=0.218, p=0.001) and trawl species (R=0.308, p=0.01). This study identifies the most influential variables with regard to water quality-biotic interactions but does not describe a majority of the variability in species abundance patterns.

GO3

Spatial Ecology of King Rails (Rallus Elegans) in Northeastern North Carolina, Jaan Runyon Kolts, East Carolina University, Greenville, NC

The king rail (Rallus elegans) inhabits primarily freshwater, non-tidal wetlands throughout the eastern half of the United States. Widespread habitat loss and wetland degradation have caused long-term declines in king rail populations, leading to its designation as a species of high conservation concern at the state and federal levels. Due to the species’ secretive nature and occupancy of dense wetlands, king rail population dynamics are poorly understood and proper management and conservation strategies are lacking. To assess territory sizes, habitat preferences, and brood movements of king rails, I affixed radio-transmitters to 16 adult king rails between August 2012 and November 2013 at MacKay Island National Wildlife Refuge in northeastern North Carolina. Radio-tracking was conducted year-round to measure changes in fine scale habitat preference and home range size. Home ranges varied from 1.1-70.8 ha (n=9) and rails were tracked in emergent marsh, wooded marsh, and managed impoundments. For the first time, broods (n=6) were followed during the 2013 breeding season and fine scale habitat was measured at 40 points. My study will provide information on the spatial and temporal dynamics of king rail populations on the Atlantic coast, ultimately contributing to conservation strategies throughout the species’ range.

GO4

The Striper Dance: How That Bass Move…along with the other fishes, Jillian Hager Osborne and Roger A. Rulifson, Department of Biology, Institute for Coastal Science and Policy, East Carolina University, Greenville, NC

The Cooperative Winter Tagging Cruise (CWTC) is representative of a long-term (over twenty years), fishery-independent dataset. The goal of this project was to analyze the dataset for spatiotemporal patterns, and to ascertain the associating factors that influence the presence and absence of striped bass (Morone saxatilis), summer flounder (Paralichthys dentatus), and members of the Clupeidae, the endangered Atlantic sturgeon (Acipenser oxyrinchus oxyrinchus), spiny dogfish sharks (Squalus acanthis), and members of the Clupeidae family (Alosa sapidissima, Alosa pseudoharengus, and Alosa aestivalis) in their overwintering grounds within the shelf waters of North Carolina and Virginia. ArcGIS 10.1 was used to create maps of the CWTC trawl locations and catches, derived from the bridge and deck logs from each
year. Habitat information not recorded during the trawling effort was obtained from the USGS usSEABED Atlantic Data files and layers were generated by kriging (encompassing depth and percent organic carbon) and Theissen polygons (encompassing sediment type). Overlaying the habitat layers generated with catch data allowed for the characterization of habitat types – also revealing a large degree of homogeneity in the habitat. Descriptive statistics allowed for the characterization of trawl captures and habitat types. Statistical analyses, including exploratory regressions, were used to determine correlations between individual species and habitat types utilized, as well as among the various species captured. We present the results of this project as a possible tool for use in better targeting species of interest.

Commercially Important Prey Species Sustaining Adult Red Drum Sciaenops ocellatus Production along the Atlantic Coast, Tyler Peacock1, Anthony Overton1, Steve Arnott2, Bill Roumillat2, Lee Paramore3, and Frederick Scharf4, 1Department of Biology, East Carolina University, 2South Carolina, Department of Natural Resources, 3North Carolina Division of Marine Fisheries, 4Department of Biology, University of North Carolina Wilmington

Fisheries management plans have traditionally discounted the importance of predation mortality compared to fishing mortality, leading to reliance on incomplete information when policies are made. Holistic and multi-species management plans require characterization of trophic relationships for a full understanding of the system. Previously published studies on the diet of red drum have not included the larger individuals seen in coastal North Carolina and South Carolina. We examined the trophic relationships of large adult red drum (>750mm TL), Sciaenops ocellatus, in the coastal waters of South Carolina (n=146) and North Carolina (n=51) from 2007-2012 to fill this gap in the literature. Stomachs were collected by NC Division of Marine Fisheries and SC Department of Natural Resources via annual fall longline surveys. The diet was analyzed using percent by number (%N) and percent frequency of occurrence (%FO) diet metrics, as well as principle component analysis (PCA). North Carolina fish fed predominantly on blue crab (Callinectes sapidus) as prey (51% N, 48% FO), while in South Carolina Atlantic menhaden was the single species (Brevoortia tyrannus) (27%N, 16% FO) occurring the most, followed by unidentified fish species (22 %N, 21%FO). A diverse group of decapods comprised the rest of the diet (31 %N, 52 %FO). The major prey species were consistent through the years sampled, though inter-annual contributions did vary. PCA showed most of the variation in diet between the states was explained by the presence of the same major prey species, with 42% of the diet variability explained in the first 2 principal components. In NC, the presence of blue crab was the largest differentiation, while in SC diets clustered closely with Atlantic menhaden and the diverse decapod prey group. Overall, the diet of NC red drum was less diverse, especially with respect to benthic marine invertebrates as their SC counterparts, likely because of prey assemblage differences between the estuarine conditions in Pamlico Sound in NC and the coastal marine habitat in SC.

Effects of Saltwater Incursion on the Growth of Bald Cypress (Taxodium distichum) Forested Wetlands, Amanda Powell and Marcelo Ardón, Department of Biology, East Carolina University, Greenville, NC

Bald cypress trees are dominant trees in forested coastal wetlands. This study combined field observations and a greenhouse experiment to examine the effects of saltwater incursion on bald cypress growth at different life stages (mature trees, young trees, and seedlings). To examine the effects of salinity on mature trees we conducted a regional survey of bald cypress growth using increment tree ring cores along a salinity gradient in the Albemarle Sound, North Carolina. To assess the response of young trees we examined the diameter at breast height (DBH) and height of young trees (>8 years old) that were planted across a restored wetland that has experienced seasonal drought induced saltwater incursion. To examine the effects of salinity on seedlings we conducted a greenhouse experiment with flooded and drought conditions and different salinity treatments. For increment tree ring cores the average core age for the six sites ranged from 94.35 to 117.80 years old. For the young trees, increased water depth did not have a significant effect on diameter at breast height, nor did it have a significant effect on tree height. But increased chloride concentrations from saltwater incursion had a significant negative effect on height and DBH. In the greenhouse experiment, we found that drought, saltwater, and sulfate had a significant negative effect on height, while drought and saltwater had a significant negative effect on root collar growth. Overall, we found that the presence of saltwater decreased height of young bald cypress trees by 14% and decreased the diameter at root collar by 37% compared to the absence of saltwater. Seedlings watered with saltwater showed a decrease in biomass for leaves (55%), stems (50%), and roots (71%) compared to seedlings in the control, watered with freshwater. Seedlings that were saturated had a significant increase in stem biomass. Increases in saltwater incursion and sea level rise could lead to decreased growth of bald cypress trees which are important for coastal ecosystems and provide habitat and food for wildlife.
GO7

Physical and Psychological Risks of Texting While Walking Among College Students, Ogaga Jonathan Tebehaevu, East Carolina University, Greenville, NC

The aim of this study is to evaluate the physical and psychological risks of Texting While Walking (TTW). Texting while walking is any activity that engages the user with the keyboards or buttons of mobile phones and tablets while walking. This could be chatting, playing games, surfing the internet, sending of test messages or emails and such like. Contemporary research has drawn attention to texting/calling while driving; however, not much focus has been channeled towards the rather increasing current trend on texting while walking. According to statistics, an average of 4.1 billion text messages (as defined above) are sent every day in the US with college students accounting for more than 40%, while an estimated more than 7.8 trillion text messages are expected to be sent worldwide in 2014. (Mobi Thinking 2012). While mobile text message system may play some beneficial roles in communication (Warner 2003), the risk posed doing it while walking calls for serious concern. The study will provide insight into some current research done thus far, with identified risks and consequences. Although the statement of problem will be discussed from a broad perspective as obtained in today’s society, the main attention though will focus on college students, where this act is reportedly high. An IRB approval will be sought to conduct simple observational studies on a few students on the ECU campus. The expected results will be analyzed with recommendations provided for future benefits. The significance of this study will assist to further create awareness of the inherent risks associated with this practice.

GO8

Nutrient addition increases the effects of competition in a plant community: evidence from a removal experiment in a long-term fertilization study, Joshua Cameron Thiggen, East Carolina University, Greenville, NC

Nutrients are important for plant growth and survival. However an over abundance of available nutrients tends to cause a decrease in plant diversity. This negative correlation between nutrient availability and diversity has been studied by ecologists. One mechanism that has been proposed to explain this pattern is competition. When all nutrients are readily available in an environment, other resources such as water and sunlight will limit growth of plant species. When this happens, the species that can best obtain these other resources tend to outcompete the plant species that are less effective at doing so. In a long-term nutrient addition experiment, we tested the hypothesis that an increase in competition resulting from nutrient addition can lead to diversity loss. The West Research Campus, located in Pitt County NC, is home to a long-term ecological experiment that was initiated in February of 2002. The purpose of this study is to determine how nutrient availability and disturbance affect the diversity and composition of the plant community. During the 12 years of this study, data on stem count and percent coverage have shown that fertilization decreases overall species diversity. One of the species that has been shown to decline with fertilization is Solidago rugosa, a perennial angiosperm in the family Asteraceae. In order to determine a possible explanation this pattern, we performed removal experiments in the fertilized and unfertilized plots. The experimental design contained three control plots and three removal plots in each treatment. In the removal treatments, all plants except for S. rugosa were removed in a 1x1m plot. In the control plots there was no removal of the other surrounding plants. In the fertilized treatment, removal of competitors resulted in taller plants with more biomass, whereas in the unfertilized plots, the plants in the removal plots and the control plots were similar in size and biomass. These results support competition as the mechanism for the decrease in species diversity in nutrient rich areas.

GO9

Ichtyoplankton community patterns in Beaufort Inlet, North Carolina, Tolopka, Nicholas and Anthony Overton1; Kellison, Todd and Neil McNeill2; Taylor, Chris3, 1East Carolina University, Greenville, NC 27858, 2National Marine Fisheries Service, Southeast Fisheries Science Center, Beaufort, NC 28516, 3National Ocean Service, Center for Coastal Fisheries and Habitat Research, Beaufort, NC 28516

Environmental fluctuations can have noticeable impacts on marine fish community diversity and population density. Ichtyoplankton were collected from 1986 to the present via neuston net on the Piver’s Island Bridge over the Beaufort Inlet during winter ingress. These samples were then identified by species, enumerated and stored in ethanol. Preliminary analyses (1986-2001) of fish showed inter annual variation in both richness (2.82-4.11) and Shannon-Wiener index (2.27-2.68). The lowest year for both richness and Shannon index was 1995 while the highest was 1988. The most abundantly caught species were Leiostomus xanthurus, Lagodon rhomboides, Micropogonius undulatus, Brevoortia tyrannus, and Myrophis punctatus. The most frequently occurring species were P. lethostigma, L. rhomboides, M. undulatus, L. xanthurus, and M. punctatus. Though the most dominant species was Leiostomus xanthurus in early years, Lagodon rhomboides has become more dominant in recent years. The phenological patterns of larval ingress were not consistent across years and varied among species. These phenological patterns may lead to significant variation on species community and recruitment dynamics.
Mapping potential coastal shark habitat within Pamlico Sound, North Carolina, Charles W Bangley and Roger A Rulifson, East Carolina University, Greenville, NC

Coastal sharks often use estuarine environments as nursery habitat, making them potentially vulnerable to human activity. Pamlico Sound is part of the second-largest estuary system in the United States, but relatively little is known about its use by coastal sharks. To identify potential shark habitat areas within the Pamlico Sound, environmental and shark catch data were taken from North Carolina Division of Marine Fisheries (NCDMF) gillnet and longline surveys covering February-December 2007-2013. A total of 7,521 gillnet and 631 longline sets captured 2,299 individual sharks representing 11 species. All sampling locations were plotted in Arc-GIS and distance to the nearest inlet and known SAV bed were determined for each station. Environmental and spatial factors potentially affecting shark abundance were interpolated into raster layers covering the area of Pamlico Sound. For each species, multiple regression analysis was used to determine which of these factors most strongly correlated with abundance. These factors were run through classification and regression tree (CART) models to identify environmental “break points” between high and low shark catches. These values were used to map areas of Pamlico Sound falling within environmental conditions associated with high shark abundance.

Marsh Habitat Mapping and Potential Responses to Sea-Level Rise in the Rachel Carson Reserve, Margaret Ann Garner, Coastal Resources Management, Dr. Thomas R. Allen, Department of Geography, East Carolina University, Greenville, NC

Tidal marshes provide crucial ecosystem services to society including pollution filtration, fish and wildlife nursery and habitat, storm surge mitigation, and sinks for atmospheric carbon. Uncertainty of wetland responses to sea-level rise is a pervasive concern in coastal science and management, particularly for coastal resource conservation and climate change adaptation. This project addressed three critical needs relevant to the North Carolina National Estuarine Research Reserve’s management issue of climate change impacts to coastal areas: 1) mapping high and low marshes at the Rachel Carson Reserve with ultra-high resolution multispectral imagery; 2) estimating the vulnerability of marsh habitat from sea level rise; and 3) expanding the application of new remote sensing algorithms for broad-scale, high-resolution marsh maps using integrated Synthetic Aperture Radar (SAR), LiDAR, and multispectral data with object-based image analysis (OBIA) techniques. Results showed substantial vulnerability of the Reserve’s marshes to conversion to tidal flats and ultimately to open water under the sea level rise scenarios modeled. The vulnerability maps produced highlight potential future wetland losses and facilitate resource managers’ prioritization of sites and appropriate practices for restoration or adaptation.

What Does the River Say? Utilizing Water Chemistry to Establish Spatial and Temporal Variability in the Albemarle Sound/Roanoke River Management Areas, Coley Susan Hughes, Coastal Resources Management, East Carolina University, Greenville, NC

Striped bass (Morone saxatilis) is an important anadromous species that provides valuable ecological and economic benefits to North Carolina. This fishery accounts for over 45 million dollars in revenue from commercial and recreational activities within the Albemarle Sound Management Area (ASMA) and the Roanoke River Management Area (RRMA) (NCDMF 2011). The strategic habitat areas of striped bass continue to be a topic of interest to researchers, fisheries managers, recreational and commercial fishermen. The fundamental basis of otolith microchemistry (a technique used to characterize movement and natal origin in fish) is reliant on knowing the spatial and temporal variation of water chemistry. Surface water chemistry can be used to discriminate between different water bodies because typically each system has different types and abundance of elements (Elsdon and Gillanders 2003c; Dorval et al. 2007). This research will measure dissolved elemental concentrations in water samples. Water samples will be collected and analyzed to identify whether watersheds have elemental signatures, and if so determine the trace elements that make each of these river systems unique. Previous research has shown that the ASMA/RRMA has stable patterns of water chemistry over time and temporal variations have been relatively short (Mohan 2009; Zapf 2012). However, collecting water samples over several seasons and years is essential to verify stable conditions. Assessing trace elements in water chemistry will determine spatial and temporal variability in the ASMA/RRMA.
Boat Noise Alters Reproductive Communication in the Oyster Toadfish (Opsanus tau), Cecilia Susanna Krahforst, Joseph J. Luczkovich, Coastal Resources Management, Department of Biology, and the Institute for Coastal Science and Policy, East Carolina University, Greenville, NC

Male oyster toadfish (Opsanus tau) produce a “boop” sound that indicates spawning readiness and attracts females to dens. These shallow water (~1 m) dens are common in areas inundated by boat noise. The aim of this study is to determine if boat noise influences the calling rate (calls/min), power (dB), and duration (s) of the male oyster toadfish boop sound. Toadfish colonized artificial dens placed in the field. One of six sounds (two bottlenose dolphin, Tursiops truncatus, sounds, two boat noises, a simultaneous boat and dolphin sound, and snapping shrimp sounds) was played to each set of dens. Snapping shrimp sounds were used as a control and dolphin sounds were used as an acoustic disturbance comparison for boat noise because dolphins are a known predator of oyster toadfish. Oyster toadfish sounds in response to playbacks were recorded at dens using a hydrophone. The recording period consisted of 10 min before, 10 min during, and 10 min after noise exposure. Toadfish sounds and their characteristics were identified in Raven. Preliminary results suggest that neither snapping shrimp nor outboard playbacks impacted toadfish calling rates. Dolphin sounds, large vessel noise, and simultaneous large vessel and dolphin sounds significantly altered toadfish call rates (Friedman Test, p-values <0.05). In all cases, the calling rate dropped during sound exposure but recovered to pre-exposure levels by the end of the recording period. The characteristics of the boop call (power and duration) were also altered by the playbacks. Large vessel and outboard noises showed significant changes in call power (dB) during sound exposure (Friedman Test, p-values <0.05) but by the end of the 10-min post-playback recording period, power did not significantly differ when compared to the pre-exposure period in both playback treatments. Call duration did not significantly differ (Friedman Test, p-values >0.05) in all playback experiments. These results suggest that anthropogenic sounds in the ambient environment influence the male oyster toadfish mating advertisement calls, and these boat noises have an effect that can exceed that of natural predator sounds. However, the fish recovers quickly (within 10 min) from the noise exposure. One concern is that continuous vessel noise exposure due to increasing vessel traffic in coastal areas will likely alter toadfish and other soniferous fishes (spotted seatrout and red drum) reproductive output due to reduced mating opportunities.

How do differences in species hatching phenology and the presence of predators affect population and ecosystem level properties of aquatic food webs?, Lauren C. McCarthy and David R. Chalcraft, Biology Department and Center for Biodiversity, East Carolina University, Greenville, NC

A growing amount of evidence indicates that both the order in which species enter into a community and the process of predation can play an important role in controlling community dynamics. Seldom considered is how differences in species hatching phenology and predation interact to affect algal resources and growth rates of later arriving species. To investigate these effects we conducted an experiment in mesocosms (artificial ponds made from cattle watering tanks). We manipulated the occurrence of different zooplankton species (fairy shrimp, clam shrimp and cladocerans) that differ in their hatching phenology in mesocosms that either contained or did not contain predatory Notonecta. In general, we found that phytoplankton abundance declined through time but the extent of decline depended on which species were present. Phytoplankton abundance declined through time at similar rates in all treatments except treatments that contained both fairy shrimp and clam shrimp. When fairy shrimp and clam shrimp were present together there was little temporal change in the abundance of phytoplankton present. Otherwise the rate of change in phytoplankton abundance through time was similar among treatments, including treatments with no zooplankton, which suggests that each species alone had little influence on phytoplankton abundance. Though periphyton abundance increased through time the rate of change in periphyton abundance was similar across all treatments. The presence of clam shrimp slowed the per capita rate of cladoceran population growth when Notonecta were present but otherwise rates of growth did not vary among treatments. Together these results indicate that species differing in hatching phenology have little influence on ecological systems when alone, but interactions between particular pairs of co-occurring species can have important effects on both ecosystem level and population level responses.
Background: Onset of post-operative atrial fibrillation (POAF) is a common and costly complication of heart surgery despite major improvements in surgical technique and quality of patient care. The etiology of POAF, and the ability of clinicians to identify and therapeutically target high-risk patients, remains elusive.

Methods and Results: Myocardial tissue dissected from right atrial appendage (RAA) was obtained from 244 patients undergoing cardiac surgery. Reactive oxygen species (ROS) generation from multiple sources was assessed in this tissue, along with total glutathione (GSHt) and its related enzymes GSH-peroxidase (GPx) and GSH-reductase (GR). Monoamine oxidase (MAO) and NADPH oxidase were observed to generate ROS at rates ten-fold greater than intact, coupled mitochondria. POAF risk was significantly associated with MAO activity [Quartile 1 (Q1): adjusted relative risk (ARR) = 1.0; Q2: ARR = 1.8, 95% confidence interval (CI) = 0.84-4.0; Q3: ARR = 2.1, 95% CI = 0.99-4.3; Q4: ARR = 3.0, 95% CI = 1.9-7.5; adjusted Ptrend=0.009]. In contrast, myocardial GSHt was inversely associated with POAF [Quartile 1 (Q1): adjusted relative risk (ARR) = 1.0; Q2: ARR= 0.93, 95% confidence interval (CI) = 0.60-1.4; Q3: ARR = 0.62, 95% CI = 0.36-1.1; Q4: ARR = 0.56, 95% CI = 0.34-0.93; adjusted P trend=0.014)]. GPx also was significantly associated with POAF, however, a linear trend for risk was not observed across increasing levels of the enzyme. GR was not associated with POAF risk.

Conclusions: Our results show that MAO is an important determinant of redox balance in human atrial myocardium, and that this enzyme, in addition to GSHt and GPx, is associated with an increased risk for POAF. Further investigation is needed to validate MAO as a predictive biomarker for POAF, and to explore this enzyme’s potential role in arrhythmogenesis.

GO15

Monoamine Oxidase is a Major Determinant of Redox Balance in Human Atrial Myocardium and is Associated with Postoperative Atrial Fibrillation, Timothy M. Darden BS,1 Ethan J. Anderson PhD,1,2 Jimmy T. Efird PhD,2 Stephen W. Davies MD, MPH,2 Wesley T. O’Neal MD, MPH,2 Kathleen A. Thayne MS,1 Lalage A. Katunga BS,1 Linda C. Kindell BSN, RN,2 T. Bruce Ferguson MD,2 Curtis A. Anderson MD,2 W. Randolph Chitwood MD,2 Theodore C. Koutlas MD,2 J. Mark Williams MD,2 Evelio Rodriguez MD,2 Alan P. Kypson MD2, Departments of 1Pharmacology & Toxicology, and 2Cardiovascular Sciences, East Carolina Heart Institute, Brody School of Medicine, East Carolina University, Greenville, NC

Mild Traumatic Brain injuries (mTBIs) often manifest into a myriad neurological deficits including cognitive and emotional impairments. The lack of gross physical damage from such injuries makes diagnosis extremely difficult. This allows mTBIs to be immensely prevalent and largely untreated. Circulating microRNAs (miRNAs) have been used as biomarkers in a wide range of biological disorders due to their stability and ability to be examined in a non-invasive manner. This study aims to identify circulating miRNAs as novel biomarkers for blast over pressure induced mTBIs and their related mental status changes. A rodent model has been generating by exposing Sprague Dawley rats to an air pressure wave of 10 psi over ambient pressure. Blood samples are withdrawn at several time points to assess changes in miRNA expression levels. These changes are combined with three sessions of Morris water maze (MWM) training to monitor the evolution of behavioral and emotional deficits caused by the “blast exposure”. Finally, histological and biochemical examination is ongoing to detect gene expression changes at both transcriptional and translational level. Signs of cognitive deficits were observed and biochemical changes were detected. Gene expression analysis has identified circulating miRNAs that are aberrantly expressed, and findings coincide with behavioral changes seen in MWM testing. Further bioinformatic assessments will be performed to determine miRNA related pathways regulating neurological deficits and their functional outcome with behavioral/emotional changes.

GO16

Circulating miRNAs as Biomarkers for mTBIs and Related Cognitive Deficits, Dorothy L. Dobbins, Erin C. Connolly, and Xiaoping Pan, East Carolina University, Greenville, NC
GO17

Evaluation of microRNA expression in alveolar macrophages from a multiwall carbon nanotube (MWCNT) murine granuloma model, M. McPike, A. Malur, BP. Barna, MJ. Thomassen, East Carolina University, Greenville, NC

Background: Peroxisome proliferator-activated receptor gamma (PPARγ), a nuclear transcription factor, is a negative regulator of inflammatory mediators. PPARγ is constitutively expressed in alveolar macrophages of healthy individuals while a deficiency is observed in patients with inflammatory conditions of the lungs. These findings suggest that PPARγ may have an important role in regulating lung homeostasis. We have described a murine granuloma model (AJRCMB 2011, 45: 858) in which multiwall carbon nanotubes (MWCNT) elicit a granulomatous disease markedly similar to that found in sarcoidosis, a prototypical human granulomatous disease. Our previous studies demonstrated downregulation of PPARγ and increased proinflammatory cytokine production in alveolar macrophages from wild type mice at 60 days post MWCNT instillation. Elevation of proinflammatory cytokines was also observed in macrophage-specific PPARγ null mice. MicroRNAs (miRs) have been shown to regulate gene expression by either inhibiting translation or promoting degradation of target messenger RNA. Numerous cellular processes have been shown to be regulated by microRNAs, including those involving the inflammatory response or PPARγ. Hypothesis: We hypothesized that microRNA expression would be dysregulated in alveolar macrophages from MWCNT-exposed mice. Methods: Six-eight week old C57/B16 mice received 100ug of MWCNT mixed with 35% surfactant in saline via an epipharyngeal route. At 60 days post MWCNT instillation, animals received bronchoalveolar lavage samples. The microRNA expression was assessed in alveolar macrophages using qPCR. Results: Expression of miR-27a and miR-27b was increased at 1.6 and 3.4 fold respectively (n=5, p<0.01). miR-27a and miR-27b have been shown experimentally to downregulate PPARγ expression in several cell types. Conclusion: Based on these data, we believe that miR-27a and miR-27b may play a role in the downregulation of PPARγ expression in chronic pulmonary inflammatory conditions.

GO19

FtrABCD is a low-iron and acid-induced ferrous iron specific transporter that is required for the virulence of Brucella abortus 2308 in mice, Ahmed Ehaboun Mohamed Elhassanny, East Carolina University, Greenville, NC

Brucella are Gram-negative bacteria that cause abortion and infertility in their natural animal hosts resulting in extensive economic losses. Humans can also acquire a chronic, debilitating febrile illness known as brucellosis, as the result of contact with infected animals or their products. In fact, human brucellosis is the leading zoonotic disease worldwide. The brucellae live mainly inside phagosomal compartments in host macrophages where they struggle to acquire enough iron to meet their physiological needs. However, Brucella spp. have evolved multiple strategies for overcoming iron limitation in their mammalian hosts, including siderophore-dependent ferric iron-specific and heme acquisition systems. Recently we have discovered FtrABCD, a ferrous iron specific transporter that is essential for the wild-type virulence of B. abortus 2308 in experimentally infected mice. The identification of a ferrous iron transporter in Brucella is an important finding because during the early stages of their infection of host macrophages the brucellae reside in acidic compartments known as endolysosomal Brucella-containing vesicles (eBCVs), where Fe2+ could potentially be a biologically relevant iron source because the acidic pH favors the stability and solubility of ferrous iron. Bacteria generally express their iron acquisition genes only in response to iron deprivation to avoid the potentially toxic effects of this metal. Our studies have found that maximal expression of the ftrABCD operon in B. abortus 2308 occurs under low-iron conditions. This response is mediated by Irr, the predominant iron-responsive regulator in Brucella and the other alpha-proteobacteria. These genes are also induced by exposure to acidic pH in both B. abortus 2308 and an isogenic irr mutant, indicating that the iron- and pH-responsive regulation of the ftrABCD operon are independent processes. This acid-responsive and iron-independent expression of the ftr locus is important because it conceivably provides these bacteria with a mechanism for prioritizing the expression of their iron acquisition systems by responding to two biologically relevant environmental stimuli encountered in the intracellular environment of host macrophages. Studies in our laboratory are currently aimed at identifying and characterizing the transcriptional regulator responsible for the low pH responsive expression of ftrABCD in B. abortus 2308.

GO18

Retinoic Acid Induces Multiple Hallmarks of the Pro spermatogonia-to-Spermatagonia Transition in the Neonatal Mouse, Buada JT, Keye EP, Rengar RH, Geyer CB., East Carolina University, Greenville, NC

In mammals, the majority of neonatal male germ cells (pro spermatogonia) are quiescent and located in the center of the testis cords. In response to an unknown signal, spermatagonia transition into spermatogonia, reenter the cell cycle, divide, and move to the periphery of the testis cords. In mice, these events occur by 3–4 days postpartum (dpp), which temporally coincides with the onset of retinoic acid (RA) signaling in the neonatal testis. RA has a pivotal role in initiating germ cell entry into meiosis in both sexes, yet little is known about the mechanisms and cellular changes downstream of RA signaling. We examined the role of RA in mediating the prospermatogonia-to-spermatogonia transition in vivo, and found that 24 h of precocious RA exposure induced germ cell changes mimicking those that occur during the endogenous transition at 3 to 4 dpp. These include: 1 – spermatogonia proliferation, 2 – maturation of cellular organelles, and 3 – expression of markers characteristic of differentiating spermatogonia. Taken together, our results indicate that exogenous RA induces multiple hallmarks of the transition of prospermatogonia to spermatogonia prior to their entry into meiosis.
Ca2+/calmodulin-dependent protein kinase kinase alpha (CaMKKα) is a Ca2+-activated, serine/threonine kinase, and work from our lab and others has suggested a key role for CaMKKα in the regulation of skeletal muscle glucose and protein metabolism. In mouse muscle, constitutively active CaMKKα expression for 2 weeks increased glucose uptake and muscle mass, suggesting that the glucose may be fueling the energetic and/or biosynthetic demands of growth. Unfortunately, the link(s) connecting CaMKKα to these processes is currently unknown. The pentose phosphate pathway is a metabolic pathway that links glucose to growth-dependent processes, as it metabolizes glucose to produce both NADPH for reductive biosynthesis reactions, and pentose monosaccharides for nucleotide synthesis. To date, there are no studies that have examined whether CaMKKα signaling regulates the pentose phosphate pathway. Therefore, the purpose of this study was to determine if chronic activation of CaMKKα signaling stimulates the pentose phosphate pathway in mouse skeletal muscle. To selectively and specifically activate CaMKKα signaling in skeletal muscle, tibialis anterior muscles from female, 6-8 week old CD-1 mice were transfected with plasmid DNA (100 ug) containing constitutively active CaMKKα or empty vector using in vivo electroporation/muscle gene transfer. Two weeks later, muscles were collected and sent for global biochemical profile analysis (i.e. metabolomics) to assess metabolic byproducts of the pentose phosphate pathway. The results showed that expression of constitutively active CaMKKα significantly increased levels of ribulose (1.57-fold), ribose (1.48-fold), ribitol (1.41-fold), arabinol (1.32-fold), xylulose (1.68-fold) and sedoheptulose-7-phosphate (2.15-fold), while ribulose-5-phosphate/xylulose-5-phosphate and ribose-5-phosphate trended towards being increased (1.33 fold, p=0.06; and 1.31-fold, p=0.25; respectively). Collectively, these data show that chronic activation of CaMKKα signaling stimulates the pentose phosphate pathway in mouse muscle, suggesting that the pentose phosphate pathway may be a key metabolic pathway linking skeletal muscle glucose and protein metabolism.

T lymphocytes are important components of mammalian immune response to pathogens and abnormal cells. Through immunophenotyping with fluorochrome-conjugated CD surface markers, T lymphocyte can be further divided into subtypes, such as CD4+ cells and CD8+ cells. CD4+ cells can be activated to become T regulatory (TReg) cells, which perform regulatory roles by suppressing immune responses to self-antigens. While CD8+ cells can become T cytotoxic (TC) cells, which kill infected and cancer cells carrying antigens or mutations. According to the clinical studies, cancer patients tend to have a higher ratio of CD8+/CD4+ cells. Therefore, a label-free and rapid method to distinct these cells will be a powerful tool for study lymphocytes and other white blood cells in immunology and immunotherapy. We have developed a diffraction imaging flow cytometry (DIFC) method which allows classification of biological cells based on the feature parameters extracted from the diffraction image data, which makes it possible to distinct cells of subtle differences in their 3D morphology without the need to stain the cells. To examine the possibility for classification of T lymphocytes with the DIFC method, we have studied quantitatively the T lymphocytes’ 3D morphology to analyze the structural difference among the different T subtypes of CD4+ and CD8+ cells. We have extracted the lymphocyte and white blood cells from fresh human spleen tissues and acquired confocal image stacks from the CD4+ and CD8+ T lymphocytes obtained from extracted cells. A software based on Matlab has been developed to reconstruct and analyze the 3D morphology of imaged cells from image stacks. The software segments intracellular organelles of cytoplasm, nucleus and mitochondria in the green and red channels of each image slice. Then structures of the cytoplasm, nucleus and mitochondria were reconstructed in 3 dimensions for quantitative characterization. After reconstruction, 3D morphology of the imaged cells is analyzed by performing calculation of volumes, surfaces areas, shape and their ratio. Statistically significance differences in nuclear volume were found between CD8+ and CD4+ cells, indicating the possibility and preparing a ground for classification of subtypes of T lymphocytes with the DIFC method without the need for staining in the near future.
Motility and chemotaxis were reported to be crucial for the infectious life cycle of Borrelia burgdorferi, the Lyme disease spirochete. However, our knowledge on how the spirochete achieves asynchronous motility is limited. Most importantly, the roles of most of the B. burgdorferi putative chemotaxis proteins are still elusive. The components of the chemotaxis signal transduction system are highly conserved among prokaryotes, but chemotaxis in B. burgdorferi differs from other well-studied bacterial models and is much more complicated due to the presence of multiple copies of chemotaxis genes. The activity of the iron-responsive regulator Irr is modulated by cellular iron levels and ferrochelatase activity in Brucella, as an intracellular pathogen, B. abortus must overcome iron sequestration in the host cell by utilizing highly efficient iron transport systems. These systems must be tightly regulated, however, as excess intracellular iron is toxic to the bacterial cells. Most of the alpha-proteobacteria rely on a transcriptional regulator known as the iron response regulator (Irr) to control the expression of their iron metabolism genes. In these bacteria, Irr serves as an activator of genes involved in iron acquisition and a repressor of genes encoding for products that require high levels of iron for their function or serve as iron storage proteins. An isogenic B. abortus irr mutant produces significantly less siderophore when grown under iron limiting conditions compared to the parent strain. The irr mutant is also significantly less sensitive to the iron requiring antibiotic streptomycin and exhibits a slower rate of radioactive iron uptake than the parent strain, indicating that the irr mutant is unable to efficiently internalize iron. Microarray analysis and real-time RT PCR have been used to show that essentially all of the known genes encoding for iron uptake systems are mis-regulated in the irr mutant strain, along with the genes encoding for cytochrome biosynthesis proteins and iron storage proteins. The iron responsive activity of the B. abortus Irr protein is unique, in that when intracellular iron levels are high, Irr is degraded and it can no longer function as a transcriptional regulator. The iron responsive degradation of Irr is dependent on the enzymatic activity of ferrochelatase, the enzyme that catalyzes the last step in the biosynthesis of heme by incorporating iron into a protoporphyrin IX skeleton. We have experimentally determined that an internal HXH heme binding motif that is highly conserved among the alpha-proteobacteria is required for iron dependent degradation of Irr in B. abortus. We are presently exploring the mechanism behind the HXH and ferrochelatase-dependent iron responsive degradation of Irr in B. abortus in an effort to better understand how Irr coordinates the expression of iron metabolism genes.

Role of CheD in Borrelia burgdorferi: Bacterial Chemotaxis and Pathogenesis, Ki Hwan Moon, Elizabeth A. Novak, and MD A. Motaleb, East Carolina University, Greenville, NC

Motility and chemotaxis were reported to be crucial for the infectious life cycle of Borrelia burgdorferi, the Lyme disease spirochete. However, our knowledge on how the spirochete achieves asynchronous motility is limited. Most importantly, the roles of most of the B. burgdorferi putative chemotaxis proteins are still elusive. The components of the chemotaxis signal transduction system are highly conserved among prokaryotes, but chemotaxis in B. burgdorferi differs from other well-studied bacterial models and is much more complicated due to the presence of multiple copies of chemotaxis genes. B. burgdorferi has only one CheY-P phosphatase gene, cheX, which is commonly found in most bacteria. The spirochete also has a putative gene encoding CheD. CheD is relatively well-characterized in Bacillus subtilis and Thermotoga maritima, where it plays an important role in chemotaxis by modification of methyl-accepting chemotaxis protein receptors (MCPs) by deamidation or by enhancing CheC/CheX phosphatase activity, thereby regulating the levels of the CheY response regulator. CheD in B. burgdorferi is predicted to play similar roles. To verify the roles of CheD in B. burgdorferi chemotaxis, we constructed a cheD mutant and complemented strain. The mutant cells exhibited defects in chemotaxis as well as in motility; whereas the wild-type cells had a run-flex-reverse swimming pattern, the cheD mutant exhibited an incomplete reverse phenotype. Based on these phenotypes,
we predict that CheD likely modulates an MCP protein. To verify the receptor deamidase activity of CheD, we expressed recombinant MCPs and CheD in Escherichia coli in order to perform receptor modification assays. Moreover, the enhancement of CheX phosphatase activity will be tested by a CheY-P phosphorylation assay. A role of CheD in host infection or colonization has not been reported in any pathogenic bacteria. Our preliminary studies indicate that the cheD mutant has reduced infectivity in C3H/HeN mice compared to wild-type or complemented strain via needle inoculation. We also performed tick-mouse infection assays to determine the role of CheD in its infectious life cycle. Our preliminary results indicate that CheD is not required for acquisition or transmission of spirochetes. However, the mice fed by the mutant-infected ticks displayed a lower immune responses than wild-type or complemented strain. We are currently investigating if CheD is important for the tick molting process. Delineating the role of CheD in B. burgdorferi will provide insights into not only the chemotaxis pathway of this spirochete but also its asymmetric swimming and infectious life cycle.

GO25

Depletion of Cap-Dependent Protein Synthesis and Its Affect on Germ Cell Tumor Progression, Julia Kathleen Morrison, Andrew J. Friday, and Brett D. Keiper, East Carolina University, Greenville, NC

During translation initiation eIF4GI provides a scaffolding complex allowing for the association of initiation factors and ribosomes on recruited mRNAs. We have previously shown that C. elegans caspase, CED-3, cleaves eIF4GI (IFG-1 p170) during apoptosis and removes the eIF4E and PABP binding domains, preventing their involvement in translation initiation. Unlike mammalian cells, only two eIF4G forms are found in C. elegans, IFG-1 p170 (cap-associated) and p130 (not cap-associated). Despite the decrease in cap-dependent translation, initiation on a select subset of mRNAs becomes more efficient. Cleaved eIF4GI and its cap-independent paralog, p97, are known to bind directly to mRNA, often via internal ribosome entry sites (IRESs) to recruit these mRNAs for translation. Translational regulation is particularly important during C. elegans germ cell meiosis as the result of the silencing of transcription. Therefore, translational regulation is the only way to control the proteins profiles leading to the development of gametogenesis. Overexpression of eIF4G results in transformation of human cell lines. Similarly, overexpressing or deleting essential translational regulators within the C. elegans gonad has also been shown to result in the generation of germ cell tumors. In this study we address whether germ cell tumors resulting from changes in expression patterns of essential translational regulators are affected by the knockdown of cap-dependent protein synthesis. Despite the fact that cap-dependent protein synthesis results in the synthesis of mitotic and antiapoptotic proteins, our results suggest that knockdown of cap-dependent protein synthesis does not result in changes in germ cell fate or the mitosis.

GO26

-catenin/NPRAP/Neurojungin mutation promotes prostate tumorigenesis in mice overexpressing Myc oncogene, Jongkee Nopparat, Jiao Zhang, Yan-Hua Chen, and Qun Lu, Department of Anatomy and Cell Biology, The Brody School of Medicine, East Carolina University, Greenville, NC

Prostate cancer (PCa) is the most common non-cutaneous malignant neoplasm in men in Western countries. In humans, PCAs progresses from precursor lesions, termed prostatic intraepithelial neoplasia (PIN), to overt carcinoma confined to the prostate, and finally to metastatic disease that often results in lethality. Previous studies in our laboratory have shown that -catenin (gene designation: CTNNB2), a primarily neural-enriched protein in the brain of healthy individuals, is overexpressed corresponding to human PCa progression. However the underlying mechanisms in which -catenin promotes PCa progression have not yet been elucidated. In order to gain a better understanding of the roles of -catenin in PCa progression, we utilized a novel mouse transgenic model of prostate cancer with overexpression of human Myc oncogene driven by rat-probasin promoter (ARR2PB) as the initiating event, which has been proven to mimic human disease conditions. These Myc transgenic mice were further crossbred with -catenin mutant (named as -cat/-) mice whose exon 9 of -catenin gene was disrupted. We then examined the histological differences of mouse prostates in wild type and Myc with -catenin homozygous mutant (named as Myc/-/-) mice. We observed that morphological alterations characteristic of mouse PIN (mPIN) developed in luminal epithelial cells of transgenic mice by 6 weeks. These changes include an increase of nuclear size, multi-layering, and cribriform formation. Surprisingly, Myc/-/- mice at 6 months of age displayed the dramatically increased tumor size and progression from mPIN to adenocarcinomas. We also showed that Myc/-/- mice increased in both number of proliferating cells and cells undergoing apoptosis compared with that of wild type animals. However, in Myc/-/- mice proliferative index was approximately 4-fold greater than apoptotic index, thus the net effect was increased tumor growth. Additionally, we demonstrated that Myc/-/- resulted in a statistically significant induction in -catenin and its downstream effector of Wnt/-catenin signaling cascade, which is commonly upregulated in number of cancers. Collectively, our findings provide strong evidences that mutations of -catenin contribute to tumorigenesis of mouse prostate by enhancing the effects of Myc oncogene through Wnt/-catenin signaling pathway resulting in an increase of cell proliferation and thereby promoting prostate tumor growth. Supported by NIHCA111891 and NIHCA165202.
Dose reconstruction technique for retrospective analysis of radiation therapy treatment of pediatric patients, Christopher Pelletier, East Carolina University, Greenville, NC

The goal of this study is to develop an accurate process for dose reconstruction of pediatric patients for whom specific patient anatomy is not available. For patients who have undergone radiation therapy, accurate assessment of the dose delivered to different normal tissues and structures is necessary to evaluate the risk of potential short-term and long-term complications. For pediatric patients, this risk of long-term complications is elevated due to the longer life span beyond treatment when compared with adult patients. Before the advent of computed tomography (CT), radiation therapy was performed with no knowledge of the specific internal anatomy of the patient. For patients treated before 1986, CT scans are typically not available. The National Institute of Health (NIH) hybrid phantom library was developed as a tool to allow for the estimation of normal tissue doses for patients who were treated without CT. We have evaluated the use of the Monte Carlo software X-ray Voxel Monte Carlo (XVMC) in conjunction with the NIH hybrid phantom library to simulate the treatment of whole brain irradiation on a 10-year-old patient. We have developed an in-house tool for converting the hybrid phantom format (.dcm) to the 3-D density matrix necessary for XVMC (.d3d) and have validated the conversion process by comparing in-field dose using XVMC and a conventional treatment planning system (TPS), Eclipse. We have also compared out-of-field doses between XVMC and Eclipse to see if there were significant differences in normal tissue doses using the two calculation methods. Initial results have shown that the Matlab conversion process can accurately convert dicom images to XVMC file format. In-field doses calculated with the two methods show good agreement, with mean brain dose as calculated by XVMC within 0.6% of dose calculated by Eclipse. Significant differences are seen in out-of-field regions, including a 6.1% difference in mean eyeball dose and a 3.8% difference in mean thyroid dose. We have shown the viability of this dose reconstruction technique. We plan to continue the validation process by verifying the accuracy of the in-field dose for a wider range of ages and body mass indices (BMIs). Eventually, we will use this technique to help develop more accurate normal tissue dose constraints for pediatric patients.

GO28

Novel J-series prostaglandin-ethanolamides are crucial for the cannabinoid receptor-independent effect of a nandamide in non-melanoma skin cancer cells, Eman Saliman, Allison Danell and Rukiyah Van Dross, East Carolina University, Greenville, NC

Non-melanoma skin cancer (NMSC) is the most common cancer in the United States. NMSCs overexpress cyclooxygenase-2 (COX-2), differentiating them from normal epithelial cells. COX-2 is an enzyme that metabolizes arachidonic acid to H-series prostaglandins (PGs) which are further metabolized by PGF- and PGD-synthases to E-, F-, and D-series PGs, respectively. D-series PGs (PGD2) are then converted to J-series PGs (PGJ2) and these bioactive lipids induce apoptosis by mechanisms including endoplasmic reticulum (ER) stress. Arachidonoyl-ethanolamide (AEA) is a cannabinoid that causes apoptotic cell death in diverse tumor types. AEA is metabolized by COX-2 to E-, F-, and D-series PG-ethanolamides (PG-EAs). Our previous data showed that COX-2 also converts AEA to novel J-series PG-ethanolamides (PGJ-EAs). In addition, we found that AEA induces ER stress and apoptosis in a COX-2-dependent manner. Therefore, in the current study, we test the hypothesis that AEA-induced ER stress and apoptosis is mediated by PGJ2-EAs in NMSC cells. In tumorigenic JWF2 keratinocytes, AEA activated the three ER stress pathways, p70S6 kinase (PERK), inositol requiring kinase-1 (IRE1), and activating transcription factor-6 (ATF6) and increased the expression of apoptotic ER stress protein, C/EBP homologous protein-10 (CHOP10) as well as the cleavage of caspase3. To determine the role of PGJ-EAs in AEA-induced ER stress apoptosis, the selective PGD synthase inhibitor, selinium tetrachloride (ScCl4), was used. ScCl4 reduced AEA-mediated PGD2-EA and PGJ2-EA synthesis, CHOP10 expression and apoptosis. To confirm that the metabolic products of D-series PG-EAs were ultimately responsible for the effects of AEA, tumorigenic keratinocytes were treated with PGD2-EA. Similar to AEA, exogenous PGD2-EA was metabolized to PGJ2-EA and increased CHOP10 expression and caspase3 cleavage. To verify that AEA-induced ER stress apoptosis occurs independent of the cannabinoid receptors, selective inhibitors of cannabinoid receptor 1 (CB1R) and cannabinoid receptor 2 (CB2R) were used. Pretreatment of tumorigenic keratinocytes with these agents did not inhibit AEA-induced CHOP10 expression or apoptosis. These findings implicate PGJ-EAs as primary mediators of the receptor-independent apoptotic effect of AEA. Since AEA-mediated production of PGJ2-EA requires COX-2, AEA may be an ideal topical agent for eradication of NMSCs that overexpress COX-2.

GO29

A Trans-generational ripple: How a puff during early development lead to a global huff in microRNA profiles as well as grand-offspring addictive behavior in Caenorhabditis elegans, Faten A Taki*, Xiaoping Pan, Baohong Zhang, Department of Biology, East Carolina University, Greenville, NC

Despite public health policies and tobacco-free awareness campaigns, the percentage of children and teenagers exposed to tobacco smoking remains high. Early developmental stages are highly sensitive to stress, which predisposes them to diseases/addictions as adults. Nicotine is the main addictive component in tobacco. Previous dose and time-dependent studies have revealed biphasic phenotypes and symptoms induced by nicotine in several organisms; however, trans-generational effects have not been documented. In our study, we used C. elegans as a model to investigate the effects of nicotine on the systematic miRNA expression profiles across three generations. Worms were treated with two nicotine concentrations (20µM and 20mM). Treatment was restricted to parent (F0) larval stage. None of the parent adults, nor were their progeny directly exposed to
nicotine. L4 larvae were sampled from each generation and were used for analysis. Behavior was analyzed via WormLab software (MBF) and qRT-PCR was used to quantify the expression levels of 231 miRNAs in each treatment group. Here we report that parental post-embryonic nicotine exposure, even at the low dose, altered sinusoidal locomotion, body bends, and speed in all three generations. Complementarily, some miRNAs were commonly affected across two or more generations while others were specific to one. Target prediction and pathway enrichment analyses showed daf-4, daf-1, fos-1, cmk-1, and unc-30 to be potential effectors of nicotine addiction across generations. These genes are known to be mediators of addiction phenotype in different organisms including humans. We proposed a “two-hit” model to explain trans-generational impact with emphasis on the vulnerability of early developmental stages to nicotine. Further investigations are necessary to understand the contribution of aberrantly expressed miRNAs to addiction pathways and their therapeutic potential. Key words: nicotine, systemic miRNA profiles, C. elegans, L4, post-embryonic stage, dose-dependent, time-dependent, acute, chronic, withdrawal, trans-generational.

GO30

The Human Element: Characters and Relationships in Fiction Writing. Timothy James Buchanan, East Carolina University, Greenville, NC

The lives of human beings are most complex and interesting where other human beings interfere. Thorny relationships have always influenced my writing: in an effort to complicate the lives of my characters, I consider who rather than what is most likely to disrupt their world. In my short story, “Mezuzah,” sex, drugs and Judaism form the major lines of contention between two sisters when the burial of a young woman mistakenly identified as one of the sisters forces each to confront her place in the family dynamic. In my presentation I will talk about my story writing process, from idea generation to revision. I will discuss the issues that arise when writing a story from far outside one’s own experience, in other words, how to write “what you don’t know” with authenticity. Finally, I will read a brief excerpt of my story and then answer questions from the audience.

GO31

Closed for Repairs, a stage play. Gaiselle Inez-Nicole Cambra, East Carolina University, Greenville, NC

A stage play. I started and completed this play as an undergrad at ECU and am now attending the graduate program at ECU as well for creative writing. Summary: Jasmine is through with love. After a nasty break up she is ready to throw in the towel. One night she finds herself in a rundown bar drowning her soul and “spilling her library of secrets” to the bartender. What else is she to do, but take him home? Danny knows going home with Jazmine could ruin what he has going for him. It’s hard enough just being release from jail, but does he need the added complication of an affair with the troubled professional? Tessa has had a tough go of it. Her childhood wasn’t the best, and if it weren’t for her best friend, Jazmine, she may not have come out of it with the only commitment and self-esteem issues he has. And although her boyfriend Jahmal understands why she is the way she is, it doesn’t make it any less frustrating when she refuses to let him meet any of her friends and family. Jahmal thinks it’s because she is ashamed that he has a record. Will Tessa get able to put her past aside before Jahmal finds someone else with fewer issues? Teaser: In this play about a diverse cast of friends, we have our main character Jazmine and her best friend, Tessa. Although the two have been friends since childhood, they still keep earth shattering secrets from one another. Like who they sleep with. Jazmine finds herself inexplicably drawn to rough around the edges Danny when she finds herself in a bar after a nasty breakup. Can you get him to overlook his concerns and give the relationship a try? More importantly can she muster up enough faith in commitment to stop sabotaging herself? And will or elusive Danny be able figure out the difference between what he wants and what he needs before he loses everything he has worked hard to keep? Tessa has issues. Abandonment, commitment, self-esteem. You name she’s got it. It’s no wonder she dates Jahmal in secrecy. But can give get over them before Jahmal gives up or will she demand that he accept her corks and settle for nothing less? This is a tale about friends that go to extreme measures to enough that work and play don’t ever mix. We follow the two couples as they navigate the ups and downs of their relationships with each other and with friends. When the dust settles, will everyone’s relationship escape fatalities, or does anything go when it comes to love and war.

GO32

Traditional Crafts In Saudi Arabia. Samirah Alotaibi, East Carolina University, Greenville, NC

Traditional Crafts in Saudi Arabia. For thousands of years, the Arabian Peninsula has been at geographic, commercial, and cultural crossroads of the world. In the seventh century, Islam as religion emerged first in Makkah then spread all over Arabia, the Arab countries, then to the west of the Atlantic Ocean and as far as the Indian subcontinent and China. Every year, for the past fourteen centuries, Muslim pilgrims from around the world travelling to Makkah and Al Medina have helped further enrich the culture of the people of Saudi Arabia. Islam influenced nearly all aspects of Arabian cultural and spiritual life, but it is the deep roots of the first native people (Nomadic Bedouin Society) that shaped the country’s cultural heritage in the area of traditional crafts. I’ve chosen this topic considered as part of cultural heritage, social identity and creativity of the country. For example, what we inherited from our past generations, what we should preserve and we should pass to our future generations. All these questions has guided me to talk about crafts in Saudi Arabia. I will give a brief historical review of Traditional Crafts in S.A such as: Weaving, Jewelry, Costumes, Nomadic equipment, traditional Weapons, and Household Crafts. My research will include the presentation (PPT) and the sample of this heritage.
GO33

Patterned Fabrics and Their Ability to Evoke Nostalgic Experiences, Alison Louise Bailey, East Carolina University, Greenville, NC

My intimate relationship with textiles and my desire to look into my childhood for inspiration for my work has lead me to research nostalgia and how objects and patterns can evoke deep emotions and feelings within an individual. I am interested in how a color, tactile sensation, or a smell can jolt one back into an event or memory once forgotten. I enjoy the way that metal and fabric contradict one another. Metal is hard and cold and doesn’t break down while fabric is fragile, warm, and easily deteriorates. I work within the format of jewelry because jewelry is intimate and is often viewed as precious. Jewelry pieces are often cherished and passed down from generation to generation. My work deals with coming to terms with the past and the search for something to find comfort in. I find comfort in making. It is my hope that through this research into nostalgia, pattern and the evocative qualities of material, that the resulting artwork can bring a sort of comfort to my viewer.

GO34

Jazz on Broadway, Gregory Bailey, East Carolina University, Greenville, NC

My work is a synthesis of an analysis of “the conjunction and juxtaposition of forms”. The reaction of one object being placed in proximity of another is the primary visual, tangible and philosophical result that the viewer experiences. It is my desire of this concept to create works that evoke emotion, convey a sense of place, and inspire an understanding of themselves to those who view them. This project is to be located in the town of Broadway NC. The scheme will center upon a common theme in the town which alludes through its name to ties to New York City and its theatre district. The project is to be titled “Jazz on Broadway”. I have chosen to express this through the medium of sculpted and cast in place colored and textured concrete creating forms evoking musical instruments with stainless steel “trim” and fixtures to provide life and movement through a play of water and reflection. The project was conceived by the use of digital design and this as well as customary modeling will be utilized in its fruition.

GO35

Pottery: Identity, Function, and Place (I’ve Got a Pot for That), W. Gaines Bailey, East Carolina University, Greenville, NC

The work in this series is largely motivated by maintaining functionality in ceramic objects without limiting scale or form. My work is made to meet unfulfilled niches in the domestic home environment. By evaluating the compositional variables in a particular ceramic piece (function, scale, form, profile, and placement) and altering these variables individually, a single piece can be created that suits multiple demands. For example, by taking a large decorative vase and creating compartments for removable flower holders, the piece can satisfy the needs of a display space in the home and also the habits associated with smaller flower vases.

GO36

Paths to Abstraction, Emily Joy Branch, Professor Scott Eagle (Mentor), East Carolina University, Greenville, NC

To abstract is to take away from, condense, or abbreviate. Through the ages, the elements and principles of design have been used in art to communicate abstract ideas, such as human beliefs and emotions. All paintings, including hyperrealism, can be understood as abstractions of reality. When discussing art, the term abstract generally refers to nonrepresentational artwork. For a variety of reasons artists choose to depart from naturalistic techniques in favor of more simplistic or abstruse methods of representation. Artworks such as these can continue to be popularly understood and enjoyed through their use of design elements to symbolically represent human experiences. I will discuss the strategies and means employed by artists to abstract or abbreviate images to convey a message, emotion, or concept through painting as they relate to my creative practice.

GO37

Looking Back to the Futurists, Mohammad Kamran Goudarzi Langroudi, East Carolina University, Greenville, NC

Throughout history visual communication, or what we call art, has been used as a means to communicate a myriad of thoughts and beliefs ranging from religious to sociopolitical ideologies. Among the various movements that continued this tradition are the Futurists. The Futurist movement was steeped in politics, and could be argued to be as being politically successful in many ways. Based on a perceived need to separate themselves from an overbearing past, the Futurists declared a need to “burn the past” and focus solely on the future. With the industrial revolution in full swing there was no shortage of new technologies and subject matter for inspiration, and yet at its core existed an inherent hypocrisy in how the Futurists practiced their philosophy. Forward driven though they were, many Futurists continued to produce art using very traditional materials, such as I. My own desire to communicate sociopolitical beliefs is an imperative and impetus of my work. By re-exploring the Futurist aesthetic it is my hope that I will be better equipped to pursue this goal. As a painter, I feel that by understanding why they chose to continue using traditional painting media I can perhaps better understand my own reasons for doing the same.
Reliquaries: Childhood Relics, Sarah Harvell, East Carolina University, Greenville, NC

A reliquary is a container for relics that may be the physical remains of saints, pieces of clothing, or some object associated with saints or other religious figures, including human body parts. Reliquaries also use words or pictures to represent what the relic is or what the story is in relation to the relic and they can take a variety of shapes, from a simple box, to the shape of the relic inside. Christians, Buddhists, Hindus, and many other religions use reliquaries to house sacred objects and followers make pilgrimages to these reliquaries in order to gain blessings or spiritual power. I feel compelled to create objects that resemble reliquaries as a direct result of an experience I had while volunteering at a nursing home when I was in my early teens. I observed a family visiting their mother, who suffered from Alzheimer's disease. The only way the mother could remember her child was by a teddy bear the mother had made when her child was an infant. The woman would present her mother with the old teddy bear and only then did the mother recognize her. Members of my own family have suffered from the disease and through my work I hope to enshrine my memories and protect them. I will use my creative process as a mnemonic device with the hope that when presented with these reliquaries later in life it will trigger the memories associated with the enshrined objects. With the assistance and input of my family I will fabricate these works because it is the memories and objects associated with them that I hold most sacred.

Flowering, Patrick Stephen Hutti, East Carolina University, Greenville, NC

My work celebrates the limitations of time by using floral growth as a metaphor of how to live. The short life expectancy of a blooming flower reestablishes concerns for future events. I use the fragility and permanence of clay to create visual tensions that represent the “apex of life” moments by pushing the limitations of the material. Making, firing, and assembling represent parallels to birth, life, and death.

Natural Dye: A Review of Dye Processes with Plant and Insect Material, Alyssa Anne Karpa, East Carolina University, Greenville, NC

In my research, I am experimenting with the application of natural dyes. Natural dyes have a long and rich history, having been used for centuries. First, I will look at the history of these practices in order to understand the origins of natural dyes. I aim to use this understanding to gain more of an appreciation for these ancient methods in which natural pigment and dye were used. From here, I will investigate several plants and insects that produce dyes as well as the areas of the world in which these are native. Along with these plants/insects, I will inquire about the mordants used to aid in the binding of the dye to the fiber as well as what different results are achieved with different fiber. In the second part of my research, I will review the process in which I underwent to dye fabric with plant/insect material. I will also look at the results I obtained and the various ways in which I have and will use these methods in my work.

Killa Beez (cross-pollination), Zachery Hart Lichtenberg, East Carolina University, Greenville, NC

My investigation as a Graduate student has been primarily concerned with cross-pollination of the field of jewelry and other small objects with the imagery and aesthetic I have grown accustomed to working with. The imagery that I use is strongly graphic, and often referred to as lowbrow. During my first year of graduate school I had learned the techniques of enameling (the act of fusing grains of glass on metal). This allowed me to investigate methods of giving my work color and texture that I had not experimented with or investigated in depth up to this point. After developing my skills of the enameling techniques I decided to investigate methods of display for the objects that I am creating. I pull from production and consumer culture to create an object that I consider to be fit. At this point the viewer can decide to use the work for its utilitarian function or strictly as an aesthetic object.

A Craze for Paisley, Mary Elizabeth Klacza, East Carolina University, Greenville, NC

The term ‘paisley’ is commonly associated with the ‘paisley’ pattern. The paisley motif did not gain this name until the mid-1800s when it became associated with the town of Paisley, Scotland. This design actually has roots that can be traced back to a cult of fire-worshippers in ancient Persia. By following the trade patterns of the ancient world the origins of this design can start to be understood. Exchange among cultures via the Silk Road and then later the cashmere shawl trade eventually brought the pattern to Victorian England. This is where the pattern became associated with the name ‘Paisley’ and then became synonymous with both the paisley motif and the cashmere shawl itself. By analyzing the history of the paisley pattern, my artwork is informed by the variations in paisley styles. I have taken the two-dimensional pattern and transformed it into an array of three-dimensional paisley-esque forms. As my sculptures have taken shape, the similarities between the forms and other basic natural shapes has become apparent.
GO43

Nature and Industry in the Urban Environment, Sarah Kathryn
Lock-Test, East Carolina University, Greenville, NC

My work investigates the effects on nature within industrial, urbanized environments and their impact on the physical landscape. The work can be divided into three sub-categories: industrial processes resulting in pollution, the green movement and remediation efforts, and mapping of pollution within metropolitan centers. Products of industry, such as steel and found objects are used as both material and imagery. Gears, steel towers and corrugated metal reference various industrial activities and machinery. Pieces of found rusted metal are appropriated as ‘gemstones’ of the industrial movement. Once a prosperous industry, steel manufacturing has declined in the United States, leaving contaminated sites that require remediation. Blossoms, made from reclaimed metals, are used to replicate the plants used to extract toxins from the soil in phytoremediation process. Because of the industrial processes and human activities that occur within cities, metropolitan areas are several degrees hotter than outlying areas. Climate related impacts are more severe in many cities, diminishing tree-cover, and increasing greenhouse gases. Using thermographic images of cities, I map out the areas of particular consequence. Color, playing an important role throughout the work, is at times muted, purposely over-fired or garish to reference rust stains, thermographs or pollutants. Architectural elements play the role of ambiguously tying a piece to a particular city. The intent of this work is to map and document the impact and decline of industry and urbanization on the environment.

GO44

Salt Fired Ceramics: History and Application in Vapor Glazing, Devin George Mekin, East Carolina University, Greenville, NC

The goal of my research is to have a better understanding of vapor glazing processes in ceramics. The study will focus mainly on the application of salt (NaCl) at peak temperature of the glaze firing, which occurs within the range of 2,000–2,300 °C, at which point the NaCl vaporizes and bonds with Silica (SiO2) present in the clay body. Salt glazing has been practiced since as early as the 14th century, in Germany. It gained popularity as a glazing method due to the abundance of salt as a commodity and the efficient manner in which “salting” allowed the potter to glaze his ware. Salt glazing came to America with new colonies and has a strong presence in North Carolina pottery. Clay body formulation, chemical composition of the salt, and methods of introduction into the kiln, as well as historical and regional applications of the process will be explored.

GO45

The Spaces Between, Aisling Helena Millar, East Carolina University, Greenville, NC

My sculptures are inspired by iconic images found throughout Ireland, such as New Grange, the Book of Kells, the architecture of Christian churches, and the political art of Northern Ireland. I utilize similar quality of line and style of traditional interlace Knotwork, but with modern materials and tools in order to place these sculptures in the present. While the works of the Neolithic and Christian eras have been created through subtractive stone carving, I choose additive steel fabrication which allows me to echo the contemplative and spiritual feelings of the stone monuments while allowing me to open up the form, exposing its interior, and creating an uplifting, gravity defying visual element. Through this presentation, the audience will learn about the historical influences of each sculpture and how they work together to display a unified aesthetic.

GO46

Historical Techniques and Modern Issues, Dru Lindsey Patrick, East Carolina University, Greenville, NC

The research I am conducting explores the uses and technical processes of miniature portraits. Juxtaposing historical techniques with modern issues is a recurrence in my work. This investigation begins with an in-depth look into the history of miniature portraits, particularly miniature portraits that were used as gifts to lovers and suitors as well as erotica jewelry and objects. This research parallels research of online dating websites in which I study the criteria that are sought after in a significant other. Media and technology play a large role in the way lovers and strangers often send erotic photographs and messages through texts and e-mail. Viewing modern day online dating profiles and private erotic photographs and presenting them as historical miniature portraits serves as my research and creating process to unveil ideas about the expectations of women in today’s society.

GO47

Wanderings, A Childhood Introspective, Cathy Perry, East Carolina University, Greenville, NC

The transitions of my family life, generational traditions, and enduring memories of my childhood are portrayed through bronze, and welded steel sculptures arranged into intricate natural forms. My memories from childhood growing up with five sisters are directly expressed through this biographical body of research. Twigs, seedpods, blossoms found in nature are woven into the work with different materials to highlight specific memories. This biographical work reflects families entwined, tangled, and existing together dealing with the joys and travails of life.
GO48

My Art Object as Memorial, Amber D Watts, East Carolina University, Greenville, NC

The artworks I make are affectionate records of my experience in the world. They function as memorials to life and death. The comparison I will make here is between my works and everyday memorials such as tombstones or shrines. These objects share the main characteristic of physicality; constructed objects having a presence in the space occupied. They are usually not narrative in a linear sense, nor do they attempt illusion of space, like in classical painting. They are the objects themselves - tangible and real, signifying a specific moment in time. Memorials are often rich in symbolic imagery with personal or more widely understood meanings. Text, dates, size and style of decoration may give us hints about an event or person being honored or remembered. My art assemblages present clues about commonplace events in my life using the same method of poetic metaphor and symbolic meaning. In this talk I will compare my artwork and other types of memorials, discuss my creative process, and present other artists who use assemblage as a means of expressing ideas.

GO49

The Role of Shrines Within Our Artistic and Religious Belief Systems, Erin Elizabeth Young, East Carolina University, Greenville, NC

Shrines are historically used to dedicate prayers to revered figures for protection and additional desires. I am researching religious and secular shrines that are surrounded by objects that implore a connection with the supernatural. These sacred spaces inspire my work, which is based on a combination of Judaic and Christian beliefs. My shrines are a culmination of my religious experiences in church and at home. My work explores the parallels between art and religion that show a significant change in the use of shrines today.

GO50

Memory, Place, and Process, Christine Zuercher, East Carolina University, Greenville, NC

I am investigating the photograph’s relationship to memory and place through the construction and deconstruction of reappropriated imagery. The first point of my investigation is conceptual and relates to photography and my personal approach to the medium through my relationship with my hometown of Dayton, Ohio. My family has lived in Dayton for over a century and it is deeply ingrained in my family’s history. The second point of my work is an investigation of the universal study of memory and our connection to home. As I’ve moved to North Carolina I’ve been researching the role historical technology such as flight has played in our relationship to place. I am also examining Greenville’s role in shortwave radio systems and the photograph’s role in myth and its connection to our sense of place. This investigation relates to photography and the use of process. Methods in which the photograph is taken beyond its original use and reappropriated to possess new meaning are used as a means of invention and alteration of our experiences. I have been investigating the photograph’s ability to shape memory through processes such as Gum Bichromate, analog and digital imagery, and textiles. Through the study of alternative forms of image construction and its relationship to myth, history and place, I wish for my investigation to demonstrate the photograph’s role in elevating our experiences and our understanding of home.

GO51

Art and the Tools of Energy Healing, Steven Wade Hall, East Carolina University, Greenville, NC

My current research interest is the energy healing technique developed by the pre-World War II Japanese scholar Mikao Usui in the early 1900s, known as Reiki. This led me to investigate other techniques, such as Chinese Qigong and modern Wicca. As I became more engaged with alternative healing practices, I came to use my artwork to help strengthen my connection to this research and deepen my understanding of these processes. I looked first at the physical tools used in energy healing. The singing bowl, a type of Tibetan bell, came to the forefront as a tool that is used in many different practices. It seemed the perfect vehicle to combine the practices of healing and art, since both Reiki and forming rely on the hand of the practitioner. As I continue to explore energy healing, I intend to put together an exhibit in which the audience can experience for themselves how singing bowls and other meditation or alternative healing tools can influence healing energy flow.
Needle Felting and Digital Print: From Factory to Artistry, Mary Jones Dementry, East Carolina University, Greenville, NC

From the 1950s, needle felting/needle punch was originally used to make felt for industrial purposes, for use with musical instruments and as building materials. Industrial felt is made with large plates filled with special barbed felting needles that are mechanically moved up and down to felt wool and other materials together such as polyester or nylon. There are many uses for industrial felt in home construction such as: weather protection in roofing felt and a moisture absorbing layer for floor layouts. Felt byproduct even evolved into a bald spot remedy created from the clean white scraps of felt from factories. They were then ground up, colored and put in an aerosol cans and sold as a bald spot hair spray. Needle felting was then further advanced by David and Eleanor Stanwood in the 1980’s. They created a home needle punch technique, a smaller version of the industrial punch, to make wool bars for quilts. Ayala Talpai, a family friend was taught the technique and she further developed it into the single, needle felting craft technique that we see today. My research will explore the possible next advancement in needle felted fabric, merging needle felt with digital print. I will analyze the boundaries of dry felt fiber migration within digitally printed silks using hand dyed pre-felt inlay and needle felting techniques and state my findings. My research will also include 1) an exploration of fiber migration to intensifying color vibrancy, contrast, and dominance 2) an exploration of optical color blending through fiber migration 3) an exploration of complementary color mixing and juxtaposing to create depth illusion 4) an exploration of texture through shrinkage and manipulation of inlays.

Eyes Wide Open, Ernest Wesley Akins, East Carolina University, Greenville, NC

Artists continually, create art celebrating Western Society and Civilization as the epitome of human culture. Art is created that memorializes our environment, landscape and culture in ways that are inconsistent with the truth and evidence of our history. As an artist and creator of culture, I am working to create and promulgate new ideas and practices. I am aware that our social practices are partially formed by the imagery of the visual culture that surrounds us, and as an artist, I work to create a visual culture that strives at questioning our understanding of community (the people and the environment that surrounds us), love (the love of oneself and our neighbor), nature (the interconnectedness of all things) and individuality (our understanding of self). My desire to create and develop new cultural and social practices grows from the absence of benevolence and humanitarian values in contemporary western society ideas and practices. This need has given me purpose to create and pursue a career in art despite the evidence and history of my culture, so that I can create works that celebrate life despite the travesty that we, western society, have made of it. This work is to be an inquiry into our way of life, and the reason of my current art making.

Designer’s Perceptions of Safe Design and Its Potential for Innovation, Ronan McAleenan, East Carolina University, Greenville, NC

Safe design to influence construction and maintenance worker safety is a concept that has been around for many years in the United Kingdom and Australia. The concept is that designers can influence the safety of the project during the design phase. This study aims to determine whether designers consider this concept an aid or a hindrance. The extent to which safe design is implemented, its timing within the design process, and the tools and processes employed could well be related to designers’ perceptions. If the designers’ fundamental tenet is that their technological and intellectual disposition is to prepare and execute safe designs then the core question has to be, do designers view safe design as a pleasure or a pain? This study will focus on designers from the United Kingdom and Australia since ‘design safety’ legislation has been implemented there for several years and both jurisdictions provide an element of guidance on safe design practices. The purpose of the study is to determine if thinking about worker safety in the design process enables or restricts innovation and creativity in the design process. The analysis will compare safe design approaches in the two regions to see if there is any correlation between them. The thoughts and practices of designers from the both countries are explored to determine, among other things, their perceptions of the value of safe design. The primary methodology for this study is a questionnaire, followed up with a more detailed interview, conducted on a sample group, comprising design engineers and architects across a range of industries, with differing levels of experience. The expectation is to find some innovations that stem from the safe design process. The expected results could impact the view of safe design and safe design regulation, particularly useful in the year that United Kingdom is reviewing its approach to regulating construction, design and management. In the United States there are no such safe design regulations in the foreseeable future. However, the National Institute for Occupational Safety and Health has a safe design initiative, and these results could provide insight to the concept’s adoption in the United States.

Generalizing Lamport’s Bakery Algorithm to Solve Group Mutual Exclusion Problem, Yuan He, East Carolina University, Greenville, NC

Mutual exclusion is a classical problem in distributed computing introduced by Dijkstra. In this problem, processes repeatedly cycle through four sections of code viz., REMAINDER SECTION, ENTRY SECTION, CRITICAL SECTION and EXIT SECTION, in that order. The problem consists of designing code for the ENTRY SECTION and the EXIT SECTION such that the mutual exclusion property is satisfied. MUTUAL EXCLUSION property states that no two processes can be in the CRITICAL SECTION at the same time. Group mutual exclusion problem, introduced by Joung, is a natural generalization of the classical mutual exclusion problem. As before, we can think of the processes repeatedly cycling through four sections of code viz., REMAINDER
A Method for the Guitar Fingering Problem, Arman Samavatian, East Carolina University, Greenville, NC

Computer music is one of the most interesting fields in both computer science and music. Today with the help of computers, the process of learning a musical instrument has become much easier than it was in the past, and this is due to researchers in the field of computer music and human computer interaction. One of the most challenging areas of research is to realize how a music piece will be played on an instrument, such as the guitar. This is the focus of my research; however, there are some methods to solve the guitar fingering problem, but all of them have weaknesses and considerable limits. I am trying to improve what has already been done in this area, and also design algorithms to be able to include complex guitar/bass playing techniques, and to reach to a higher performance and quality in the answers.
GO58
Prediction of Athletic Injury with a Functional Movement Screen™, T.R. Hall1, J.N. Moore2, A.S. Kulas3, K.D. DuBose1, & M.T. Mahar1, 1Activity Promotion Laboratory, Department of Kinesiology, 2 Department of Athletics, 3 Department of Health Education & Promotion, East Carolina University, Greenville, NC

PURPOSE: To determine if a Functional Movement Screen (FMS) or bilateral mass asymmetry measure predict injury in intercollegiate football players. METHODS: Participants (N=81) were tested using the FMS protocol. Seven tests were scored on a 0 to 3 scale resulting in a possible total score of 21. Intra-rater reliability was estimated for FMS on all participants by viewing videotaped procedures. Inter-rater reliability was estimated on 18 participants viewed in real time by two raters. Bilateral mass asymmetry was assessed by weighing participants on two identical scales with one foot on each scale. Injury reports were obtained from the athletic training staff. Musculoskeletal injuries were classified via NCAA Injury Surveillance System criteria. RESULTS: Mean (±SD) age was 20.0 (±1.5) years, mean FMS score was 15.4 (±1.7), and mean bilateral mass asymmetry was 4.0 (±3.5) kg. Intraclass correlation coefficients for intra-rater (.94) and inter-rater (.92) composite score reliability were high. Twenty-three players (28%) scored low (≤14) on the FMS. Forty-three injuries (17 direct contact, 12 non-contact, 11 indirect contact, 2 overuse injuries, and 1 unknown mechanism) to 31 players were reported. Injury rate did not significantly differ (p>.05) by FMS score category [36% with low FMS and 41% with high FMS scores were injured]. No significant relationship was found between bilateral mass asymmetry and injury rate (p>.05). CONCLUSION: Preliminary analysis indicated that neither composite FMS scores nor bilateral mass asymmetry scores predict injury in intercollegiate football players.

GO59
Influence of Exercise Mode on Maternal and Fetal Health Outcomes, Carmen M Meyer, Human Performance Lab, Jeff Livingston, Maternal Fetal Medicine, and Linda E Mey, Foundational Science and Research, East Carolina University, Greenville, NC

The extent of the health benefits of exercise in pregnant women is just beginning to be explored and developed. The purpose of this study was to compare the effects of aerobic and circuit training throughout pregnancy on maternal and fetal adaptations. We hypothesized that there would be 1) improvements in maternal resting HR and body composition; 2) differences in fetal HR, HR variability, and heart physiological measures at 34 weeks; and 3) no differences in fetal anatomic heart measurements or birth measures between groups. Participants in one of three protocols completed three 45 minute sessions weekly from 13 weeks gestation to delivery. We measured maternal resting HR at each exercise session, maternal body composition monthly, and 34 week fetal heart measures. Statistical analyses included t-tests, multiple ANOVAs, and regression analysis of statistically significant values. No differences were found between groups for change in resting HR or BP as a result of exercise training throughout pregnancy. Pre-pregnancy BMI was similar between groups. BMI and % body fat increased throughout pregnancy, as is expected, but there were no significant differences between groups. Although nothing is significant, there is a trend toward greater decreases in body fat in the circuit and aerobic exercisers relative to controls. No significant differences in gestational weight gain were found between groups, although there is a trend towards significance between aerobic and control (p=0.10) and aerobic and circuit (p=0.06). No significant differences were found between groups for fetal anthropometric measurements, although fetal head circumference (HC) in aerobic vs. control groups neared significance (p=0.06). No differences were found in estimated fetal weight. No significant differences were found in fetal anatomical heart measures or HR between groups, but the control group (137 bpm) had lower HRs than exercising (141.4 bpm +5.6). Based on recommended exercise guidelines by the American Congress of Obstetrics and Gynecology (ACOG), these results suggest that 1) different modes of physical activity decrease body fat gain and improve maternal heart health and 2) different types of exercise may be beneficial for fetal heart function. Therefore, exercise during pregnancy appears to be beneficial for maternal and fetal health. Further research is necessary in this area.

GO60
Biomedical Research Training Opportunities at the National Institutes of Health for Students, Faculty, Clinicians, and Staff: A General Overview with a Focus on the National Institute of Nursing Research Summer Genetics Institute, Kristin JoAnn Wainwright, BSN, BA, RN, College of Nursing, East Carolina University, Greenville, NC

That National Institutes of Health offers a variety of educational and training opportunities for undergraduate students, graduate students, faculty, staff, clinicians, and more. The National Institute of Nursing Research Summer Genetics Institute is an opportunity for nursing graduate students, faculty, and clinicians to increase their knowledge and research capabilities with regards to genetics. The National Institute of Nursing Research Summer Genetics Institute (NINR SGI) is an annual one-month intensive program hosted free of charge by the NIH/NINR that provides a foundation in molecular genetics through classroom style lectures paired with hands-on laboratory experiences. This experience provides nurse scientists with the tools they need to incorporate genetics into their research from the bench to the bedside. The role of genetics in healthcare is becoming increasingly significant, redefining our understanding of health and illness. The genetic components of common health problems are being identified, yet learning how to incorporate this information into healthcare is a challenge. Nurses are posed to address new ethical challenges brought about by integrating genetics into healthcare, providing guidance and leadership to address needs of patients and the community as we grow in our abilities to translate genetics into prevention and patient care. I would like to give an overview of the NIH’s educational training opportunities for those who wish to conduct health-related research, including their Graduate Partnership Program, Summer
Ending FGM – A Case Study in Advocacy, Purity Jepch Kiny goats, East Carolina University, Greenville, NC

After briefly surveying types of female genital mutilation (FGM) and rates of FGM in Kenya, as well as the legal, policy and advocacy efforts to end the practice, this paper examines the Euro-American discursive failure to accurately represent the practice with an examination of the Sabot, a sub-group of the Kalenjin, Kenya’s third largest ethnic group. I argue that this misrepresentation of FGM is largely based on a failure to comprehend the role significance of the practice in the social organization of the Kalenjin, specifically the important role FGM plays in age-sets. I propose that the meaning of FGM varies widely from context to context and that its meaning for the Kalenjin is just one of many possible meanings of the practice across Africa. Advocacy efforts to end FGM too often fail to understand the practice “from the native’s point of view” and, consequently, speak at, rather than with, others. Ultimately, this handicaps efforts to end FGM.

Gender Perception and Participation in the Hawaiian Cultural Renaissance Movement, Shannon Elizabeth Christy, East Carolina University, Greenville, NC

This paper reports on data from a field study of the ways in which young adults (individuals between 20-35 years of age) are participating in Hawaiian cultural revitalization, their attitudes towards their involvement in the movement, and their hopes for its future. The Hawaiian Cultural Renaissance began in the 1960s and many of the key leaders have been women. Of particular interest in this research is an investigation of how younger people view the role of women in Native Hawaiian culture and in the movement. The study involved three different methodologies: a detailed literature/historical analysis, participant observation in the Hawaiian Islands, and fifteen semi-structured interviews with movement members. Research was conducted under the tenants of Tribal Critical Race Theory (Brayboy 2005, Kupo 2010). The interviews were audio-recorded and transcripts analyzed utilizing grounded theory. Some preliminary findings will be presented including the influence of education on involvement in the movement, the conception of Hawaiian women as inherently strong, the importance of environmental conservation to the future of the movement, and the conception of Hawaiian as not just an identity, but a mentality.

“Did you Hear?” Gossip as a Manifestation of Trait Aggression, John Walter Grancek and Mark Bowler, East Carolina University, Greenville, NC

Aggressive individuals, with high levels of trait aggression, are more likely to engage in counterproductive work behaviors (CWB; Bing, Stewart, Davison, Green, McIntyre, & James, 2007; Horschovis et al., 2007), which include any intentional behaviors committed by an organizational member that are viewed by the organization as contrary to its legitimate interests (Gruys & Sackett, 2003). Despite the generally low base rate of aggressive individuals (James et al., 2005; James & Mazerolle, 2002; James & McIntyre, 2000), the estimated financial cost of CWB runs into the billions and remains a growing concern for American organizations (Penney & Spector, 2005). Furthermore, verbal forms of CWB, such as incivility, take a toll on the well-being and quality of life of employees across the globe (Aubé, Rousseau, Mama, & Morin, 2009). Gossip in particular, which has been shown to be related to negative performance evaluations (Grosser, Lopez-Kidwell, & Labianca, 2010), low self-efficacy (Watson, 2011), poor reputations (Sommerfeld, Krambeck, & Milinski, 2008), and power (Ogasawara, 1998), is typically categorized a verbal form of CWB, has received a great deal of recent attention (Dunbar, 2004; Foster, 2004; Grosser et al., 2010; Michelson, Interson, & Waddington, 2010; Watson, 2011; ). However, the direct relationship between trait aggression and gossip has yet to be empirically tested. The proposed study seeks to ascertain how trait aggression relates to an individual’s tendencies, functions, and motives to participate in various types of gossip; while empirically differentiating between the application of negative and positive gossip within organizations. Based on the association between both gossip and aggression with dominance and power, the current study proposes that an individual’s tendency to gossip will be a function of trait aggression. In other words, aggressive individuals possess a strong desire to harm and gain power from others and they are likely to perceive gossip as a means to fulfill this need. Thus, aggressive individuals are likely to utilize gossip more frequently than nonaggressive individuals. Furthermore, aggressive individuals are likely motivated to use gossip for more malicious purposes, whereas nonaggressive individuals are likely motivated to gossip for self-enhancement and esteem.
Mapping the “Wastescape” of Hog Farming in North Carolina,
Calvin Harmin, East Carolina University, Greenville, NC

Purpose: This research investigates the current use and potential dangers of swine waste lagoons in North Carolina (NC) using Geographic Information Systems (GIS), aerial photography, and remote sensing. Specifically, it aims to map the location of current Confined Animal Feeding Operation (CAFO) structures (e.g., waste lagoons) and to assess the potential water quality impacts of nearby communities and ecosystems to the hazards associated with large-scale swine operations, especially as they may be affected by large floods. Results may inform public policy debates about site suitability, clustering of hazards, and stream quality impacts from a watershed perspective. Further, publicly available data about where exactly CAFO structures exist increases the potential for further research by others, such as geologists interested in potential groundwater contamination, or citizens and communities interested in water quality conservation and improvement.

Background: During the late 1980’s to 90’s the hog population in NC exploded from 3 to over 10 million pigs. The number of hog farmers decreased from an estimated 15,000 to 3,000 during the same period. The state’s swine industry, once characterized by small, independent farms, is now dominated by a vertically integrated corporate system based upon CAFOs, and mostly consolidated into a just a handful of counties in Eastern NC. The industrial animal farming paradigm, and CAFOs in particular, have been criticized for significant air, groundwater, and surfacewater pollution and for poor regulation that has allowed their construction on unsuitable or vulnerable locations. The potential environmental impacts of the hog farming industry in NC may have been most visible after Hurricane Floyd in 1999, which caused devastating loss of animal life and flooding of many swine waste lagoons. And yet, spatial analyses of CAFOs and the potential risks they pose to communities and residents in NC are still rare.

Evaluating perceptions and impacts of differential access to water resources: A review of water management strategies in St. Elizabeth, Jamaica,
Alex Andre Moulton, East Carolina University, Greenville, NC

Farmers in Jamaica face a ‘double exposure’ to stresses and shocks arising from both global climate change and regional economic instability. The present study aims to document the nature of these stresses, and also to investigate the role played by different water management strategies in building resilience in four different communities in St. Elizabeth Parish, an area facing increasingly unpredictable rainfall and a greater incidence of drought. The paper draws upon data from interviews and farmer ‘log books’ to document the perceptions and decisions of farmers using different types of irrigation, ranging from underground pipe and sprinkler systems, to hand watering from rainwater harvesting. Results show that farmers with the resources to access water have greater choice in crop selection and have more favorable production outcomes when compared to farmers with restricted access to water. More importantly, irrigation allows farmers greater control in the timing of production, particularly during drought, and this allows them to avoid the market gluts and price instability that plague farmers who are dependent upon rain-fed production. The end result, we argue, is that climate change is creating an increasingly differentiated landscape of water vulnerability in Southern St. Elizabeth, exacerbating regional inequalities and threatening the livelihoods of many smallholders.

Living Learning Community Effects on Student Mental Health, Health Behaviors and Academic Performance,
Anne Corinne Carroll and Christyn Doller, Department of Psychology, East Carolina University, Greenville, NC

Living Learning Communities (LLCs) are residential programs that build community between faculty/staff and students through learning in and out of the classroom. Current LLC research focuses on academic performance, with scarce attention to health-related effects or comparisons among different LLCs. As LLCs become common on college campuses, it is vital to verify the impact on student experiences. The purpose of this study was to examine whether LLC membership affects mental health, health behaviors, and academic performance, and whether there are different effects based on the LLC theme. Addressed also are methodological weaknesses in previous research. The project used a quasi-experimental design with three groups: first-year students in Wellness (n=28), and Leadership (n=17) LLCs, and students living on-campus but not an LLC (n=58). Students were recruited via email, flyers and classroom announcements. Psychometrically sound surveys assessed: 1) college adjustment and psychological symptoms; 2) sexual/alcohol/drug risk behaviors; and 3) retention. Participants authorized the Registrar to provide GPA data. Surveys were completed in-person and online at the end of the spring semester. Analyses tested for group differences, while controlling for potential confounds (e.g., sex, parental education, high school health behavior) to reduce error/isolate LLC effects. Examining overall LLC effects revealed the combined LLC group (Wellness and Leadership LLCs) had significantly: 1) higher college adjustment and GPA; 2) fewer sexual risk behaviors; 3) lower likelihood to binge when drinking and to drink to get drunk when compared to the non-LLC group. There were no significant differences between non-LLC and LLC groups in stress, anxiety or depressive symptoms, or amphetamine use. Examining the different LLCs revealed the Wellness LLC group had significantly higher college adjustment and lower likelihood to binge when drinking than the non-LLC group. The Leadership LLC demonstrated trends for beneficial effects but those did not reach significance. The current study replicates the association between LLC membership and academic performance reported in previous research and strengthens the support for a causal relationship due to its methodological rigor. This study contributes to the literature on mental health and health behavior effects of LLCs, demonstrating benefits to both. Wellness themed LLCs may intensify these effects; however, more research is needed.
Formative Assessment in the Mathematics Classroom: Finding the Right Opportunities for Success, Angelina Y Knies, East Carolina University, Greenville, NC

Formative Assessment is currently used in mathematics classrooms all around the world to help improve student learning and achievement. While it is evident from research that formative assessments play varying roles in the type of knowledge students gain, it is unclear what specific classroom-based protocols of formative assessment impact student achievement. This was the case for students who entered a recovery unit in an Intermediate Algebra course I taught here at East Carolina University. While many increased in their procedural skills as a result of the formative assessment methods integrated in the “recovery unit”, they lacked the conceptual understanding needed for success in the course as a whole. In an effort to learn more about this phenomenon, this action research focuses on students who enter the “recovery unit” in the Intermediate Algebra course at East Carolina University. A treatment and control group design was used as a means to gather data for the study. A formative assessment protocol synthesized from the research literature was integrated into the recovery unit for the experimental group. The results of the study has implications for both teachers and students in similar mathematics courses.

Examining the Impact of Semantic Mapping and Multiple Exposures on Fifth Grade Students’ Science Vocabulary Achievement, Stephanie Potter Woolard, Department of Reading Education, East Carolina University, Greenville, NC

A growing awareness of the importance of academic vocabulary knowledge underscores the need for more robust vocabulary instruction, especially in the middle grades (6-8) where students are expected to comprehend increasingly difficult content area text (Nagy & Townsend, 2012). The present action research study investigated the impact of a 5 week instructional intervention that aimed to boost fifth grade students’ science vocabulary achievement. The intervention design was influenced by (a) Harmon’s (1998) research on clarification of word meanings through synonyms, brief descriptions, examples and non-examples, rephrasing, repetition, associations, and unique expression and (b) McKeown, Beck, and Omanson’s (1985) findings about the positive influence of frequent encounters with new words. Thus, semantic maps that required clarification of science word meanings and repeated exposures to the vocabulary words served as the basis of the intervention. The researcher utilized a quasi-experimental pretest/posttest comparison group design to investigate the following research question: How will semantic mapping and multiple exposures improve fifth grade students’ science vocabulary development compared to traditional methods? Twenty-two students in the comparison class experienced traditional instruction requiring only associations between words and definitions, while twenty-three students in the treatment class participated in the intervention of semantic mapping along with multiple exposures to new vocabulary. Data analysis is currently in progress. The mean gain scores of the pre-post-vocabulary test and pre-post-self-knowledge rating surveys of both groups will be calculated with an independent samples t-test. A researcher log served as a third data source. Findings and classroom instructional implications will be discussed.

Examining the impact of interactive writing on kindergarten students’ phonological awareness and writing, Susan Langston McCollam, East Carolina University, Greenville, NC

The purpose of this action research study was to examine the impact of Interactive Writing on kindergarten students’ phonological awareness and writing skills. A quasi-experimental pretest posttest comparison group design was employed. During this five-week study, pre- and posttest data were collected from 35 kindergarten students to compare their growth in phonological awareness and writing. Three sources comprised the dataset: DIBELS phonological awareness assessments, writing samples, and anecdotal notes from a researcher log. The teachers in the intervention classroom and the comparison classroom, both of whom instruct 18 kindergarten students, used the Daily 5 literacy model as a framework for instruction. While both teachers administered Writer’s Workshop instruction, the teacher of the experimental classroom implemented Interactive Writing, a supplemental writing strategy. This intervention was administered for 30 minutes per day while they shared the task of writing meaningful text together. Data analysis is currently in progress. An independent samples t-test will be used to compare the mean change scores of the pre-post-DIBELS test and pre-post-writing samples of both groups. A researcher log served as a third data source. Results and classroom implications will be shared.
Leisure as a Self Management Practice to Manage Arthritis,  
Susan Kel Anderson, East Carolina University, Greenville, NC

Arthritis is a chronic disease and a leading cause of functional limitation and disability (Mock, Fraser, Knutson, & Prier, 2010). Self-management practices — activities adopted to better take control of the disease — are encouraged for adults with arthritis. Involvement in leisure activities is one potential self-management tool that can reduce the impact of arthritis symptoms on their daily lives (Betha, Lovett, Cooks, & Bell, 2010). Arthritis limits some adults’ pursuit of leisure opportunities; however, by using selective optimization with compensation (SOC) strategies in their leisure they may attain desired outcomes. Selection (e.g., prioritizing time and energy for certain activities), optimization (e.g., allocation of resources, persistent focus, acquisition of new skills, and compensation (e.g., using assistive devices or modifying behaviors) strategies may help adults better self manage their arthritis and leisure interests (Freud & Baltes, 1998; Quandt et al., 2012). This study explored the relationship between adults’ leisure activities and their perceived ability to manage arthritis pain and symptoms. The sample included 102 adults aged 50 and older (Mean age = 73.5). Adults self-reported the leisure activities they engaged in during a typical week, and this information was used to create measures of leisure repertoire and style. Leisure repertoire is the total number of unique activities the respondents reported; leisure style is a classification of their typical leisure involvement as sedentary, physical, cognitive, or mixed based on the types of activities reported. Self-management was also measured in two ways: 1) adults’ confidence in their ability to manage their arthritis, and 2) use of selective optimization with compensation strategies. ANCOVAs were used to examine the association between the adults’ leisure involvement and arthritis self-management. Leisure repertoire was significantly associated with adults’ confidence in managing their arthritis (p=.01) as well as their use of SOC strategies (p=.03) but leisure style was not. Specifically, adults who reported a greater number of activities in their leisure repertoire had more confidence in their self-management skills and an increased participation in leisure activities. Leisure activities have the potential to influence the health of individuals with arthritis.

Exposure to a Food-Based Science Curriculum Results in Dietary Behavior Changes among Fourth-Grade Children,  
Stacey Bala, Jana Hovland1, Melanie W. Duffrin2, Jason Brinkley3, Virginia Carravay-Stage2, 1 Department of Dietetics, Marshall University, 2 Department of Nutrition Science, East Carolina University, 3 Department of Biostatistics, East Carolina University

The purpose of this study was to evaluate the effect of FoodMASTER (Food, Math, and Science Teaching Enhancement Resource) Intermediate (FMI) on the self-reported dietary behaviors of fourth-grade children. FMI is a hands-on, integrative curriculum for grades 3rd-5th that uses food as a tool to teach science and mathematics. During the 2009-2010 academic year, researchers administered a modified School, Physical Activity, and Nutrition (SPAN) survey in 18 fourth-grade classrooms receiving FMI (I) and 16 comparison classrooms (C) to determine changes in dietary behaviors between groups and at pre- and post-intervention. A total of 757 children (I=429; C=317), aged 9-11 years, were enrolled in the study. Using hierarchical clustering of pre-data to examine the consumption of foods targeted within the curriculum (e.g. high-fat meats; dairy; grains, including whole wheat; vegetables; fruit; juice; and sweets), three clusters were identified: “eats a little bit of everything” (Cluster 1), “eats everything” (Cluster 2), and “healthy eater (except fried meat)” (Cluster 3). Significant differences were observed between clusters at pre-assessment for all dietary behaviors, except whole-wheat breads. Furthermore, changes within each cluster from pre- to post-assessment and between intervention and control groups were statistically significant for all dietary behaviors, except whole-wheat breads. Outcomes demonstrated FMI did impact dietary behavior among exposed fourth-graders regardless of their prior eating pattern; however, changes in dietary intake were not always positive. Further research is needed to explore reasons behind negative dietary changes.

The Effect of Prenatal Obesity and Prenatal Depression on Gestational Weight Gain, Hema Chagarlamudi, Department of Public Health and Center for Health Disparities, East Carolina University, Dr. Juhee Kim, Mentor, Department of Public Health and Center for Health Disparities, East Carolina University, Greenville, NC

Pregnancy outcomes and infant growth and development are influenced by various prenatal and postnatal factors. Gestational weight gain is one such important indicator of pregnancy outcomes. Excessive gestational weight gain has been associated with poor pregnancy outcomes while meeting recommended weight gain has become an important benchmark in prenatal care. Prenatal obesity and prenatal depression have been individually identified as possible risk factors for not meeting gestational weight gain recommendations. Although obesity and depression have been studied individually, their interaction with gestational weight gain must be explored. It is unclear whether obesity or depression is more likely to be associated with not meeting recommendations for weight gain. In addition, it is unknown whether the occurrence of both factors corresponds to a logically higher likelihood of inadequate gestational weight gain. Given the impact and burden of prenatal risk factors among the study population of low income women at ECU OB/GYN, it is important to clearly understand the association between such prenatal risk factors and gestational weight gain. In this study, obesity and depression will be analyzed simultaneously with relation to gestational weight gain. The three specific aims that will be presented at the Research and Creative Achievement Week are: whether pre-pregnancy weight status is associated with gestational weight gain; whether prenatal depression is associated with gestational weight gain; and whether the interaction of both obesity and depression is associated with gestational weight gain. The study will include pregnant women who received prenatal care from the ECU OB/GYN.
Exploring the Psychological Impact of Breast Cancer Treatment among African American Women in Rural North Carolina,
Crystal Ellis, BS Department of Public Health, Brody School of Medicine, Dr. Esie Torres, PhD, MPH Department of Health Education and Promotion, East Carolina University, Greenville, NC

According to the Centers for Disease Control and Prevention, breast cancer is the most common cancer among women in the United States. Although mortality rates for breast cancer have been decreasing since 1990, as a result of treatment advances, earlier detection through screening, and increased awareness, an estimated 39,520 women in the US were expected to die in 2011. Although breast cancer mortality rates have been steadily decreasing, African American women have the highest death rate and shortest survival of any racial and ethnic group in the U.S. for breast cancers. Although the impact of treatment on the quality of life of breast cancer survivors is an emerging area of research, understanding the psycho-social impact on African American women is currently understudied. The overall aim of this study is to investigate the barriers and facilitators in accessing breast cancer treatment options and potential challenges faced while complying to medical treatment plans to ensure cancer-free health. This is a sub-analysis that will provide a better understanding of the psycho-social impact that breast cancer treatment has on African American breast cancer survivors. Using a mixed-methods approach, a sample size of 32 African-American women who resided in Pitt, Nash, and Edgecombe counties were interviewed and asked a series of questions to help gain an understanding of their experiences from diagnosis to survivorship as breast cancer survivors. Seven focus groups were conducted, using an interview guide, to create a comfortable atmosphere for the participants to express their experiences. Surveys were utilized to obtain additional information on basic demographics and family health history of each participant regarding year and age of diagnosis, types of cancer and types of treatment they received. The results of this investigation will provide a better understanding of the current health disparity gap concerning the mortality rate of breast cancer among African Americans. Specifically, this study will provide a better understanding of the influence of body image in the context of ethnicity and culture and how this impacts the quality of life of African American women. This study will expand current research on cultural and contextual factors and the psycho-social impact on cancer survivorship. This study could also contribute to the development of interventions to support African American women during their continuum of breast cancer care.
GP6

The role of federal and local emergency managers in post-disaster mosquito control in North Carolina, Jonathan Harris, East Carolina University, Greenville, NC

Emergency managers are responsible for the coordination of county, state, and federal resources following disasters. Hurricanes result in conditions such as flooding and standing water which are conducive to mosquito propagation. Recent changes to vector control policies in North Carolina (NC), including the elimination of state-level mosquito control funding administered by the Public Health Pest Management section of the Department of Environment and Natural Resources, forced many local mosquito control programs (MCPs) to operate with reduced functionality. In August 2011, Hurricane Irene resulted in increased mosquito abundance that impacted the residents of eastern NC. The absence of state mosquito control support left some emergency managers with the added burden of mosquito control, including coordination, implementation, and reimbursement for control activities. In the current study, surveys were sent to emergency managers in 100 NC counties to gain a better understanding of the responsibilities emergency managers face with regard to mosquito control in post-disaster situations. A total of 53 NC emergency managers completed the survey for a response rate of 53%. Respondents were divided by geographic region for statistical analysis. No significant changes in the roles of emergency managers play in post disaster mosquito control duties were found between emergency managers surveyed from different NC regions. However we discuss themes that impact emergency managers with regard to mosquito control in NC, i.e. emergency manager involvement in mosquito control, conceptions emergency managers have about mosquito control, and mosquito control training for emergency managers. We highlight the importance of implementing proactive rather than reactive mosquito control measures.

GP7

Conceptual Framework for Recreational and Sport Skill Development through the Use of Video Feedback, Charles Addison Harvey Jr., Dr. Nelson Cooper, Department of Recreation and Leisure Studies Associate Professor, East Carolina University, Greenville, NC.

Video technology has advanced, become more accessible, and user friendly in the past two decades. With that, the use of video for coaching feedback and athlete learning has grown in popularity in a variety of sports and levels of participation, including recreational youth sports. Cantor (2008) noted that intercollegiate and professional football has been using video technology for teaching and learning for decades and has served as one model for justifying the use of video at other levels of sport. While video feedback has grown in popularity, there is an evolving research foundation to confirm that it uniquely contributes to learning sport and recreational skills. This presentation suggests three contributing conceptual frameworks when utilizing video feedback for teaching sport skills in recreational sport environments. Constructivism is a continuous learning process that depends on active participation for optimal results (Davies, 2010). Observational learning is the innate action of learning through observing an action (Horn, Williams, & Scott, 2002). Instructional technology encompasses the analysis of learning and performance problems, and the design, development, implementation, evaluation and management of instructional and non-instructional processes and resources intended to improve learning ad performance (Reiser and Dempsey, 2012). Each of these conceptual frameworks contains characteristics that may further illustrate the video feedback learning process for the instructor/coach. In addition to summarizing the contributions of these frameworks, recommendations to the recreational sports profession will be presented.

GP8

Effects of a Before-School Physical Activity Program on Musculoskeletal Fitness in Children, Noelle A.M. Knight & Matthew T. Mahar, East Carolina University, Greenville, NC.

Background: Children should engage in 60 minutes of aerobic activity every day, and muscle- and bone-strengthening activities on at least 3 days of the week, to promote health. Many children do not meet these recommendations. Opportunities for activity during the school day are limited. The time before school begins could be a prime time to increase physical activity levels in children.

Purpose: To examine the effect of a before-school physical activity program on measures of physical activity and upper body endurance, power, and strength in elementary school students. A secondary purpose was to examine the effect of an acute bout of physical activity on cognitive function. Preliminary results of the measures of musculoskeletal fitness are presented here. Methods: Participants were 3rd grade students (23 girls, 16 boys) aged 8.5 ± 0.6 years who attended a before-school physical activity program (44 days total), for approximately 25 minutes before the school day, for 10 weeks. The program emphasized aerobic and upper body strength activities, and had both free time and structured activity each day. Anthropometric measurements of height, weight, and percent fat (20 ± 7% fat) from skinfolds were collected. Upper body endurance was assessed with the 90-degree push-up test, upper body power was assessed with a seated 4-pound ball toss, and handgrip strength was measured with a handgrip dynamometer on both hands at the beginning and end of the program. Preliminary Results: Of 39 participants who returned consent forms and agreed to participate, 28 attended on at least 70% of the days the program was held. Participants were at the program for an average of 16.6 (± 3.4) minutes per day and took an average of 925.6 (± 403.6) steps per day for an average of 53.7% of the days the program was held. Participants were at the program for an average of 16.6 (± 3.4) minutes per day and took an average of 925.6 (± 403.6) steps per day for an average of 53.7% of the days the program was held. Participants were at the program for an average of 16.6 (± 3.4) minutes per day and took an average of 925.6 (± 403.6) steps per day for an average of 53.7% of the days the program was held. No significant differences from pre- to post-training (p < .05) were found on upper body endurance (Pre: 3.8 ± 3.8 vs. Post: 3.3 ± 4.1 push-ups), power (225 ± 41 vs. 225 ± 40 cm), or strength (15.9 ± 4.3 vs. 15.8 ± 3.4 kg). Conclusion: The before-school activity program did not result in any positive changes in musculoskeletal fitness in elementary school children. Changes in physical activity levels and cognitive function have not yet been analyzed.
Alcohol consumption is routinely seen as a rite of passage into the adult world. However, there are many negative consequences that can result from the effects after a night of hazardous drinking. Continual hazardous drinking behaviors along with high levels of alcohol in the blood increase an individual’s risk for harming themselves and/or others. This secondary data analysis targets individual patrons who consumed alcohol at establishments in the downtown area of Greenville, North Carolina during the fall of 2013. The study population was limited to individuals between the ages of 18 and 25 who have indicated that they attend East Carolina University. Patrons recruited were asked to complete a survey regarding hazardous drinking behaviors and then to blow into a breath alcohol-testing device that would measure the individual’s BrAC. In an effort to gain better understanding of the relationship between hazardous drinking and breath alcohol content (BrAC), this study looks at individuals who have identified themselves as a member of a social fraternity or sorority and compares responses to biological samples to determine if they are more at risk than those who have not identified themselves as part of a Greek organization.

Associations between biologic samples of breath alcohol concentration (BrAC) and hazardous drinking behaviors in those identified as members of a social fraternity or sorority.

Justin Sharpe, Dr. Beth Chaney, Dr. Jennifer Cremeens, East Carolina University, Greenville, NC

Age-induced physiological changes lead to the biomechanical locomotor adaptation of a distal to proximal shift in joint torques and powers during steady-state walking. Namely, proximal hip muscles generate more torque and power than distal ankle muscles in old compared to young adults when walking. Steady-state walking does not fully describe mobility because normal walking is most often comprised of only several constant-velocity steps between accelerating, decelerating, or changing direction. Accelerating steps presumably require increased muscle force and torque and may be inherently more difficult for older adults. Despite its prevalence, existing literature lacks biomechanical analyses of accelerated walking. This proposal tests the hypothesis that aging induces a distal to proximal shift in joint torques and powers during accelerated walking. We will recruit ten healthy young adults (18-25 years old) and ten healthy older adults (70-85 years old) to walk on a Bertec instrumented split belt treadmill, equipped with one force plate under each belt. Qualysis Oqus 300 cameras and Qualysis Track Manager software will collect 3D motion data from passive reflective markers placed over the right lower extremity and pelvis on each volunteer. Volunteers will walk at an initial velocity of 0.5 m/s and researchers will use Bertec treadmill software on a computer separate from the treadmill to accelerate the participants at rates of 0.3 m/s², 0.5 m/s² and 0.7 m/s². Rest periods will be provided when necessary. Visual 3D software will analyze the data employing inverse dynamics to calculate joint torques of the hip, knee, and ankle. Joint powers will be calculated as the product of joint torques and angular velocity. Peak torques and powers at each joint during the stance phase will be regressed to step number during the acceleration phase to produce a prediction equation for each variable and joint. The slopes of the regression equations for each joint and variable will be statistically compared between younger and older adults. It is expected that older adults will display larger increases in hip torque and power and smaller increases in ankle torque and power compared to younger adults during accelerated walking. An investigation of differences between younger and older adults during the acceleration phase of walking may provide a foundation for future interventions that will help older adults maintain their independence, mobility and quality of life.

Joint Torque and Power Redistribution During Accelerated Walking in Older Adults, Shane Rabideau, Daniel Schuster, Randall Bishop, Dr. John Willson, Patrick Rider, Dr. Paul DeVita, East Carolina University, Greenville, NC
How Do We Accelerate While Running?, Daniel J. Schuster^1, Shane M. Rabideau^1, Randall A. Bishop^1, Paul DeVita, PhD^1, 1Department of Kinesiology, East Carolina University, Greenville, NC

Running biomechanics are well established in terms of ground reaction forces (GRFs), joint torques and joint powers as is the direct relationship between these variables and running speed. Many studies have investigated the effects of these variables when running velocity was increased in constant state increments (Arampatzis, Bruggemann, & Metzler, 1999; Belli, Kyrolainen, & Komi, 2002; Dorn, Schache, & Pandy, 2012). However, running velocity during an athletic contest is rarely held constant. Athletes go through periods of acceleration and it is these periods that are less investigated. One study did investigate the acceleration period of running and found some results that did not align with the previous research. They found that the joint torques did not increase during the acceleration period compared to the constant velocity that occurred before acceleration. They also found that the GRFs did not increase during the acceleration period (Van Caekenbergh, Segers, Aerts, Willems, & De Clercq, 2013). Since acceleration involves running faster we would expect the joint torques and GRFs to increase during the actual acceleration as they did in the previous, constant state research.

The purpose of this study is to quantify lower extremity joint torques and powers during constant speed running and during running while accelerating at three rates of acceleration between a baseline velocity of 2.50 ms-1 to a maximal velocity of 7.00 ms-1. It is hypothesized that there will be an increase in the magnitude of the GRFs and joint torques and powers with each step during accelerated running. This study will start at a baseline velocity of 2.50 ms-1 and will accelerate to a maximum velocity of 7.00 ms-1 at rates of 0.40 ms, 0.60 ms, and 0.80 ms. They will perform each acceleration twice. Inverse dynamics will be used to determine joint torques and powers using ground reaction forces and kinematic data collected using standard motion capture procedures. Regression analyses will be used to identify the relationship between maximum GRFs, joint torques, joint powers and step number during the acceleration period while running. We expect to observe significant positive relationships in that GRFs, torques, and powers will increase with each accelerating step.

Differences in Patellofemoral and Tibiofemoral Knee Joint Loads with increasing BMI, Ann Marie Tullock, Patrick Rider, John Willson, Zachary Domire, Paul DeVita, East Carolina University, Greenville, NC

Obesity is defined by the Center for Disease Control as the presence of excess body mass, beyond what is considered generally healthy and is quantified as Body Mass Index (BMI). BMI values less than 25 kg/m^2, between 25 and 30 kg/m^2, and over 30 kg/m^2 are considered lean, overweight, and obese, respectively. Excess mass creates increased compressive forces in the knee joint which are linked to the development of osteoarthritis (OA) in obese adults (Coggan, 2001). While obese individuals vs. lean individuals walk with greater compressive tibiofemoral (TF) forces in the knees (Haight, 2013) the exact relationship between knee forces and level of obesity is unknown. Inexplicably, obese vs. lean individuals do not have a higher rate or OA in the patellofemoral (PF) portion of the knee joint. The purpose of this study was to evaluate the relationship between body mass index (BMI) and joint compressive forces across the tibiofemoral (TF) and patellofemoral (PF) portion of the knee joint. 20 adults (44 yrs) with BMI values between 18 and 44 kg/m^2 participated after providing written informed consent. Gait analysis for all participants was conducted using a 3D motion capture camera system and a force plate. TF and PF knee joint compressive forces were calculated from the motion and force data with a biomechanical model of the lower extremity while walking at a self-selected pace (1.53 m/s). Maximum PF joint force and maximum TF joint forces were correlated with BMI. PF forces ranged from 224 to 1,180 N and TF forces ranged from 1,793 to 5,714 N. A non-significant correlation was found between maximum PF
joint forces and BMI ($r=.040$) whereas a significant ($p<0.05$) correlation was found between maximum TF joint forces and BMI ($r=.694$). These data suggest that an increase in obesity contributes greatly to increases in TF compressive forces while having little to no influence on PF compressive forces. In turn, this research supports the theory that obesity is linked with the development of knee OA.

**GP14**

**Dengue in Pan America 2001-2012: Trends in Cases Imported into the United States**, Caitlin A.M. van Dedoorn and Stephanie L. Richards, East Carolina University, Greenville, NC

Dengue (DEN) fever is currently the most diagnosed traveler-related illness and there are 50-100 million global cases per year. An understanding of human travel patterns between DEN-endemic countries and the United States (U.S.) will improve risk assessments and identify potential routes of entry for DEN virus (DENV). As international travel increases, the geographic range of the four DENV serotypes may also increase, hence increasing the likelihood of multisero type epidemics. Travel statistics for 51 Pan American countries were analyzed from the Compendium of Tourism Statistics for 2001-2012. Countries were categorized into eight geographical regions (i.e. North America, Central America, Andean, Southern Cone, Hispanic Caribbean, English Caribbean, French Caribbean and Dutch Caribbean). Most Pan American DEN cases occurred in Brazil (Southern Cone region) in 2010 (> 1 million reported cases). In the United States, the highest numbers of imported DEN infections were observed in travelers that visited the Dominican Republic (Hispanic Caribbean region). Differences were observed in the number of travelers and DEN cases imported into the U.S. from the eight different Pan American regions. Implications due to changes in U.S. case reporting requirements over the course of the study are discussed. It is essential that the role of human travel be included in risk assessment models for the global spread of DENV.

**GP15**

**Strength Training Versus Strength Training with Whole-Body Vibration on Plantarflexor Strength and Gait Biomechanics in Older Adults: Preliminary Data**, Christopher Wendt1, Patrick Rider1, Joseph Brunol, Ann Marie Tullock2, Tibor Hortobagyi2, Paul DeVita1, The College of Health and Human Performance, Department of Kinesiology, East Carolina University, Greenville, NCI, University of Groningen, The Netherlands2

Aging is associated with deleterious physiological and biomechanical adaptations. Strength training has increased both strength and walking ability in older adults and whole-body vibration (WBV) has increased muscle strength in older adults. Little is known, however, if WBV in addition to strength training would elicit even larger improvements in gait in older adults compared to strength training alone. It is hypothesized that WBV plus strength training will increase ankle joint torque and power during walking in older adults more so than strength training alone. The purpose of this study is to compare the effects of WBV plus strength training exercise to strength training exercise on lower extremity muscle strength and ankle joint biomechanics during walking in older adults. Four healthy, older adults (2 male, 2 female) were recruited for a strength training protocol, designed to increase plantarflexor strength. They were randomly assigned to a vibration plus strength training group (VIB) with 35Hz frequency and 4mm amplitude vibration or a strength training group (ST) in which the same exercises are performed without vibration. At baseline, 5-weeks and 10-weeks, each subject participated in walking tests at 2 gait speeds, using 3D Qualisys Motion Capture and AMTI force data with Visual 3D analysis to determine changes in walking speed, stride length, and ankle joint torque and power. Additionally, strength tests were performed using a HUMAC isokinetic dynamometer. At the time of submission, each group (VIB and ST) had one male and one female complete 5-weeks of strength training. Due to small n, inferential statistics were not applied to the data. Self-selected walking speed, stride length, maximum ankle joint torque and power did not appear to differ between groups or within groups over the 5-week period. Additionally, neither group showed improvement in isometric or isokinetic plantarflexor muscle strength. Overall, there were no observable enhancements in gait or lower extremity strength as a result of strength training with or without accompanying whole-body vibration. Small sample size and little exercise exposure may explain the lack of response.

**GP16**

**Maximizing Student Development through Recreation Employment**, Taylor Quinn Yancey, East Carolina University, Greenville, NC

Undergraduate college students continue to be encouraged to gain recreation and park work experience as part of their overall education preparation. Such experience enables the student to be highly competitive for entry-level positions. Higher education costs continue to increase, which places more pressure on the student to gain employment to cover immediate expenses but to also be strategic in work experiences. Recreation and park professionals offer an ideal environment for students’ comprehensive development outside of the classroom. Many work-related tasks provide life skill development, professional development, and increased relationships with coworkers and supervisors. The purpose of this report is to present a conceptual framework related to college student employees and their professional development. Chickering’s Theory of Identity Development proposes that students progress through seven vectors of human development during their college experience (Chickering & Reisser, 1993). These vectors are inter-related, can be experienced simultaneously, and can be reevaluated and redveloped later. The vectors include developing competence, managing emotions, moving through autonomy toward independence, developing mature interpersonal relationships, establishing identity, developing purpose, and developing integrity (Chickering & Reisser, 1993). Specific examples of operationalizing Chickering’s theory will be illustrated. Recommendations to recreation and park professionals will also be presented.
Postural Responses Perturbations in People with Diabetic Peripheral Neuropathy: A Research Proposal, Matthew George Becker, Stacey Meardon, Zachary J. Domire, Sunghan Kim, Paul DeVita, East Carolina University, Greenville, NC

Individuals with diabetic neuropathy are significantly less stable during quiet and perturbed standing than individuals without diabetic neuropathy. They exhibit higher sway velocities and area ranges. The postural stability measure time-to-contact (TtC) has been shown to be more sensitive in assessing postural stability in people with other neurological conditions, such as multiple sclerosis and concussions, than traditional stabilometric measures, such as center-of-gravity (CoG) sway velocity and area. TtC has not, as of yet, been used to assess postural stability in people with diabetes or diabetic mellitus. TtC establishes a boundary of support around a person's feet when standing and predicts how long it would take that person's center of pressure to reach that boundary, given current instantaneous position, velocity, and acceleration. If the center of pressure reaches the boundary of support, the person will either fall or have to catch him or herself. We hypothesize that TtC will provide a more sensitive measure of postural stability for people with diabetic neuropathy and that as the severity of neuropathy increases, postural stability in response to horizontal translational perturbations will decrease. The first purpose is to compare the relationships of TtC and CoG sway with severity of diabetic neuropathy in anteroposterior and mediolateral perturbations in people with diabetic neuropathy. The second purpose is to identify the relationships among neuropathic severity with TtC during oblique postural perturbations. The results of this study could be used to create a diagnostic tool for risk of falling and severity of neuropathy. Three-dimensional motion capture and force plate data will be collected on 40 participants. All participants will be diabetic, with most having diabetic neuropathy ranging from low to severe and some having diabetes with no neuropathy. Participants will be perturbed on a NeuroCom Research Module (Natus Medical Inc., Clackamas, OR). Perturbations will be at 2 speeds, 10 cm/s and 20 cm/s and will last for half a second. Force plate data will be collected for 5 seconds following each perturbation. Perturbations will be forward, backward, left, right, and at 45o diagonal angles. TtC will be calculated using force plate data that will be analyzed using MATLAB software (MathWorks, Natick, Massachusetts). Both TtC and CoG sway will be regressed with results from clinical sensory testing.

Fatigue as it Relates to Automobile Accidents, Marc Anthony Bitner, East Carolina University, Greenville, NC

This study examines the role of regulatory agencies in reducing fatigue related accidents by comparing drivers in the commercial trucking industry to drivers in other industries. Fatigue has been implicated in a range of impairments that can have detrimental effects on individuals. The commercial trucking industry is heavily regulated by both state and federal regulations. House oversight and government reform subcommittees determine hours of service (HOS) for commercial truckers in order to ensure fatigued drivers do not pose a danger to themselves or other drivers. This review highlights efforts by regulatory agencies to reduce accidents resulting from fatigue. Recommendations will be made in accordance with findings as to how regulation may be implemented in other industries.

Across Porous Frontiers: Movements, Exchanges & Hidden Histories of Slavery and Freedom in 19th century United States, Mexico & the Caribbean, Maria Esther Hammack, Dr. Angela Thompson (Mentor), MA History, Atlantic World Program, East Carolina University, Greenville, NC

My Research Poster will introduce a hidden part of 19th century Atlantic World History: the transnational exchanges in African slaves that occurred along the Mexico-US border, and across the territorial and coastal boundaries of the United States, Mexico, and the Caribbean. I will specifically highlight the vicissitudes of an era ridden with unfamiliar, yet constant, movements across transnational boundaries forced by two official abolitionist actions; the abolition of the international slave trade in 1808 into the United States, the abolition of slavery in the Republic of Mexico in 1829, efforts by the British to abolish the African slave trade in the Caribbean and Atlantic. African slaves were continuously smuggled into the United States from the Caribbean through the porous US-Mexico borders up until and through 1861. Simultaneously, many runaway slaves from the antebellum south found safe havens across the southern frontier into Mexico especially after the country officially abolished the institution in 1829. African Americans were often helped by Native Americans, who themselves were also subjected to slavery on both sides of US/Mexican border and also in the Caribbean. My poster will present Mexico's role as a sanctuary for African American slaves during the 19th century, a field that has seldom been explored. The complexities of these movements and exchanges shaped a pivotal era in Atlantic World history; one that must be carefully studied as an intrinsic part of the history that includes not only the abolition of slavery in the United States, but 19th century abolitionist efforts outside of the United States, the struggles, coalitions, and connections of African slaves and Native Americans in Antebellum South, and the Underground Railroad beyond the roads that led north or east, across the Atlantic. My research is based on primary sources, abolitionists' papers, travel accounts, journals, Mexican and Texas's government documents, as well as records and correspondence from the British Parliamentary papers.
This study presents findings from a focus group held with eight older individuals with diabetes to explore barriers to participation in a diabetes self-management education program in eastern North Carolina. Participation requires referral from a physician, attendance at two classes and a follow-up session along with monitoring of health status. The main barriers to participation are the costs of the program, inconvenient class times, and a lack of agreement about the value of the program in helping with disease management. Participants felt that opportunities to talk together and find support were of greater benefit than educational classes.

**Factors that Prevent Participation and Retention in a Diabetes Self-Management Education Program**, Kenley Turney, East Carolina University, Greenville, NC

Petra suffered from few conditions that would result in bone pathologies, such as infection and malnutrition, with degenerative disorders, primarily osteoarthritis, the most common pathology observed. Therefore, Petra appears not to present the picture of a dirty, disease-riddling city of antiquity.

**Patriotism and Religion: How the ‘Fight for Freedom’ unites Americans**, Zachary Stone Parker, East Carolina University, Greenville, NC

This research, collected through interviews, scholarly observations, and a cultural consensus survey, examines how the thematic ‘Fight for Freedom’ is the central banner that unites all early groups of colonists in America. The theme is so pervasive that it takes on a strong religious character and becomes inextricably intertwined with the theologies of several denominations. Using Guilford County, North Carolina as a microcosmic example, I will illustrate how American locales can use this overlying theme to better represent a wider array of cultural groups in parks, museum, memorials, and history generally. Rather than pitting one group against another as is common in historical narratives, this uniting theme can facilitate a more accurate, multifaceted approach to the past.

**Exploring Quality of Life at Petra through Paleopathology**

Courtney Canipe, Megan Perry, Department of Anthropology, East Carolina University, Greenville, NC

The ancient city of Petra, Jordan, capital of the Nabataean kingdom from roughly the 2nd century B.C. to 2nd century A.D., has attracted ongoing archaeological research since the early 1900s. However, much of this work has focused on the site’s architecture, leaving many unanswered questions concerning what the quality of life was like for Petra’s inhabitants. This poster provides a picture of health and quality of life of individuals buried on Petra’s North Ridge (n=38) during the 1st century A.D. The North Ridge tombs are hypothesized to contain the non-elite segment of the population, as opposed to the elites buried in the monumental carved tombs for which Petra is famous. Skeletal analysis included macroscopic observation of pathologies along with assessment of age and sex profiles of the sample. This evidence clearly shows that non-elite individuals at Petra suffered from few conditions that would result in bone pathologies, such as infection and malnutrition, with degenerative disorders, primarily osteoarthritis, the most common pathology observed. Therefore, Petra appears not to present the picture of a dirty, disease-riddling city of antiquity.

**Revisiting the work of Stanley South: Excavation at the Palmer-Marsh House, Bath, NC from 1960-2013**, Eva Elizabeth Falls, East Carolina University, Greenville, NC

In 1960, Stanly South uncovered a ballast-stone lined cellar located in the backyard of the historic Palmer-Marsh House in Bath, North Carolina. South conjectured the cellar pre-dated the construction of the Palmer-Marsh House and was attached to a larger residence. The 2013 East Carolina University Field School, under the direction of Dr. Charles Ewen, tested South’s hypothesis by excavating an area along the northern wall of the cellar, and found no definitive evidence the cellar was indeed attached to a larger structure. This excavation concludes the work South began over 53 years ago, and provides further insight into the settlement of 18th century Bath.
**GP25**

**An Investigation of the Taphonomic Effects of Animal Scavenging**, Alexander Garcia-Putnam, Megan Perry, Department of Anthropology, East Carolina University, Greenville, NC

Numerous environmental and human-induced variables that affect decomposition can cloud accurate estimations of the postmortem interval (PMI). For instance, scavenging animals can remove soft tissue and disarticulate and scatter remains, resulting in faster-than-expected decomposition. This study investigates the impacts of animal scavenging on decomposition rates and estimations of the PMI in eastern North Carolina using pigs (Sus scrofa) \( n = 4 \) as analogs for human remains. Systematic observation over a five-month period documented which scavengers affected the death scenes, the decompositional changes of each subject, and the scattering patterns of the skeletal elements to determine whether or not scatter patterns over time can be predictive of the postmortem interval. One specimen enclosed in a wire cage served as a control. Motion sensing cameras were positioned at the three exposed sites to capture images of scavenging animals. Vultures and canid scavengers produced the most pronounced scattering events. The exposed remains reached full skeletonization and disarticulation by day 8, while the control reached a skeletal state by day 23. Scatter patterns however are not strongly predictive of the time since death.

**GP26**

**A Bayesian Approach to Investigating Age-at-Death of Subadults in a Forensic Context**, Kelsey I. Roepe, East Carolina University, Greenville, NC

Mortality profiles of children from archaeological contexts provide a sensitive indicator of overall population success. Estimating the age that subadults perished is the first step in this assessment, with dental formation remaining the most accurate aging indicator for children due to minimal environmental impact. Even the most accurate method, however, is affected by “mimicry bias”, where the age profile of the target population “mimics” the age profile of the reference population used to develop the age estimation method. Bayesian statistics and transition analysis can control for this bias in archaeological and forensic samples through calculating the average age that transition from one phase of development to another occurs, and then estimating the probability that someone of a certain age has a given phase of development based on a sample of individuals of known age. Here, robust age ranges related to the dental formation phases of Moorrees et al. (1963) were generated using a sample of 200 children of known age (Orthodontics Case File System, Maxwell Museum of Anthropology). These ranges can be used by bioarchaeologists and forensic anthropologists wishing to control for “mimicry bias” in their mortality profiles that rely on age estimation via dental formation.

**GP27**

**The Analysis of Mississippian Settlement Patterns in the Town Creek Area, North Carolina**, Taryn Page Ricciardelli, East Carolina University, Greenville, NC

Town Creek is an archaeological site located in Montgomery County, North Carolina. This site represents the remains of a late prehistoric Native American community that existed between AD 1150-1400. The people who lived at Town Creek practiced a way of life that archaeologists refer to as Mississippian. Mississippian peoples were maize farmers who lived in large settlements and built earthen mounds. Town Creek appears to have been a civic-ceremonial center that served as a ceremonial focal point for people living in the surrounding region. Previous research indicates that the site was more heavily populated in its early history (AD 1150-1300) compared to its later history as a vacant center (AD 1300-1400). My research has investigated the region surrounding Town Creek to see if there were corresponding changes in regional populations. In my research, I have looked at the spatial distribution of archaeological sites in the region surrounding Town Creek, and I have dated these sites by using ceramics that were used during different time periods. Previous studies have shown that these ceramics are a good indicators of the occupation history of an archaeological site. My research is focused on the settlement pattern analysis of hinterland sites in the region surrounding Town Creek. I used the spatial and temporal distributions of sites within a 40 km area around Town Creek to determine which sites were contemporaneous with the mound site. I also studied how the occupancy of the area changed through time. My results support a similar timeline to that of Town Creek, with hinterland sites having a peak occupancy from or earlier than AD 1150-1300. Spatial analysis also indicates that Town Creek was its own administrative center, similar to other Mississippian mound sites located more than 32 km apart. These results show that as people moved away from the Town Creek site, they were also leaving the hinterland sites. Because Town Creek’s distance from other mound sites also suggests that Town Creek was its own political entity, I conclude that the hinterland sites surrounding Town Creek were connected to the mound site either politically or economically, and consisted of the inhabitants who moved away from Town Creek when it became more of a vacant center.

**GP28**

**An Assessment of a Leadership Development Program and the Influence on Student Leadership Learning Outcomes**, Brittany N Hopewell, Nelson I. Cooper, East Carolina University, Greenville, NC

The purpose of this research project is to assess a collegiate leadership development program and explore the relationship between program participation and student leadership learning outcomes, based upon the Social Change Model of Leadership Development (SCM). Utilizing a one group pre-test post-test design and convenience sampling, 68 full-time enrolled, on-campus students completed the Socially Responsible Leadership Scale (SRLS). The SRLS was used to measure eight characteristics of socially responsible leadership: consciousness.
of the self, congruence, commitment, collaboration, common purpose, controversy with civility, citizenship, and change. A series of t-test analyses were conducted to compare pre-test and post-test scores of the leadership characteristics. The findings may contribute to collegiate student affairs professionals programming strategies and assessment procedures, especially as many colleges and universities place an emphasis on leadership development.

GP29

Park-based Physical Activity among City Residents with Varying Socioeconomic Levels, Emily Pimdal1, Katrina D. DuBois1, Bleiba Dasi1, Kindal Shores2, Stephanie Jilcott Pitts3, 1Department of Kinesiology, East Carolina University, Greenville, NC, 2Department of Recreation and Leisure Studies, East Carolina University, Greenville, NC, 3Department of Public Health, East Carolina University, Greenville, NC

Background: Parks are increasingly recognized as an important component of the built environment for physical activity (PA) (Bedimo-Rung et al., 2005). They provide a free space to engage in PA and are a unique opportunity for researchers to investigate park-based PA among residents from varying socioeconomic status (SES). Purpose: To examine the differences in park-based PA and self-reported PA among residents of various SES. Methods: Participants (N=4786) were randomly selected to receive a mailed survey using a modified Dillman (1978) approach. The survey included questions on park visitation, park-based PA, demographics, and self-reported PA from the International Physical Activity Questionnaire (IPAQ). Physical activity levels were categorized as “low”, “moderate” and “high,” according to standard IPAQ protocol. SES was defined by household gross income; low SES was an income less than $19,999 and high SES was an income greater than income $59,999. Results: A total of 371 surveys were used in the analyses. Low SES residents had a lower prevalence of park-based PA (56%) versus high SES residents (65.2%) (p=.249). The prevalence of “moderate” PA was less for low SES residents (29.5%) compared to high SES residents (42.0%) (p=.171). Low SES residents reported less “high” PA (32.0%) compared to high SES residents (42.1%) (p=.171). Despite differences in park-based PA and self-reported PA, the differences in PA level were not statistically significant between SES levels. Conclusion: Park-based PA and self-reported PA in this study does not follow the trend of previous research (Sallis et al., 1997), where low SES residents reported lower amounts of “moderate” and “high” PA. However, given the limited number of studies, more research is needed to understand the role park-based PA has among individuals varying of SES levels. Park-based PA has the potential to shed light on communities’ physical activity and understanding health disparity in the United States.

GP30

Perceptions of Safety Survey in the Technology and Computer Science Departments at ECU, Abigail Marie Sweet, East Carolina University, Greenville, NC

The purpose of this study is to assess the effectiveness of the lab safety program in the College of Technology and Computer Science, East Carolina University. Engineering, Technology, Construction Management, and Chemistry Departments in colleges and universities typically have lab safety programs, but just how effective are these programs in actuality? A way to measure effectiveness of the safety programs is by conducting a perception survey of the people involved such as students and lab instructors. The survey should help to shine light on the true “reality” of safety program efficiency and effectiveness by comparing perceptions at different operational levels. In this study, a perception survey will be conducted in the Chemistry, Engineering, and Technology Laboratories at East Carolina University. After approval from the Institutional Review Board, willing students and lab supervisors/instructors will be invited to participate in the survey and the results will be summarized and analyzed. Based on the findings of the survey results, recommendations will be provided to help with efficiency and effectiveness of lab safety programs of the surveyed labs.

GP31

Financial Education and Debt: The Key May be Confidence, Karen Vajda1, Bryce Jorgensen1, Hui Bian2, 1Department of Child Development and Family Relations, East Carolina University, 2Office for Faculty Excellence, East Carolina University, Greenville, NC

Less than one third of young adults in the United States possess adequate understanding of basic financial concepts. Unfortunately, lacking financial knowledge has been linked to several problematic outcomes such as increased debt and not planning for retirement. This study examined the relationship between financial literacy and education to more fully understand the process of obtaining financial knowledge as well as how education impacts one’s confidence in managing his or her finances and debt incurrence. Participants (N = 462) completed the College Student Financial Literacy Survey (CSFLS), which included items assessing financial education, financial attitudes, and total debt. Results indicated that participants with more financially-related education had higher levels of financial knowledge and were significantly more likely to rate their confidence in managing their finances as high compared students who had not taken these courses. Students who felt more in control of their finances had significantly less total debt than students who did not feel in control of their finances (p < .05), while students who felt like their finances were a significant source of worry or hassle had significantly more total debt (p < .001). Implications for financial education for college students will be addressed.
I’m with her: An examination of Old Lesbian relationship status and its association with health conditions, health behaviors and health perceptions, Christina Hall, Kerry Littlewood, Paige Averett, Intae Yoon, Carol Jenkins, East Carolina University, Greenville, NC

Existing research has demonstrated that those in committed relationships are healthier than those who are not. Yet very little research on same-sex relationships and particularly older lesbian relationships exists. The current study examined the physical and mental health conditions, health behaviors and health perceptions of 456 older lesbians via their relationship status. In the analysis depression was the only health condition with a statistically significant association with relationship status, with widowed and celibate lesbians suffering from higher percentages of depression. Findings suggest that relationship status is statistically associated with all health perceptions (physical, emotional, weight, being lesbian, and aging), but no health behaviors (exercise and tobacco and alcohol use). This research suggests that future interventions designed to reduce depression and improve health perceptions for older lesbians may benefit from examining relationship status. Future research is needed to further explore the importance of relationship status for older lesbians.

Art is Good Medicine Program, Lindsey D. Harrell, Paige Averett, East Carolina University, Greenville, NC

The Art is Good Medicine program is sponsored by the Pitt County Arts Council at Emerge located in Greenville, North Carolina. It is a unique outreach program in which art is used as a vehicle for the improvement of the mental, physical and social wellbeing of those living with cancer. The one-on-one interactions and group workshops offered through the program are open to patients, survivors, caregivers and family members. The Art is Good Medicine program consists of trained and specialized artists as well as social workers. While the artists provide the arts component for the program, the social workers utilize his/her training to help the patient in using various art forms as a guide for self-expression and discovery. By bringing artistic aspects into the lives of these individuals, this program helps to provide a holistic approach by engaging their mind, body, health and overall well-being. In order to determine the success of the program, evaluations are conducted through surveys and interviews with participants. The intention of this program is to provide valuable benefits of using art as a vehicle for personal growth, particularly in the medical setting.

Youth Outreach in Pitt County: The Youth Public Arts Program, Vanessa Hines, Paige Averett(Mentor), College of Human Ecology, East Carolina University, Greenville, NC

The purpose of this creative activity is to facilitate at-risk youth in developing positive expression through the use of various art mediums. “At-risk” refers to youth who are experiencing social, behavioral or emotional difficulties such as problems at school or at home, involvement with negative peer groups, legal troubles, etc. At-risk youth who have access to the arts in school and other settings are more likely to have improved academic results, better workforce opportunities, and increased engagement in their local community. In an effort to provide a positive artistic outlet for the youth in our community, the staff at Pitt County Arts Council at Emerge developed the Youth Public Arts Program. Founded in 2005, The Youth Public Arts Program is a non-profit community art program that meets two Saturdays out of the month. Youth between the ages of 8-18 come to Emerge to learn a variety of art techniques and create meaningful individual and public art projects. Youth also develop beneficial character skills through the process of “sketchbook sessions” with social work interns. The intention of this poster is to showcase the work, engagement and process of this creative activity.

Perceptions of Biologists by Undergraduate Students: Are we reinforcing negative stereotypes? Kristi Walters 1 & Grant Gardner 2, 1 Dept of Biology, ECU; 2 Dept of Math/Science Ed, MTSU

After decades of research on students’ perceptions of scientists, there is little research into understanding why these perceptions exist, let alone how (and if) they should be corrected. The cliché image of a scientist continues to be a common stereotype in popular culture. When college students were asked to describe a scientist, they perceived them as “unsociable, introverted, and possessing few, if any, friends”. Students who might consider enrolling in science courses or entering the sciences are hesitant to do so, because they may not perceive themselves as fitting the classic image of a scientist or do not want others to view them in that light. Therefore these students may avoid STEM fields in order to avoid being labeled with a perceived negative self-image. What seems like an innocuous misconception, could actually be harmful for developing future scientists and sustaining the science pipeline. A quasi-experimental pre-post design was used. Students (n = 312) were from two sections of the same introductory biology course. An online survey was provided to all members of the group prior to the start of the course and the post-test was embedded in the final exam. The instrument was an adaptation of the Kitchen, Reeve, Bell, Sudweeks, and Bradshaw (2007) Science Perceptions Survey (SPS). The SPS uses a dichotomous scale and began with “biologists are…?” followed by a choice of two descriptive terms. The most significant changes were observed in the students’ perception of a biologist’s intelligence, selfishness, humanity, inclusive nature, ethics, social responsibility, morality, problem solving ability, logic, honesty,
skepticism, spiritual beliefs, patience, and ability to agree. There was a slightly significant difference in the perception of female versus male biologists and in the hardworking ability of biologists. The information obtained from this study could be useful in designing learning and social interventions for STEM students. If we can better understand how students perceive biologists and biology (and what drives these perceptions) then perhaps we can address the negative views and hopefully correct these perceptions while we encourage and promote the positive views.

GP36

**Media Reporting on Crimes Committed by Individuals with Mental Illness: Effect on Public Perception**

*Lucy Walcott Wilmer, East Carolina University, Greenville, NC*

The influence of media on public perception of mental illness is exponential and long-lasting. Stories about or references to people with mental health issues are rarely out of the headlines and are often the focal point in film and television scripts. Mental health conditions are often “headlined” and overemphasized as causes for criminal activity therefore implying that persons with mental illness are likely to commit violent acts. Research strongly suggests this overemphasis of mental illness as “root cause” for criminal acts, as opposed to potential contributing factor, or unrelated factor, is flawed and fundamentally harmful to large-scale public perception of mental illness. A widely held public perception, arguably propagated by the mass media, that individuals with mental illness as dangerous fuels negative stereotypes about individuals with mental illness and instigates fear within communities which play an influential role in compromised human rights (Rose, 1998). This study consists of information gathered through surveys and interviews of individuals who have a diagnosed mental illness and those who did not disclose whether or not they have such a diagnosis. Respondents were asked to report their feelings about whether they consider individuals with mental illness dangerous or not dangerous as well as asked to comment in detail about how their perception(s) of the mentally ill were influenced by the media. Data provided moderate to high level indications respondents’ perceptions of individuals with mental illness were negatively influenced based on media consumption of televised news stories and print articles. Further research is needed to determine definitively the scope and breadth of this negative influence on public perception of individuals with mental illness.

GP37

**An Analysis of Digital Assessment of Crown Preparations Using CADCAM Technology (E4D)**

*Hannibal Alexander Crisp, East Carolina University, Greenville, NC*

Background and Purpose: The Commission on Dental Accreditation recommends that dental education provide tools for students to develop into lifelong learners and to becoming active participant in the learning process. Self-assessment protocols have been developed in pre-clinical and clinical programs to foster a reflective process and engaging the student in the learning process. During preclinical exercises faculty and students subjectively evaluate performance visually. One area that is difficult to evaluate is the amount of retention or the Total Occlusal Convergence (TOC) on crown preparations. CADCAM technology provides an objective mechanism to evaluate performance. The purpose of this investigation was to evaluate teeth prepared for crowns with known variations using the E4D system (E4D Compare). Methods and Results: Thirty preparations were made on plastic teeth with preclinical standard protocol. Increasing taper was generated by reducing tooth structure on the coronal axial walls of the preparation and placed into three groups (1mm, 1.5mm, and 2mm reduction). The preparations were scanned digitally using the E4D scanner, and the TOC was measured with E4D Compare. The TOC was measured at three points on the tooth on three separate days. The three points were combined to create a mean TOC for each group. The mean TOC was 10.66°, 22.80°, and 46.87° respectfully. There was a statistically significant difference between all groups p=.001. Therefore the E4D Compare is an effective means to objectively measure crown retention. Conclusion: The results of this study support the use E4D Compare for as objective way to evaluate the retention of crown preparation. Using the Compare software is also a potentially effective means for a student to self-assess their performance.

GP38

**Improving Outreach Regarding Contamination in North Carolina Self-caught Fish**

*Elizabeth Ann Brown-Pickren, East Carolina University, Greenville, NC*

Recreational fishing is popular and fish is a good source of health benefits, yet self-caught fish may be a source of contaminants. Each state issues consumption advisories, some state-wide and some specific to water bodies, and each state manages marine fish and shellfish through catch limits, size limits and closed areas. An open-ended intercept survey of coastal anglers in North Carolina revealed extensive knowledge of catch restrictions but minimal knowledge of the effects of contaminants on health, little concern for contaminants in their catch, and a misguided faith that the government would post warnings at every water body at risk for contaminants. This project is intended to encourage collaboration between fishery management agencies and public health agencies, and outline an effective outreach framework.
Semantics Use in Discourse: The Influence of Age and Cognition, Stephen Kintz and Heather Harris Wright, Department of Communication Sciences and Disorders, Associate Dean for Research, College of Allied Health Sciences, East Carolina University, Greenville, NC

According to the feature-specific model (McRae, Cree, Seidenberg, & McNorgan, 2005), semantic knowledge is a distributed network of features that are stored separately and can be impaired separately. This can be seen in individuals presenting with categorical deficits (e.g., living things deficit). Semantic features are the building blocks that make up concepts (e.g., visual, color, or sound). Yet most of the research on semantic knowledge and category deficits uses only single concepts. Few researchers have examined how semantic knowledge is used within discourse. The purpose of the study, then, was to determine semantic knowledge use in discourse produced by younger and older participants and determine the influence of cognitive ability on semantic knowledge use in younger and older participants’ discourse productions. Cognitively healthy, younger (n=30, 20-39) and older (n=30; 60-89) participants told stories that were transcribed and coded for 10 types of semantic knowledge and also living and nonliving things. Participants also completed memory and attention measures. Preliminary results indicated group differences for the semantic knowledge – sound, and living and nonliving things. Across groups, proportion of use of the semantic knowledge sound, significantly correlated with performance on measures of episodic memory and executive attention. For the proportion of living and nonliving concepts, nonliving things significantly correlated with performance on measures of semantic memory and executive attention. Younger and older adults used semantic knowledge differently in discourse productions; yet, there were only weak relationships between any of the semantic knowledge types and cognitive measures. Theoretical implications of results will be discussed.

Workplace Mentoring: The Impact of Humor Style and Frequency, Zachary M Love, Department of Psychology; Mark C Bowler, Department of Psychology, East Carolina University, Greenville, NC

This study examined the effects of mentor positive humor style and humor frequency on mentoring satisfaction and subsequent work-related outcomes. The matched mentor-protégé sample was drawn from a formal mentoring program of direct-care staff at a large southeastern state psychiatric hospital. Path analysis was used to test a series of eight hypotheses in order to determine the fit of the hypothesized model (N=54). Overall, both a mentor’s positive humor style and humor frequency had positive direct effects on their protégé’s satisfaction with mentoring. Furthermore, mentoring satisfaction had positive direct effects on affective organizational commitment and job satisfaction. Finally, the results demonstrated a negative indirect effect of mentoring satisfaction on turnover intentions, mediated by affective organizational commitment. Several fit indices were employed including RMSEA (.05), SRMR (.06), CFI (.99), and TLI (.98), which unanimously indicated excellent fit of the model with the data. The implications of the study include: (1) The precedent for humor as an antecedent of successful mentoring relationships, (2) the support for humor as an important work-related variable, and (3) increased knowledge regarding the effectiveness of workplace mentoring.

The Financial Behavior of Emerging Adults: A Family Financial Socialization Approach, John T. Schweichler, Medical Family Therapy Doctoral Student, East Carolina University; Bryce L. Jorgensen, Department of Child Development and Family Relations, East Carolina University, Greenville, NC

The present study examined the role of attachment insecurity locus of control and parental financial communication in the financial behavior of emerging adults from a family financial socialization theory perspective. The sample consisted of 348 emerging adult college students (226 female) from a large southeastern university. Structural equation modeling was utilized to examine the direct and indirect effects as well as the overall fit of the model that was constructed according to family financial socialization theory. Results indicated a mediated relationship between attachment insecurity and financial behavior with significant indirect effects (β=-.717 p<.001). Direct effects of attachment insecurity on the mediating variables locus of control (β=-.956 p<.001) and financial communication (β= -.380 p<.001) were significant. Significant positive effects from locus of control (β=.615 p<.001) and financial communication (β= .338 p<.001) on financial behavior were also found. Overall fit of the model was good (CFI=.971 TLI=.953 RMSEA=.050 SRMR=.049). The findings support the inclusion of attachment as an important family relationship variable in the financial socialization process. The results also support the structure of a conceptual model of family financial socialization theory. Implications for research and practice are discussed.

Self-Discrepancies in Wife and Mother Roles in Relation to General and Role-Specific Well-Being, Megan Sharp, Summer Anderson, & Christyn Delbier, Department of Psychology, East Carolina University, Greenville, NC

Self discrepancy theory posits that discrepancies between who people actually are (actual self) and who they wish to be (ideal self) or think others feel they should be (ought self) are associated with poorer well-being. The current study assesses such discrepancies within the roles of wife and mother and their associations with general and role-specific well-being. The study also compares levels of discrepancies between two groups (married, working first time mothers; and married, working non-mothers)
It is hypothesized that those with co-occurring ADHD will have captured from the Drug Use History and Treatment Questionnaire. The participants' alcohol and drug use history will have reported childhood (Wender) and continuing ADHD symptoms. The participants in outpatient treatment for substance use disorders with vs. without attention deficit hyperactivity disorder (ADHD) on their patterns of substance use disorders with more unsuccessful attempts to quit substance use in their recovery. Results from the study will be presented and discussed along with conclusions and recommendations for future research and treatment.

**GP44**

**Stress & Health: Medical Students’ Training Perceptions, Knowledge, & Intentions to Address Stress Management, as a Specific Application of the Biopsychosocial Model, Summer Anderson, Christyn Dolbier, Department of Psychology, East Carolina University, Greenville, NC**

Introduction: Research shows a strong relationship between high stress levels and a variety of mental and physical health concerns. This affects both healthcare providers and patients. In response to this and other psychosocial factors strongly linked to health, the biopsychosocial (BPS) model has been increasingly incorporated into medical education (ME). Despite this increase, a recent national survey indicates that many people do not feel stress and its management are adequately addressed by their healthcare providers. This highlights a gap between ME efforts and patient care. Limited research exists investigating how psychosocial factors in ME translate to patient care and provider/trainee’s perceptions of these aspects of care. Purpose: The current study aims to address this gap using the following research questions: (A) how is current ME influencing physicians’ preparation to address stress management, as a specific application of the BPS model; and (B) how does perceived effectiveness and accessibility of stress management relate to the intention to address stress management with patients. Method: The study employs a cross-cohort (years 1-4) survey of Brody School of Medicine (BSOM) students (N=320). Participant recruitment will occur in cohort classes/meetings with help from ME directors. The survey will include relevant aspects of the Physician Belief Scale and Health Care Provider Survey. Expected Results: (A): 1) greater perceived amount of stress/health curriculum content will relate to greater intention to address stress management with patients; 2) greater personal stress management practice will relate to greater perceptions of effectiveness of stress management; and 3) greater perceptions of importance and effectiveness of stress management will relate to greater intention to address stress management with patients. (B): 1) greater perceptions of importance and effectiveness of stress management will relate to greater perceptions of barriers to addressing stress management with patients; 2) greater personal stress management practice will relate to greater intention to address stress management with patients; and 3) greater perceptions of effectiveness of stress management and intentions to address it with patients will relate to greater collaborative approaches to patient interaction. Results-based recommendations will be provided to BSOM ME directors to aid in improving ME.
The Influence of Foot Type and Orthotic Device Use on Frontal Plane Motion at the Ankle During a Single Leg Landing from a Jump, Kristen Garrison, Elizabeth Young, Courtney Ross, Izzat Chaaban, Emily Martin, Dr. Walter Jenkins, East Carolina University, Greenville, NC

Purpose: To assess how foot type and orthotic device use influence ankle frontal plane kinematics during single-leg landing from a jump.

Introduction: It has been repeatedly reported in the literature that female athletes experience anterior cruciate ligament (ACL) injury at a higher incidence than male athletes. The majority of these injuries occur during non-contact mechanisms, such as landing from a jump or a pivoting movement. These activities elicit a sequence of lower extremity movements, termed medial collapse, involving hip adduction and internal rotation, knee abduction (valgus), tibial internal rotation, and subtalar eversion. The resulting medial collapse places a high strain on the ACL, increasing risk for injury. Gender differences in hip and knee kinematics have been emphasized in the literature. The influence of distal factors on ACL injury have not been adequately investigated. Methods and Measures: Thirty-nine female subjects were divided by foot type (n=18 rigid feet, n=21 mobile feet) using the Navicular drop test. Foot type criteria included: mobile > 10 mm navicular drop; rigid < 4 mm navicular drop. All subjects performed single-leg jump landings on the left lower extremity to 75% of their maximum vertical jump height during each trial repetition. Subjects were randomly assigned to perform 10 repetitions with and without their foot orthoses. An 8-camera Qualysis Motion Analysis system was used to collect biomechanical measures. Two-Way ANOVA analyses were used to determine differences in frontal plane ankle motion within and between foot type and within and between orthotic use (p < 0.05). Results: Females with a mobile foot type perform a single leg landing with a significantly greater peak ankle inversion as compared to the females with a rigid foot type. Use of foot orthotic devices within each group produced no significant differences in ankle frontal plane motion. Discussion and Conclusions: Females with a mobile foot type land with significantly greater peak ankle inversion than females with a rigid foot type. The use of orthotic device to control ankle motion had no significant effect within subjects. Females with mobile feet may be at increased risk for ACL injury due to the influence of increased ankle motion during landing.

GP46


Introduction: In 2009-2010 the prevalence of obesity in children 2-9 years was 16.9% in the United States. Compared to their healthy weight peers, increased BMI in children 4-6 years was correlated with poorer gross motor skill performance. Children who move poorly may participate less physical activity, putting them at increased risk for obesity. The purpose of this study was to examine the relationships between body mass and motor skills in children ages 7-10 years. We hypothesized that higher body mass would be negatively correlated with scores on the Movement Assessment Battery for Children 2nd Edition (M-ABC2). Methods: Forty subjects 7-10 years of age, of all BMI levels, are being recruited from the Greenville, NC area. Data reported here are from the first 23 participants. Participants completed two data collections. Data gathered included demographics, anthropometric measures (height, weight, BMI and BMI Z-score), skinfolds (triceps and calf), physical activity surveys, vital signs and the MABC-2. The MABC-2 is a standardized test with established reliability and validity consisting of nine items that assess the child’s fine and gross motor skills. Scores for each component (Manual Dexterity, Aiming and Catching, and Balance), as well as total test scores were calculated. Body fat percent was calculated from skinfold measurements. Results: The mean age for these 23 participants was 8 years (SD=1.07) and BMI Z-scores ranged from -1.08 – 2.56 (mean=0.78). Subjects’ BMI for age and gender ranged from the 14th to 99th percentile (mean=71st percentile, SD=26.7). Percent body fat ranged from 12.4 - 49.9 (mean=25.8, SD=9.7). There was a weak positive relationship between BMI Z-scores and the MABC-2 Total percentile (r=0.18), the Manual Dexterity percentile (r=0.11) and the Aiming and Catching percentile (r=0.26). There was a weak negative relationship between BMI Z-scores and the Balance percentile (r=-0.12). Additionally, there were no strong correlations found between body fat percentage and any of the MABC-2 test components scores. Conclusion: Our hypothesis is not supported by our findings thus far; BMI Z-scores were found to have a low correlation with motor skill performance on the MABC-2. Three of the four participants with the top BMI Z-scores were boys, indicating gender differences in motor skill performance may have influenced the correlations we found. Results may change when all 40 subjects are added to the study.

GP47

A Pilot Study of Using 3D Ultrasound to Measure Intrinsic Foot Muscle Parameters, Ersia A. Bell, Jamie E. Hibbert, Patrick M. Rider, Anthony S. Kulas, Zachary J. Deming, East Carolina University, Greenville, NC

Finite element (FE) models are valuable tools for evaluating the foot’s response to mechanical load, insole development, effect of surgical decisions, and can potentially provide insight into numerous clinical pathologies. However, with majority of the focus of these models on external features and bony morphology of the foot, and the neglect of soft tissue contributions, there is room for improvement. Recent research has observed motion in various joints of the foot contributing to the motion of the foot in walking, due to intrinsic foot muscles, which are vital for performance of activities of daily living as they are important for safe ambulation, standing balance, and stabilizing the foot and arch. Findings of highly mobile joints in the foot present a need to develop a non-rigid foot model that accounts for the motion occurring in these joints that is achieved through active intrinsic foot muscles. It is important to understand both the structural contributions and the dynamic function of intrinsic foot muscles in order to define their role in the overall mechanical
function of the foot. Measuring the small structures of the foot, however, poses a challenge as they have a difficult layered arrangement. MRJ is known as the gold standard to measure soft tissue, but 2D ultrasound has been shown to be a reliable, more convenient and inexpensive way to obtain measurements of soft tissue in the foot. This study will seek to assess the reliability of ultrasound technology to develop improved FE models of the foot. 3D ultrasound will be used to measure structural parameters of muscles and tendons and ultrasound elastography will be used to measure soft tissue material properties of selected intrinsic foot structures. It is hypothesized that 3D ultrasound technology will produce reliable measures of intrinsic foot musculature. Preliminary data supports this hypothesis. In 4 subjects, measurements of volume were highly reliable and elastography measurements were reliable. Future work will be needed to assess validity, possibly using cadavers or comparing our measurements to MR measurements. This research will improve the knowledge of current FE models by providing more subject-specific input, as well as more detailed information about internal foot structures.

GP48
An Ergonomics Evaluation and Repetitive Motion Analysis Conducted at a Manufacturing Facility in Eastern North Carolina, Justin M. Rainey1, MA, Anne Corinne Carroll1, Ba, Hamid Fonooni2, PhD, CPE, Mark Bowler1, PhD, 1Department of Psychology, East Carolina University, 2Department of Technology Systems, East Carolina University, Greenville, NC

Background: Ergonomics is a process to minimize work related stress on workers, and requires innovation, creativity, and professional judgment. A manufacturing facility located in Eastern North Carolina participated in this study. The company produces a variety of automobile parts and employs between 500–550 full-time employees and between 100–150 temporary employees. The most common type of occupational injury for employees is hand injuries (e.g., lacerations). Purpose: The objective of this ergonomics evaluation was to investigate the tasks at the Welding Station, as well as strengthen the existing relationship between East Carolina University and local industry. The analysis assists in recognizing occupational risks before injury or illness occurs and will be used by the organization to drive a positive safety climate. Method: This project utilizes direct observation, employee interviews, and video recording/photographs of work tasks in order to complete ergonomics evaluations at two workstations. In evaluating each station, this assessment parsed out the individual tasks necessary to complete the assigned work duties and investigated the risks associated with each task. Consequently, physical exertions were identified and quantified using ergonomics task analysis. Two teams reviewed the data and the results were compared to ensure accuracy and consistency. Results: After evaluating the jobs, it was determined that over the course of a 3.6-hour shift, workstation #1 exhibits approximately 325,428 exertions and workstation #2 exhibits approximately 256,563 exertions. Possible employee risks at both stations include cumulative trauma disorders (CTDs). Recommendations: The formation and training of an ergonomics team will greatly benefit in the identification and mitigation of ergonomic risks. Additionally, considering the re-design of both workstations will benefit the ergonomics of the workplace. Further recommendations included the automation of workstations, addition of ambidextrous machine levers, anti-fatigue mats, cushioning for sharp edges, and a sit/stand option.

GP49
Comparing Active and Sedentary Female Workers: A Study of Physical Function and Quality of Life, Christopher Colt Marion, Robyn Hursley and Susan Leach, East Carolina University, Greenville, NC

Purpose: Physical inactivity accounts for more than 3 million deaths per year and is the fourth leading cause of death worldwide. In all facets of modern daily life the amount of physical activity in which an individual participates has drastically decreased. Occupational activity has been highly correlated to daily activity related energy expenditure. This study assessed differences between active and sedentary workers to determine the effects of workplace activity level on performance in the following areas: quality of life, overall physical function, static balance, dynamic balance, gait speed, and functional endurance. Methods: The participants were divided into two groups based on type of work activity and classified as either active or sedentary. Participants were instructed to complete the International Physical Activity Questionnaire (IPAQ) and Short Form 36 (SF-36) prior to arrival. Data were collected in a laboratory setting through a sixty-minute, one-time battery of assessments including the Balance Error Scoring System (BESS), Four Square Step Test, Maximum Step Length (MSL), Gait Speed, and Three Minute Step Test. Data were analyzed using descriptive statistics and two tailed Student’s t-test; a p-value of <0.05 was used to determine statistical significance. Results: Self-reported data from the IPAQ revealed that active workers partake in more frequent vigorous physical activity and less sitting time per weekday compared to sedentary workers. Although non-significant, the active workers had a higher total score on the SF-36 health survey. Results from the BESS test illustrated that the active workers demonstrated significantly less sway area during static standing balance in the following subtests: double limb stance firm surface (p=0.0098), double limb stance foam surface (p=0.0002), single limb stance foam surface (p=0.0068), and tandem stance foam surface (p=0.0091). Compared to sedentary workers, active workers had a significantly higher average comfortable gait speed (p=0.0218) and average gait velocity (p=0.025). Rate of perceived exertion was significantly less (p=0.0419) for the active group on the third minute of the three-minute step test compared to the sedentary group. Conclusion: These data illustrate that increased activity in the workplace may be linked with improved physical health and function in regards to balance, functional endurance, and gait speed.
Comparison of Strength, Range of Motion, and Pain Between Active and Sedentary Female Workers, Erin B Bostic, Anthony D Moss, Dr. Susan Leach, East Carolina University, Greenville, NC

Purpose: The purpose of this study was to compare upper and lower body strength, range of motion (ROM), pain, and subjective health between allied health workers with active jobs and sedentary workers with computer-based careers. Methods: 10 female participants in the active healthcare worker group (PTs, PTAs, OTs, and OTAs) between the ages of 25 and 55 were age-matched with 10 participants in the sedentary computer user group. The following tests were used in data collection: The Jackson Strength Evaluation System, grip and pinch strength dynamosimeters, The 5 Times Sit-to-Stand functional strength measure, The CROM (Cervical ROM Instrument), and The Sit and Reach and Thomas tests. The following questionnaires were used: The Standardized Nordic Questionnaire, The RAND 36-Item Short Form Health Survey, and The International Physical Activity Questionnaire. In analyzing data, descriptive statistics and t-tests with p<0.05 were defined as statistically significant. Results: In comparing the two groups of participants, active healthcare workers demonstrated significantly greater isometric strength measured via the Jackson shoulder lift (p = 0.024), grip strength (p = 0.021 for dominant and p = 0.013 for non-dominant hand), and pinch strength (p = 0.0001 for dominant and non-dominant hands) vs. sedentary computer users. Computer users were significantly more likely to have been limited in the past 12 months by neck (p = 0.023) or shoulder (p = 0.023) pain vs. active healthcare workers. Computer users were also significantly more likely to have had discomfort in one or both shoulders (p = 0.039) or knees (p = 0.004) over the past 12 months. Results showed that the sedentary group had an average sitting time of 683.33 min/weekday vs. 187.5 min/weekday for the active healthcare workers, which was found to have statistical significance (p = 0.0001). Conclusion: Active healthcare workers showed significantly greater upper body strength, less pain (shoulder/neck), and less time spent sitting compared to sedentary workers. Greater upper body strength in the more active population may be due to the physical demands imposed by one’s job duties. Increased likelihood of upper extremity (UE) pain in computer users may be related to the ergonomic setup of the work environment and the amount of time spent sitting.

Oceans of Oil: History and Archaeology of Whaling on the Outer Banks, Ryan Joseph Bradley, East Carolina University, Greenville, NC

Since the Colonial era, inhabitants of the Outer Banks of North Carolina engaged in whaling, in some form or another, right up to the second decade of the 20th century. What began as drift-whale salvage operations in the early settlement days progressed to coordinated efforts of shore-based teams with onshore lookouts and six-man boat squads by the end of the 19th century. New England whalers, whose beginnings mirrored that of the Outer Bankers, rapidly evolved in the trade. By the middle of the 18th century ships out of Nantucket and New England plied an area off the North Carolina coast called the “Hatteras Grounds”. Before the introduction of onboard tryworks, these whalers may have put in to the coast of North Carolina to try-out their oil introducing techniques to the locals of coastal North Carolina. Today, little is left of the industry conducted on the Outer Banks for over two centuries. This poster presentation will feature current and ongoing research into where the trade was plied in North Carolina, what tools were used, what type of whales were caught, as well as how many and how much they were worth.
Throughout the nineteenth century, steam propulsion in ships grew from an idea to a widely used method of modern transportation. While the use of steam in propulsion has been given credit with advancing shipping into the modern age, the advancements in steam powered unloading systems on the Great Lakes helped propel shipping into the twentieth century. One ship that fully demonstrates this advancement in maritime technology is the schooner-barge Adriatic of Sturgeon Bay. Credited as the first self-unloading schooner-barge on the Great Lakes, Adriatic’s development into a self-unloader cut the vessel’s unloading times by nearly a fourth. The innovative technological design of Adriatic adapted the vessel to the diverse demands of Great Lakes commerce. With its steam powered self-unloading equipment, Adriatic played a vital role in the expansion of trade in the Great Lakes, and served as a model for future designs in self-unloading technology. This vessel and many components of its self-unloading machinery, now lie off shore of one of the largest shipbuilding companies in Wisconsin. This past summer, East Carolina University’s program in Maritime Studies conducted an archaeological survey of the site, recording the vessel and all artifacts found within, an important aspect of the preservation of Wisconsin’s maritime cultural heritage.

In the last 25 years, academic, political, and social leaders have increasingly been addressing the fact that the world’s population is aging. In many ways, these changes in population demographics can be attributed to several factors, including changing fertility rates, increasing life expectancies, and in some cases, emigration/immigration rates, etc. The greatest increase is expected in some Latin American countries where groups of individuals aged 65 years and older, and 80 years and older are expected to increase at least 200% by 2030 (Wacker and Roberto, 13-15). This demographic shift has, and will undoubtedly continue to have, profound effects on social policy development, our understanding of health and wellness in old-age, and the practice of medicine itself, especially in regions of the world that experience the most dramatic growth within this age group (i.e. South American nations). As this ever-aging population is progressively thrust into contact with its nation’s healthcare system, increasing emphasis will need to be placed on physician education and understanding of the needs of geriatric populations. Previous qualitative interview studies have demonstrated that several recurring themes emerge when physicians are faced with the complexity of geriatric care. In particular, perceived barriers to adequate care include insufficient time with the patients, low reimbursements, and poor connections with community social service agencies (Hinton, 1488); these themes appear to hold true within the realm of Peruvian healthcare. Culture-bound perceptions of health, wellness, aging, and end-of-life care can differ greatly between ethnic groups, and are crucial to the understanding of the personal and medical needs of the elderly (Kim, 891). In this project, a phenomenological approach was used to investigate the cultural and social experience of health and disease in aging adults in the South American country of Peru. In particular, the physician perspective on caring for the aging population in Peru, as well as the issues and conflicts they may face when making decisions about end-of-life and palliative care will be addressed. An investigation of the social determinants of health (e.g. cultural, religious, socioeconomic considerations) that Peruvian providers must take into account when making treatment recommendations for their geriatric patients revealed 3 major themes within this population, including disparity in geriatric care, provider competency in geriatric care, and geriatric patient reliance on family. Examination of these cultural nuances may facilitate enhanced communication between providers and their patients; thus, more research will be necessary in these regions in order to gain insight that will help future providers serve the aging population more effectively worldwide.

Stem cells behave in particular fashion when it comes to cell cycle progression. The traditional model of the cell cycle describes four major phases, each one with similar lengths: growth phase 1 (G1), where the pre-replicative complex (early DNA replication machinery) is usually assembled; S phase, where synthesis of DNA takes place; M phase, where mitosis occurs; and growth phase 2 (G2). In contrast, many stem cells progress much more rapidly through G1 compared to the other phases. It has been proposed that a short G1 helps the stem cell to remain undifferentiated. Curiously, this phase, as previously mentioned, is often the place where the initial replicative factors congregate for the subsequent DNA replication process. In order to elucidate the dynamics of this behavior, we are using the ovarian germine stem cell development in D. melanogaster as a model system. We are attempting to identify whether G1 truly takes place in the cell cycle of the germline stem cell. In addition, we are trying to pinpoint when exactly in the stem cell cycle the pre-replicative complex is assembled. Finally, we want to find out whether cell cycle regulators influence the assembly of this pre-replicative complex. Our findings will have the potential of contributing to the understanding of conditions such as cancer, where it is believed stem cells play a major role. Moreover, furthering knowledge of stem cell behavior could have a tremendous impact in fields such as regenerative medicine, where stem cells could be used to produce differentiated tissue and eventually organs.
TMEFF2 acts as an AR activator in prostate cancer cells,
Joshua Corbin, Thomas Green, Maria Ruiz-Echevarria, East Carolina University, Greenville, NC

While the ability to detect prostate cancer has improved significantly due to PSA screenings, the survival rate for men diagnosed with prostate cancer has remained stagnant. Most patients initially respond to androgen deprivation treatment; however, a significant percentage of patients relapse with currently untreatable castration resistant prostate cancer, during which the prostate cancer cells develop the ability to grow in the absence of androgens. The androgen receptor (AR) plays a vital role in prostate development and homeostasis, and the deregulation of the AR drives prostate cancer tumorigenesis and progression. Delineating molecular mechanisms that contribute to AR activity may provide further insight into how aberrations in androgen signaling occur during the advancement of prostate cancer. TMEFF2 is a protein that is regulated transcriptionally and translationally by the AR, and is overexpressed in prostate cancer, suggesting a role in this disease. Preliminary data presented here demonstrates that TMEFF2 promotes changes in the transcriptional output of AR, indicating that TMEFF2 is not only an AR target, but also an effector of AR activity. The silencing of TMEFF2 with shRNA decreases the expression of certain androgen responsive genes, including PSA and FKBP51, in prostate cancer cell lines. The goal of this study is to delineate the mechanism through which TMEFF2 modulates AR activity. Interestingly, western blot analysis indicates that TMEFF2 knockdown increases global histone 3 lysine 9 trimethylation (H3K9me3). Because H3K9me3 is a repressive mark that confers a compact chromatin state and transcriptional silencing, and H3K9me3 demethylases have been shown to be important for AR transcriptional activity, it is possible that this observation may provide insight into the mechanism through which TMEFF2 modulates AR activity. Our preliminary data indicate that TMEFF2 plays a critical role as an AR activator in prostate cancer. Future experiments will aid in determining the specific AR targets that TMEFF2 effects and the mechanism through which this modulation occurs. This data will contribute to our understanding of androgen signaling in prostate cancer, and its potential for future clinical implications.

Notch-1 Regulates Epithelial to Mesenchymal Transition in Colorectal Cancer, Alex Fender, Makenzie Nutter, Timothy Fitzgerald, Fred Bertrand, George Sigounas, East Carolina University, Greenville, NC

Colorectal cancer (CRC) is the second leading cause of cancer death nationwide. Current models of CRC progression hold that tumor development is driven by a small subpopulation of cancer stem cells (CSC) that share many properties of stem cells. These cells have the capacity to drive tumor growth, are largely responsible for relapse and have been implicated in metastasis via epithelial to mesenchymal transition (EMT), similar to normal counterparts in organogenesis. Notch-1 is the major receptor for a highly conserved signaling pathway that is well-documented to control stem cell and lineage commitment in various organs, including the colon. The function of Notch signaling in colorectal cancer, however, is not well-defined. In this study, we sought to test the hypothesis that Notch-1 signaling in colon cells promotes EMT by enhancing stem cell and EMT characteristics of tumor cells. The human colon tumor line HCT-116 was transduced with a retroviral construct that expresses constitutively active Notch-1 (ICN1). Hes-1 protein levels were increased in the activated Notch-1 transduced cells, indicating that the construct was functional in activating Notch-signaling. These HCT116/ICN1 cells exhibited higher plating efficiency than the parental cell line. The average colony size of the HCT116/ICN1 cells was about two-fold smaller than the parental cell line (p<0.001). In addition, cells with constitutively active Notch-1 (HCT116/ICN1) had a longer duplication time than parental HCT-116 cells (p<0.03). Transwell migration assays revealed a two-fold increase in migration of HCT116/ICN1 cells as compared with the parental control (p<0.03). Western blot analysis demonstrated that the HCT116/ICN1 cells with activated Notch-1 expressed highly increased levels of the EMT associated proteins Smad3, CD44 and Slug. This was accompanied by a four-fold decreased expression of E-cadherin. Collectively, our data point to the Notch-1 pathway as being a potential key regulator of EMT in colorectal tumors and as such, may be of therapeutic or prognostic utility.

Cardiac Ischemic Reperfusion Injury Remains Expanded 7 Days After Intratracheal Instillation of Nanosilver, N. A. Holland1, D. P. Beakl1, R. A. Lusli1, S. J. Sumner2, T. R. Fennell2, and C. J. Wingard1, Department of 1Physiology, East Carolina University, NC, 27834 and 2RTI International, Discovery Sciences Research Triangle Park, NC 27709

The potential uses of engineered nanomaterials have expanded in biomedical technology and consumer manufacturing. Our lab has demonstrated expansion of myocardial infarction in male Sprague-Dawley (SD) rats 24 hours after intratracheal (IT) instillation of nanosilver (AgNP). We hypothesized that pulmonary exposure to AgNP induces a persistent systemic sensitized inflammatory state that underlies the expansion of cardiac ischemia-reperfusion (IR) injury. To test this hypothesis, we instilled male SD rats with 200 μg of 20 nm or 110 nm PVP or citrate coated AgNP, or a respective PVP or citrate vehicle. Serum samples were collected prior to instillation and 1, 3, 6, 24, 48, 72, and 168 hours following instillation. Serum samples were analyzed by multiplex assay for the following cyto/chemokines: G-CSF, IL-1α, IL-2, IL-6, IL-18, MCP-1, and TNF-. Seven days (168 hours) after exposure, cardiac ischemia was induced by left anterior descending coronary artery ligation for 20 minutes followed by 2 hours of reperfusion (IR injury). IT exposure to 20 nm (37.8 ± 2.7) and 110 nm (42.1 ± 4.7) AgNP/PVP resulted in expansion of IR injury (% infarcted area/area at risk) compared to small PVP (23.6 ± 0.9), large PVP (27.2 ± 2.2) or naïve (17.0 ± 0.6). Exposure to 20 nm (36.85 ± 1.4) and 110 nm (28.3 ± 2.2) AgNP/Citrate also resulted in expansion of IR injury 7 days following IT exposure versus citrate vehicle (20.83 ± 1.3). Exposure to 20 nm AgNP/PVP resulted in higher aggregate serum concentrations of G-CSF (287.3
± 17.4 pg/mL), IL-2 (606.7 ± 29.7 pg/mL), IL-6 (1799 ± 195.7 pg/mL), IL-18 (479.6 ± 28.7 pg/mL), and MCP-1(2465 ± 86.0 pg/mL) compared to small PVP vehicle: (181.2 ± 23.1 pg/mL), (250.1 ± 25.9 pg/mL), (468.2 ± 103.9 pg/mL), (250.1 ± 103.9 pg/mL), (207.4 ± 22.2 pg/mL), and (1767 ± 107.9 pg/mL) respectively. No statistical differences were demonstrated between 110 nm AgNP and large PVP. Based on these data, we suggest that IT AgNP exposure increases circulating levels of several pro inflammatory cytokines which may contribute to the expansion of IR injury as far out as 168 hours post exposure. Supported in part by NIEHS UI9 ES019525 and ECU.

Dephosphorylated smooth muscle myosin filaments are unstable in the presence of ATP; yet in smooth muscle cells myosin filaments are maintained. Several proteins have been identified that stabilize myosin filaments and actin-myosin interactions. Our experiments show that fesselin may be one such protein. This was tested by observing the effect of fesselin on the rate of dissociation of actin-myosin by ATP in a stopped-flow device. Dissociation was measured by light scattering (a measure of particle size) and by Acrylodan tropomyosin fluorescence (a measure of myosin detachment). Fesselin greatly reduced the rate of detachment of myosin from actin, but had little effect on the rate of HMM detachment. Data from this study suggests that fesselin stabilizes myosin filaments and acts to tether myosin to actin. Electron microscopy measurements also demonstrated that fesselin reduced the rate of dissociation of myosin filaments. In the presence of fesselin myosin filaments were found to be larger and organized into bundles. These results support that fesselin acts to organize smooth muscle contractile elements.

Avian Synaptopodin 2 (Fesselin) Stabilizes Myosin Filaments and Actomyosin in the Presence of ATP, Nathaniel L. Kingsbury, Randall Renegar, Mechthild M. Schroeter and Joseph M. Chalovich, East Carolina University, Greenville, NC

The levator veli palatini (LVP) muscle is the primary muscle responsible for elevating and retracting the velum during velopharyngeal (VP) closure. VP closure is crucial for production of oral speech sounds. In cleft palate anatomy, VP function often remains impaired after surgery due to altered repositioning of the LVP. Recent technological advancements provide more reliable means of direct visualization of this region. MRI is the only imaging modality that can visualize the underlying musculature of the VP region. Research into this region using MRI is primarily based on images obtained at rest or during sustained phonation of speech sounds (Ettema et al., 2002; Ha et al., 2007). Dynamic MRI in real-time enables visualization of rapid VP closure as it occurs in 100-150 milliseconds during connected speech (Kuehn, 1976). The purpose of this study was to examine differences in LVP muscle morphology in adults with repaired cleft palate and adults with normal anatomy at rest and during speech using Magnetic Resonance Imaging (MRI). Five adults with repaired cleft palate and five adults with normal anatomy were scanned at rest and during production of “ampa.” Recent advancements in dynamic MRI protocol enable improvements in image acquisition rates, image quality, and signal-to-noise ratio as cited in previous literature (Bae et al., 2011; Perry, Kuehn, & Sutton, 2013; Sutton et al., 2010). Data enabled visualization of midsagittal and oblique coronal images for each participant at rest and during production of each phoneme (sound) in the sample. Preliminary findings are based on quantitative measurements of ten participants at rest. Average LVP length was longer in adults with normal anatomy than those with repaired cleft palate. The normal anatomy group demonstrated less variability between participants in LVP length and distance between origin points. Distance between origin points was shorter in adults with repaired cleft palate than those with normal anatomy. Preliminary results suggest similar average angle of origin and LVP thickness measurements between adults with repaired cleft palate and adults with normal anatomy. Findings suggest variations between individuals with repaired cleft palate and adults with normal anatomy. These findings are in agreement with prior studies related to normal and abnormal anatomy in adults (Ettema et al., 2002; Ha et al., 2007).
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Investigating the Interaction of RecQL4 and Mcm10 in Drosophila melanogaster, Wayne A. Rummings, Jr, Michael Reubens, Lucas T. Hopkins, and Tim W. Christensen, East Carolina University, Greenville, NC

Disrupting the machinery responsible for the highly orchestrated events of the cell cycle is thought to play an important role in the development and progression of cancer. RecQL4 is one of the five RecQ helicases found in humans. It is a 1208 amino acid protein with a highly conserved Superfamily II helicase domain that has been shown to be essential for cell viability. Mutations in human RecQL4 give rise to three autosomal recessive diseases: Rothmund-Thomson syndrome, RAPALIDINO, and Baller-Gerold syndrome. Affected individuals age prematurely and are predisposed to site-specific malignancies. Further, RecQL4 possesses a distinct N-terminal region, sharing sequence homology with the yeast replication initiation factor Sld2. Given this, elucidating key protein-protein interactions will provide further insight into RecQL4’s involvement in replication. Mcm10 is another highly conserved protein, first discovered in Saccharomyces cerevisiae. Mcm10 has essential roles in replication and the elongation process. Work in 293T cells and Xenopus extracts show a direct interaction between the two proteins, with Mcm10 mediating RecQL4’s association with the Mcm2-7 helicase and GINS complex. With this in mind, we are interested in further establishing Drosophila melanogaster as a model for investigating the significance of this protein interaction. Using the yeast two-hybrid system, we have confirmed that a physical interaction exists between Drosophila RecQL4 and Mcm10. The generation of double mutants suggests a genetic interaction after observing the rescue of RecQL4 lethal and Mcm10. The generation of double mutants have confirmed that a physical interaction exists between Drosophila RecQL4 and Mcm10. This study was to determine if architecturally different ST and BFLH hamstring muscles also differ in muscle stiffness. Methods: Muscle stiffness was assessed by shear modulus of the BFLH and ST from 12 recreationally active participants (4 male, 8 female, 19.58yrs± 0.67, 1.68m±0.06, 66.3kg±7.96) using ultrasound elastography. Subjects reported on 2 separate days approximately 1 week apart to determine reliability and precision. Subjects laid prone (hip flexion at 90°, knee flexion at 0°) on a standard treatment table while each muscle was marked from its distal musculotendinous junction to its proximal musculotendinous junction; verified via ultrasound. At approximately 50% of the muscle length, shear modulus was measured within each muscle at an area equidistant between superficial and deep aponeurotic tendon. ICCs (0.89, 0.78) and SEMs (5.78%, 9.61%) for the BFLH and ST, respectively, supported the reliability and precision of shear modulus measurements. Results: The ST (20.14kPa±3.8) was 27% stiffer (p=0.013) than the BFLH (15.75kPa±2.64). Conclusions: Consistent with synergistic gastrocnemius muscles’ stiffness differences, the ST and BFLH also had different material properties. However, the short-fibered medial gastrocnemius was stiffer compared to the lateral gastrocnemius (Basford et al 2002), whereas the long-fibered ST was stiffer compared to the BFLH in the current study. Thus, the exact relationship between architecture and stiffness is not clear. Although speculative, the ST may be stiffer to prevent overstretcing and subsequent muscle damage at high excursion speeds. Further research is warranted to better understand the relationship between muscle architecture and muscle stiffness.

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Shear Modulus of Architecturally Different Hamstring Muscles, Kayla D. Seymore1, Jamie E. Hibbert1, Zachary J. Domire1, Anthony S. Kulas2, 1Department of Kinesiology, East Carolina University, 2Department of Health Education and Promotion, East Carolina University, Greenville, NC

Introduction: Muscle architecture, the arrangement of fibers, is a strong determinant of muscle function. While hamstring muscles produce hip extension and knee flexion, they are different architecturally. The biceps femoris long head (BFLH) is designed for short excursion and high maximal force production and has short and highly pennated fibers. In contrast, the semitendinosus (ST) is designed for long excursion and lower maximal force production and has long and less pennated fibers. Other muscles with the same functional roles but different architectures, the medial and lateral gastrocnemius, possess different passive material properties (Basford, 2002). Therefore, we hypothesize that the ST and BFLH will also differ in stiffness. Objective: The purpose of this study was to determine if architecturally different ST and BFLH hamstring muscles also differ in muscle stiffness.

Methods: Muscle stiffness was assessed by shear modulus of the BFLH and ST from 12 recreationally active participants (4 male, 8 female, 19.58yrs± 0.67, 1.68m±0.06, 66.3kg±7.96) using ultrasound elastography. Subjects reported on 2 separate days approximately 1 week apart to determine reliability and precision. Subjects laid prone (hip flexion at 90°, knee flexion at 0°) on a standard treatment table while each muscle was marked from its distal musculotendinous junction to its proximal musculotendinous junction; verified via ultrasound. At approximately 50% of the muscle length, shear modulus was measured within each muscle at an area equidistant between superficial and deep aponeurotic tendon. ICCs (0.89, 0.78) and SEMs (5.78%, 9.61%) for the BFLH and ST, respectively, supported the reliability and precision of shear modulus measurements. Results: The ST (20.14kPa±3.8) was 27% stiffer (p=0.013) than the BFLH (15.75kPa±2.64). Conclusions: Consistent with synergistic gastrocnemius muscles’ stiffness differences, the ST and BFLH also had different material properties. However, the short-fibered medial gastrocnemius was stiffer compared to the lateral gastrocnemius (Basford et al 2002), whereas the long-fibered ST was stiffer compared to the BFLH in the current study. Thus, the exact relationship between architecture and stiffness is not clear. Although speculative, the ST may be stiffer to prevent overstretcing and subsequent muscle damage at high excursion speeds. Further research is warranted to better understand the relationship between muscle architecture and muscle stiffness.

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A Molecular Dynamics Study on the impact of the S27E and S27A Point Mutations on the Structure, Stability, and N-terminal Orientation of Annexin A1, Bradley J Simpkins, Matthew Donohue, Yumin Li, East Carolina University, Greenville, NC

The Annexin family of proteins is responsible for calcium dependent membrane aggregation activities of the cell. This study uses Molecular Dynamics techniques to study the impact that two point mutations have on Annexin A1. Molecular Dynamics simulations were performed on full length Annexin A1 and only the N-terminal structure of Annexin A1. Simulations were done for wild-type Annexin A1 and two point mutations S27E and S27A, located in the N-terminal domain. Multiple simulations were performed for each of the 6 structures totaling 200ns of simulation time. The simulations were analyzed to study the core domain calcium binding affinity, the core domain and N-terminal structures, and the N-terminal domain orientation. Our study showed that the two mutations caused little change in calcium binding affinity from that of wild-type Annexin A1. The S27A mutations showed beneficial effects to membrane aggregation ability when the N-terminal linker showed less helical structure and faster migration in the direction of the core domain. The S27E mutations showed characteristics that are not beneficial to the membrane aggregation process when it was observed that the N-terminal linker structure had a longer alpha helix than the wild-type Annexin A1.
and the migration of the N-terminal was not in the direction of the core domain. Our results provide at atomistic explanation of the ability of the S27A mutation to maintain its membrane aggregation ability while the S27E mutation showed a higher calcium concentration requirement and lower maximal extent of aggregation than the wild-type and S27A mutant Annexin A1 proteins. These characteristics are important for the further understanding of the membrane aggregation process performed by the Annexin family of proteins.

Reperfusion arrhythmia is prevented by preserving mitochondrial membrane potential: The effect of exercise adaptation, Rick J. Allemen, Hetal D. Patel, Fatiba Moukdar, and David A. Brown, Department of Physiology, Brody School of Medicine, East Carolina University, Greenville, NC

Exercise is known to confer cardioprotection against ventricular arrhythmia and reduce the incidence of sudden cardiac death, yet the underlying mechanisms are not fully understood. We have previously shown that the transition to arrhythmia occurs concomitant with a collapse in mitochondrial energetics, which induces action potential lability via ATP- and redox-sensitive ion channels. In this study, we hypothesized that the cardioprotection observed in exercised (Ex; 10 d of treadmill running) animals would be associated with maintenance of mitochondrial membrane potential (Δψm) in early reperfusion. We used a novel combination of two-photon microscopy in intact, perfused hearts, coupled to simultaneous electrocardiogram recording to test our hypothesis. Hearts underwent 40/30 min of ischemia/reperfusion. Consistent with our previous work, hearts that displayed heterogeneous collapses in ΔΨm transitioned to ventricular arrhythmia. Hearts from Ex animals experienced a much lower incidence of reperfusion arrhythmia than sedentary counterparts, with 7 of 8 sed hearts experiencing tachycardia or fibrillation compared to 3 of 8 Ex hearts. m, assessed with the fluorescent probe TMRM, was better maintained in Ex hearts during the first 10 minutes of reperfusion. Mitochondrial respiratory control ratios were similar following ischemia/reperfusion in sed and Ex (9.00±0.92 v. 9.03±0.70, respectively), suggesting that mitochondrial damage was similar across groups. These data provide a definitive link between sustaining mitochondrial energetics and prevention of electrical dysfunction with Ex, and suggest that therapies that preserve Δψm can mitigate sudden cardiac death in patients experiencing acute coronary syndromes.

Skeletal muscle function during high intensity contractions is improved by increased AMP Deaminase expression, PR Davis, CA Witczak, JJ Brault, East Carolina Diabetes and Obesity Institute, Departments of Kinesiology, Physiology, Biochemistry and Molecular Biology, East Carolina University, Greenville, NC

During intense skeletal muscle contractions, ATP consumption outpaces ATP re-synthesis resulting in an increase in free ADP and Pi and a concomitant reduction in the free energy (G) of ATP hydrolysis. Removal of AMP by AMP Deaminase (AMPD) [AMP + IMP + NH3] favors ATP production and ADP clearance via adenylyl kinase (ADP + AMP + ATP + AMP) thereby protecting the energetic state. The purpose of this study was to determine if AMPD overexpression could improve force production or contraction kinetics of skeletal muscle under high energy demands, indicating an improvement in energetics. Methods: Solei of adult male CD-1 mice were transfected with empty vector or AMPD3 plasmid by in vivo electroporation. Seven days later, solei were removed and electrically stimulated for twitch characteristics and then either kept at resting length or fatigued (150 Hz, 167 ms train, 2 tetani/s) over 60 seconds in oxygenated Krebs-Henseleit bicarbonate buffer at 37°C. Force was recorded via a Dual-Mode Muscle Lever System (Aurora Scientific Inc.). Solei were then snap-frozen, and adenine nucleotides and IMP were measured from PCA extracts via UPLC. Results: Adenine nucleotides were no different between AMPD3 and control solei in resting and contracted conditions. Twitch characteristics (max force, ½Relaxation Time, time to max) were no different between AMPD3 and control solei. During tetanic contractions, both AMPD3 and control solei exhibited similar fatigue patterns and significant accumulation of IMP (p<0.0001). However, there was no effect of AMPD3 on IMP accumulation. Regression analysis showed a significantly shorter ½RT in AMPD3 transfected solei compared to controls (p<0.001). Conclusions: These data suggest that AMPD overexpression improves muscle function during high energy demands. It is likely that shorter ½RT in AMPD treated solei resulted from additional buffering of the G of ATP hydrolysis which protects SERCA function. (Funding: ACSM Foundation and ECU start-up funds)
PPP1R42 regulates PPI to control centrosome dynamics, Nicole DeVaul, Rong Wang, Ann O Sperry, East Carolina University, Greenville, NC

The centrosome is a dynamic organelle that undergoes dramatic transitions during its progression through the cell cycle including differentiation into a basal body required for ciliogenesis; and duplication and separation for nucleation of the mitotic spindle. Although numerous kinases are required for centrosome dynamics, less is known regarding how specific phosphatases participate in this process. PPI (Protein Phosphatase 1), a serine/threonine phosphatase, negatively regulates kinases involved in each step of centrosome dynamics. We have identified a regulatory subunit of PPI, PPP1R42, which is expressed in ciliated cells and colocalizes with the centrosome. This protein provides a unique tool to study the mechanisms through which PPI regulates ciliogenesis and centrosome duplication. We hypothesize that PPP1R42 positively regulates PPI and therefore, negatively regulates its downstream effectors, including Nek2, in centrosome dynamics. Overexpression of PPP1R42 results in a significant increase in cilia number and length. Depletion of PPP1R42 results in an increase in centrosome number and a curled cilia morphology. This data indicates that PPP1R42 is involved in regulation of centrosome duplication and cilia length, structure, and disassembly, likely through the activation of PPI. We then investigated the mechanism by which PPP1R42 regulates PPI and its downstream target, Nek2. Nek2, a serine/threonine kinase, is negatively regulated by PPI in both centrosome separation and cilia biogenesis. Knockdown of PPP1R42 results in a decrease of active PPI expression and an increase in Nek2 kinase activity. These results support our hypothesis that PPP1R42 positively regulates PPI and, in turn, negatively regulates Nek2 activity to induce both ciliogenesis and centrosome duplication. In summary, we have identified a novel regulator of PPI with a necessary role in regulation of centrosome dynamics.

Changes in Running Mechanics Following a Prolonged Run Among Males and Females, Katherine Edwards, John Willson, Meredith Hayek, East Carolina University, Greenville, NC

Introduction: Females are more prone to certain running-related injuries such as tibial stress fractures and patellofemoral pain than males. Increased gluteal musculature activation among females during running has been suggested to lead to unique changes in running mechanics as these muscles become fatigued over the course of a prolonged run. The objective of this study is to test if males and females demonstrate a similar effect of exertion on running mechanics associated with these running-related injuries. We hypothesize females will demonstrate a greater increase in hip and knee joint frontal plane angles, ground reaction force loading rate, and hip and knee joint frontal plane angular impulse over the course of a prolonged run. Methods: Thirty-four recreational runners participated in this study (22.5 years; 18 females/16 males). Following acclimation to the treadmill, three-dimensional lower extremity kinematics (240 Hz) and ground reaction forces (2400 Hz) were recorded as participants ran at 3.5 m/s. Participants then continued to run at 3.5 m/s until perceived exertion levels reached 18 out of 20 on the Borg scale, at which time running mechanics were recorded again. Peak hip and knee joint frontal plane angles, average vertical ground reaction force loading rate (AVLR), and hip and knee joint frontal plane angular impulse during the stance phase of 5 foot steps before and after the running protocol were analyzed using a 2-way (2 (male, female) x 2 (beginning, end of run)) mixed factor ANOVA. Results: Changes in running mechanics over the course of the protocol were not different among males and females. However, increased peak hip adduction (1.2 degrees, P <.01), increased AVLR (11%, P < .01), increased hip abduction angular impulse (4%, P = .016), and increased knee abduction angular impulse (4%, P = .05) were observed at the conclusion of the running protocol. Conclusions: Previously reported differences in hip muscle activity during running between males and females do not appear to manifest as unique changes in running mechanics among females over the course of a prolonged run. Increased peak hip adduction, hip and knee frontal plane loads, and AVLR at the conclusion of the protocol have been associated with the etiology or exacerbation of running-related injuries. As such, these results may be relevant to both prevention and treatment efforts for males and females alike.

Role of the Human T-cell Leukemia Virus type-I encoded Protein HBZ in Cell Adhesion and Migration, Ana Laura Fazio-Kroll, Nicholas Polakowski, Isabelle Lemasson, East Carolina University, Greenville, NC

Human T cell leukemia virus type I (HTLV-I) is the etiologic agent of a severe disease called Adult T-cell Leukemia (ATL), an aggressive malignancy of mature T cells that develops in less than 5% of infected individuals after a long period of incubation. ATL is characterized by infiltration of the infected CD4+ T cells in different body compartments, such as skin, lymph nodes, liver, spleen, intestinal tract and lungs, and represents a serious clinical problem that negatively affects the disease profile and prognosis. The detailed molecular mechanisms associated with leukemic cell migration and organ infiltration are not exactly known. HBZ, a viral nuclear basic leucine zipper (b-ZIP) protein, is encoded by the minus strand of the HTLV-1 genome. It has been shown that HBZ is constitutively expressed in ATL cells and has been correlated with disease progression. The mechanism through which HBZ produces HTLV-I related diseases is still unclear. In our laboratory, we are interested in determining the role of HBZ in the leukemic progression of ATL, using cell clones expressing HBZ or HBZ mutants, and also HTLV-I infected cells. Using in vitro transmigration assays across activated endothelium, we have demonstrated a significant increased capacity in migration of stably HBZ transfected T cells compared to controls. Through wound healing assays, we have further shown that the expression of HBZ increased cell motility compared to cells expressing HBZ mutants and controls. We also examined the homotypic aggregation of several HBZ transfected T cell clones and found enhanced self-aggregation that...
correlated with their transmigration enhanced activity. Using antibodies against specific adhesion molecules, including membrane receptors that are crucial for leukocyte adhesion, such as α2, we were able to significantly reduce the self-aggregation among HBZ transfected and also HTLV-I infected cells. Using a microarray that allowed comparison of gene expression profile among HBZ transfected and uninfected T cells, we found significant modifications in the expression of several genes related to adhesion molecules and migration processes. One of our future directions is to use quantitative real time PCR (qRT-PCR) to determine a difference in the expression pattern of these genes in HTLV-I infected and HBZ transfected cells but not in uninfected cells. Taken together, these findings suggest that HBZ protein constitute one of the main inducers of cell adhesion and migration on leukemic cells, thus it is able to promote the infiltrating phenotype of infected CD4+ T cells. Therefore, we propose that HBZ participates in the leukemic progression of ATL. A better molecular understanding of the pathological mechanisms through which HTLV-I is able to regulate T cell motility and adhesion, is essential for addressing new strategies in patient treatment.

GP70

Persistent neuronal morphological changes after chronic CB1 receptor antagonist SR141716A or antidepressant treatment in developing and adult zebra finches, Tessa L. Holland, Marvoita T. Gilbert, Ken Soderstrom, Department of Pharmacology and Toxicology, Brody School of Medicine, East Carolina University, Greenville, NC

Dendritic spines operate as postsynaptic sites that are a structural analogue related to long-term plasticity, which underlies many fundamental brain processes, including mood, learning, and memory. Zebra finches possess a developmental sensitive period of vocal learning in which decreases in spine density occurs in brain song regions. Previously, we observed that chronic developmental treatment with cannabinoid CB1 receptor agonist WIN55,212-2 prevented this normal reduction, but adult treatment had no effect, suggesting WIN55,212-2 possibly disrupted developmentally significant endocannabinoid signaling. To evaluate the effects of CB1 receptor antagonism during vocal development, in a similar experiment we treated developing and adult zebra finches (n=4) with CB1 receptor antagonist SR141716A (6 mg/kg) for 25 days followed by 25 days of no treatment (until maturation) and created 3D neuronal reconstructions using Golgi-Cox staining and NeuroLucida software. Surprisingly, both developmental and adult treatment persistently increased spine densities. Adult treatment produced more dramatic increases, suggesting tonic inhibitory endocannabinoid control of song region spine densities is perhaps important to maintain mature neural phenotypes. Another interpretation is the increased spine densities are a consequence of the mood depressant effect of SR141716A, which was used clinically to treat obesity and observed to cause depression in patients. To determine if antidepressant treatment resulted in different effects on neuronal morphology, we treated zebra finches (n=3) with monoamine oxidase inhibitor (MAOI) phenelzine (1 mg/kg) chronically in a similar experiment. Phenelzine treatment had no persistent effects on spine density, and antidepressants may help maintain stable spine populations. Co-administration of phenelzine and SR141716A prevented a SR141716A-induced increase in spine density, suggesting an association between spine density and the mood effects of these drugs (n=4). This reversal was only observed following adult treatment. Co-administration with phenelzine and SR141716A in developing zebra finches did not prevent SR141716A-induced increases in spine density, suggesting that developmental antidepressant treatment may be less effective. In the future, we will explore the role of antidepressants or cannabinoids in modulation of stress responses and the possible developmental dependence of these drug effects.

GP71

Comparative analysis of the effects of shear stress on vascular smooth muscle cell migration using two novel in situ wound assays, Andrew Holt, David Tulis, Department of Physiology, Brody School of Medicine, East Carolina University, Greenville, NC

Many vascular growth disorders are characterized by endothelial cell injury or disruption and exposure of the underlying vascular smooth muscle (VSM) layer to frictional blood flow. This process contributes to pathologic VSM cell migration, a mechanistic foundation of and major contributor to cardiovascular disease. Unfortunately, currently used experimental approaches aimed at analyzing the effects of blood flow and fluid shear stress on VSM cell migration suffer from non-physiological influences including the impact of trypsinization on cell function. These methods disturb normal cell-to-cell and focal contacts and cytoskeletal geometry necessary for cell migration; in turn, improved modes for analyzing cell migration under more (patho)physiological conditions is essential. This study was designed to characterize novel in situ methods of quantifying VSM cell migration following exposure to (patho) physiological levels of fluid shear stress. We hypothesize that elevated shear stress protects against abnormal VSM cell migration associated with arterial injury and disease. Using newly developed wound assays with established perfusion apparatus (parallel-plate flow chamber and a micro-slide perfusion channel), we compared the migratory responses of primary and commercially-available rat VSM cells to 0, 10, or 20 dyn/cm² levels of fluid shear stress for 4 or 24 hours. To determine if the wound assay and/or the level of shear stress affects the VSMC migration response following injury, cells located in the center of the confluent monolayers were mechanically scraped (flow chamber) or removed with a laser capture microscope (micro-slide channel) and allowed to migrate up to 15 h. These methods were characterized by eliciting a reproducible migratory phenotype that completely closed the wound area over time (< 15 h) using both cell types on four different substrates (tissue culture treated; ibidi treatment; gelatin; collagen). Further, cell confluence was maintained following perfusion while changes in globular to filamentous actin ratios were observed between groups. Early findings suggest that fluid shear stress attenuates the migratory responses of perfused VSM cells compared to static controls. Investigation into potential mechanisms controlling vascular cell migration is critical for translating these in vitro findings to clinical cardiovascular relevance.
Peroxisomal Biogenesis Occurs in Response to Obesity and to a High Lipid Environment in Human Skeletal Muscle, Tai-Yu Huang1, Donghai Zheng1, Barbara Muller-Borer2, Maria Collins3, Robert Noland4, Katsuhiko Funai, Robert C. Hickner1, Ronald N. Cottrell1, 1Kinesiology, Physiology, and Diabetes Obesity Institute, East Carolina University, 2Engineering, East Carolina University, 3Cardiovascular Sciences, HS ECHI Congen Res, East Carolina University, 4Skeletal Muscle Metabolism, Pennington Biomedical Research Center, Baton Rouge, LA

Obesity is associated with elevated levels of lipids and reductions in mitochondrial fatty acid oxidation in skeletal muscle, both of which are associated with insulin resistance. Known almost exclusively for their actions in liver, peroxisomes are critical subcellular compartments essential for chain-shortening very long- and long-chain fatty acids to acyl-carnitines which are hypothesized to permit CPT-1 independent entry into the mitochondria for subsequent oxidation. We hypothesize that peroxisomes proliferate in human skeletal muscle as an adaptive response to a high lipid environment to facilitate mitochondrial fatty acid oxidation. Assays for peroxisomal membrane protein 70 (PMP70) and peroxisomal biogenesis factor PEX 19 protein content, and peroxisomal-mitochondrial co-localization were assessed in vastus lateralis from obese and lean humans and after lipid incubation in human skeletal muscle primary myotubes. Results: 1) A peroxisomal-mitochondrial co-localization was identified in human skeletal muscle 2) Peroxisomal abundance (PEX 19) was elevated (P<0.05) with obesity and 3) lipid oversupply leads to induction of the peroxisomal marker PMP70 (P<0.05) in human primary myotubes. Conclusion: Peroxisomes co-localize with mitochondria and compared to lean, their abundance in skeletal muscle from obese individuals is significantly elevated and is responsive to lipid oversupply.

Influence of Race on Velopharyngeal and Craniofacial Anatomy in Children, Lakshmi Kollara, East Carolina University, Greenville, NC

Background & Purpose: Cleft lip and palate affects one of every 594 births, making it the most prevalent birth defect in the United States (Centers for Disease Control, 2006). However, only one per 2,500 Black individuals is born with a cleft (Suleiman, Hamzah, Abusalab, & Samaan, 2005). Although it has been established that racial heterogeneity is present in the incidence of cleft lip/palate, the exact cause and extent of these variations is not conclusive. There are limited studies examining the velopharyngeal anatomy and physiology in children (Tian et al., 2010a; Tian et al., 2010b; Tian et al., 2010c, Kollara and Perry, 2013). No studies have analyzed the effects of craniometry on the velopharyngeal anatomy in young children based on race. The purpose of this study was to examine the effect of race on craniofacial and velopharyngeal anatomy in two racial groups (Black and White) among young children (4-8 years of age). Methods: Thirty healthy children (14 White and 16 Black) were scanned using a 1.5 Tesla Philips Intera scanner. A high resolution, T1- weighted turbo-spin-echo (TSE) 3D anatomical scan called SENSE was utilized. Twelve craniofacial and nine velopharyngeal measures were obtained and analyzed using 3D visualization software. Results: The mean velar muscle length (mean=26.01mm) and thickness (mean=7.11mm) in the present study were similar to those reported in studies of Chinese children (Tian et al., 2010). The mean levator muscle length (29.3mm), mean levator angles of origin (mean=55.06mm), and the levator origin widths (mean=45.30mm) were also similar to those reported in previous studies. Statistical analyses on the already collected 30 subjects are in progress and will be completed by February 2014. Preliminary results are being reported on 15 children. Conclusion: Previous studies have documented significant differences in anthropometry in Black individuals compared to other...

Unaltered dopamine D1, D2, and D3 receptor expression in the spinal cord after intrathecal block of D3 receptors, A. Marley Jensen (1), Sophia Samir (1), Grecia Morales (1), Agnese Salvadè, Ph.D. (2), Mauro Manconi, M.D. (2), and Stefan Clemens, Ph.D. (1), (1)Department of Physiology, Brody School of Medicine, East Carolina University, (2)Neurocenter of Southern Switzerland, Civic Hospital of Lugano, Switzerland

Background: Restless Legs Syndrome (RLS) is a sensorimotor disorder that affects sleep. Dopamine (DA) receptor agonists targeting the D3 receptor are effective treatments, suggesting a role of the DA D3 system in the disorder. To test the effects of spinal D3 dysfunction in RLS, young adult rats were implanted with intrathecal mini-pumps primed with saline or a D3 receptor antagonist. Here we analyzed spinal D1, D2, and D3 receptor expression in cervical, thoracic, and lumbar segments after the behavioral experiments. Methods: Spinal cord tissues were homogenized in RIPA buffer with protease and phosphatase inhibitors (Sigma-Aldrich, St. Louis, MO). Using equal concentrations of protein was separated via a SDS-PAGE (Criterion TGX 7.5%, Bio-Rad, Canton, MA) and transferred onto a membrane (Millipore, Germany). The membranes were probed with primary antibodies for D1, D2 and D3 receptors (Abcam), at 1:1000 1:800 and 1:1000 respectively. The membranes were then washed and incubated secondary antibodies at 1:30000 (Li-Cor, Lincoln, NE). The targeted proteins were visualized using the Li-Cor detection system according to the manufacturer’s recommendation and quantified utilizing the Image System software. The values are given as the ratio of D1, D2 or D3 to - actin. Results: We found that, in the cervical cord that there was no significant changes in dopamine receptors D1,D2 or D3 after intrathecal block of D3 receptors. Similarly, in thoracic segments D1, D2 or D3 receptor expression appeared to be unaltered in animal that had undergone intrathecal treatment. We are currently analyzing the expression levels in the lumbar cord. As the treated animals showed a change in their behavior, we expect that dopamine receptor expression levels in the lumbar cord will be different between placebo and treatment groups.

GP73

GP74
rationalmocel. This is the first study to provide data on the internal musculature of the velopharyngeal system in Black children. This study provides normative data on White and Black children representing an underrepresented group of subjects in this area of research.

**GP75**

**Synthesis and Evaluation of the Novel Prostaglandin, 15-Deoxy, 12,14Prostaglandin J2–Ethanolamide, as a Potent and Selective Inducer of Tumor Cell Death,** Daniel Ladin1, Colin Burns2 and Rukiyah Van Dross1, 1Department of Pharmacology and Toxicology, Brody School of Medicine, 2Department of Chemistry, East Carolina University, Greenville, NC

Non-melanoma skin cancer (NMSC) is the most prevalent cancer in the US. Many cancers including NMSC overexpress cyclooxygenase-2 (COX-2). COX-2 converts arachidonic acid to prostaglandins (PGs) including prostaglandin E2 (PGE2). PGE2 promotes cancer by activating anti-apoptotic signals and angiogenesis. In contrast, the COX-2 metabolite, 15deoxy, 12,14prostaglandin J2 (15dPGJ2) inhibits cancer cell survival by promoting apoptosis via mechanisms including oxidative- and endoplasmic reticulum (ER)-stress. Arachidonoylethanolamide (AEA) is an endogenous cannabinoid that causes cell death in cancer cell lines. Our previous data showed that AEA-induced apoptosis is COX-2-dependent. Furthermore, AEA is metabolized by COX-2 and our mass spectral analysis show that the novel prostaglandin, 15dPGJ2-EA is a primary metabolic product. Our studies seek to characterize 15dPGJ2-EA by determining if its biological effects differ from the structurally-related molecule 15dPGJ2. 15dPGJ2-EA was synthesized using a coupling reagent in the presence of ethanolamine and verified with H1-NMR. The cytotoxicity of 5 μM 15dPGJ2-EA was compared to 5 μM 15dPGJ2 in cultured NMSC cells by using MTS assays. Cell survival was reduced by 77% in 15dPGJ2-EA-treated cells and by 13% in 15dPGJ2-treated cells after 12 hours. We also found that 15dPGJ2-EA and 15dPGJ2 produced greater toxicity in tumor cells compared with non-tumor cells. To verify that J-series PG-induced cell death was due to apoptosis, caspase-3 cleavage was measured. After 6 hours, a 3-fold and 1.5-fold increase in caspase-3 cleavage was observed in 15dPGJ2-EA- and 15dPGJ2-treated NMSC cells, respectively. To determine the mechanism of apoptosis, oxidative stress was detected 30 minutes after NMSC cell exposure to the J-series PGs. DCF fluorescence was increased by 300% in 15dPGJ2- EA-treated cells and by 200% in 15dPGJ2-treated cells. To determine if J-series PGs also induce ER stress the expression of ER-stress apoptosis protein, CHOP10 was evaluated. 15dPGJ2-EA and 15dPGJ2 increased CHOP-10 protein expression by 4- and 3.5-fold, respectively. These findings suggest that 15dPGJ2-EA produces greater levels of NMSC cell death, oxidative stress, and ER stress compared to 15dPGJ2. Moreover, 15dPGJ2-EA was highly cytotoxic to NMSC cells while causing minimal toxicity in non-tumor keratinocytes. Thus, the novel prostaglandin, 15dPGJ2-EA may be a potent and selective agent that can be used clinically to eliminate NMSC.

**GP76**

**The Role of Dicer in the Restorative Macrophage Phenotype,** Sherri M Moore, East Carolina University, Greenville, NC

Sustained inflammation as a result to various types of injury (i.e, hepatitis C, chronic ethanol, steatohepatitis) is generally accepted to be the key prerequisite for tissue scarring (i.e, fibrogenesis). The interactions between the infiltrating immune cells and hepatic stellate cell fundamentally regulate collagen deposition. Reversal of fibrosis involves a cascade of infiltrating macrophages that express MMPs, which facilitate the breakdown of collagen matrix. Specifically, this project has addressed the macrophage-specific role of Dicer, central regulator of miRNA processing, in the development of restorative macrophages in vitro, the presence of restorative macrophages in liver fibrosis, and the resolution of hepatic fibrosis. The central hypothesis is that Dicer regulates the development of restorative macrophages that facilitate the resolution of hepatic fibrosis. Using the standard carbon tetrachloride exposure model of liver fibrosis, fibrosis was established by bi-weekly doses of CCl4 for 4 weeks. Resolution of fibrosis occurs within 7-10 days of cessation of CCl4. Liver and serum was harvested at 1, 3, 5 days after the last dose of CCl4, qPCR of Collagen gene expression from the in vivo model showed in both wildtype and MacDicer knockouts, a steady decrease after 0, 3, and 5 days post CCL4 however the histology showed sustained collagen staining in the knockouts where there was evidence of resolution in the control. Furthermore, MMP gene expression levels were significantly blunted in the knockouts. Supporting the idea that MMPs facilitate collagen breakdown and aid in resolution of fibrosis and more importantly, suggesting dicer plays an intimate role in the development of macrophage differentiation. Serum was fractionated and screened for its ability to induce macrophage differentiation in a defined in vitro model of bone marrow derived macrophage differentiation. Most importantly, serum from mice in the “profibrotic” (1 day post CCI4) phase vs. the “restorative” phase (5 days post CCL4) of liver fibrosis instructs bone marrow derived macrophage to differentiate toward distinct proinflammatory or restorative phenotypes, suggesting the presence of a hepatic-derived chemokine responsible for the recruitment and/or differentiation of macrophages. In conclusion, these experiments suggest a role of the restorative macrophage in the resolution of fibrosis. Moreover, the expression of dicer seems to be important for the restorative phenotype.
Myocardial inflammation can lead to scarring of heart tissue and ultimately dilated cardiomyopathy. Thousands of Americans suffer from myocarditis every year, however the true incidence is unknown due to the often asymptomatic nature of the disease. Current treatment for myocarditis is limited to managing cardiac output with ACE inhibitors, beta blockers, and diuretics. Immunotherapy with steroids or immunoglobulin has been unreliable in managing the disease. Molecular mimicry has been implicated as a cause of myocarditis and multiple disease pathogens such as beta hemolytic streptococcus and Chagas disease are known to result in myocarditis. This occurs when adaptive immune cells generated to eliminate the pathogen cross react with epitopes present on cardiac tissue. These adaptive, cross-reactive memory cells of the immune system can remain dormant for years and possibly lead to complications during myocardial infarction. New epitope specific therapies for myocarditis could help those with confirmed myocarditis and possibly help patients recovering from myocardial infarction.

Cytokine peptide fusion proteins have successfully attenuated autoimmune disease in rodent models of multiple sclerosis (EAE) and in a rat model of autoimmune myocarditis. Cytokine peptide fusion proteins offer a new way to treat autoimmune diseases including autoimmune myocarditis by modulating the adaptive immune system in an epitope specific fashion. To explore the mechanisms responsible for cytokine peptide fusion protein inhibition of myocarditis, two fusion proteins were created for rodent models of experimental autoimmune myocarditis (EAM). Epitopes 614-643 and 334-352 from the cardiac myosin heavy chain are known to respectively cause EAM in the Balb/c and A/J strains of mice. These epitopes were each covalently linked to the cytokine, GMCSF, to study EAM in Balb/c and A/J mice. Bone marrow proliferation assays indicate attachment of the myocarditic peptide did not impair the bioactivity of GMCSF. Balb/c mice were pretreated with GMCSF-Myo614 once a week for three weeks prior to EAM induction. Histological sections from the hearts showed animals pretreated with the fusion protein had statistically lower levels of cellular infiltrate compared to animals pretreated with PBS or the myosin peptide 614-629. Future experiments will be performed in A/J and Balb/c mice to elucidate the mechanisms responsible for efficacy.

GP78

Evaluating the requirement of Mcm10’s expanded CTD in D. melanogaster, Michael C Reubens, East Carolina University, Greenville, NC

First discovered in yeast as a mutant defective for the ability to maintain mini chromosomes, Mcm10 has become a protein documented to function in both replication and heterochromatin formation. Despite ongoing research in many model systems the exact functions of Mcm10 in these processes remains poorly understood; however, due to this protein’s involvement in these essential cellular processes, it is not surprising that recent reports have listed Mcm10 as one of the top 10 genes found to be altered in many cancerous states. These recent findings suggest that a firm understanding of the functions of Mcm10 in these processes may provide insight into the mechanisms that underlie oncogenesis, and potentially lead the way to new cancer diagnostics and/or novel treatments. Our investigation of Mcm10 in Drosophila began with the characterization of two mutant alleles which yielded evidence that the expanded and conserved C-terminal domain of Mcm10, present in higher eukaryotes but not in S. cerevisiae, was important for interactions with proteins involved in both replication and chromatin dynamics. To better understand the function of this expanded C terminal domain, we have continued our analysis of Mcm10 by characterizing the impacts of three larger C terminal truncations on cell cycle progression and chromatin biology by investigating the canonical cell cycle in the larval CNS, the endoreplication cycle of the larval salivary gland, the rapid synchronous cell cycles of the early embryo, the chromatin dynamics during oogenesis, and PEV in the adult male eye. Together our analyses have suggested that the C terminal 388aa of Mcm10 are dispensable for adult viability, but required for efficient oogenesis and embryogenesis. Though not required for adult viability, the CTD of Mcm10 is required for proper cell cycle progression and chromatin packaging in somatic tissues. It is our hope that further analyses of Mcm10’s C terminal domain will shed light on the essential nature of Mcm10, and aid in a better understanding of replication, chromosome biology, and potentially oncogenesis.
findings suggest that L-glutamate release is involved in RVLM GPR109A-mediated brief pressor response. Ongoing integrative and molecular studies will elucidate the role of PGs and oxidative stress in the delayed pressor response caused by intra-RVLM NA. The findings are clinically relevant because they will elucidate the mechanisms of a centrally mediated deleterious effect of NA on BP and yield new insight into the potential use of concurrent therapeutics to circumvent such deleterious effect.

**GP80**

**Sexual Dimorphism of the Levator Veli Palatini Muscle in Typically Developing Infants**, Graham C. Schenck, MS1, Jamie L. Perry, PhD1, David P. Kuehn, PhD2, 1Dept. of Communication Sciences and Disorders, East Carolina University, 2Dept. of Speech and Hearing Science, University of Illinois at Urbana-Champaign

The majority of magnetic resonance imaging (MRI) studies that have examined the anatomical position and subsequent variation of the levator veli palatini muscle (levator) in children and adults are limited by small sample sizes lack an age-matched control group (Kuehn et al., 2001; Ettema et al., 2002; Kuehn et al., 2004; Ha et al., 2011; Perry et al., 2011; Perry et al., 2013). The present study was designed to obtain quantitative and qualitative information on the velopharyngeal anatomy in typically developing White infants using a relatively large sample size (17 subjects). Comparisons between males and females may highlight sexual differences and provide normative data necessary for comparing anatomical differences in infants born with cleft palate. Seventeen typically developing White infants (10 males, 7 females) between 9-18 months of age (mean=13.8 months, SD=3.2 months) were recruited from a pool of subjects already scheduled for a clinical MRI scan at East Carolina Neurology in Greenville, NC. Parent/caregivers reported no history of swallowing, neurological, or musculoskeletal disorders. Subjects were also not included in the study if they had a history of cleft palate or craniofacial anomalies. Images were collected using a 1.5 Tesla System. Quantitative craniometric and velopharyngeal measurements were obtained on two-dimensional (2D) sagittal and axial planes and a three-dimensional (3D) oblique coronal plane. A statistically significant difference was observed between gender groups (p = 0.04) for sagittal velar thickness with males demonstrating slightly thicker velums compared to females. Sagittal velar thickness was significantly correlated to the sagittal basion to sella distance (p = 0.02). Oblique coronal levator muscle length (p = 0.01) and width (p = 0.05) were significantly correlated with the sagittal nasion-sella-basion angle. Levator mean muscle length (59.3 mm), mean origin to origin width (44.5 mm) and mean velar length (22.2 mm) were similar to the values reported by Perry et al. (2011), however the current study controlled for race and did not include any infants with a history of cleft palate or craniofacial anomalies. Additional analysis is necessary to determine if there are interactions between variables such as age and gender in characterizing normative velopharyngeal and craniometric measures.

**GP81**

**Speech-Language Pathologists’ Perceptions Toward Normal Speakers and People with Communication Disorders Before and After Completion of Therapy**, Lin Sun, M.A. 1, Daniel Hudock, Ph.D., CCC-SLP,2 Graham Schenck, M.S. 1, and Joseph Kalinowski, Ph.D. 1 1 East Carolina University, 2 Idaho State University

Background: A large body of research indicates that there is a negative stereotype of people who stutter in various populations, including speech clinicians, parents of children who stutter, teachers, family members, counselors, and employers. The stereotype is not only pervasive but also highly resistant to change. Numerous studies have shown that attempts at modifying perceptions of toward people who stutter have failed. Aims: In this study, we examined speech-language pathologists; perceptions of stutterers before and after therapy. Clinicians were asked how they perceive normal speakers; people who stutter; people with aphasia; and people with voice disorders before and upon completion of therapy. Results: It revealed that clinicians viewed therapies as a valuable tool for people with communicative disorders and clinicians have less negative perceptions toward people who have speech impairments after therapy.

**GP82**

**The onset and decay of heterologous tolerance to morphine after subcutaneous (sc) injection for varying lengths of time**

Benjamin Thompson, Jackie Masterson, David A. Taylor: Department of Pharmacology and Toxicology, Brody School of Medicine, East Carolina University, Greenville, NC

The development and decay of heterologous tolerance following chronic morphine exposure via pellet implantation is well documented in the guinea pig longitudinal muscle/myenteric plexus (LM/MP). However, this method of administration only permits a qualitative analysis of the decay of tolerance because the time at which morphine exposure is completed is unknown. Therefore, we assessed tolerance development in animals treated with twice daily sc injections of morphine for 1, 2, 4, 7, or 10 days. The analgesic effect of morphine was assessed using the paw pressure test and the heterologous nature of tolerance evaluated using the neurogenic twitch inhibition of DAMGO and 2-CADO in the LM/Mp. Decay of tolerance was determined by evaluating animals or tissues from them 0, 1, 2, or 4 days after treatment cessation. A significant level of tolerance was generated by 2 days after treatment, which peaked at 4 days and was maintained through both 7 and 10 days of treatment. The data indicated that the time for return to baseline was correlated to the magnitude of tolerance in all animal groups and was not significant by 2 days after treatment stopped. The fact that the decay of tolerance is a function of both the length of treatment and magnitude of tolerance developed reinforces the idea that tolerance following chronic treatment with morphine is an adaptive process produced by alterations in several cellular signaling proteins.
Mitochondrial Capacity is Decreased in Skeletal Muscle with Estrogen Depletion, Torres, MF 1,2; Gilliam LAA 1,3; Neufer, PD 1,2,3, East Carolina Diabetes and Obesity Research Institute 1, Dept. Kinesiology 2 and Physiology 3, East Carolina University, Greenville, NC

The onset of menopause dramatically increases a woman’s risk to develop cardiovascular disease and type-2 diabetes. Menopause coincides with a significant decline in the production of ovarian hormones, particularly 17-estradiol (E2), a key regulator of energy and glucose homeostasis in numerous peripheral tissues. Skeletal muscle is responsible for ~80% of insulin-stimulated glucose uptake, and mitochondrial function in muscle has been linked to the control of insulin sensitivity. However, the underlying mechanism(s) by which E2 regulates insulin sensitivity and mitochondrial function in skeletal muscle remains unresolved. Using a short-term ovariectomized female mouse model (C57BL/6, 2-week-OVX), we determined the impact of E2 depletion on mitochondrial respiratory function in skeletal muscle. State 3 Complex I- and Complex II-linked respiration was decreased (26 ± 7 %, p<0.05) in permeabilized fiber bundles from red gastrocnemius of OVX mice compared to normally cycling females (CTRL). Following E2 depletion citrate synthase activity was reduced (CTRL: 86 ± 6; OVX: 59 ± 4 μmol/min/mg protein, p<0.05), suggesting a decrease in mitochondrial content. The cellular redox environment, as indexed by the GSH/GSSG ratio, shifted to a more oxidized state with E2 depletion, primarily reflected by an increase in the total GSSG concentration (24 ± 6 %, p<0.05). Our results highlight the protective effects of E2 on mitochondrial function and redox state in skeletal muscle, and provide a potential mechanism for the pro-diabetogenic effects of menopause.

Investigation of the Immunosuppressive Function of the Vaccinia Virus Protein O1L, Anastasia C Weeks, Gwendolyn Jones, and Rachel Roper, East Carolina University, Greenville, NC

Poxviruses cause a wide range of mammalian diseases, and there are many poxviruses that are emerging human pathogens worldwide. Although smallpox was declared eradicated from nature due to the success of the Vaccinia virus vaccine, poxviruses still pose a bioterrorism threat. Vaccinia is also currently used successfully as a vector in recombinant vaccines that target diseases such as HIV, malaria and cancer. However, Vaccinia virus retains significant virulence in mammals and is unsafe for approximately 25% of the US population. In order to understand poxvirus pathogenesis, our lab is investigating poxvirus virulence genes. We show herein that the previously uncharacterized, highly conserved Vaccinia virus gene O1L is a virulence factor in mammals. Prior data from this lab indicated that the OIL protein was not required for replication, therefore we hypothesized that OIL functions in some immunomodulatory capacity. To ascertain the mechanism of action of the OIL protein, we investigated the immune response in mice infected with Vaccinia virus or OIL deletion mutant viruses. Data from ELISA assays demonstrated that OIL suppressed levels of Vaccinia specific antiviral antibody, supporting our hypothesis that OIL functions in some immunomodulatory capacity. To ascertain the mechanism of action of the OIL protein, we investigated the immune response in mice infected with Vaccinia virus or OIL deletion mutant viruses. Data from ELISA assays demonstrated that OIL suppressed levels of Vaccinia specific antiviral antibody, supporting our hypothesis that OIL is immunoregulatory. We are also investigating the effects of OIL on T lymphocyte activation and differentiation by intracellular cytokine staining and analysis of secreted cytokines. The removal of specific immunosuppressive virulence genes will increase the immunogenicity and safety of Vaccinia vaccines. Furthermore, immunosuppressive viral genes have the potential to be used clinically to reduce undesirable immune responses.

Mechanistic insights into retinoid-based therapies for inflammatory skin diseases—reprogramming of integrins, Lei Wang, East Carolina University, Greenville, NC

A hallmark of inflammatory skin diseases is aberrant trafficking of immune cells to the skin. Cutaneous T cell lymphoma (CTCL) is a rare inflammatory skin disorder, characterized by extensive infiltration of malignant T cells to the skin. Retinoids, natural and synthetic derivatives of vitamin A, govern immune cell localization by inducing the expression and function of select adhesion receptors to target cells away from the skin to the gut. Retinoids that naturally target immune cells to the gut have been routinely used as treatments for skin disorders, from acne to CTCL. In spite of reported use for over three decades, the therapeutic mechanism of action of retinoids for resolving CTCL and other inflammatory skin disorders remains unknown. Whether the established physiological role of retinoids in immune cell trafficking accounts for the therapeutic benefit in aberrant CTCL cell trafficking has not been addressed. I hypothesize that retinoids regulate the expression and function of select integrins to decrease the potential of CTCL cells to accumulate in the skin. My preliminary data demonstrated that multiple retinoids, bioactive forms of vitamin A, enhance cell surface protein levels and function of gut-associated integrins. Interestingly, selective stimulation of either RAR or RXR nuclear receptors induces adhesion. In addition, the integrin-dependent adhesion induced by retinoids is attenuated by 1,25(OH)2 vitamin D3, a vitamin derivative implicated in skin-specific homing. These findings establish that vitamin A and vitamin D derivatives have antagonistic roles in CTCL immune cell adhesion. This work provides insight into the mechanism of action of retinoids in the regulation of integrin adhesion receptors involved in CTCL cell trafficking and may entail a spectrum of inflammatory skin diseases.
Human T-Lymphotropic Virus Type 1 (HTLV-1) is a human retrovirus which is the etiologic agent of Adult T-cell Leukemia (ATL), a malignancy involving the transformation of CD4+ T-cells after an extended period of viral latency. Currently, the mechanisms involved in HTLV-1 mediated transformation remain unclear. Previous studies have indicated that malignant ATL cells are characterized by increased expression of two virally encoded proteins: the transcriptional activator Transactivator X (Tax) and the antisense-encoded HTLV-1 bZIP factor (HBZ), suggesting that these proteins play key roles in HTLV-1 mediated oncogenesis. Though Tax has been found to be essential for transformation, the expression of this viral protein is only found in approximately 40% of ATL cells, suggesting that this protein is not required for the continuation of the transformed phenotype. Conversely, HBZ has been found to be expressed in all transformed ATL cells and is associated with increased rates of cellular proliferation as well as increased cell migration. Additionally HBZ has been reported to interact with several cellular factors to regulate both viral and cellular transcription. The N-terminal activation domain interacts with the KIX domain of p300/CBP while the basic leucine zipper region, or ZIP domain, interacts with a number of cellular factors including CREB family members, c-Jun, JunB, JunD, MafB, and ATF3. In this study, we attempt to further define the functions of HBZ in transformation and the regulation of viral and cellular transcription by elucidating novel cellular binding partners. We began our proteomic analysis by generating clonal HeLa cell lines stably expressing flag-tagged HBZ. Through a series of purification steps, including flag-immunoprecipitation, we were able to purify HBZ complexes and analyze these proteins using LC-MS/MS. Interestingly, during the course of these studies, evidence began to suggest that HBZ may also be capable of disrupting cellular protein complexes, possibly preventing target interaction or resulting in a redistribution of transcription factors and coactivators. To further explore this activity, we performed anion exchange chromatography followed by a series of western blots to examine how HBZ affects the interactions of known cellular binding partners. We also aim to perform ChIP analysis to examine whether HBZ affects the DNA binding functions of several cellular transcription factors, particularly p300.

Human T-cell Leukemia Virus Type 1 (HTLV-1) is a retrovirus and the causative agent of Adult T-cell Leukemia (ATL). ATL is the abnormal proliferation of infected CD4+ T cells. We previously reported that HTLV-1 basic leucine zipper factor (HBZ) interacts with the cellular coactivator p300 in cells derived from ATL patients. We further determined that HBZ directly binds to the histone acetyltransferase (HAT) domain of both p300 and its homologue CBP. HAT activity transfers an acetyl group to lysine residues on histone tails and transcription factors to generally upregulate transcription. We observed that the HBZ interaction with the HAT domain of p300/CBP inhibits acetylation of histones and of the tumor suppressor p53. In this study, we wanted to determine whether inhibition of HAT activity was limited to p300/CBP or extended to other HAT families. We focused on the GCN5/p/CAF and MYST HAT families. We found that HBZ co-immunoprecipitates with both p/CAF and MYST2. These data support a recent finding that HBZ interacts with MYST2 in a yeast two-hybrid assay. Through in vitro HAT assays using recombinant proteins we found that HBZ inhibits acetylation of histone H3 and histone H4 by p/CAF and MYST2, respectively. Furthermore, HBZ reduces acetylation of p53 by p/CAF. Since both p300 and p/CAF acetylate p53 to increase its DNA-binding activity, we performed quantitative RT-PCR to evaluate expression of the p53 target genes, p21, GADD45A and NOXA. We observed reduced mRNA levels of these genes when cells expressed HBZ. Overall these results suggest that HBZ inhibits the HAT activity of coactivators from different HAT families to contribute to transcriptional deregulation in HTLV-1 infected cells.
These forecasts could help specific geographic regions better prepare each of maximum strength of tropical cyclones in this basin for a given year. This means they are beginning to analyze the storms based specifically on their tracks, genesis location, and their maximum strength based on both wind speed and pressure readings (Joint Typhoon Warning Center). This is typically done separately for areas north and south of the Equator, but in this particular case I will be splitting the northern region into two parts: the Bay of Bengal and the Arabian Sea. The southern half of the basin will also be split with the western portion being west of 78E and the eastern portion being east of that line. Over the last several decades scientists have discovered a series of dipoles aptly called the Indian Ocean Dipole and the Subtropical Indian Ocean Dipole that each behave like a basin scale version of the El Nino Southern Oscillation (Li et al 2003, Saji and Yamagata 2003). This means that the dipoles involve a series of warm (cold) anomalies that develop over the western (eastern) portion of the basin or vice versa depending on the phase of the oscillation (positive or negative) (Pierce 1997). As known by basic meteorological principles when there is a change in water temperatures there tends to be a change in several of the necessary conditions needed for tropical cyclogenesis including, but not limited to: water temperatures above 26C, the amount of conditional instability, and finally the amount of relative vertical wind shear (An Introduction to Tropical Meteorology, COMET). It is the belief of this author that these dipoles coupled with ENSO lead to clustered patterns in the genesis point and area of maximum strength of tropical cyclones in this basin. These clustered patterns can be analyzed and mapped to aid in the forecasting of tropical cyclogenesis and the area of maximum strength of tropical cyclones in this basin for a given year. These forecasts could help specific geographic regions better prepare each tropical cyclone season and save life and property.

GP90
Netrin expression in Pristionchus pacificus, Kelly A Mahoney, David Rudel, Brent Wyatt, East Carolina University, Greenville, NC

Netrin (UNC-6) is a secreted cell guidance cue recognized by two molecularly unrelated cell surface receptors: UNC-40, a member of the DCC receptor family, and UNC-5. In Caenorhabditis elegans, Netrin provides a signal guiding axon extension and cell migrations, including the migrations of the gonadal distal tip cells (DTCs) and subsequently the extension of the gonadal arms during larval development. It has been shown that Netrin receptors are necessary for the dorsal migration of the DTCs. In the nematode Pristionchus pacificus, the gonadal arms make a second dorsal to ventral migration during gonad arm extension. We hypothesize this may also involve Netrin receptors. We have identified a Ppa-unc-40 homolog, but to date no Pristionchus unc-5 gene has been identified. To begin characterization of the Netrin pathway in P. pacificus we have isolated the Ppa-unc-40 genomic locus and characterized the mRNA using RT-PCR. Not surprisingly, preliminary RNA in situ hybridization results suggests that Ppa-unc-40 may localize to the DTCs. We are constructing transcriptional transgenic DNA constructs for future expression studies. The transgenic construct Ppa-unc-40:gfp contains the promoter sequence for Ppa-unc-40 fused to the green fluorescent protein (GFP). This transgenic construct and a co-injection marker are introduced into the gonad arms of young adult hermaphrodites. Expression of the co-injection marker produces a dominant roller phenotype and is indicative of a successful introduction. Expression of UNC-40 is measured by observing the presence of GFP during development of transgenic progeny. We hypothesize that UNC-40 expression in the DTCs will be correlated with phases of gonad arm extension.
Synthesis and stability of aromatic ureas from 4,4'-Methylenebis(phenyl isocyanate) and secondary 4,4'-methylenebis(N-alkylaniline)s, Jason Ryan Atkinson, Dr. Timothy Romack, East Carolina University, Greenville, NC

Polyurethanes are a broad class of commercially important materials made by reactions between diisocyanates with diols and/or diamines. Aliphatic and aromatic isocyanates readily react with alcohols and amines to form the urethane and urea linkages that give these materials their robust properties. While some urethane and urea connective groups can be subject to hydrolysis or oxidative degradation under some conditions, many years of research has shown that they are generally very stable. Previous investigations carried out in our laboratories have raised questions regarding the stability, potential reversibility or possible exchange reactions of urea linkages formed between aromatic isocyanates and N-alkyl secondary aromatic amines. In order to further understand prior results, we have undertaken the synthesis a series of 4,4'-methylenebis(N-alkylaniline)s to be used in reactions with 4,4'-Methylenebis(phenyl isocyanate) to form model compounds that can be used to allow direct observation of the groups in question using competing rate and exchange reactions with alcohols in addition to in situ kinetic 1H NMR spectroscopy. Structure reactivity trends; stability and reactivity of the resulting urea linkages are of particular interest in this work. Syntheses of the first series of representative N-alkyl substituted aromatic diamines and corresponding kinetic and reactivity studies for reactions with 4,4'-diphenylmethane diisocyanate are currently underway. Investigations into the reversible formation of aromatic amines by the reaction between aromatic amines and aromatic isocyanates under mild conditions will have implications in poly(urea-urethane chemistry) and related fields.

Development of an OSL instrument to measure the radiation dose from teeth after a nuclear event, Carlos Cardenas 1, Regina DeWitt 1, Waldemar de Rijk 2, 1 Department of Physics, East Carolina University, 2 School of Dentistry, East Carolina University, Greenville, NC

Since the development of nuclear weapons and nuclear power plants, researchers have been looking for ways to measure radiation doses that humans could be exposed to during a nuclear attack or nuclear accident. An immediate and accurate measurement of dose after exposure can expedite medical diagnosis and assure accurate post-exposure treatment is delivered. Our goal is the development of an instrument that will allow rapid dose assessment from human dental enamel. It has been found that human teeth can be used to measure the absorbed radiation dose, i.e. that they can serve as dosimeters. Upon exposure to ionizing radiation, charged particles are trapped in impurities or imperfections found in the crystalline structure of human enamel. If light of a certain wavelength stimulates the tooth, these trapped charged particles recombine with the ions and, in this process, emit light at a different wavelength than the incident light. This emitted light, the so-called optically stimulated luminescence (OSL), can be used to measure the radiation dose absorbed by the tooth. We are developing a prototype instrument that takes advantage of this property and that can make accurate dose measurements shortly after radiation exposure. As a first step the instrument has been tested with commercial dosimeters such as Al2O3 chips. We have tested various options to separate the stimulation light from the OSL. Data gathered with our instrument has shown the traditional exponential decay observed in OSL, which we can utilize to determine the dose absorbed by the Al2O3 chips prior to testing. In a next step we will further develop our prototype by testing with human teeth.

The role of microRNA 159 in reproductive development of Zea mays, Sterling Field, Beth Thompson, East Carolina University, Greenville, NC

MicroRNAs (miRNAs) are a class of small noncoding RNAs that post-transcriptionally regulate gene expression in all multicellular organisms. MiRNAs have important roles in plant development and physiology and a better understanding of the function of miRNAs in agriculturally important food crops, such as Zea mays (maize), could identify new targets and pathways for genetic manipulation, and potentially improve yield and adaptation to stresses such as climate change. The maize fuzzytassel (fzt) mutant contains a mutation in dicer-like1 (dcl1), which encodes an enzyme required for miRNA biogenesis. Most miRNAs are decreased in fzt mutants compared to normal plants, although some miRNAs are more dramatically reduced. In plants, miRNAs function primarily by promoting degradation of target mRNAs and fzt mutant phenotypes are likely due to increased levels of specific miRNA-targeted mRNAs. MiR159 is decreased >5 fold in fzt seedlings and tassel primordia compared to normal controls. In Arabidopsis, miR159 targets a class of MYB transcription factors that regulate gibberellic acid signaling (GAMYBs) and have important roles in anther development. In maize, miR159 also targets MYB transcription factors that are closely related to the GAMYBs. Published results indicate that the GAMYBs GRMZM2G139688 and GRMZM2G028054 are expressed in developing tassels, ears and mature anthers, while GRMZM2G161512 is only expressed in mature anthers. I confirmed these expression patterns by RT-PCR using cDNA generated from tassel, ear, and mature anther tissue. To examine the expression of these targets in developing inflorescences and stamens, I will use RNA in situ hybridization. In fzt mutants, which have decreased levels of miR159, I expect the level or expression domain of these miR159 target mRNAs to increase. These experiments will give insight into the normal function of these GAMYBs and potentially link specific aspects of the fzt phenotype to misregulation of miR159 target mRNAs.
GP94

The Thermodynamics of Cadmium (II) Binding to Full length and Truncated (1-89) Human Cardiac Troponin C (cTnC); Investigating new Mechanisms of Cadmium (II) Toxicity, Lindsay Michelle Fulcher, East Carolina University, Greenville, NC

Toxic metals such as cadmium (II) and lead (II) have been shown to bind to and interfere with various calcium (II) binding proteins including the regulatory protein cardiac troponin C (cTnC). Recent structural data has shown that cadmium (II) binds to both calcium (II) binding loops in the regulatory domain of human cTnC including defunct loop I. Although the data reveals two cadmium (II) ions bound to the protein, the binding constants and other thermodynamic parameters are not known. Therefore, the goal of this research project is to using Isothermal Titration Calorimetry (ITC) to obtain thermodynamic parameters such as K, H, G and S, of cadmium (II) binding to both full length and truncated (1-89 amino acid residues) cTnC, and compare it to our previous data with calcium (II). Through our results we hope to shed light on potential mechanisms of cadmium (II) toxicity and its possible effects on cardiac function.

GP95

Characterizing the expression patterns of miR167-regulated arf3 and arf30 in maize inflorescences, Caitlin Johnson, Christine Todd, Stacey Simon, Blake Meyers, Sarah Hake, Beth Thompson, East Carolina University, Greenville, NC

Plant growth and development depends on the activity of meristems, pools of stem cells that generate leaves and other organs. Maize (corn) produces two inflorescences, the tassel and ear, which are patterned by and linked to and interfere with various calcium (II) binding proteins including the regulatory protein cardiac troponin C (cTnC). Recent structural data has shown that cadmium (II) binds to both calcium (II) binding loops in the regulatory domain of human cTnC including defunct loop I. Although the data reveals two cadmium (II) ions bound to the protein, the binding constants and other thermodynamic parameters are not known. Therefore, the goal of this research project is to using Isothermal Titration Calorimetry (ITC) to obtain thermodynamic parameters such as K, H, G and S, of cadmium (II) binding to both full length and truncated (1-89 amino acid residues) cTnC, and compare it to our previous data with calcium (II). Through our results we hope to shed light on potential mechanisms of cadmium (II) toxicity and its possible effects on cardiac function.

Role of MiR319 in Maize Inflorescence Development, Katherine Ann Novitzky, Beth Thompson, Department of Biology, East Carolina University, Greenville, NC

Plant microRNAs (miRNAs) are 20-22 nucleotide long non-coding RNAs that play a pivotal role in plant development by regulating their mRNA targets at the post-transcriptional level. The maize fuzzy tassel (fzt) mutant has severe vegetative and inflorescence defects and has a mutation in dicer-like-1, a key enzyme required in miRNA biogenesis. RNA sequencing analysis of tassel primordia showed that most miRNAs are moderately reduced in fzt plants, with a few miRNAs more dramatically reduced. MiR319 is reduced >10-fold in fzt mutants, suggesting that downregulation of miR319 and upregulation of its target miRNAs may account for some aspects of the fzt phenotypes. In Arabidopsis, miR319 targets five members of the class-II TCP transcription factors, which affect cell proliferation in developing tissues. During floral development, this lack of regulation of tcp genes by miR319 results in severe defects in the floral organs. In maize, miR319 is predicted to target five tcp genes. To understand the role of miR319 and its target miRNAs in maize development, I will initially focus on the predicted miR319 target, tcp5 (GRMZM2G115516). To determine the expression of tcp5 during normal inflorescence development, I will examine the expression of tcp5 in normal tassel and ear primordia using RNA in situ hybridization. I will also examine expression of tcp5 in fzt mutant tassel and ear primordia to gain insight into how misregulation of tcp5 might contribute to fzt mutant phenotypes. I expect expression of tcp5 to increase in fzt tassel and ear primordia compared to normal. To this end, I have designed and synthesized sense and anti-sense DIG-labeled RNA probes corresponding to the tcp5 3’UTR. In addition, I am fixing tassel and ear primordia using several fixation methods to optimize fixation conditions for RNA in situ hybridization. I will also obtain a publically available mutator transposon insertion in tcp5 to functionally characterize the role of tcp5 in maize development.
Leaf litter breakdown rates across a salinity gradient in natural and restored wetlands, Patrick R Korn and Marcelo Ardon, East Carolina University, Greenville, NC

Sea-level rise and human activities are causing the increase of salinity in some coastal freshwater wetlands. Increased salinity has been found to accelerate leaf litter decomposition rates in wetlands, an important driver of nutrient availability and carbon sequestration. Ongoing research at Timberlake Observatory for Wetland Restoration (TOWeR) and two reference wetlands in eastern North Carolina has documented periods of increased salinity associated with drought. Here, we examined breakdown rates of leaf litter from common wetland tree species (Nyssa biflora and Liquidambar styraciflua) in TOWeR and two reference wetlands. We also examined macroinvertebrate abundance and microbial enzyme activity on the litterbags. Microbial extracellular enzyme activity of BG (carbon acquisition), NAG (nitrogen acquisition), LAP (arsenic acquisition), AP (phosphorus acquisition), AS (sulfate acquisition), and PO (phenol group breakdown) was obtained by measuring fluorescence (absorbance for PO). Leaf litter breakdown rates, as well as BG, NAG, LAP, PO, and AP activity were expected to increase with higher salinity, while the activity of AS and macroinvertebrate abundance was expected to decrease. During the 29 weeks of the experiment, salinity incursion was not as prevalent as in previous years; reaching conductivities of 111.59 and 1863.37 μS cm⁻¹ for the sites with the lowest and highest conductivities respectively. Despite the lack of a large change in salinity, we observed a doubling of leaf litter decomposition rate (from 0.0014 d⁻¹ to 0.0032 d⁻¹) and a linear regression of breakdown rate against the average conductivity of each site explained 85% of the variation (p=0.02). Enzyme activity, over all was low compared to literature values and contrary to expectations AS increased with salinity. BG increased with salinity, suggesting that labile carbon is more difficult to obtain as salinity increases. Macroinvertebrate presence was very low, only being present in 49 out of 315 litter bags, and did not correlate to salinity or increase breakdown rates where present. Overall, our results suggest that even small increases in salinity might accelerate decomposition rates without major changes in microbial enzyme activity or macroinvertebrate abundance.

You are what you eat: determining the zooplankton fatty acid composition in western Albemarle Sound and Chowan River, North Carolina, Deborah Ann Lichti, Jacques Rinchard, David G. Kimmel, East Carolina University, Greenville, NC

River herring (Alosa pseudoharengus and A. aestivalis) stocks have failed to recover over the last century and two potential reasons for this lack of recovery may be low larval survival rate due to a lack of zooplankton prey and/or inadequate nutrition derived from zooplankton prey. We investigated these hypotheses in the western Albemarle Sound and Chowan River, North Carolina by measuring zooplankton abundance, community composition, and fatty acid composition during spring and summer 2013. In April, the larger sized zooplankton (>60 μm) were primarily represented by Cyclopoidea, and Bosmina spp. The upper river sites had a fatty acid signature dominated by -linolenic and stearidonic acids. In May, the zooplankton community was dominated by Acartia spp. in the sound and lower reaches of the river, with a transition at the up river sites to Leptodora kindtii. As salinity increased, the fatty acid signature consisted of docosahexaenoic (DHA) and eicosapentaenoic (EPA) acids. In June, the down river sites were dominated by Leptodora kindtii and copepods, and the upper river sites by smaller cladoceran species. Leptodora kindtii fatty acid signature was dominated by high EPA and a decrease in DHA. The fatty acid signature of copepods had an EPA/DHA ratio of one, which represents omnivorous feeding, and smaller cladoceran had higher palmitoleic acid, representing herbivory. Small sized zooplankton (<60 μm) at all locations, over all months were a mixture of copepod nauplii and rotifers. We found that zooplankton fatty acid composition was tightly coupled to species composition and was correlated to sampling time and salinity, even when abundances were similar. A salinity intrusion event in May dramatically shifted the fatty acid composition of the zooplankton community, but was short-lived. This suggests that the diet conditions experienced by river herring may change rapidly, impacting survival and growth of river herring over short time periods.

Effects of temperature and climate on inter-annual variation of striped bass (Morone saxatilis) in the Albemarle Sound, NC, Tracy A McCulloch, Anthony S. Overton, East Carolina University, Greenville, NC

Construction of the Roanoke Rapids dam, Roanoke River, NC, a tributary to Albemarle Sound, blocked fish passage of commercially important migratory fish species, including striped bass in 1955. Previous studies concluded that declines in striped bass abundance were attributed to river flow, and that water temperature was influential on spawning activity. Large scale climate patterns such as the North Atlantic Oscillation (NAO) and the Atlantic Multidecadal Oscillation (AMO) have been linked to precipitation and river flow, temperatures, and fish abundance. The NAO is an index in the difference of sea level pressure (SLP) between the Azores high and the Icelandic low. The AMO is an index based on sea surface temperature (SST). We examine the influence of the AMO and winter time NAO on local temperature and striped bass (Morone saxatilis) abundance from ichthyoplankton trawls collected between 1955 and 2012 in Albemarle Sound. Mean winter (December through March) air temperature near Roanoke Rapids, NC from 1904 to 2011 correlated with the NAO (r = 0.38, p < 0.0001, n = 107), and the AMO (r = 0.28, p = 0.0025, n = 107). Monthly mean winter air temperature for the same period was weakly correlated to the NAO (r = 0.19, p = 0.001, n = 427) and the AMO (r = 0.14, p = 0.004, n = 427). Correlations between climate and striped bass may explain inter-annual variation in striped bass abundance in Albemarle Sound.
GP100
Maturation and Fecundity of the North Carolina Central Southern Management Area Striped Bass Stock, Evan Herring Knight, Roger A. Rulifson, East Carolina University, Greenville, NC

The largest stock of Striped Bass (Morone saxatilis) in North Carolina is the Albemarle/Roanoke stock; however, other populations inhabit North Carolina's coastal and riverine waters. The Central Southern Management Area (CSMA) consists of the waters of the Tar/Pamlico River, Neuse River, Cape Fear River, and Pamlico Sound. Striped Bass populations have been sustained in the CSMA by stocking (Roanoke River broodstock) from the North Carolina Wildlife Resources Commission (NCWRC), but the goal from the fishery management plan is to establish self-sustaining spawning populations of striped bass in these coastal rivers. A maturation and fecundity schedule is needed for stock assessment models and effective management of the CSMA striped bass population. Striped bass were sampled (n=60) on and near the spawning grounds in the Neuse and Tar/Pamlico River by electroshocking during the pre-spawn, spawning, and post-spawn period (March-May 2013). Each fish was measured (fork length and total length, mm) and weighed (g). Otoliths were removed for ageing and otolith chemistry. Sex was determined, and gonads were removed and weighed to determine the GSI and stage of reproduction. Ovaries were preserved in cold formalin for histological examination. Livers were weighed to determine the liver somatic index (LSI) and K factor, two indicators of fish condition or well-being. A maturation and fecundity schedule was determined based on results from analyzing otoliths, gonads, and histological samples of individual fish. Results from this study will aid fishery managers in effectively managing the CSMA Striped Bass stock.

GP101
Parent-offspring communication in the biparental care system of mimic poison frog Ranitomeya imitator, Miho Yoshioka, East Carolina University, Greenville, NC

The function of energetic offspring begging behavior in animals has often been studied by testing whether begging intensity reflects offspring need and whether resource provisioning by parents depends on begging intensity. However, most previous studies may not have fully assessed the role of begging in parent-offspring communication. First, forms of begging occur in the absence of direct sibling interactions in some species, suggesting that the behavior may not be selected for only in the context of intrabrood dynamics, as traditionally hypothesized. Therefore, species like the mimic poison frog that care for offspring individuals in separate rearing sites may be more suitable for elucidating the informational content that begging behavior provides for brooding parents. Moreover, studies have commonly assumed that begging intensity primarily reflects short-term hunger; thus, less ephemeral conditions like overall metabolic energy, potentially influencing begging intensity, may not have been adequately accounted for. Also, begging has been principally tested as a signal of need, under the assumption that begging intensity always increases with offspring need. However, begging intensity may be higher in less “needy” individuals that have access to more resources (e.g. food). Such a signal would identify individuals that may not only have relatively higher metabolic energy but also promise greater reproductive return. I will examine begging behavior in the mimic poison frog, a species native to Andean Peru, in which one offspring individual is cared for by both parents within a single rearing site. To test if tadpole begging intensity reflects metabolic energy reserves, and if so, whether begging acts as a signal of need or quality, I conducted an experiment in which I subjected tadpoles to either low, medium, or high diet and monitored body size and begging time over the course of tadpole development. The resulting data is currently under statistical analysis. It is important to accurately characterize the information that is indicated by begging signals because if parents appear to use begging intensity to direct care allocation, the proximate basis of begging intensity variation will suggest the mechanism underlying selection favoring such a pattern of parental care. I am preparing for field studies to be conducted this summer in Peru to test whether parental care behaviors in R. imitator are dependent on tadpole growth rate and/or begging intensity.

GP102
Population Structure of River Herring in the Albemarle Sound, North Carolina: Does morphometric analysis agree with other stock identification methods? Walter Rogers, East Carolina University, Greenville, NC

River herring use tributaries of the Albemarle Sound, North Carolina as spawning and nursery habitats. Stocks of these anadromous fish have experienced dramatic declines in North Carolina, and show no sign of recovery. Although the state has designated considerable resources to the management of river herring, we still do not fully understand river herring utilization of North Carolina’s estuaries, and know little about the structure and composition of populations. Determining the population, or “stock” structure of species is crucial for the proper distribution of management efforts. We seek to determine the population structure of river herring in the Albemarle Sound system using morphometric analysis, and compare the results of this analysis to those of other stock identification methods.

GP103
A GIS-Based Analysis of Precipitation Organization and Regional Hydrology in North Carolina, Christopher Zarzar, Thomas Rickenbach, Rosana Nieto-Ferreira, and Brian Nelson, East Carolina University, Greenville, NC

This study focuses on North Carolina and takes advantage of a GIS framework to examine hydrological responses to different modes of precipitation organization. Specifically, we address the following questions: How does the ratio of watershed discharge to watershed rainfall change for MCS compared to isolated rain? That is, which type of rain
leads to more water storage in the watershed? Does that storage change in watersheds vary geographically, or seasonally? We first present seasonal and annual composites of precipitation and duration of MCS and isolated convective cells across three regions of North Carolina: the western mountains, the central Piedmont, and the eastern coastal plain. Early results suggest that there is substantial geographic and seasonal variability in modes of precipitation organization. For example, daily precipitation from isolated convection is enhanced during the summer months. Western North Carolina receives the majority of its daily rainfall from isolated convection during the summer. In contrast, MCS are the main contributor to daily rainfall in the central and eastern portions of the state. Further analysis in a GIS framework will provide information about the impacts this seasonal and geographic variability in precipitation has on watershed storage. The analysis will adopt the USGS North Carolina watershed boundaries to define watersheds. Using ArcGIS and the climatology QPE precipitation data, we will estimate the amount of rainfall that comes from MCS and isolated convection in each watershed. Comparing these estimates to USGS stream discharge data will provide information about the impact different modes of precipitation organization have on watershed retention and runoff in North Carolina.

**GP105**

**Otolith Microchemistry Illuminates Possible Movement of North Carolina Striped Bass between Management Areas,**

Daniel J Zurlo, Department of Biology, East Carolina University, Roger A Rulifson, Department of Biology, Senior Scientist Institute for Coastal Policy, East Carolina University, Greenville, NC

Striped Bass, Morone saxatilis, is an important, highly migratory commercial and recreational species with significant fisheries along the eastern American seaboard. Their broad migration patterns complicate management strategies. With three independently managed stocks, North managers need to understand potential mixing of these different. Striped bass from two major management areas in North Carolina -- the Albemarle and Roanoke River Management Area, and Central/Southern Management Area -- were used to analyze migration patterns. Otolith microchemistry analyzed by LA-ICP-MS was used as a proxy for migration patterns as otoliths incorporate trace elemental signatures of the watersheds the fish inhabit. Preliminary results suggest a portion of the older Albemarle stock is anadromous, and some Albemarle Sound fish will migrate to waters in the Central Southern Management Area.

**GP106**

**Spatial and Temporal Translational Control of Germ Cell mRNAs by an eIF4E Isoform, IFE-I, Andrew Joseph Friday, East Carolina University, Greenville, NC**

Gamete development is governed largely by regulated translation initiation on stored mRNAs. The rate limiting step is their derepression and recruitment by initiation factors (eIF’s) to ribosomes. eIF4E isoforms are the first factors to interact with mRNAs, specifically recognizing their methyl guanosine cap. The nematode, C. elegans, expresses five isoforms of eIF4E (IFE-1-5). Previously we demonstrated that these isoforms recruit unique subsets of mRNAs. Consequently, individual IFE gene knockouts result in unique phenotypes in the soma and/or germ line. Loss of IFE-1 causes temperature-sensitive sterility due to defective cytokinesis in secondary spermatocytes as well as diminished oogenesis. In order to identify specific mRNAs recruited by IFE-1 that play roles in oocyte and spermatocyte development, we undertook a differential polysome microarray analyses called “translational state array assays” (TSAA) on wildtype and ife-1 null mutants. We identified a unique set of mRNAs (~80) recruited by IFE-1 for translation initiation. Among the IFE-1-regulated mRNAs are several that are integrally involved in stages of germ cell differentiation such as the transition from mitosis to meiosis and late stage oocyte maturation. Analysis of these mRNAs (e.g. gld-1, ran-1, vab-1, vpr-1, nos-3) showed decreased translational efficiency in the absence of IFE-1, demonstrating their specific reliance on this cap-binding isoform. Transgenic 3’UTR reporters showed selectivity in spatial and temporal de-repression and recruitment of several of these mRNAs within individual developing germ cells in vivo. We will characterize unique proteins and mRNAs in mRNP complexes specific to IFE-1. Our data provide evidence for spatial and temporal regulation of unique mRNA populations by the translation initiation machinery. An eIF4E isoform, IFE-1, executes positive, selective translational control that drives germ cell differentiation.

**GP104**

**Juncus roemerianus patch stability and community shifts across a marsh, Sherer B. Etheridge, Robert R. Christian, and Mark M. Brinson, East Carolina University, Greenville, NC**

Juncus roemerianus, black needlerush, is common in high marshes and in patches in low marshes, along the Mid-Atlantic and southern USA. We postulated that J. roemerianus patches will remain relatively stable in the absence of disturbance and under normal variations in flooding across a marsh. Disturbance will occur from winter storms through wrack (dead plant material) deposition and promote plant community shifts. The borders of patches between J. roemerianus and other saltmarsh species within different areas of a salt marsh were tracked at Upper Philips Creek (UPC) in Virginia since 1990. UPC is located on the Delmarva Peninsula and is part of the Virginia Coast Reserve Long-Term Ecological Research (LTER) site. In 1990, eight 3 x 8 m permanent plots, which contained the interface between J. roemerianus and other species, were established throughout the UPC marsh. Two hundred squares within 1 x 2 m quadrats within the plots were assessed for ground cover. Every year from 1990 to 2013 ground cover was identified visually and non-destructively. Patch borders are integrated into the location in the marsh. Expansion occurred at high marsh sites both away from and near a creek. Little to no expansion was observed at one low marsh site and a high marsh site bordering a hollow. Wrack reduced patch size at another low marsh site in 1994 without full recovery. This study helps better understand the geomorphic setting and context for this plant and helps determine the time scale of community changes associated with patches of J. roemerianus. It also helps understanding of the long-term effect of sea-level rise versus wrack disturbance.
Does exposure of individuals to predators early in development affect the performance of those individuals later in development? Scott P. Jones (1,2) and David R. Chalcraft (1,2), 1. Center for Biodiversity, East Carolina University, 2. Department of Biology, East Carolina University, Greenville, NC.

Many organisms have the ability to alter their morphology, behavior or life history in response to environmental cues. For example, many tadpoles can alter their morphology to better escape from predators. It is unclear, however, whether morphological changes made by tadpoles in response to predators in their aquatic environment have negative consequences after the tadpoles leave a pond when they become juvenile frogs or toads (i.e. metamorphs). To examine these potential consequences, we conducted an experiment where we 1) raised tadpoles of the southern toad in artificial ponds that had no predators, caged predatory dragonfly larvae, or caged predatory fish and 2) assessed whether the morphology and performance of metamorphosed individuals varied among these treatments. We assessed the performance of metamorphs by raising them in penned enclosures and measured growth, survival and hopping ability. Fish induced larval toads to develop shorter tails compared to larval toads reared with dragonflies and larval toads reared without predators. Dragonflies induced longer body lengths in toad metamorphs compared to metamorphs that had been reared with fish or without predators. Dragonflies also induced higher survival of toads at metamorphosis than fish predators or no predators. Toads reared in different larval environments no longer differed in morphology after being added to the terrestrial enclosures. These data suggest that the consequences of larvae changing their morphology in response to predators have little impact on individuals after they metamorphose. Nonetheless, this conclusion should be interpreted with caution as survival of metamorphosed individuals was relatively low regardless of the environment in which larvae were raised.

Unveiling the hidden and potential values of citizen science, M. Chad Smith, East Carolina University, Greenville, NC.

Citizen science is a tool that bridges the public to science with the goal of producing data and promoting scientific literacy. There has been debate to whether citizen science projects are worth the financial investment from government and non-profit groups. Some of these concerns are the integrity of volunteer-collected data and whether or not it could be used alongside government-collected data. In addition, there is question to how well the education component of these projects is promoting scientific literacy among volunteers. This research uses volunteer-collected data from a citizen science project that monitors water quality in the Albemarle-Pamlico estuarine system. These data will be compared to government-collected data using time series analysis. Scientific literacy of water quality volunteers and other respondent groups will be evaluated through survey distribution. Responses from the survey will be analyzed using cultural consensus analysis. Outcomes of this research will be used to offer recommendations for existing and new citizen science projects with the goal to improve (1) volunteer recruitment, (2) volunteer-collected data, and (3) scientific literacy.

Testing predictions of the Müllerian mimicry hypothesis in Peruvian poison frogs, Adam M. M. Stuckert1, Kyle Summers1, and Ralph A. Saporito2, 1Department of Biology, East Carolina University, 2Department of Biology, John Carroll University.

Ranitomeya imitator underwent a ‘mimetic radiation’ and now mimics three congeneric model species, creating four geographically distinct allopatric mimic morphs. These complexes are thought to represent a case of Müllerian mimicry, but no prior empirical studies on learned avoidance by predators or toxicity between co-mimetic species support this claim. We used young chickens (Gallus domesticus) as naive predators to determine if a co-mimetic morph of R. imitator and R. variabilis contribute to reciprocal learned avoidance by predators—a key component of Müllerian mimicry. Chickens exposed to either stimulus species demonstrated reciprocal learned avoidance, supporting the hypothesis of Müllerian mimicry. Additionally, we analyzed the toxicity of co-mimetic species from four allopatric mimic populations and demonstrate all species are toxic. We further demonstrate that R. imitator has a greater number of distinct alkaloid types than the model species and is more toxic in all but one population.

Analysis of Electron Beam Spectrum of Medical Linear Accelerator, J Yoon1, J Kim2, J Jung1, S Huq2, 1East Carolina University, Greenville, NC, 2University of Pittsburgh Cancer Institute, Pittsburgh, PA

The objective of this study is to invent and evaluate electron beam energy spectrum in Monte Carlo simulation to provide accurate output factor and depth dose profile for better commissioning. To find out energy spectrum, “random-creep” method has been suggested (Deng 2001). However, the final result is affected on the initial conditions such as starting weighting factors, the amount of increase of the weighting factors and the order of the iteration. Therefore, we suggest non-iterative method with finer energy resolution of mono-energetic spectrum of electron beam. We have simulated the central axis percent depth dose (PDD) profiles for several mono-energetic electron beams for each energy bin using BEAMnrc/DOSXYZnrc codes to generate electron spectrum for various beam energy and field size. For 6MeV electron beam, 4.9 MeV to 8 MeV range with 0.1 MeV steps were calculated. The simulation results of each energy bin were weighted by arbitrary factor and compared to the measured PDD from clinical accelerator. Gaussian model, Source model and least square model were tested in this step for compare spectrum models. Since energy spectrum of the Source model is not all the same from many studies, we have adjusted weighting factors to have minimum RMS value based on initial spectrum model. Least square model was calculated to have non-negative solutions (weighting factor), since negative solution have no physical meaning. PDDs of each spectrum model were reproduced by the Monte Carlo calculation and the results were compared to the reconstructed PDD from the previous step to validate our simulation method and for the commissioning purpose.
of the Monte Carlo code. RMS values were calculated for each spectrum model. The values were 0.248 (Gaussian), 0.176 (Source) and 0.138 (Least Square), respectively. The reproduced depth profiles of each model were in good agreement to the reconstructed within ~1% agreement. Overall, the Least Square model provides the best agreement to the measurement.

Effects of Individual Factors on Lower Extremity Strength Changes in Adolescents Who Are Obese, Jones J, Strickland H, Williams DSB, McMillan AG, East Carolina University, Greenville, NC

Only 8% of adolescents (12-19 years) currently meet the United States Surgeon General’s recommendation for 60 minutes of physical activity (PA) each day. Adolescents who are obese have greater absolute strength but lower relative strength in hip abduction and ankle plantar flexion (PF) compared to healthy weight peers. Strength deficits in lower extremity (LE) muscles are hypothesized to contribute to the movement differences seen in these subjects, placing them at risk for musculoskeletal dysfunction and pain. Initial results from our resistance training study showed that both the training and control groups increased their LE muscle strength. The purpose of this study was to examine individual LE strength results, and to determine effects of self-reported PA on LE strength changes in adolescents who are obese.

Of the 32 subjects enrolled in this study, data from 27 subjects who were obese (BMI Z score 14.7 +/- 1.8) are included in this report. Subjects were matched by gender, Tanner stage, and age, then randomized to either control (CTRL, n=9) or training (TRNG, n=18) group (age = 14.8 +/- 1.9 yrs TRNG, 14.5 +/- 1.7 yrs CTRL). The TRNG group performed resistance exercise (hip abductors, hip extensors, knee extensors, PFs) 3x/week for 8 weeks. To determine individualized strength gains, subjects were regrouped based on whether or not they achieved strength increases in ≥5/8 muscle groups tested. A PA scale (0-4: 1- No Activity [0 METS and/or 0x/week], 2- Light Activity [>3 METS and/or 1-3x/week], 3- Moderate Activity [3-6 METS and/or 3-5x/week], 4-High Activity [>6 METS and/or 5-7x/week]) was developed to quantify subjects’ PA level based on self-report of activities outside of any training completed for this study. We also considered subjects’ starting BMI Z-score as a potential factor. More subjects in the TRNG group reported PA > 3 (44.4% TRNG, 12.5% CTRL). Moderate positive correlations were found between the amount of PA and hip extensor strength gains (r=0.45 right, r=0.39 left), and amount of PA and left PF strength (r=0.41). More TRNG subjects (61.1%) than CTRL subjects (33.3%) showed an increase in strength of at least 10% in ≥5/8 of the muscle groups tested. The relationship between PA level and number of muscles strengthened was negligible (r=0.14). Pre BMI Z score did not differ between those who increased strength in ≥5/8 muscles vs < 4/8 muscles tested.

While the TRNG group reported more PA outside of the training program than did the CTRL group, there was not a correlation between self-reported PA and the percent of muscles strengthened. Level of PA was related to specific gains in hip extensors and PFs, suggesting that these muscle groups may be more susceptible to strength gains with general PA (not just specific strengthening). The informal self-report of PA may not have captured what subjects were really doing. Our protocol for strengthening was likely too conservative for this group (subjects typically reported an RPE of <4, “Somewhat Hard” on Borg’s Rating of Perceived Exertion). While not measured, we anecdotally noted that subjects’ compliance and motivation played a role in strength outcomes.

When working with adolescents who are obese, PTs might be most effective by developing individualized resistance training and PA plans especially for those who are motivated to change.

The Effects of Ankle Mobilization on Hip Strength, Nathan Daniel Watts, Alex Durland, East Carolina University, Greenville, NC

It has long been known that joint mobilization across all grades impact neural feedback and joint receptors. They have also been shown to provide neural feedback for control of pain both locally and widespread, increased range of motion, and improved postural control (Moss et al., 2007; Hoch et al., 2010; Landrum et al., 2008; Cosby et al., 2011). It also has been well documented that ankle injury is associated with hip weakness and even delayed onset of hip muscle activation (Beckman et al., 1995; Friel et al., 2006; Bullock-Saxton et al., 2004; Fredericson et al., 2000; Nicholas et al., 1976). Similar findings suggest that distal nerve stimulation increase proximal hip abductor EMG activity (Li et al., 2004) further linking neural feedback in the lower extremity. 21 healthy college males with no history of ankle sprains in the last 3 months were randomly assigned to either a control group or an experimental group and were randomly assigned a leg to be tested. Participants were positioned in sidelying with a strap placed just proximal to the iliac crest to stabilize the torso during testing. A second strap placed overtop a hand held dynamometer positioned 5.08cm proximal to the lateral joint line of the knee and was positioned so that the participant’s hip abduction strength was measured at 10° of abduction. The participant performed one practice trial followed by 5 trials of 5 seconds each with 10 seconds rest between reps. The average of the 5 trials was recorded. Following hip abduction strength testing, the study investigator performed 4 ankle mobilizations each lasting one minute each with 30 seconds rest between mobilizations. No significant difference between the two groups either pre or post testing. The experimental group received grade III mobilizations while the control group received grade I mobilizations. Following the mobilizations, participants tested for 15 minutes before their hip abduction strength was re-measured. Given the fact that joint mobilizations can increase mechanoreceptor activity and thus proprioceptive feedback, one can deduct that stimulation of these mechanoreceptors through joint mobilization may increase EMG and thus hip abduction strength. This is hypothesized based on findings of distal nerve stimulation increasing hip abduction EMG activity (Li et al., 2004). The idea of positional fault is something that has been proposed and over the past few years has come to light in the injured ankle suggesting that an anterior fibular position is present in the sub-acute injured ankle (Hubbard et al., 2008) a situation that may be correctable by mobilization of the ankle. Additionally recent findings show anterior talar positional fault to be identified in patients with chronic ankle instability (Wikstrom et al., 2010).
A Multi-Method Usability Evaluation of the Facebook Social Network Involving Blind Users, Julian I. Brinkley, East Carolina University, Greenville, NC

While social networking sites (SNSs) like Facebook are widely used and have been broadly studied, investigations of their use by individuals with visual impairments are scarce within the academic literature. Anecdotal complaints regarding their usability however can be found in abundance online. To investigate this issue we have conducted what we believe to be the first ethnographic study of the Facebook mobile interface involving blind participants. These six frequent Facebook users attempted 18 tasks in four scenarios using screen reading software on a desktop or laptop computer. Tasks were designed to be representative of common user behavior as described within the behavior chain for online participation (BCM); a user engagement model for user-content driven sites like Facebook. Task performance was recorded while opinions regarding specific features and the system as a whole were elicited through a series of semi-structured interviews and the System Usability Scale (SUS) questionnaire respectively. While user opinions were overwhelmingly favorable regarding Facebook’s potential as tool to communicate and establish relationships, nearly all participants felt that this potential was largely unrealized due to the identified usability issues. Of the features evaluated participants were most severely challenged by the process of creating a user profile and identifying other users with whom to establish relationships; two of the three core activities commonly viewed as characterizing SNSs. These findings call into question claims of Facebook’s technical accessibility and suggest that additional research is needed to make Facebook and perhaps SNSs generally, more usable for individuals with visual impairments.

The Difference between Gender BMI Levels for 8th Grade Students, Adam Andrew Tew, East Carolina University, Greenville, NC

BMI levels in children have been a concern across the country for many years. “Since 1980, the percentage of children who are more than doubled, while rates among adolescents have more than tripled” (Howell, McKenna, Lee & Dietz, 2004). Childhood obesity can lead to elevated health risks for children in adulthood. Therefore, the purpose of this presentation is to display the difference between Gender BMI levels for 8th grade students after participating in a weekly routine exercise program. Students that participated in the weekly exercise routine were the studied subjects of the secondary analysis. The secondary analysis study involves three steps. First, a literature review on information pertaining to BMI levels in adolescents and the relationship between activity levels and BMI was done to help incorporate scientific study with observation. Literature information was compiled and used to help guide research as this was a secondary analysis of information. Second, data from the students’ BMI levels as the participated in the routine exercise program was analyzed. Standards from the Centers for the Disease Control and Prevention were used to determine ideal levels versus actual levels. Lastly, the secondary analysis study will help to inform teachers and health educators of the role that gender might play in determining the BMI and overall health of an adolescent child. The data will be analyzed prior to the presentation using descriptive and inferential statistics.

Exploration of Mental Health Aspects of Women’s Reproductive Health, Christopher Ryan Dougherty, East Carolina University, Greenville, NC

Mental illness during prenatal and postnatal periods can have a negative affect on the family. A more severe form of mental illness may be extremely detrimental due to the complete dependence of the infant on the mother. This makes it particularly important for mothers to self evaluate the possibility of being at risk for a mental disorder or at risk of developing one. While there are numerous reasons that women want to have babies, an issue often overlooked is the possibility of mood disorders and how they could affect the pregnancy before, during, and after delivery of the infant. A study by Satyanarayana’s (2011) Indian journal review of 147 Pakistan women who were diagnosed with depression resulted in the low birth weight of their children. Despite the growing number of guided or experienced based studies, there remains a paucity of review articles on the subject. Thus it remains important to educate women in their child-bearing years, typically between the ages of 15 to 44, to identify mood disorders (depression and psychosis). The purpose of this study is to evaluate student knowledge of mental health aspects of women’s reproductive health, applying a multiple choice instrument before and following a required HLTH1000 class offered to college freshmen. Educational practice dictates eliminating those multiple choice questions that are deemed confusing and/or appear limited in the instruction practice. The literature confirms that pre-test and post –test analysis is the most efficient way to compile data before and after treatment of the independent (increased scores) and dependent variables (multiple choice test). Thus the continual evaluation of the multiple choice questions will assure class content is effective in the measurement of student knowledge regarding mental health.

Accelerated lipid oxidation increases the rate of mitochondrial H2O2 production in skeletal muscle, Cody D. Smith and P. Darrell Neufer, Department of Physiology, East Carolina University, Greenville, NC

Increasing lipid oxidation flux has been suggested as a therapeutic strategy to treat insulin resistance and diabetes. However, mice overexpressing peroxisome proliferator-activated receptor- in skeletal muscle (MCK-PPAR) are characterized by elevated lipid oxidation but reduced glucose
and insulin tolerance. To explore the potential mechanism(s) underlying the development of insulin resistance, aspects of mitochondrial function were assessed in permeabilized muscle fiber bundles (PmFbs) prepared from red and white gastrocnemius muscle (RG/WG) of MCK-PPAR and wild-type (WT) mice. Maximal ADP-stimulated O2 consumption (mean±SEM) was higher (P<0.05) in PmFbs from MCK-PPAR (RG: 137.4±15.8; WG: 53.4±4.8 pmol O2/sec/mg dry wt) vs WT (RG: 83.1±5.0; WG: 12.9±1.1) during lipid-supported respiration. Mitochondrial membrane potential was >20% higher in PmFbs from MCK-PPAR WG during lipid-supported basal respiration, which is associated with greater rates of H2O2 production (MCK-PPAR RG: 16.3±1.1, WG: 10.1±0.7; WT RG: 9.8±1.7, WG: 3.3±1.2 pmol H2O2/ min/mg dry wt). Interestingly, the ratio of reduced:oxidized glutathione (GSH:GSSG) was not different in MCK-PPAR mixed-fiber-type skeletal muscle; however, total glutathione concentration was 18% higher in MCK-PPAR mice. This may be a compensatory adaptation in MCK-PPAR skeletal muscle to balance the increased rate of H2O2 production due to accelerated lipid oxidation. Collectively, these data suggest that elevated flux through fatty-acid oxidation increases mitochondrial H2O2 emission, a factor that may contribute to development of insulin resistance.

The weather and climate-sensitivity of the tourism industry parallels that of other large industries including: agriculture, transportation and insurance. The extent of this sensitivity and weather information needs varies among different tourism business types. In spite of the recognized sensitivity, there have been very limited evaluations of the use of climate and weather forecasts or assessments of the climate-services needs within the tourism industry. While many climate and weather information resources are applicable to the tourism community including climate change assessments, drought, snow, wild fire land management and seasonal predictions, some tourism environments have received noticeably little outreach from the global climate-monitoring network including coastal destinations. An on-line Qualtrics survey was conducted among tourism business owners and managers within North Carolina’s eight oceanfront counties assessing the types of climate and weather forecasts they do and do not use. Questions covered a large range of forecast lead times from hourly to seasonal as well as non-traditional government and mass media produced forecasts. A MANOVA analysis was conducted to create a user profile for each type of climate and weather forecast type. This user profile offers governmental and media producers of climate and weather forecasts valuable insight into this stakeholder of their products.
Examination of the Differential Impacts of ATP vs. Shock on Patient Activity in the EMPIRIC Study, A. Whited, S. Sears, J. Koehler, B. Gunderson, East Carolina University, Greenville, NC

BACKGROUND: Implantable cardioverter defibrillators (ICDs) are devices that are placed in the chest to treat irregular heartbeats. Although ICDs have known mortality advantages over usual care and antiarrhythmic drug therapy, ICD shock has detrimental effects on quality of life and psychological functioning. However, little is known about how patient activity is affected by shock. Further, no research to date has examined the differential impact on physical activity of ICD shock vs. antitachycardia pacing (ATP), which is a milder form of cardiac therapy that was developed to reduce the treatment burden of shocks. As adherence to physical activity recommendations is critical to reducing morbidity and mortality for patients with ICDs, we sought to understand the relative effects of these therapies on physical activity in ICD patients.

METHODS AND RESULTS: Accelerometer-derived activity data were analyzed for a subset of patients (males = 83%; mean age = 62 years) enrolled in the EMPIRIC trial (Comparison of Empiric to Physician-Tailored Programming of Implantable Cardioverter-Defibrillators). The subset of patients was comprised of those who received ICD shock therapy (n = 71), or ATP therapy alone (i.e., without shock) (n = 103). Differences in physical activity between a week prior to, and a week following, ICD shock or ATP therapy were examined to compare the behavioral repercussions of ICD shock vs. ATP therapy. Further, the effect of therapy when one, few (2-4), or many (5+) therapies were delivered was assessed as well. There was a significant reduction in physical activity following ICD shock (p < .001). For patients receiving ICD shock, a significant reduction in physical activity was observed for few shocks (-26%, p = .01), and for many shocks (-34%, p = .01). In contrast, ATP-only therapy did not reduce patient physical activity levels (p > .05).

CONCLUSIONS: This study is the first to evaluate behavioral effects of ICD shock vs. ATP therapy, and whether these effects are comparable with ATP therapy. In tandem with existing literature, current results highlight that ICD shocks and ATP therapy have divergent effects on behavioral outcomes, with ATP’s effect profile appearing favorable. Many patients have ICDs due to severe and/or life-threatening cardiac disease, which often requires that patients engage in physical activity to reduce morbidity and mortality. Therefore, these findings are novel and are highly relevant for patients with ICDs.

Cancer chemotherapy impairs mitochondrial function in non-tumor-bearing tissue, Laura Gilliam, Daniel Lark, Kelsey Fisher-Willman, Maria Torres, Lauren Reese, and P. Darrell Neufert, East Carolina University, Greenville, NC

Fatigue and muscle weakness are chronic side effects in breast cancer patients undergoing chemotherapy. Our previous findings show the chemotherapeutic agent doxorubicin (DOX) causes muscle weakness and impairs skeletal muscle mitochondrial function, suggesting mitochondria in non-tumor-bearing tissue can be targeted by cancer chemotherapy. We hypothesize that the combined effect of cancer and chemotherapy compromises mitochondrial respiratory control and increases reactive oxygen species (ROS) production, leading to a decrease in muscle mitochondrial function and ultimately impaired contractile function. Using an immunocompetent syngeneic breast cancer model, EO771 cells were implanted into the mammary fat pad of ovariectomized C57/BL6 mice (TB), and a subset received a single injection of DOX (20 mg/kg). Compared to controls, maximal ADP-stimulated O2 consumption was decreased during respiration supported by Complex I (-17.1 ± 7.8 %, p<0.01) and Complex II (-11.9 ± 9.9 %, p<0.05, n=9/group) in permeabilized fiber bundles (PmFB) from the soleus muscle of TB + DOX mice. PmFB from both TB (121 ± 38 %) and DOX (360 ± 66 %) treatment alone displayed increased rates of mitochondrial H2O2 emitting potential. Compared to controls, cancer chemotherapy lowered maximal isometric tetanic force (TB + DOX: 37.6 ± 2.8 N/cm²; CTRL: 43.5 ± 1.1 N/cm²). Preliminary data suggest targeted overexpression of mitochondrial catalase in muscle is protective of the cancer chemotherapy-induced mitochondrial decline in respiration and attenuates the elevation in ROS. Our findings indicate cancer chemotherapy causes mitochondrial dysfunction, impairing respiration and elevating ROS, representing an underlying cause of cancer chemotherapy-induced muscle dysfunction. Supported by F32-AR061946 and R01-DK0796907.

S-phase factors are required for germ cell tumorigenesis and somatic cell fate transformation by GLP-1/Notch signaling in C. elegans, Young Chul Kwon, Dong Seok Cha, Rupen Patel, and Myon-Hee Lee, Department of Oncology, Brody School of Medicine, East Carolina University, Greenville, NC

Notch signaling pathway is a highly conserved cell signaling system in most multicellular organisms and plays a critical role in animal developments. In various tumor cells, Notch signaling is hyper-activated and has been considered as an important target in cancer treatments. We here demonstrated that S-phase factors are required for germ cell proliferations and somatic cell fate transformation by aberrant GLP-1/Notch signaling in the C. elegans. First, we inhibited DNA replication by Hydroxyurea (HU) treatment from L1 larval stage of wild-type and glp-1(bn18) loss-of-function mutants. HU strongly enhanced meiotic entry phenotype “glp” in temperature sensitive glp-1(bn18) loss-of-
function mutants, but not wild-type. It suggests that S-phase progress may be required for GLP-1/Notch signaling in the C. elegans. To further explore this result, we used RNAi to knockdown the S-phase related genes in three different alleles of glp-1 mutants: glp-1(bn18), glp-1(ar202) gain-of-function, and glp-1(q35) semi-dominant mutants. Interestingly, several S-phase factors affected GLP-1/Notch signaling in these glp-1 mutant alleles. Among them, RNAi of div-1, a homolog of the B subunit of the DNA polymerase alpha-primase complex, dramatically enhanced glp-1(bn18lf) phenotype, and rescued glp-1(ar202gf) germline tumor at 20°C. Importantly, RNAi of div-1 also suppressed glp-1(q35) somatic transformed multi-vulva phenotype. Genetic and biochemical analyses determined that S-phase factors did not affect the expression of GLP-1/Notch components and GLP-1 target gene. It suggests that GLP-1/Notch signaling pathways may mediate GI/S-DNA replication progression to control mitosis/meiosis decision and cell fate specification, which might be conserved in other animals.

**PP5**

**Inactivation of the chemotaxis gene, cheY3, in Borrelia burgdorferi and the effects it has on the enzootic cycle,**

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Bacterial chemotaxis systems govern the flagellar motor rotation after sensing environmental signals, and are well-conserved throughout bacteria. In the spirochete Borrelia burgdorferi, chemotaxis is hypothesized to play a critical role in the life cycle of this organism, not only by facilitating migration of the spirochetes from the midgut of ticks into the dermis of the mammalian host, but also by facilitating migration of the spirochetes from infected mammals into uninfected ticks, perpetuating new vectors for disease transmission. We postulate that spirochetal asynchronous motility is important for these disseminations, however, how these bacteria achieve this is unknown. The chemotaxis system of B. burgdorferi is well-conserved to the chemotaxis system of Escherichia coli. However, the B. burgdorferi chemotaxis system is much more complex because its genome encodes multiple homologs of several chemotaxis genes (e.g. two cheA, three cheW, three cheY, and two cheB genes). To date, only one study showed that chemotaxis is critical for the survival of B. burgdorferi throughout the infectious life cycle. The CheY protein is the response regulator in the chemotaxis signal transduction system, where it interacts with the flagellar motor switch to control motor rotation. Previous studies on the cheY genes in B. burgdorferi indicated that only cheY3 is essential for chemotaxis. However, those studies were done in vitro under one condition, and the Lyme disease spirochete is a parasite, surviving in two disparate hosts. Thus, we hypothesize that all three cheY genes—cheY1, cheY2, cheY3—are essential in either the mouse and/or the tick in addition to tick-to-mouse transmission. Preliminary data using a cheY3 mutant constructed in a low-passage, virulent B31-A3 strain suggests that the mutant is non-infectious via needle inoculation or tick. Currently, we are investigating the importance of the cheY3 gene in B. burgdorferi infectious life cycle using mouse-tick-mouse infection models.
PP6

Ethanol facilitates Estrogen-Enhanced Translocation of Estrogen Receptor α to the Cell Surface in Rat Myocardium, Stigall, R.J., Shaikh, S.R., and Abdel-Rahman, A.R.A., East Carolina University, Greenville, NC

We previously reported that acute ethanol causes myocardial depression/hypotension and autonomic dysfunction in female rats. In this study, evidence is provided that ethanol promotes the translocation of estrogen-activated estrogen receptor (ERα) to the plasma membrane of the female rat myocardium. Translocation of activated estrogen receptors and the changes exerted by ethanol, compared with controls, were analyzed in sham-operated (SO), ovariectomy vehicle-treated (OVX-veh), OVX 17α-estradiol-treated (OVX-E2), and ethanol treated SO (SO-EtOH) Sprague-Dawley rats. First, we identified the specific estrogen receptor most likely involved in mediating E2 exacerbation of ethanol-ekved myocardial depression using quantitative confocal microscopy. Dual label immunofluorescence imaging of myocardial sections was used to investigate the impact of acute ethanol-treatment (1 g/kg) on the cellular localization of ERα vs. estrogen receptor (ER) and ERα vs. G protein-coupled receptor 30 (GPR30 or GPER). While ERα and GPR30 remained localized to the cytoplasm, ERα moved from a position adjacent to the membrane to a distinct membrane localization pattern in SO and in OVX-E2 rats after ethanol administration. Next, to quantify the ERα translocation to the cell membrane, we measured its colocalization with the transmembrane protein, Cavolin 3 (Cav3). Cav3 is the major cavolin isoform in cardiomyocytes that plays an important role in nongenomic rapid signaling pathways initiated by stimulation of membrane-associated molecules. Pearson’s correlation coefficient (Pr) measurements of ERα-Cav3 colocalization were obtained by NIH ImageJ analysis of confocal images. We show that, compared with water, ethanol enhanced ERα translocation to the cardiac myocyte cell surface in the presence of endogenous E2 in SO-EtOH rats (Pr= 0.35±0.03 vs. 0.45±0.03; n=5). This synergistic interaction between E2 and ethanol to mediate ERα translocation to the plasma membrane most likely enhances nongenomic ERα signaling and might underlie the deleterious E2-ethanol interaction in the female myocardium. Supported by 2R01 AA014441-08

PP7

Estrogen Attenuates Cannabinoid Receptor 1-evoked Pressor Response in Rostral Ventrolateral Medulla in Conscious Rats, Fanrong Yao, Department of Pharmacology & Toxicology, Brody School of Medicine, East Carolina University, Greenville, NC

Background and objective. Our recent studies demonstrated that activation of the cannabinoid receptor 1 (CB1R) in the rostral ventrolateral medulla (RVLM) elevates blood pressure (BP) in conscious male rats. Whether CB1R regulation of BP is sex/estrogen (E2) dependent has not been investigated. The aim of current investigation was to investigate RVLM CB1R regulation of BP in female rats, and to elucidate the role of estrogen in this phenomenon. Methods. Female rats, surgically implanted with cranial guide cannula and femoral artery catheter to permit intra-RVLM microinjections and BP measurement, respectively, were used under the following hormonal states: (i) Proestrus sham operation (SO) rats (highest endogenous E2 level); (ii) E2-devoid, ovariectomized (OVX) rats; (iii) OVX rats plus E2 replacement (OVXE2). All rats were employed in the conscious state, and received intra-RVLM microinjection of the CB1R agonist WIN55,212-2 and/or the CB1R antagonist AM251. Results. Compared with vehicle, intra-RVLM WIN55,212-2 (100, 200 and 400 pmol) dose dependently elevated BP in all rat groups, but the pressor response was significantly higher in OVX rats than that in SO or OVXE2 rats. Intra-RVLM CB1R activation increased heart rate in OVX, but not in SO or OVXE2 rats. Following intra-RVLM WIN55,212-2, ex vivo neurochemical findings revealed enhanced phosphorylation of Akt and nNOS, and higher NO and reactive oxygen species (ROS) levels in RVLM neurons of OVX, compared with SO or OVXE2 rats. The BP and neurochemical responses elicited by WIN55,212-2 were attenuated by prior RVLM microinjection of the CB1R antagonist AM251. Conclusions. These findings suggest that estrogen dampens the molecular events triggered by CB1R activation, which leads to oxidative stress in RVLM neurons, and subsequent elevations of sympathetic activity and BP. These novel findings might yield insight into a central mechanism for estrogen dampening effect on sympathetic activity and hypertension in females.

PP8

Laminin-III Improves Skeletal Muscle Repair Following Eccentric Exercise-Induced Damage, Kai Zou1, 2, Matthew A Miller2, Dami Olatunbosun2, and Marni D. Boppart1, 2, 1 Department of Kinesiology and Community Health, East Carolina University, Greenville, NC, 2 Beckman Institute for Advanced Science and Technology, University of Illinois at Urbana-Champaign

Laminins are important and biologically active extracellular matrix proteins found in the basal lamina of skeletal muscle fibers. They provide an important scaffold necessary for tissue organization, maintenance, and survival. Laminin-III(1, 1, 1) (LM-III) is the predominant isofrom during embryonic skeletal muscle development. Systemic or intramuscular injection of LM-III can effectively prevent muscle damage and enhance muscle regeneration capacity in different mouse models of neuromuscular disease. PURPOSE: The purpose of this study was to determine the extent to which LM-III can contribute to muscle repair in response to eccentric exercise-induced muscle damage. METHODS: Each mouse was injected intramuscularly in both gastrocnemius (GAS) muscles with either 100 μL 1 mg/ml EHS LM-111 (n=12) or sterile TBS (Saline, n=12). At 1 week post-injection, mice either completed a single bout of downhill running exercise to induce muscle damage (-20o, 17 m/min, 30 min) (EX, n=6/group) or remained sedentary (SED, n=6/group). Twenty-four hours following the eccentric exercise, gastrocnemius-soleus complexes were rapidly dissected and collected for further analysis. RESULTS: The percentage of myofibers with centrally located nuclei was similar between Saline/SED (5.5±1.6%) and LM-III/SED (4.9±1.1%), but after eccentric exercise was significantly lower in LM-III/EX.
(4.4±1.1%) compared to Saline/EX (9.5±0.6%) (P<0.05). In addition, the percentage of satellite cells (Pax7+, 4.5±0.4%), proliferating satellite cell (Pax7+ and Ki67+, 38.8±8.0%) and number of newly synthesized myofibers (eMHC+, 3.9±0.6) were all significantly elevated to a greater extent in LM-111/EX than Saline/EX (2.3±0.4%, 24.9±3.2%, and 1.2±0.7, respectively) following eccentric exercise (P<0.05).

**CONCLUSION:** The results from this study suggest that LM-111 can successfully improve muscle repair following eccentric exercise-induced muscle damage.
### UO1

**Analysis of Hydrodynamic Forces on a human tooth and surrounding tissues during Oral Irrigation-A 3D Computation Fluid Dynamics (CFD) Analysis**, Rana T Abdelsalam, East Carolina University, Greenville, NC

Everyday, teeth are subjected to various elements from the food we eat and the drinks we consume. Therefore, maintenance of oral/dental health is paramount for the long term endurance of the tooth and surrounding tissues through regular cleaning and oral hygiene. The processes for oral hygiene involve pre or post oral irrigation processes through the usage of a high velocity water jets either at the dentist’s office or through the usage of oral irrigation devices. It is important for researchers to understand the hydrodynamic forces involved during the oral irrigation process and its impact on the long term durability and performance of a human tooth and surrounding tissues. In this research, CFD evaluation/analysis of the pre/post oral irrigation processes will be conducted on the human tooth with varying jet velocities and angles encompassing realistic representative values. The numerical results from the CFD studies will be used to associate safe limits for long term endurance of a human tooth and surrounding tissues. It is anticipated and hoped for that this research could help dentists, researchers, and users by providing them beneficial insights into the process of oral irrigation and contribute towards the advancement of dental research and hygiene.

### UO2

**Landing Biomechanics: The Role of Load Placement**

Joseph R. Patteson, Jamie E. Hibbert, Canden N. Byrd, Paul DeVita, Patrick M. Rider, Zachary J. Demire, Biomechanics Laboratory, Department of Kinesiology, East Carolina University, Greenville, NC

Landing is a critical component to athletic performance. Many studies have investigated the effect that added mass has on landing biomechanics finding when load is added to the body during a landing task, an increase in both vertical and anterior-posterior ground reaction forces is observed. These studies have focused primarily on adding mass to the trunk segment. It is unclear, however, if these adaptations would persist if mass was added to other body segments. We hypothesize that joint biomechanics will change as a result of load placement. The purpose of this study is to determine the effect of load placement on joint biomechanics during jump landing compared to unloaded jump landing. 7 healthy college-aged individuals participated in this study. Participants were outfitted for bilateral lower-extremity 3D motion capture. Vertical ground reaction forces (VGRF) were collected from two embedded force platforms. Each participant completed 3 successful jump landings in 3 conditions (unloaded, loaded thigh, and loaded trunk). 10% of the participant’s mass was added to the trunk via a weighted vest and 5% was added to each thigh via weighted, form fitting pants during the separate loaded conditions. Landing height was standardized to 50 (± 2.5) cm. Student’s paired samples T-tests were used to detect any mean differences with (p < 0.05) indicating significance. A significant reduction (p = .007) in peak VGRF was found between the loaded thigh condition (3235.6N ± 722.8N) and the loaded trunk condition (2954.8N ± 737.5N). Kinematic results showed that during the loaded thigh condition, participants landed with more extended knees (-13.6 ± 2.6 deg) than the unloaded (-16.8 ± 5.1 deg) and loaded trunk (-16.7 ± 6.2 deg) conditions however these results were not significant. Hip flexion angle increased in the loaded trunk condition (-25.7 ± 12.4 deg) compared to loaded thigh (-20.1 ± 6.5 deg) and unloaded (22.5 ± 7.0 deg) although these results were not significant. Our results supported the hypothesis that load placement changes landing biomechanics due to the significant changes in VGRF. Joint kinematics were not significantly different, however given the low statistical power of this study due to low sample size, we believe that these differences are meaningful. Participants generally landed with more hip and knee extension during thigh loaded conditions and more hip flexion when loaded at the trunk, signifying altered joint kinematics due to load placement.

### UO3

**Automated Assessment of ER, PR, and HER-2 Status through Computer- Based Image Analysis**, Amos Cao, J’manda Dunston, Caleb Malpass, Megha Sinha, Bryan Dangott, M.D., East Carolina University, Greenville, NC

Breast cancer is the second leading cause of death among women. After breast cancer is detected in a patient, biomarker tests are conducted to understand the severity of a cancer, which is then used in treatment planning. The protein biomarkers evaluated in breast cancer are progesterone receptor (PR), estrogen receptor (ER), and HER-2, which can be visualized and measured with a process known as immunohistochemical (IHC) staining. By applying this process to breast cancer cells from a fixed tissue section, valuable prognostic and predictive information is obtained. Because IHC stained tissue is evaluated semi-quantitatively by a pathologist, test results can vary between investigators and over time. This results in a non-standardized patient diagnosis, which can lead to mistreatment and excess cost to the patient. Through the development of an in-house image processing and scoring pipeline combined with a machine learning based image classifying algorithm, CellProfiler, an automated tumor detection and scoring system has been produced. This new system provides a quantitative method of scoring IHC products, aiding the pathologist in identifying the correct classification of a cancer, which may ultimately improve patient outcomes.

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**Undergraduate Oral Presentation Abstracts | In Person**
Characterization of Parts Produced by 3-D Printers, Sarah Christine Gurganus, East Carolina University, Greenville, NC

Parts produced by 3-D printers are being tested to determine the mechanical properties and failure modes. Since 3-D printed parts are built up layer-by-layer, they do not have the same properties in all directions. In order to determine the properties of the parts, tensile tests, compression tests, and bending tests are being performed per American Society of Testing and Materials standards. Additionally, a shear testing method is being developed that eliminates the need for specialized fixtures. Understanding how 3-D-printed parts act under loads and how they fail is important to determining the applications for which the parts can be used. Obtaining information on these properties will allow manufacturers using 3-D printers to design better functional parts.

Grady White Forklift purchase vs. lease, Steven D Watson and Anthony W Burke, East Carolina University, Greenville, NC

Grady White has a reputation as one of the most successful boat manufacturing companies in the world. They are renowned for designing and producing top of the line fiberglass boats. The purpose of this project is to analyze the benefits of leasing vs purchasing a forklift fleet for the company. Research and data analysis will be used to determine the positive and negative aspects of purchasing vs. leasing the fleet. Factors to be considered will include daily wear and tear, maintenance, convenience, cost, and customer service. The forklift fleet will prove to be a key component in the manufacturing process, thus it is vital the correct decisions are made to enable Grady White to continue to produce world class vessels.

Effects of Layer Orientation of Different Activated Carbon Fibers on Pressure Drop Across Respirator Cartridges, John Soliven Longa, East Carolina University, Greenville, NC

Currently available respirators for volatile organic compounds (VOCs) use granular activated carbon (GAC) because of its efficiency, low cost and available technology. However, due to its granular form, GAC needs to be contained in cartridges, resulting to bulky and heavy respirators that are uncomfortable to wear and to poor user compliance among workers. Activated carbon fibers (ACF) are considered as good alternative adsorbents to GAC in respirators because of their larger surface area and adsorption capacities, lighter weight and fabric form. ACF, considering its advantages over GAC, has great potential in the development of thinner, light-weight and more efficient respirators. The present study investigates the pressure resistance across ACFs in realistic respirator cartridges at various ACF composition and orientation in relation to airflow. The study provides information on the optimum composition and orientation of ACFs in cartridges that will result to acceptable breathing resistance based on the National Institute for Occupational Safety and Health (NIOSH) certification requirements. It was hypothesized that the orientation and composition of ACFs in respirator cartridges affects the pressure drop across the cartridges. Six ACF types were cut into discs or strips, oven treated, and placed in respirator cartridges at different orientations (parallel or perpendicular to airflow). ACF cartridges were challenged with 43-LPM pre-conditioned air (temperature at 23°C, relative humidity at 50%) in a customized cylindrical test chamber. Three analysis (N=3) were conducted for each ACF type per orientation. The pressure drop across the ACF cartridges were monitored using a micromanometer. The average pressure drop were compared among the different cartridge designs and to the NIOSH maximum inhalation resistance requirement of 40 millimeters of water (mmH2O). Analysis of variance (ANOVA) (p < 0.05) will be used to evaluate differences in pressure drop among ACF cartridge types, and between layer orientation types. Preliminary data suggests that the pressure drop across cartridges with ACF layers in parallel orientation is lower compared to that with ACF layers in perpendicular orientation at similar adsorbent mass for all ACF types, with differences ranging from 21-40%. Pressure drop differs among the ACF types, with ranges 23.7-40.7 and 18.7-30.8 mm H2O for perpendicular and parallel orientations, respectively. The results of this study may provide groundwork for the improved design of ACF respirators for better worker protection.

City of Greenville Sustainability, Scott Michael Barber, East Carolina University, Greenville, NC

Sustainability has been defined as “meeting the needs of present generations without compromising the needs of future generations.” Seeking to become more sustainable, the City of Greenville, North Carolina developed a Municipal Operations Sustainability Plan, which presents the vision for the city and specific goals to become environmentally, socially, and economically sustainable. Reducing greenhouse gas emissions, municipal electricity, and use of potable water, increasing the number of street trees, and establishing a sustainability fund are among the goals that, when achieved, will help Greenville become more sustainable. The Public Work’s Department has been working with Schneider Electric to reduce the amount of energy use in municipal buildings. Schneider Electric specializes in energy management, and is known worldwide for its success in saving energy and improving energy efficiency. Along with the work completed with Schneider Electric within the Public Work’s Department, Greenville has joined ICLEI - Local Governments for Sustainability, ICLEI is a nonprofit, international, membership organization of cities, towns, and counties seeking to become more sustainable, addressing climate change and clean energy. ICLEI provides resources to local governments to help save money, reduce energy use, and reduce greenhouse gas emissions. This research presents what Greenville has achieved thus far with Schneider Electric and ICLEI, and states what the next steps are to reach their goals, as well as comparing similar cities that are more sustainable to understand what can be achieved in Greenville.
The Multifaceted Cultural Attainments of the Twelfth-Century Renaissance, Sarah Carson Cox, Kevin Moll (School of Music Faculty), East Carolina University, Greenville, NC

After the year 1100, a wave of intellectual and artistic energy, known as the Twelfth-Century Renaissance, surged through Europe. Historical scholarship has tended to emphasize the attainments of this movement in intellectual disciplines (e.g., the rise to prominence of dialectic and the recovery of Greek philosophy through Arabian and Byzantine sources), and in the visual arts. This presentation will attempt to substantiate that the concept of Renaissance in the period can be drawn much more broadly, both in terms of general “renewal” of culture, and in terms of actual technical achievements in the arts. Cultural aspects that will be emphasized include: 1) the militant expansion of European Christendom through the Crusades, 2) the development of a “courtly” culture originating in southern France, 3) the significant economic improvements that characterized the era, and 4) a new preoccupation with legal, governmental, and educational institutions. Notable artistic advances that will be mentioned include: 1) the high point of the Romanesque style and the innovation of Gothic around mid-century, 2) the epoch-making codification of rhythm in music, 3) the rise of secular vernacular literatures, and 4) the dramatic expansion of secular music through the troubadours and trouvères. The goal of this paper is to illustrate the full achievement of one of the most remarkable chapters of the Middle Ages—if not all of Western Civilization.

The Personified Cultural Contrast in “Blancanieves,” Anna A Lawrence, East Carolina University, Greenville, NC

In 2012, Spanish director Pablo Berger released his film “Blancanieves,” a fantastic and fantastical reimagining of the Brothers’ Grimm fairy tale, “Snow White.” Its unconventional cinematic techniques, including a silent track and black-and-white film, won the film ten recognitions at the 27th Goya Awards, including the award for Best Film. Like the classic tale on which it is based, the plot of the film illustrates the life of a young woman and her antagonist stepmother; however, in Berger’s version, the story is set against the backdrop of southern Spain in the 1920s. In “Blancanieves,” there is a visible contrast between the protagonist and her stepmother that emphasizes the importance of embracing tradition over modernity. This theme is especially relevant in the context of present-day Spain, where political conflict and globalization have led to cultural fragmentation and the loss of a unified national identity. This investigative film review will illustrate how the contrast between Blancanieves and her stepmother is demonstrated through the film’s scenery, its wardrobe, and the representation and depiction of the two characters in the media. An extensive analysis will explain how Berger uses these elements to create a work that promotes awareness of a collective national culture.

Exploring Feminism in the Tijaniyya Sufi Order in Senegal and Nigeria, Hannah Marie Potter, East Carolina University, Greenville, NC

Sufism, which is a mystical form of Islam, serves as the main form of religion followed by people living in West Africa. The prominence of Sufism throughout West Africa has provided leadership roles for women not usually granted through their societies or other more orthodox forms of Islam. More specifically, the Tijaniyya order, primarily located in Senegal and Nigeria, played a key role in expanding the access for women to the practices of the movement. A main part of Sufi teachings is a teacher student relationship, otherwise known as a muqaddam (a) or spiritual guide. For most of history, the position was reserved for men, but with the teachings of Sheik Niass, many women were appointed to serve the role of muqaddama within the Tijaniyya order. In taking these leadership roles, however, women must embrace characteristics that inherently keep them subordinate to their male counterparts. Through this paper, I hope to understand motivations for including women in these movements, the goals, the benefits, and the challenges these women face for participating in such an institution. The voices of the women indicate that any person with a true connection with the higher deities does not see any separation between male and female. There is conscious resistance to the Western liberal feminist view on gender relations, and the Sufi women of the Tijani order express their will to create gender relations in their own way, which is often reflective of indigenous cultural values. The actions and words of these women reveal a type of feminism, which ultimately liberates and strengthens the women who are participating in leadership roles within the Tijani order in Senegal and Nigeria.
Comparison and Contrast of Sethe and Scarlett as Independent Women, Sandra B Ross, East Carolina University, Greenville, NC

Through this paper and research, I plan to explore the various ways in which Scarlett, from Margaret Mitchell’s Gone with the Wind, and Sethe, of Toni Morrison’s Beloved, achieved independence from their societal bonds, and the different obstacles both faced while working towards their complete independence. I will compare and contrast their two paths to freedom, how they achieve it, and also the influences that shaped their lives and beliefs. While Beloved has been extensively reviewed and critiqued, and research on Gone with the Wind is growing, the two characters have not been compared or researched in regards to one another before. For this research, I will primarily use the two novels Gone with the Wind by Margaret Mitchell and Beloved by Toni Morrison, as well as a few secondary sources as needed. Scarlett and Sethe are both strong women who achieve freedom during the Civil War-era South, however Scarlett is a Southern belle who breaks free of societal roles and Sethe is a slave who gains freedom from slavery by escaping to the North. Even though Scarlett is white and Sethe is black, the two women both struggle against enslavement by society. Scarlett finds her freedom during the Civil War as society’s expectations of women are forced to change. Sethe achieves her freedom by leaving the plantation Sweet Home for the North and, after the death of her daughter, achieves complete freedom. Scarlett and Sethe struggle against their bonds by defying their male counterparts, raising their children as they see fit, and running their own households to provide for their families.

The Evolution of Women’s Roles in the US Air Force
Kathleen Bates Tcherkezian1 and Charles Boler IV2, 1East Carolina University, Honors College, 2AFROTC Detachment 600, East Carolina University, Greenville, NC

Thesis: Women have played a vital role in this country’s defense relations throughout the past century and into the present. This paper will explore how women’s efforts and roles have evolved from the start of the United States Air Force as volunteers, secretaries, and nurses, into today’s combat heroes. Background: World War II ended on September 2, 1945 when Japan surrendered. At that time the military in the United States was becoming more advanced and there was an increase in the use of separate air power and ground forces during wartime scenarios. This gave the United States the need for a military branch dedicated to air power. At that time, women were allowed to serve as civilian secretaries and support roles back home, but were not permitted to fight in battle or serve within any of the branches. Summary: Just a few examples of truly extraordinary women that created history through time include Staff Sergeant Esther McGowin Blake who was the first woman to join the Air Force when it became its own branch; Jacqueline Cochran who was the first woman to break the sound barrier, and the Honorable Sheila Widnall who become the first female secretary of the Air Force. Conclusion: Women currently make up only 18.9% of the Air Force, but still make a significant contribution. This is a significant increase since the creation of the Air Force in 1947, when no women served. Not only have women set such high standards for those in following generations, the Air Force has allowed for the change to occur over time and adapted to the growing need for a diverse force.

The Traveling Tale, Kathryn Gene Ervin, East Carolina University, Greenville, NC

The aim of my senior thesis is to exhibit my art to the Greenville community using an alternative forum of presentation. On the one hand, participation in art (via museums and galleries) is statistically on the decline, and on the other, mass media has allowed for the sharing and creating of images, accessible virtually anywhere. I maintain that the tangible, physical representation of art is an encounter worth preserving and by hybridizing postmodern ideologies and contemporary techniques in the spirit of social activism, my exhibit will offer an aesthetic, interactive encounter with the allure of participation. The medium for this research will be site-specific installations. They will appear in Greenville at the end of April, at the behest of my alter ego, Thomas. I have 7 fine art paintings that will be installed in unlikely venues (a bus stop, a laundry mat, a gas station, etc.). The paintings illustrate a narrative in which Thomas adventures through the realm of the imaginary, a subconscious search for life purpose. The paintings are accompanied by the written narrative of Thomas’ tale in the form of a zine. This includes a web address and a map, leading the participants through clues, surprises, twisting trails, and the essential 7 chapters of the narrative. Success will be gauged by the number of hits on the exhibition’s web site, indicating the willingness of the viewer to step onto the stage and activate all that art has come to mean to me: a path to mental health and wellbeing, and an invitation for gainful imagination. Sometimes these interests are not adequately delivered in the traditional means of a gallery exhibition or solely through the lenses of a virtual realm; in melding the two, a much different experience can be staged.


**UO14**

**Educational engagement: Investigating service learning in the nonhuman sciences, Taylor Gray Abernethy and Dr. Claudia Jolls, East Carolina University, Greenville, NC**

Classic definitions outline service learning as engaging students in experiential education where learning goals are reached when service activities are combined with reflective assignments. In an effort to integrate education with volunteerism, service learning allows students to enhance their coursework with field experience and activism that succeeds in helping provide assistance to a community, environmental, or global problem. Service learning is a flexible concept that can be molded to fit many educational and curriculum disciplines. It can be expanded to encompass an entire course or narrowed to a project or requirement within a course restricted by a curriculum. At many schools, and especially at East Carolina University, there are many service learning courses and opportunities. Most, however, occur in the health and human sciences; opportunities in the areas of environmental and earth sciences are more limited. Schools are surrounded by biota and conservational issues that would serve as appropriate outlets for environmental service needs. Some schools have incorporated direct service programs such as planting trees and implementing recycling plans. Others have taken material learned in the classroom and developed lesson plans that were taught in K-12 schools. As the world’s environmental needs continue to magnify along with its population, there will be an increased necessity for attention to natural resources and nonhuman inhabitants. Conditions for connecting humans to the environment are all around. Crafting the right combination of service project with instruction and education can be the corridor for bringing humans and the environment together.

**UO15**

**Components of Reproductive Isolation between Subspecies of an Annual Plant, Evan B Arthur, East Carolina University, Greenville, NC**

Reproductive isolation is required in the divergence of species and includes both ecological and genetic components. In plants these include male sterility, differences in flowering time, and divergence in habitat. Cleistogamy, the production of closed, self-fertilizing flowers, creates a barrier to gene flow by preventing hybridization. However, there is little to no literature showing its impact in reproductive isolation. A unique opportunity arose to determine the degree of isolation that cleistogamy provides within Pitt County. Two subspecies of an annual, cleistogamous plant Triodanis co-occur. Each subspecies exhibits a mixture of cleistogamous and open (chasmogamous) flowers. To understand the relative contribution of cleistogamy to reproductive isolation, we attempted to quantify the strength of barriers conferred by all potential ecological and genetic factors. By studying the subspecies in their natural habitats, soil moisture and content were quantified at several sites where they co-occur to calculate the extent that habitat differences contribute to the isolation of the two subspecies. By calculating the extent that these components contribute to isolation we were able to see the relative contribution cleistogamy provides. Calculations show that there is a significant variation in soil composition, moisture, and ability to hold water. Observations in the field were also made to determine whether differences in flowering time prevent hybridization. Further analysis showed that flower production in the subspecies does in fact overlap and thus is unlikely to promote prezygotic isolation. To quantify the extent of prezygotic isolation due to cleistogamy, number of seeds produced was quantified between open and closed flowers. By using hand pollination, an F1 generation was made and raised in the greenhouse. Results show that F1's are in fact viable and in some cases appear to be as large or larger than parentals, indicating that there is little to no postzygotic isolation at all. This study is essential to the understanding of cleistogamy as a component of reproductive isolation between divergent plant taxa.

**UO16**

**Proposed origin of “black mats” found at the Younger Dryas boundary, Abigail Leonie Maiorana-Boutilier, East Carolina University, Greenville, NC**

In order to better understand the cause of the Younger Dryas (YD) stadial, a global period of abrupt climate change, sediment samples of a layer of “black mat” from 13 sites in Mexico, United States, and the Netherlands were chemically analyzed in this study. The black mats have been hypothesized to be pyrogenic residues created either by 1) meteoritic impacts or 2) abrupt climate change, thought to occur globally ~12,000 years ago. Although other researchers have addressed various compositional indices of the black mats as evidence of meteoritic impacts, there are no studies addressing the composition of hydrocarbons in these residues. Interestingly, there are similar black mats associated with a known impact event, which occurred at the cretaceous-tertiary (K-T) boundary, and the black mats from the K-T boundary contain elevated levels of combustion-derived hydrocarbons. I analyzed the YD samples in my study for polycyclic aromatic hydrocarbons (PAHs) and stable isotopic ratios of soot carbon to test my hypothesis: climate-driven wildfires will leave different PAH and soot carbon “signatures” at each location, due to the diversity of plant material present at each site. An extraterrestrial impact however, could diffuse soot globally, in which case the signatures would all be similar. I will show that the PAH abundance at the impact sites are elevated and indicative of combustion. I will also show that the mass spectral fingerprints and isotopic ratios from the various sites will be similar, indicating a common source and a possible cause of combustion. This information is critical in determining the cause of the YD Stadial.
UO17

Do neotropical flycatcher species exhibit morphological variation among populations consistent with competitive exclusion by similar-sized sympatric species? Bradley Todd Moore and Susan B. McRae (Mentor), East Carolina University, Greenville, NC

Morphological variation can be used to distinguish species and predict behavior. However, members of different populations of the same species can show distinctive morphological differences. Character displacement, trait variation among populations subject to different competitive regimes, can lead to such morphological differences. This is directly attributable to similar species imposing selection, and is therefore a fundamental consequence of resource partitioning. The geographic ranges of Neotropical flycatchers overlap extensively with other family members. Using specimens from the Smithsonian National Museum of Natural History, I measured morphological traits in the same species of flycatcher sampled at 6 distinct regions in Panama, Central America. I collected standard morphometric data (wing length, tarsus length, beak length, width, and depth) from study skins. I compared mean measurements among populations to identify morphological differences. Species assemblages in each region were determined from recently published field guides. Species were sorted according to body length, and it was determined whether or not similar-sized flycatchers coexisted in each region. I will test the prediction that foraging competition among species of similar-sized sympatric flycatchers could produce trait divergence among populations of the same species separated by relatively small geographic distances.

UO18

Assessing morphological variability in silversides from the Albemarle and Pamlico Sounds, North Carolina, Stephen Wayne Parker and Anthony S. Overton, East Carolina University, Greenville, NC

Silversides including Inland silversides (Menidia beryllina), Atlantic silversides (Menidia menidia), and Rough silversides (Membras martini) are ubiquitous fishes in the estuaries of North Carolina. These species are very similar in appearance and may share many morphological traits. In this study, we analyzed conspecific silverside populations to characterize morphological variance within and between species. Our goal was to determine if geographic differences could point to significant morphological variation among silverside populations in Pamlico and Albemarle Sounds. Fish were collected by seine, returned to the laboratory, and 17 morphological characteristics were measured on each fish. All morphological characteristics were significantly related to total length and all 17 characteristics differed significantly among the species (P <0.05). Principal Component Analysis showed that eye diameter accounted for most of the variation among the species. The morphological variation in a species is an important component, which repeatedly has been shown to correlate with factors such as diet, habitat and predation risk in fishes. Any significant variance may be a product of genetically differentiated populations as due to reproductive isolation by distance. It is essential to evaluate the cause of varied species traits in order to better understand how populations adapt to their environments.

UO19

The Genetic Basis of Pigmentation Variation in Domesticated Zebra Finches, Shaivya Pathak, Allison Lansverk, and Christopher Balakeridhan, East Carolina University, Greenville, NC

Coloration plays a very important role in camouflage, mimicry and social communication in birds. To understand how pigmentation is regulated on a genetic level, we aim to identify changes in the genome associated with pigmentation in the zebra finch Taeniopygia guttata. We focus on comparisons of a specific domesticated strain of zebra finch, the Chestnut Flanked White (CFW). Analyzing sequence variation in genes associated with pigmentation will identify polymorphisms associated with coloration. The CFW mutation is known to be sex linked, so we targeted two sex-inked genes with known roles in melanin production, TYRP1, (tyrosinase-related protein 1) and SLC45A2. Transcription of the TYRP1 gene leads to the production of melanin by encoding for a melanosomal enzyme. In humans, TYRP1 null alleles cause rufous albinism and in other species its mutants cause lack of pigmented skin and/or hair. Studies on the analysis of the TYRP1 gene conducted on both human and mice support that this gene mutant is attributed to melanocyte death caused by a single base alteration (C-T transition) from wild type. SLC45A2 gene encodes for the SLC45A2 carrier protein involved in the mediation of melanin synthesis. The SLC45A2 gene has been found to play a role in melanogenesis relating to pigmentation in several species. A mutant of this gene is responsible for the white tiger, an elusive Bengal tiger variant with white fur and dark stripes. Papers on the genomic studies of the White Tiger indicate that nonsynonymous mutations corresponding to a C to T transition lead to an alanine-to-valine substitution. Deeming this single base pair alteration to be the genetic basis for SLC45A2 missense mutation in the white tiger. It is our objective to determine whether there are any nonsynonymous mutations in sequences of the TYRP1 and SLC45A2 genes of the CFW. Whether these mutations are consistent with other cited studies will further influence our understanding of the genetics behind a trait of adaptive significance.
Female Middle Schools Students Living in Eastern North Carolina Have Higher Nutrition Knowledge Compared to Males, C. D. Hodges, BS; A. Roseno, BS, M.W. Duffrin, PhD, RD, LDN, & V. Carraway-Stage, PhD, RD, LDN, East Carolina University, Greenville, NC

School-based K-12 programs aimed at improving health behaviors have proven to be a promising and efficient method to prevent childhood obesity. The classroom is an ideal environment for interventions aimed at increasing knowledge and developing skills needed to encourage adolescents to make healthy lifestyle choices; however, the provision of nutrition education in the school setting has been a challenge. The White House's Taskforce report on childhood obesity recognized the amount of time spent on nutrition education has declined, potentially negatively impacting students across all grade levels. This purpose of this study was to determine the nutrition knowledge of eighth-grade students attending public schools in eastern North Carolina (NC). A secondary aim was to explore potential gender differences between males and females. Researchers recruited students (n=265, 45% male) within 16 eighth-grade classrooms from nine counties to participate in the study. At the beginning of the 2013-2014 academic year, a 22-item researcher-developed nutrition knowledge survey was administered to participating students. The questionnaire addressed three content standards within the NC Healthy Living Standards (HLS) (i.e. using tools to analyze dietary patterns (e.g. MyPlate); creating strategies to improve dietary intake; creating plans for lifelong health) for middle school students. The average nutrition knowledge score among all students was 10.5 (58% correct). Researchers observed a significance difference between males (µ=9.98, SD=3.35) and females (µ=11.02, SD=3.12) for the total nutrition knowledge score (t = -2.59, p=.01), and within the HLS “using tools to analyze dietary patterns” content area (t = -2.68, p=.01). Past research findings affirm that females tend to have higher nutrition knowledge independent of age. However, results from the current study indicated greater knowledge was primarily concentrated within the area of using tools (e.g. Dietary Guidelines, Nutrition Facts labels) to improve diet. Future research should re-examine nutrition knowledge among the same students at the end of eighth-grade to determine if student knowledge improves and if differences between gender change.

Puppet Shows That Make a Difference, Shayna Meyers, Teresa Heavilin, Purity Kimaiyo, East Carolina University, Greenville, NC

In fall 2013, two undergraduate students created and performed original health-oriented puppet shows for Pitt County children between the ages of three and seven. One puppet show focused on the importance of dental hygiene, and the other focused on the importance of exercise. In the first show, Chomper the bunny rabbit loses a baby tooth and is visited by the tooth fairy, who answers all of his questions about keeping his teeth healthy. In the second show, Abigail, an elementary school student, helps her friend Cheryl build her physical fitness in advance of her school fitness test. Both shows contained an interactive question/answer session afterwards between the puppets and the children. The interactive portions of the scripts helped to engage the children while allowing the puppeteers to gauge how much information the children were learning. These puppet shows offered community children a unique artistic experience while creating a fun and engaging way to teach children about dental and physical health, beyond conventional teaching methods.

Teacher and Administrator Perceptions of Nutrition Education During Mealtime in Head Start Preschools, A.D. Peterson, N. Bechar, L.S. Goodell, PhD, RD & V. Carraway-Stage, PhD, RD, LDN, East Carolina University, Greenville, NC

Mealtime in the preschool classroom represents a unique opportunity for teachers to provide nutrition education; however, research suggests that teachers are often overwhelmed during this time, making the provision of quality education difficult. The purpose of this study was to examine the factors impacting the provision of nutrition education during mealtime in North Carolina-based Head Start preschools. Researchers conducted 63 in-depth, structured interviews between September 2011 and May 2012 with Head Start teachers (n=32) and administrators (n=31). Transcribed interviews were coded and analyzed to identify emergent themes. Following grounded theory, researchers identified and condensed 13 inter-related themes within a substantive-level model. Findings indicated that time constraints (e.g. scheduling time, kindergarten readiness), mealtime barriers (e.g. chaos of mealtime, quality of meals, peer influence), teacher factors (e.g. modeling, resistance), and availability of resources (e.g. educational resources, teacher training) were all contributing factors to the provision mealtime nutrition education. Implementing nutrition education during mealtimes in Head Start centers may alleviate complications associated with scheduling time for formal instruction and funding constraints. Mealtime education may also enhance the learning processes for children by appealing to children's learning styles, senses, and interests. However, in order to ensure quality education is provided, teachers may need additional support through additional training and educational materials sensitive to the challenges within the mealtime environment. Further research is needed to determine the barriers, facilitators and overall effectiveness of providing mealtime based nutrition education to preschool age children.
“Nothing to Lose: Deviant Behavior Before and After Surpassing Adolescent Early Fatality Expectations.” Sarah Quinn Brickels, East Carolina University, Greenville, NC

An adolescent’s potential future often serves as a strong deterrent for engaging in deviant behavior. Related, adolescent expectations of the future have been linked to future attainment and lower levels of delinquency during adolescence, with no expectation of a future what does an adolescent have to lose by engaging in delinquent behavior? Beyond adolescent delinquency, what happens to these “nothing to lose” adolescents if they outline their expectations but what happens to adolescents who do not expect to have a future? With little investment in an unforeseen future, do these adolescents have the option of a conventional life? Using a sample of adolescents from the National Longitudinal Study of Adolescent Health, this project examines the delinquency of adolescents with “nothing to lose” during adolescence before the anticipated age of fatality and their deviance during the transition to adulthood after surpassing their early fatality expectations.

Erasing the Mark of a Criminal Record: Examining the Effect of Education on Ex-Offender Employment, Milton Timothy Joyner, East Carolina University, Greenville, NC

The United States has the largest incarcerated population in the world, and with that it also has the largest population of citizens with criminal records and the stigma associated with these records. The stigma encountered by ex-offenders is thought to contribute to the high recidivism rates currently observed through blocking opportunities for advancement in conventional society (i.e. attaining a formal education, acquiring and maintaining steady employment, and the ability to move into better areas). Pager’s (2003) work found that individuals with a felony conviction were half as likely to receive an interview or call-back regarding employment as individuals with no felony convictions. Beyond this finding she also observed significantly lowered odds of receiving an interview or call-back based upon race. Pager’s work ultimately demonstrates the impact that the mark of a criminal record can have on employment. While previous research has noted the existence of negative stigma, little research has been conducted to examine potential methods for reducing the stigma ex-offenders face upon re-entering society. In conventional society the most common method for securing stable employment is attaining degrees in formal education. While education has long been associated with the pathway to the American dream in conventional society, it is unclear as to whether education can erase or at the very least mitigate the mark of a criminal record. Using audit study methodology, we seek to answer the question of whether the level of education matters in securing employment for ex-offenders. We expect to show a positive correlation between the level of education achieved by ex-felons and their chances of gaining stable employment, with the hopes that our research could help divert funds towards educating individuals who have minor records instead focusing on incarcerating them.

Analysis of Paralinguistic and Nonlinguistic Codes of PTSD, Kristin Elena Moran, East Carolina University, Greenville, NC

Individuals with post-traumatic stress disorder (PTSD) have been shown to be socially isolated and lacking in self worth (Sloan, Bovin, & Schnurr, 2012). This pilot study investigates whether or not nonlinguistic behavior along with paralinguistics are symptomatic of PTSD by identifying ways in which participants evidence social isolation in different types of conversational settings. A convenience sample of 8 males, ranging in age from 26 to 65 years, was recruited with snowball sampling; half serve as control group participants and the others have a self-reported diagnosis of PTSD. Participants were assessed with a battery of instruments, including the Test of Pragmatic Language and the Mini Mental Status exam. They were interviewed twice, once using an IRB-approved questionnaire and once using unstructured conversation. During the interviews, participants were assessed for data such as the content of the answers, length of response times, presence/amount of eye contact, and variations in body language and gestures. Audio recordings of the interviews were made for later review in order to reinforce initial impressions and evaluate prosodic features. Initial analysis shows that participants in the control group were less likely to be emotionally and socially distant; they demonstrated relaxed posture and open body language. Further analysis will show whether or not aspects of participants’ speech are affected in order to find whether or not symptoms related to speech are characteristic of the disorder directly.

A Social Commentary of Women Comediennes on Saturday Night Live and the ‘Weekend Update’ Sketch, Kathryn Mullins, East Carolina University, Greenville, NC

Saturday Night Live is a television institution that continues to draw upon its past and look to its future. Women have consistently been praised for their comedic efforts as cast members, but not many have served as anchors on the “Weekend Update” sketch. As the longest-running sketch, it is surprising that “Weekend Update” has not seen the amount of diversity audiences have come to expect from Saturday Night Live. This social commentary website will delve into the issues surrounding women on the show, as well as their achievements and advancements. This website will serve as a platform for written creative expression, as well as a project in media promotion. The purpose of this project is to inform and entertain the reader with articles about the women of Saturday Night Live, as well as use social media strategy to promote the website and increase viewership. The objectives of this project are to 1) Design and create a website that is user-friendly and functional, 2) Write between ten and twenty insightful and topical articles, and 3) Gain a regular readership following of two hundred unique viewers.
Connective Leadership: A New Approach to Civic Leadership and Engaged Citizenship, Tori Alison Rodriguez, East Carolina University, Greenville, NC

In this complicated and interconnected age where people have become constant consumers of digital interaction and distraction, America seems to find itself at a crossroads. Citizens are increasingly disinterested in civic engagement and mistrustful of their government — two recent Pew Center for the People and the Press studies cite that a mere 19% of people trust their government to do the right thing and only 29% have contacted one of their public officials (at any level of government) in the past year. So why are civic leaders and constituents so out of sync? I would suggest that it’s due in large part to a breakdown in connectivity, transparency and adaptability at the leadership level. This disconnect has caused citizens to disengage and government to find it increasingly acceptable to function autonomously of those citizens to whom it’s beholden. Governmental leadership is faltering in these three categories which I broadly define as the following: connectivity — engagement in meaningful, multiplatform communicative interactions with citizens; transparency — ethical behavior with specific focus on straightforwardness, accountability and honesty; and adaptability — the capability to rapidly adjust to changing social, technological, and political ideas.

I propose a reframing of the understanding of civic leadership with an emphasis on a leader’s responsibilities and the leader-constituent relationship. This new framework will be informed by an analysis of classical leadership theories as well as popular trade press concerning leadership, organizational communication, civics and social change published in the past 14 years (since 2000). Through a comparison of these two sets of data, I hope to gain a broader understanding of trends in various approaches to leadership, where they succeed or fail, and how the concept of civic leadership can be better implemented in today’s technologically saturated world.

The Aztec Calendar Stone’s Significance in the Aztec Culture, Jose Adolfo Grande-Gomez, East Carolina University, Greenville, NC

The topic for my research is about the Aztec Calendar Stone and its importance in the Aztec empire as how it is involved with their political and religious aspects. It seems that the Aztec Calendar Stone was made to make a statement of how much control and power the Aztecs or Aztec officials and rulers wanted to show to other people. The Aztecs were an ethnic group from central Mexico from fourteenth to sixteenth century A.D., and their empire was recognized as one of the most powerful in the Mesoamerican region. This civilization established the city of Tenochtitlan, located on an island of Lake Texcoco, which is now known as Mexico City. The Aztec Calendar Stone, or the Stone of the Sun, was discovered from the ground in 1790 when the Zocalo of Mexico City was being renovated. It is believed that the carved stone was made by the orders of the Aztec king Itzcoatl, in a way to mark the year of his accession to power. The way that the Aztec Calendar Stone represented the significance of this civilization was by showing how the Aztecs wanted to control and utilize the systems of time and space. With time, this monument was being utilized by using some calendrical aspects. To start this, the central face in the stone is most likely to be a representation of Tonatiuh, the Aztec sun god, due to the solar rays that surrounds it. The circle that surrounds the face has twenty images that represent the twenty days that make their months. These images that are in this circle are representations of gods as they are viewed in some type of nature or animals. This circle composes the Tonalpohualli calendar diagram. With this calendar, everyday would be ruled by a god and each of the weeks were also dominated by a certain deity.

As for space, the Aztecs were trying to make sure they also control the four directions, or cardinal points. They knew that the universe was infinite based from what they inscribed on the massive stone. The four directions were important to the Aztecs because they could be used as guidelines. By looking at the Aztec Calendar Stone, the north direction has a warrior’s headdress. This image symbolizes the military power of the Mexica and the continuation of the growth of their empire. At the opposite side, the south, has a monkey which indicates a part of one of the prior suns or ages based from the myth of creation. The east direction is a tecpatl which symbolizes human sacrifice. Finally, the west shows Tlalocan or the house of the rain god Tlaloc. It also means water which is very important for human to survive. An interesting thing that supports the idea that the Aztecs were trying to show their power in the calendar is by looking at the central face. If the central face is in fact Tonatiuh, then the Aztecs were trying to show how much they valued their militarism faith. Tonatiuh was distinguished as a god that have military knowledge and the Aztecs worshiped him since this Mesoamerican culture expanded its kingdom based upon its military power. Also, the central face has a tecpatl on its tongue, which might infer that the deity wanted bloody offerings since the tecpatl was used in the sacrificial rituals. Another interesting fact that gives out the power of the Aztec kingdom is by analyzing the xiuhcoatl around the edge of the Aztec Calendar Stone. These mythical creatures represent the connection of the upper and lower worlds which the Aztecs were so intrigued by the mysterious supernatural worlds. Furthermore, the xiuhcoatl represents the god Huiztilopochtli, who one of the Aztecs main gods. These details can support the idea that the Aztecs were using the Aztec Calendar Stone as a form of representation of their power as they manipulated the dimensions of time and space in order to grow and strengthen their civilization.
Connective Leadership: A New Approach to Civic Leadership and Engaged Citizenship, Tori Alison Rodriguez, East Carolina University, Greenville, NC

As Generation Y moves into the forefront of the consumer market, it has become increasingly important to study their purchasing behaviors, specifically regarding the environment. The purpose of this study was to observe Generation Y and their eco-friendly purchasing decisions. Some major areas that were observed include: marketing, willingness to buy, and behavior and perceptions towards eco-friendly purchases. To be clearer cut the study set out to answer the following questions: 1) When given the choice between two equal products, one environmentally friendly and one not environmentally friendly, would college students choose environmentally friendly because it serves a better purpose? 2) Does attitude and behavior towards the environment affect whether or not consumers purchase environmentally friendly clothing? 3) Are consumers who are more eco literate more likely to buy environmentally friendly clothing? 4) Is there one specific gender that is more likely to make environmentally friendly purchases?

Previous research has shown that attitude and behavior are good indicators of consumers purchasing environmentally friendly products (e.g. Laroche, Bergeron, and Barbaro-Forleo, 2001; Abdul-Muhmin, 2007). In a study conducted by Cheah and Phau (2011), it was found that eco literacy was an antecedent influenced consumers' willingness to buy environmentally friendly products. There is evidence that supports the idea that females are more likely to make environmentally friendly purchases than males as was reported in the study by Laroche et al (2001). Likewise, a study that was performed by Arlow (1991) found that females are more likely than males to act in a more socially responsible way.

A survey instrument that utilized the Likert scale was employed to collect data amid 126 college students from a mid-size university in the South East region. The sample included college age students from the university, male and female, merchandising majors and non-merchandising majors. The survey asked the participants demographic information along with questions about whether or not they had taken a class dealing with the environment or sustainability and whether or not they believed in global warming. The survey asked students to either agree or disagree to some rate with statements that dealt with negative and positive behaviors towards the environment. Additionally, participants were asked to agree or disagree to some level with statements that indicated positive environmentally friendly purchasing behaviors. The data that was collected from the surveys was analyzed with Excel, through which the data was translated into frequency, means, standard deviation, and T-tests. The results of the study did show that there was a positive relationship with the participants' willingness to make environmentally friendly purchasing decisions if they had partook in a class dealing with the environment or sustainability. The findings of this study showed that there was not a significant difference between male and female respondents. This study indicated that eco literacy is important when studying consumers and their environmentally friendly purchasing behaviors. Mainly, the respondents disagreed with the statements that hinted at negative behaviors towards the environment. The respondents for this study demonstrated mostly positive feedback when asked to agree or disagree to some level with statements that indicated positive environmentally friendly purchasing behaviors.
UP1
Knee Joint Loading During Running in Individuals Who Are Post-Partial Meniscectomy, Wesley Trent Brown, Scott Alexander Hadding, Richard William Willy, East Carolina University, Greenville, NC

Introduction: Over half of the individuals who undergo a procedure to remove a torn piece of knee cartilage, known as a partial meniscectomy (PM), develop knee osteoarthritis within 10 years. Previous studies have suggested that individuals who are PM demonstrate reduced quadriceps and hip abductor strength. Quadriceps strength deficits may alter the ability to attenuate knee joint loading during recreational tasks, such as running. Hypothesis: Compared with controls, we hypothesized that individuals who were 1-5 years post-PM would demonstrate greater knee joint loading (knee external addiction moment [KEAM]) while utilizing a knee stiffening strategy during treadmill running. We also hypothesized that PM individuals would demonstrate reduced quadriceps and hip abductor weakness. Methods: This is an ongoing study, with 6 active individuals who are PM (3 males, 21.3 ± 1.1 years, BMI: 25.6, ± 3.8, 6 active healthy control subjects (CON) (3 males, 24.4, ± 2.6 years, BMI: 24.2, ± 2.8 enrolled to date. Three-dimensional, lower extremity mechanics were sampled during instrumented treadmill running (3.1 m/sec). Isometric quadriceps and hip abductor strength testing was also conducted. Effect sizes (Cohen's d) were calculated in this incomplete cohort. Large and moderate effect sizes were operationally defined as >0.80 and 0.5-0.80, respectively. Results: In PM participants collected to date, large effects were noted for greater peak KEAM (d=0.81, PM: 0.652, ±0.123, CON: 0.538 ± 0.153) and reduced knee joint excursion (d=-0.83, PM: 28.9, ±5.8°, CON: 33.6, ±5.5°) than matched controls. A moderate effect size was noted for reduced peak isometric quadriceps strength (d=-0.60, PM: 20.0 ±6.8 %bw*m, CON: 24.3 ± 7.6 %bw*m). Conclusions: Quadriceps strength deficits may alter the ability to stabilize the knee in the sagittal and frontal planes. Running with a knee stiffening pattern is likely a faulty strategy that does not reduce KEAM. Excessive KEAM during gait activities has previously been associated with the eventual development on knee osteoarthritis in other populations. Potential rehabilitation strategies reduce KEAM during running after PM may include gait retraining and quadriceps strengthening.

UP2
Effect of walking speed on patellofemoral joint loads per unit distance, Chelsea Hollingsworth, Jennifer Warren, Dr. John Willson, East Carolina University, Greenville, NC

Introduction: The patellofemoral joint (PFJ) is a common site of pain among young adults. It is also a common site for the development of osteoarthritis among older adults. High PFJ contact force has been associated with the development of both injuries. Greater walking speed is expected to increase peak PFJ force per step. However, greater walking speed is also expected to decrease the number of steps required to cover a given distance. It is not known if this decrease in steps per unit distance mitigates the effect of higher PFJ force per step. The purpose of this study is to test the hypothesis that PFJ force per unit distance does not change as a function of walking speed. Methods: Fifteen healthy people participated in this study (7 female and 8 male). Three-dimensional lower extremity kinematics (240 Hz) and ground reaction forces (2400 Hz) were recorded as participants walked at three different speeds: their preferred pace, 20% slower, and 20% faster (in random order). Hip, knee, and ankle sagittal plane angles and net internal joint moments served as inputs for a biomechanical model to derive PFJ force over 5 steps at each walking speed. The total PFJ force per step was calculated as the area under the PFJ force curve per step. Finally, total PFJ force per mile was determined by multiplying PFJ force per step by number of steps per mile in each condition. Differences between peak PFJ force, total PFJ force per step, and total PFJ force per mile were examined for significance with separate repeated measures ANOVAs and LSD follow up tests (α=.05). Results: Peak PFJ force per step and total PFJ per step changed as function of walking speed. Peak PFJ force and total PFJ per step decreased 37% and 13%, respectively during the slow walking condition (both P < .01). Peak PFJ force and total PFJ per step increased 38% and 8%, respectively during the fast walking condition (both P < .01). However, total PFJ per mile did not change across the range of walking speeds tested (slow: 224 BW*s/mile, preferred: 227 BW*s/mile, fast: 223 BW*s/mile). Conclusions: Although peak PFJ force and total PFJ force per step vary directly with walking speed, these effects are mitigated by the inverse association between walking speed and steps required to walk a mile. Thus, total force experienced by the PFJ over the course of a mile does not vary with walking speed.

UP3
Early Childhood Caries: An Overview and a Combative Effort in eastern North Carolina, Joshua Stephen Lovick, East Carolina University, Greenville, NC

Early childhood caries have become an endemic problem in recent years within many varying populations and regions across the globe. Both developed and underdeveloped nations have seen the impacts of dental caries on widespread populations. Very few demographics or geographic areas seem immune from dental caries, especially young children. For the past decade, the effects of early childhood caries on young children has been condition of widespread concern. With such virulence from a chronic, preventable condition the etiology and circumstances surrounding the condition deserve to be analyzed along with present treatment methods, as well as possible improvements that can be made on existing practices. In this review, these main topics will be explored along with a current effort that is attempting to combat early childhood caries in eastern North Carolina.
Female soldiers have higher rates of load carriage related injuries than male soldiers. We propose this higher injury rate is because females often carry the same absolute loads as males despite having lower maximal muscle strength. The purpose of this study was to determine gender differences in knee joint and quadriceps muscle forces while walking without an external load and while carrying a standard load in two loading conditions.

After providing written, informed consent, eight males and eight females from East Carolina University’s Army Reserve Officers’ Training Corps program with no history of lower limb or back injury participated in this study. The males were 20.0 ± 2.1yrs, 85.1 ± 8.4kg, and 1.82 ± 0.05m and females were 19.5 ± 1.8yrs, 66.4 ± 10.1kg, and 1.69 ± 0.05m. Subjects walked in unloaded and loaded (low back and mid back) conditions with a standard 24kg backpack and were tested on 10° inclined and declined surfaces. Electromyography, 3D motion capture, and force plate data were collected from each subject. Data were reduced with Visual 3D software and knee joint and quadriceps muscle forces were calculated using inverse dynamics and a biomechanical model of the lower extremity. Maximum knee joint compressive and quadriceps muscle forces were compared with two-way ANOVA (gender by load) on each surface, p<0.05. There were no significant interaction effects or biomechanical differences between genders due to load carriage or from loading position. There were significant load effects on knee compressive and quadriceps forces in incline and decline walking. During incline walking, males and females had a 42% and 60% increase in knee compressive forces (unloaded vs. loaded condition) respectively. In decline walking the males and females knee compression forces increased 28% and 31%. During incline walking the males’ and females’ quadriceps forces increased 42% and 89%. In decline walking, the males’ and females’ quadriceps forces increased 29% and 35%. There appears to be both a load and directional effect on walking. During the unloaded condition there were minimal differences in knee compressive and quadriceps forces in incline and decline walking. In the loaded condition however, subjects had a much higher increase in knee compressive and quadriceps forces during incline walking. Because females are adapting to load carriage similarly to males, it remains unclear why females have higher rates of load carriage related injuries.

College students are often pushed towards fast foods as a means of getting a pleasurable, quick bite to eat. Fast foods are high in fat, salt, and sugar content and can lead to cardiovascular disease (CVD) risk. Honors students may be more conscious of negative effects of bad dietary choices. Objectives include assessing Honors students knowledge of American Dietary Association nutritional recommendations and analyzing association between fast food consumption and CVD risk factors: physical inactivity, stress level, BMI, and family history of CVD and CVD risks. An 18-question survey was administered between April and June 2013 to East Carolina University Honors College students via the Honors College list serve. The survey measured frequency of fast food, sweetened beverage and snack consumption; height, weight, exercise frequency, stress levels, course load, and family history of CVD, and nutritional knowledge. Students were categorized as frequent fast food consumers (FFF) 3 or more times a week or infrequent fast food consumers (IFF) less than 3 times a week. 92 responses representing 36.2% of the 2012-2013 Honors College were collected. Twenty-three percent of participants were male, 79.3% White, 13% Asian, 5.4% Black descent, and 2% Other. Thirty-seven percent were able to correctly identify their nutritional recommendations. IFFs were able to answer 2 out of 3 nutritional questions correctly versus only 30% of FFFs. A fifth (21.7%) of participants had 3 or more CVD risk factors. Thirty percent of FFFs had 3 or more cardiovascular disease risk factors versus 18.8% of IFFs. Frequent fast food consumers had more risk factors compared to IFFs. Students who answered nutritional questions correctly also consumed less fast food, demonstrating that they applied their knowledge to their own eating habits.
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UP6

What is Nutrition Education? Teacher and Administrator Perceptions of Nutrition Education for Preschool Children in North Carolina Head Start Classrooms, Behar, N., Peterson, A.D., & Carraway-Stage, V., East Carolina University, Greenville, NC

Dietary habits are learned through exposure and education. The earlier the child is exposed to health education, the greater the opportunity for establishing healthy habits that can continue into adulthood. Unfortunately, little theory-based research is available to guide nutrition educators and teachers regarding the most appropriate content and effective format of nutrition education for preschool children. The purpose of this study was to explore North Carolina (NC) Head Start administrators and teachers perceptions of nutrition education in the preschool environment. Researchers conducted 63 in-depth, structured interviews with Nutrition/Health Coordinators (n=31) and teachers (n=32). Interviews were recorded and transcribed by investigators. Data was analyzed using grounded theory, which resulted in the identification of the central phenomenon (What is nutrition education?) and four primary constructs (i.e. casual conditions, intervening conditions, strategies, and consequences), resulting in a substantive-level model. Findings indicated teacher background, teacher knowledge/attitude towards nutrition, classroom barriers (e.g. resources, time), curricular expectations (e.g. engaging, easy to use), nutritional concepts taught (e.g. food groups), and child-related benefits (e.g. improved academics) were described by administrators and teachers as influential towards the quality and quantity of nutrition education provided in the Head Start preschool environment. The model suggested a primary understanding of the administrators and teacher’s perception of nutrition education in NC Head Start facilities. In order to improve nutrition education in the preschool environment, teachers may need additional support in the form of resources (e.g. funding, engaging curricular materials, hands-on materials). Furthermore, teachers would benefit from additional education and training and education targeting nutrition concepts and teaching methods appropriate for preschool children. Ultimately, overcoming internal and external barriers to nutrition education may provide improved nutrition education opportunities for preschool children, improving understanding, knowledge and potentially positively impacting long-term health outcomes.

UP7

Understanding the Relationship Between Physical Activity Levels, Physical Education, and BMI Status among United States High School Students, Shelby Lane Cook, Calle Marie Pisk, Virginia Carraway-Stage, PhD, RD, LDN, East Carolina University, Greenville, NC

According to the U.S Department of Health and Human Services, adolescents should participate in 60 minutes or more of moderate to vigorous physical activity at least three days of the week. Regular physical activity has many beneficial effects in reducing the risk of obesity. Schools are a key player in the promotion of physical activity among students. Unfortunately, since 2003, the percent of high school students enrolled in daily physical education (PE) classes declined from 41.6% to 28.4%. The purpose of the study was to examine the relationship between physical activity level (PAL), PE class attendance, and body mass index status (BMI) of students in high schools across the United States. Cross-sectional data from the 2011 Center for Disease Control and Prevention’s (CDC) Youth Risk and Behavior Survey (YRBS) were analyzed. The survey was administered to a randomized stratified sample of high school students (9th-12th grades) (n=15,425) across 48 states. The survey information was previously found to be valid and reliable. Secondary data analyses were conducted using basic descriptive, Spearman’s Rho correlation coefficients, and independent t-tests. Findings revealed no correlation between PAL and BMI [r=.00, p=.96], or PE attendance and BMI [r=.00, p=.73]. On the other hand, a significant, small relationship was observed between PAL and PE attendance [r=.02, p=.01]. Additionally, no significant differences in BMI were observed between students who reported they were not physically active and students who reported engaging in 60 minutes or more of physical activity 1 day or more a week [r=1.56, p=.12]. Significant differences were also not observed in BMI between students who participate in PE class 3 or more days a week and students who do not [r = -.382, p = .70]. Findings from this study suggest PAL and PE attendance may not relate to the BMI of high school students. School physical activity programs should consider strategies to increase health education and student physical activity participation. Moreover, further research should examine the quality of physical activity occurring in PE classes to assess their effectiveness on students BMI status.

UP8

Exercise slows the development of early non-cognitive symptoms in the triple-transgenic mouse model of Alzheimer’s disease, James Jackson 1, Tyler Johnston 1, Qun Lu 2, Tuan D. Tran 3, and Sonja K. Bareiss 1, 1 Department of Physical Therapy; 2 Brody School of Medicine Department of Anatomy and Cell Biology; 3 Department of Psychology, East Carolina University, Greenville, NC

Alzheimer’s disease (AD) is characterized by a progressive impairment in cognitive function; however, recent evidence suggests that several non-cognitive sensorimotor symptoms accompany early stages of the disease. Although exercise is emerging as a major therapeutic to combat AD progression, little is known about the effect of exercise on non-cognitive functions. The purpose of this study was to determine the impact exercise on non-cognitive sensorimotor symptoms in the triple transgenic (3x-Tg) AD mouse model. Three month old 3x-Tg bearing the PS1-M146V, APP-Swe, and tauP301L mutations and non-transgenic (wild-type, WT) mice were randomly assigned to either an exercise or sedentary control groups. Exercise groups received forced wheel running three times per week at a moderate intensity of 8.0 m/min for 60 minutes for 12 weeks. Six month old animals underwent non-cognitive behavioral testing. Sedentary 3x-Tg AD mice displayed reduced somatosensory function compared to WT in the open field test, beam traversal, spontaneous activity and
Exercise Effects on Body Composition in Male and Female Prepubescent Children, Rachel M Jenkins, East Carolina University, Greenville, NC

The difference between the male and female body with respect to body composition post puberty is widely known and mostly understood. However, the difference between male and female prepubescent children regarding lean mass and fat mass, and changes in these measures with exercise training have not been extensively studied. A study was conducted at East Carolina University investigating the effects of a 16-week physical activity program on obese prepubescent children. The purpose of the present analysis is to use data from the larger study to examine the difference in body composition in male (M) and female (F) prepubescent children. Seventeen female and fifteen male, prepubescent children participated in the study. Body composition was measured using dual energy X-ray absorptiometry (DEXA). Measures were taken before and after a 16-week mentor based physical activity program with an intensity goal of heart rate >140 beats/min for one hour, 3 days per week. The lean mass of the male subjects increased by a factor of 0.06% and the lean mass of the male subjects increased by a factor of 0.045%. Female prepubescent children increased their lean mass by 0.015% more than male prepubescent children, indicating that in prepubescent years the effect of 16 weeks of a physical activity program on changes in lean body mass is similar in both males and females.

Understanding the Role of Schools in Community Prevention of Childhood Obesity, Kaitlyn Janeil Braun, College of Nursing, East Carolina University, Greenville, NC

Childhood obesity is considered an epidemic in the United States with obesity more than tripling in the past 30 years (Institute of Medicine, 2012). Many factors in the environment contribute to this problem including increased availability of unhealthy foods, limited access to healthy foods, increased screen time and lack of accessible and safe places for physical activity (Center for Disease Control and Prevention, 2013). Since many of these factors are often shared by a community, successful interventions should target the community. Community partners that include city parks, neighborhoods, schools, government, and health care professionals are essential to developing successful childhood obesity prevention practices. Studies have found that nutrition education, increased opportunities for physical activity and use of the school as a resource are crucial in curbing childhood obesity (Bleich, Segal, Wu, Wilson & Wang, 2013; Waters et al., 2011). This honors project was conducted in rural eastern North Carolina at a school-based health center located in a public school in collaboration with a school nurse. The school has a student population of 460 in 5th through 8th grade. In eastern North Carolina 17.4% of children ages 2-17 years are obese (North Carolina State Center for Health Statistics, 2011). The purpose of this project is to integrate community resources related to healthy food choices and physical activity in the school setting. The objectives of this project are to 1) interview 4-5 key informants about community resources and how the school uses these resources to improve food choices and physical activity; and 2) provide written recommendations on the integration of community resources with school-age children to increase healthy food choices and physical activity levels. Public health interventions used in this project are collaboration and coalition building with community partners.
Physical Activity Assessment by Accelerometers and Commercially Available Activity Monitors, Thomas F. Mahar, Hotaka Maeda, Heyong Sun, Matthew T. Mahar, Activity Promotion Laboratory, Department of Kinesiology, East Carolina University, Greenville, NC.

Commercially available monitors to assess physical activity are widely used, but their accuracy is unknown. Research grade accelerometers are considered to be the best way to assess movement and were used in this study to evaluate the accuracy of popular commercially available activity monitors. PURPOSE: To evaluate the accuracy of commercially available activity monitors in comparison to ActiGraph accelerometers. METHODS: Participants (N=79) aged 18-29 yrs wore activity monitors during standardized step tests and for two consecutive weekdays to assess free-living physical activity. Commercially available activity monitors included the wrist-worn Nike Fuelband, the hip-worn Fitbit One and the New Lifestyles NL-1000 pedometer. Two ActiGraph GT3X+ accelerometers, worn at the hip and wrist, were treated as criterion measures. For 100-step walk and 100-step run tests, step outputs from the monitors were compared with actual counted steps. For free-living data, outcome variables from the Nike Fuelband, Fitbit and pedometer were compared with ActiGraph accelerometer output variables. 'Nike Fuel' and 'Very Active Minutes' were used as the main output of the Nike Fuelband and Fitbit, respectively. Participants completed a questionnaire about monitor preference. RESULTS: Nike Fuelband steps significantly (p<.05) underestimated actual steps during the 100-step walk (mean=82±21 steps) and run (mean=93±3 steps) tests. The Fitbit accurately estimated mean steps for the walk (mean=100±3) and run (mean=100±1). For the free-living data, Nike Fuel was highly correlated (r=.91) with minutes of moderate-to-vigorous physical activity (MVPA) and with vector magnitude (VM) (r=.94) from the wrist-worn ActiGraph. Fitbit Very Active Minutes was highly correlated (r=.80) with MVPA and with VM (r=.78) from the hip-worn ActiGraph. Step output from the pedometer was more highly correlated with MVPA (r=.90) and VM (r=.93) than Active Minutes output from the pedometer (MVPA r=.74; VM r=.70). Participants generally preferred the wrist-worn Nike Fuelband (82%) over the hip-worn Fitbit (9%). CONCLUSIONS: The Nike Fuelband and Fitbit One had high correlations with overall estimates of physical activity from research grade accelerometers. Some output variables on commercially available monitors may not possess evidence of absolute validity (e.g., Nike Fuelband Steps), but the variables that include intensity in their calculation provide a relatively good estimate of overall physical activity.

Muscle Stiffness as a cause of Reduced Muscle Volume in Older Adults, Amanda Loughlin McEarl, Zachary J. Donire, Jamie E. Hibbert, Matthew Salzano, East Carolina University, Greenville, NC.

A leading cause of impairment in elderly individuals is sarcopenia, the progressive deterioration of muscle size and strength, which ultimately limits muscle functionality. The loss of muscular strength is directly correlated with increased mortality, hypertension, metabolic syndrome, and diabetes. This corresponds with limitations to activities of daily living, therefore further restricting the individual's independence. Therefore, our study is to determine a possible cause of sarcopenia by studying the relationship between muscle size and stiffness. Our theory is that the muscle cell stiffens with age and stretch in response to a mechanical stimulus is reduced. The strain sensitive receptors will then undergo less stimulation, and the muscle cell will eventually decrease in size to compensate for the long-term decrease in perceived mechanical signaling. We have targeted the vastus lateralis in 20 adults – 10 aged 20-30 and 10 aged 70-85. Measurements will be taken along the longitudinal axis via ultrasound to determine muscular length. Muscular area will be calculated by taking 10 cross-sectional ultrasound measurements across the muscle. These measurements together will be used to calculate muscular volume, while muscular stiffness will be measured using ultrasound elastography. A regression analysis will be performed to determine the relationship between muscle stiffness and muscle size to analyze stiffness as a potential cause of sarcopenia.

A Comparison of Usual Versus Best Practice in Preventing and Managing Low Back Pain, Joshua Henry Mosakowski, Kim Larson (Mentor), College of Nursing, East Carolina University, Greenville, NC.

Musculoskeletal disorders contribute to 33% of work-related injuries in the United States that result in missed days from work (Bureau of Labor Statistics, 2011). Healthcare workers are at a particularly high risk of injuring themselves in the hospital setting. Low back pain (LBP) has a significant public health impact as back injuries have the highest rate of occurrence out of all musculoskeletal disorders. Risk factors for LBP include obesity, joint disease, poor posture, and poor lifting techniques. Two frequently used treatments for LBP, with some evidence of effectiveness, are chiropractic and massage therapy. Prevention is critical to reducing the incidence of LBP. Exercise programs that incorporate aerobic and strength-training have proven effective at preventing LBP (Hasan et al., 2010). Evidence-based guidelines for managing LBP include prescribing acetaminophen, educating the client, and treating in a primary care setting (Williams et al., 2010). This project is being conducted at a local hospital in rural eastern North Carolina. This hospital has experienced a high incidence of work-related LBP. The purpose of this project is to compare usual practice with best practice for the prevention and management of LBP among hospital workers. Collaboration and policy development and enforcement are two public health interventions used in this project. This project is a collaborative partnership with an interdisciplinary team including the staff development nurse, employee health nurse, rehabilitation specialist, physical therapist, occupational therapist, and insurance coordinator. The two project objectives are 1) to interview and observe the work of 5-7 key informants who are involved in LBP prevention and management, and 2) to make 2-4 recommendations, based on findings, to the hospital administration on the prevention...
and management of LBP. In this program evaluation, data generated from key informants will be organized in a matrix to identify gaps between usual and best practice. In collaboration with the staff development nurse this data will be analyzed and interpreted to provide recommendations in the prevention and management of LBP by February 26, 2014.

UP15

Falls in the Independent Living Glenaire Community, Katherine Ann Reise, Mrs. Debra Tavasso, B.S., M.A.Ed, East Carolina University, Greenville, NC

Falls are a major issue in the geriatric community and lead to premature incapacitation as well as direct and indirect loss of life. Glenaire is a continuing care retirement facility in Cary, North Carolina. Glenaire recently opened a state-of-the-art Balance Center in order to reduce the incidence of falls by their residents. This addition to the facility could be a great asset to the residents; however, they have not been taking advantage of the Balance Center. This project had two fundamental goals: assess Glenaire’s independent living resident’s understanding of their susceptibility to falls and the severity of the consequences of falls, and to identify ways to increase usage of the Balance Center. Data collected from 29 residents indicate that the independent living residents know their age group is susceptible to falling due to physical deterioration and mental complacency, among other things. They also recognize that falls can have severe consequences like bruises, broken bones and concussions. Even with this basis of knowledge, they do not think they are personally susceptible. Recommendations to Glenaire include a marketing plan to expand their resident’s knowledge and awareness of fall prevention and to increase awareness of the benefits of the Balance Center. If independent living residents feel more susceptible to the threat of falling, perceive the threat as severe, and they see the Balance Center as a way to reduce the threat then they will be more likely to use it.

UP16

Health Services for Children with Special Health Care Needs in a Public School: A Program Evaluation, Rachel Anne Schillo, East Carolina University, Greenville, NC

The Maternal and Child Health Bureau recognizes children with special health care needs (CSHCN) as “those with chronic physical, developmental, behavioral, or emotional conditions that require health and related services of a type or amount beyond that required of children generally” (Kuhlthau, Bloom, Van Cleave, Knapp, Romm, Klatka… Perrin, 2011, p.136). These children may need medication, medical care, mental or educational services, or special therapy in order to maintain functionality (Houtrow, Okumura, Hilton, & Rehm, 2011). A significant number of CSHCN attend school daily who require additional health support (DurRant, Gibbons, Poole, Suessmann, & Wyckoff, 2010).

Federal law mandates schools to adapt their services to provide equal opportunity for the student body including CSHCN, but many schools struggle to adapt programs due to cost of personnel and resources (Murphy & Carbone, 2008). When school services are not fully available to CSHCN, they are more likely to have unfavorable outcomes in school such as repeating grade, lack of engagement, and increased absences (Reuben & Pastor, 2013). To ensure that the health needs of children with disabilities are met adequately at schools, it is important to understand how schools provide comprehensive services for them (Reuben & Pastor, 2013). This honors project was conducted in rural eastern North Carolina at a school-based health center in collaboration with a school nurse in Wayne County. The purpose of this project was to examine the health services available to the 142 CSHCN at Brogden Middle School and determine barriers to available health services. The objectives of this project were 1) to interview 4-5 key informants in the public school who have close contact with CSHCN by Feb 11, 2014 and 2) identify programs and services most utilized by CSHCN at this public school by Feb 17, 2014. Public health interventions used in this project were advocacy and policy enforcement. Written recommendations based on the findings will be provided to the Director of the school-based health center, school nurse, and key teachers to improve services for CSHCN in this school.

UP17

Best practices to use in the Emergency Department when attending to patients with suicidal ideations, Kaitlyn Nicole Svagr, East Carolina University, Greenville, NC

Every year approximately 800,000 people attempt suicide and 30,000 of those attempts are lethal, making suicide a widespread issue in our country (Giordano & Stichler, 2009). Generally those who have suicide thoughts or attempt suicide are sent to the Emergency Department (ED) for treatment (Knesper, 2011). After review of studies of outcomes of these patients, the SPRC (Suicide Prevention Resource Center) recommended that the ED is the prime place for suicide prevention and there are certain practices that the ED staff can implement to further aid in the prevention of suicide attempts. These best practices include appropriate screening, educating the patient and their families, suicide means restriction, active referral to specialists, and follow-up care. A case study was conducted by interviewing someone with first-hand experience of an ED visit for suicide ideation. This study uses the literature review to compare what was observed in this specific incident to identify whether any of the best practices were put into action.
**UP18**

Usual Care Versus Best Practice for Fall Risk Assessment: A Program Evaluation, Cori Wright, College of Nursing, East Carolina University, Honors College, East Carolina University, Greenville, NC

In the United States, falls are a significant cause of morbidity, mortality, and loss of independence in the older adult population. One third of adults, age 65 years and older, fall each year (Centers for Disease Control and Prevention, 2013b). The fear of falling can also lead to decreased activity level, further increasing fall risk (Kempen et al., 2009). Furthermore falls have a major financial impact, costing the United States over 30 billion dollars each year (Centers for Disease Control and Prevention, 2013a). In North Carolina, falls were the most common diagnosis for hospital admission among the elderly (NC Department of Health and Human Services, 2012). To address the prevention of falls in the community, community-based agencies have implemented fall risk assessment tools (Tinetti, 2008). This honors project was conducted at a home health agency in a city in eastern North Carolina in collaboration with a home health nurse. The purpose was to examine the usual practice of fall risk assessment among home health clients and compare this with best practice fall risk assessment. This project will take place over seven weeks, and will include routine home visits to home health clients with a home health nurse. The project has three objectives: 1) to interview 4-5 key informants to determine their perspective on falls among older adults and the usefulness of the fall risk assessment by Feb. 14, 2014, 2) to identify the steps in implementation of fall risk assessment with home health clients by Feb. 26, 2014, and 3) the home health nurses and I will determine how usual practice compares with best practices by February 26, 2014. By utilizing the fall risk assessment tool with my preceptor I will be providing screening for my clients to determine which clients are considered a high risk for falls. I intend to provide health teaching to my clients on ways to prevent falls within their homes, and written recommendations will be submitted to the agency nursing director at a staff meeting by February 26, 2014.

**UP19**

The Relationship Between Physical Activity, Obesity Levels, and Motor Skills in 3-6 Year Old Children, Morgan Chilton1, Katrina D. DuBois1, Amy Gross McMillian2, 1Department of Kinesiology, East Carolina University, 2Department of Physical Therapy, East Carolina University, Greenville, NC

Introduction: Children with movement difficulties have lower activity levels than that of movement competent peers (Bar-Or, 1983). Further, a link between proficiency in motor ability and body mass index (BMI) seems to be prevalent in older children, as lower body fat correlates with better motor skills in overweight and obese children (Cantell, 2008; Lubans, 2010; Jones, 2010; Okley, 2004). Healthy weight children had significantly better motor skills than overweight children, and overweight children had significantly better motor skills than obese children (Lopes, 2012). Purpose: This study assessed the effect of weight status on the motor skills of children ages 3-6 years. The secondary purpose was to examine the relationship between moderate and vigorous physical activity and motor skills.

Methods: Currently, 17 participants have competed in the study. On the initial visit, measurements of height, weight, waist circumference, and skinfolds were taken. Participants were given an accelerometer to wear and physical activity log to record their physical activity for one week. A second visit assessed the Manual Dexterity, Catching and Aiming, and Balance components of motor skills using the Motor Battery Assessment for Children testing. BMI and BMI z-scores were calculated. Time spent in moderate-to-vigorous physical activity (MVPA) was determined from the accelerometer data. Results: No relationships existed between BMI z-score and Manual Dexterity, Aiming and Catching, Balance or total motor skills after adjusting for sex and age (p>.05). Likewise there was no relationship between the amount of time spent in MVPA and Manual Dexterity, Catching and Aiming, or total motor skill (p>.05). However, a significant relationship was observed between MVPA and balance (r²=0.504, p<.05) after adjusting for sex and age. Conclusion: BMI does not appear to be related with motor skill. Engaging in MVPA does improve the Balance component of motor skills. The present study contributes to the gap in existing research specifically in the 3-6 year old age range, as it relates to physical activity, weight status, and motor skills. Subsequently, with further investigation, there could be more relationships observed.

**UP20**

Are Long-acting Reversible Contraceptives a Viable Solution for Adolescents in Rural Eastern North Carolina? Ashley Brannen Stacy, East Carolina University, Greenville, NC

Teenage pregnancy rates in the United States have been on a steady decline for the past five years, yet these rates remain higher among teens in specific geographic regions. North Carolina has the 16th highest teen pregnancy rate in the US (The National Campaign to Prevent Teen Pregnancy, 2013) and many of the highest rates within the state are in rural counties (NC Department of Health and Human Services, 2012). It is estimated that 80% of all teenage (age 14-18 years) pregnancies in the US are unintended (Fifer & Zolna, 2011), making contraception a key component of adolescent health. Long-acting reversible contraceptive (LARC) methods include intrauterine devices (IUDs) and implants, and are more effective in preventing pregnancy than both condoms and oral contraceptive pills (Centers for Disease Control and Prevention, 2013). In addition, they provide contraception for 3-12 years (Dean & Schwarz, 2011, p. 152). The American College of Obstetricians and Gynecologists states that “Long-acting reversible contraception—intrauterine devices and the contraceptive implant- are safe and appropriate contraceptive methods for most women and adolescents… Adolescents should be encouraged to consider LARC methods” (The American College of Obstetricians and Gynecologists, 2012, p.1, 4.) This honors project was conducted in a health department located in a rural county of eastern North Carolina. In collaboration with a community health nurse, I assessed adolescents and young adults in the family planning clinic with a goal of understanding the utilization of LARC methods.
of LARCs at the health department. The objectives of this project were to 1) interview 4-5 key informants about the utilization of LARCs and provider attitudes regarding their recommendation, 2) assess contraceptive choice of adolescents seeking services in the family planning clinic and to 3) compare LARC use among young adults and adolescents at the health department. This program evaluation identified the benefits and barriers to contraceptive services for adolescents and young adults. The primary public health intervention implemented in the project was advocacy at the community level. Advocacy ensures that community members receive adequate information about contraception to improve their reproductive health. Based on my findings, recommendations were made to the Director of Nursing and Manager of the Family Planning Clinic.

Since the 1970’s, tattooing has become increasingly popular in American society, explanations for this phenomenon include expressing individuality and gaining acceptance into a subculture (Gagne 2009). In addition, young adults are not as frequently participating in organized religion as their parents’ generation (Patalon 2001). Although research has demonstrated that spirituality influences tattooing practices (Swartz 2006), few studies explore the intersection between Christian beliefs and tattoos (DeMello 2007). My research focuses on the relationship between tattooing practices and the changing values of 18 to 30 year old active Christians in Greenville, NC. An active Christian is defined as a person who participates in his or her faith community at least 3 times a month. A class project during a previous semester had facilitated the proposal development, including literature review of tattoos and Christianity and the design of the data collection instrument, asking questions on personal faith, bible verse interpretations, tattoo stereotypes, tattoo symbolism, and opinions about tattoos. Data was collected using a semi-structured interview instrument asking open-ended questions, including free-listing tasks. To increase comparability, all informants were recruited from the same a non-denominational Christian organization in Greenville, NC. A quota sample was employed to reflect differences by gender and preference for tattoos. I interviewed eight females with tattoos, eight males with tattoos, eight females without tattoos, and eight males without tattoos. Interviews were recorded and transcribed. The resulting text was coded using a grounded theory approach, logging discoveries about frequencies and co-occurrences of themes in AtlasTi software and SPSS statistics software to establish similarities and differences between study participants. This project aims to present a model of Christian beliefs and values that explain the choice for or against a tattoo.

UP21
What Explains Getting a Tattoo? The Role of Religious Belief in Body Adornment, Rachel Anne Johnson, East Carolina University, Greenville, NC

UP22
Did Federal Reserve Policy Cause the Housing Crisis? A Time Series Exploration, Katherine Elizabeth Kirk, East Carolina University, Greenville, NC
UP23

School Sports Programs and Their Effect on Obesity in Adolescents, Cameron Blake Little, East Carolina University, Greenville, NC

Health issues related to obesity in adolescents are a major concern in today’s society. Even at early ages, obesity has been related to comorbidities, such as diabetes and heart disease. The Institute of Medicine (2012) recommends integrating physical activity into daily life, making healthy food choices readily available, marketing the benefits of eating healthy and exercising, expanding the role of healthcare providers, and using schools as a focal point. North Carolina (NC) is the 10th state in the nation with the highest incidence of overweight and obese individuals (NC Prevention Action Plan, 2009). In rural eastern NC lack of access to healthy food choices and safe environments for physical activity contribute to this problem. Lack of access to primary care providers and insurance coverage in these areas contributes to this problem, as adolescents may not be screened, counseled or treated for health issues. Public schools are charged with providing quality physical education and healthy food choices. In addition, school sports programs should help adolescents maintain a healthy weight. Body Mass Index (BMI) is one indicator of obesity. For the purpose of this study BMI is defined as: normal (18.5-24.9), overweight (25-29.9), and obese (>30). This honors project is being conducted in collaboration with the school athletic director and school nurse in a public school in rural eastern NC. The high school serves a predominantly African American (90%) student population. The purpose of this project is to determine whether the BMI of students enrolled in school sports programs is more within normal limits compared to students not enrolled in school sports programs. The project has two objectives: 1) review and categorize BMI data of student athletes; and 2) compile and organize BMI data of students not enrolled in a school sports program. For this program evaluation, data from the two groups will be compared and analyzed. A written report will contain recommendations based on findings. The report will be distributed to the school athletic director, clinical director and advisory board members for future program planning. The public health interventions associated with this project are collaboration and consultation, advocacy for students, and policy development and enforcement.

UP24

Qualitative Analysis of Student Perceptions of Science and Science Careers in Eastern North Carolina, Allender Lynch, Sykes S., Rivera D., PHD, Daffrin M.W, PHD, RD, LDN, Barnaway-Stage V., PHD, RD, LDN, East Carolina University, Greenville, NC

The United States has witnessed a decrease in students who are planning to pursue careers involving science, technology, engineering, and math (STEM). Using the theory of planned behavior (TPB) as a guide, researchers sought to understand the attitudes, influences, and intentions of adolescent-aged students toward science and careers in science. The population of interest for this study were pre-teens. The researchers conducted a pilot focus group with seven students (ages 10–14) recruited from the Boys & Girls Clubs of Pitt County. Students were asked a series of structured questions about science within the context of the TPB. A moderators’ guide was developed using standard methods as described by Krueger. The data were transcribed and coded, and three researchers identified 12 emergent themes through consensus coding. The researchers collapsed the interrelated themes into the seven constructs of the TPB (i.e., behavioral beliefs, attitude, normative beliefs, subjective norms, control beliefs, perceived behavioral control, and intention). Findings indicated that multiple factors may influence students’ intention to choose science careers. The researchers were able to obtain data suited to all the constructs of the TPB, except subjective norms. With the data, researchers observed that each construct of the TPB led to the next construct (e.g., behavioral beliefs produced a favorable or unfavorable attitude toward behavior), resulting in students’ intentions and possible future behaviors (e.g., careers in science). According to TPB, normative beliefs may result in social pressure (e.g. subjective norms). Students did not describe social pressure during the focus group, however. Additional research should further explore this construct within the TPB in this population. Moreover, future studies should explore teachers’ influence on students’ science performance. A shorter moderators’ guide as well as a review of the terminology of the moderators’ guide by grade level teachers should also be considered.

UP25

Can a medical specialty camp become a venue of providing reinforcement education regarding transfer from pediatric to adult healthcare? A pilot study with young adults with congenital heart defects, Sarah Jane McEarl and Kristin Leigh Kirby, East Carolina University, Greenville, NC

Background: Due to advances in medical technology, a majority of children born with chronic conditions will make the transition to adulthood. Adult patients with congenital heart defects (CHD) are recommended to see an adult cardiology specialist every 12 to 24 months due to the risk for complications (e.g., future surgeries and/or arrhythmias). There is need for improvement in the success of transition from pediatric to adult care for young adults with CHD. It is important for young adults with CHD to be accurately educated about the adult care setting as well as their diagnosis and required treatment prior to admittance to an adult clinic. Preparation for the transition to adult care should be a planned process and is significant to the success of this transition. Attendance at medical specialty camp with peers with similar cardiac diagnoses has shown benefits for camp participants. The present pilot study aims to explore whether receiving transition to adult care related education during attendance at a medical specialty camp for children and adolescents with complex congenital heart defects would be perceived as beneficial. Methods: The study will be submitted for IRB approval. Data will be collected only after IRB approval has been received. Eligible participants will be young adults (ages 18-21 years) with a complex CHD who have ever attended a regional weekend medical specialty camp for children and teens with a CHD. This study will engage either focus groups or individual interview techniques. Participants will
be interviewed regarding i) experiences living with a complex CHD and resources used ii) knowledge regarding diagnosis and treatment adherence iii) experiences in communicating with doctors and adhering to doctors’ orders iv) opinions regarding experiences in the adult clinic v) parental role in medical care vi) thoughts regarding the benefits of educational experiences focusing on the transition of care during a medical specialty camp. They will also complete a questionnaire about their diagnosis and demographic information. Results: Results will indicate the potential for adding an educational component to the camping experience contributing to the preparation of young adults for the transition from pediatric to adult care. Outcomes of this study may contribute to program improvement regarding developing a learning module for reinforcement education regarding transition to adult care for use at a medical specialty camp.

UP26

Food Ecology Promotes Efficient Use of Science Education Community Resources, Sarah Sykes; Jacqueline DeChabert-Rios, PhD; David Rivera, PhD; Shawn Moore, MS; Virginia Carraway-Stage, PhD, RD, LDN; Melani Duffrin, PhD, RD, LDN, East Carolina University, Greenville, NC

In the summer of 2012 and 2013, FoodMASTER (Food, Math, and Science Teaching Enhancement Resource) offered two 1-week summer camps to Boys and Girls Clubs (BGC) of Pitt County, North Carolina. The focus of the camp was on food, nutrition, and gardening. At the same time, L.A.S.T (Love A Sea Turtle) and A Time for Science (ATFS) were offering a 1 week camp called UpStream-DownStream Connection (UDC) to BGC of Pitt County. Knowing the importance of community volunteers and efficient use of financial resources, program staff began working together to construct a new approach that would best utilize all organizational resources. Collectively, the organizations involved realized that the content covered in both camps could be merged through a food ecology approach. Food ecology as overarching thematic content lends itself to a wide variety of STEM (Science, Technology, Education, and Mathematics) subject matter. This allowed camp curriculum developers to draw from a wider variety of community science education resources without overburdening any one specific scientific discipline. Subsequently, all organizations involved have merged resources to create SMART Works (Science and Mathematics Aimed at Relevant Thinking Works) Summer Enrichment program for the summer of 2014. The purpose of this presentation is to illustrate the prior structure of the two camps and the new 2014 model that will merge the camps together with an overarching food ecology content approach. Researchers will also compare and contrast the features of the two models and discuss potential benefits of the new model.

UP27

Understanding Pre-service Early Childhood Educators Feelings of Preparedness to work with Chronically-Ill Children
Juliet Marie Stalls, Arkhana Higde, PhD, East Carolina University, Greenville, NC

Many young children in the United States are faced with chronic illnesses. Because of the difficulties children with chronic illnesses face, members of support teams of these young children should feel prepared to care for them. Members of these support teams may include the child’s primary caregiver(s) and community members, such as teachers. It is especially important for researchers to understand how prepared teachers feel because they play such a significant role in children’s lives. If teachers do not feel prepared to work with chronically ill children, steps should be taken to ensure they do feel prepared. The purpose of this study was to gain a better understanding of how prepared pre-service, or student, early childhood educators feel to work with chronically-ill children. A self-constructed tool on preparedness was developed for this study and was administered via an online survey method. Participants included pre-service teachers who are seeking licensure in Birth through Kindergarten education.

UP108

An Analysis of the Influence of Nuclear Weapons on International Affairs, Kevin Michael Kearney, Mentor: Dr. Nancy Spalding, East Carolina University, Greenville, NC

Perhaps no technological innovation in modern history made more of an impact on the course of international relations than the creation of the nuclear bomb. The question of its exact influence on international affairs is an important one that this thesis will discuss and analyze. Since the creation of nuclear weapons, there have been positive and negative aspects of its influence on international affairs. Some of the positives include a decrease in devastating conventional warfare and an increased reliance on diplomacy over conflict. The negative consequences include the possibility of radiation from the use of nuclear weapons, the instability of the mutually assured destruction (MAD) principle, and complicated moral dilemmas in the use of such potentially catastrophic weapons. Historically, political figures and theorists have had contrasting views on nuclear weapons and their influence since their deployment on the Japanese cities of Hiroshima and Nagasaki. The theory of deterrence became a strong defense in favor of nuclear weapons. Deterrence theory essentially states that due to the sheer ability of a nation to counterattack in devastating way utilizing nuclear weapons, rival states are dissuaded from using their own nuclear weapons. Others have claimed that this theory is empirically illogical and very unstable. Those who support this stance include renowned political figure Henry Kissinger, who actually once supported deterrence theory, but has since reversed his position. This thesis will center on exploring how the impacts of nuclear weapons have had an influence on the world as a whole, both through their use, and the threat of deployment, and whether my presumed positives and negatives are valid. To do this, I will describe and analyze several key cases in which I believe nuclear weapons helped avoid serious conflict. These cases include the Middle East, the Cold War, the Pakistan-India conflicts, and Japan.
UP28

The Effects of Implementing Authentic Materials in a Foreign Language Classroom, Jennifer Natalie Moser, Kaitlyn Day Connor, Mariab Elizabeth Richards, East Carolina University, Greenville, NC

The incorporation of authentic material has proven to be an effective teaching strategy in the field of foreign language education (Mousavi & Iravani, 2012). Authentic materials are those materials (i.e. books, television programs, conversations, movies, CDs, blogs, newspapers, etc.) that are written in the target language by speakers of the target language, who are part of the target culture, for other native speakers (Bahrami & Soltani, 2012). They are materials taken from the real world and are then applied to teach the same type of information found in a traditional textbook where the writings, information, and dialogues are normally presented in a way to express specific vocabulary or grammar points. For this study, the researchers will review research articles that focus on using authentic materials in the foreign language classroom. They will look at different foreign languages studied in the United States, as well as in different countries around the world, including teaching English as a foreign language. This study will explore what research has been done and the specific areas of research like vocabulary acquisition, grammar acquisition, intrinsic motivation, interpretive skills, etc., that have been focused on in these studies. This study will focus on these articles, which have been published using authentic materials within the last 15 years and will include statistics and data on each of the studies. The study will question whether or not using authentic materials in the foreign language classroom is beneficial for the students and in what ways it has been proven beneficial.

UP29

Influence of High Stakes Testing on Individual and Group Competition, Joshua Shaji Thomas, Erin Lynn Cottrel, East Carolina University, Greenville, NC

An atmosphere of competition has been created in schools across the United States after the implementation of standardized testing but, there is a gap in literature regarding the immediate effects on student achievement. Depending on the source of competition, internal or external, students may experience varying degrees of success on their standardized tests. In this study college student participants will be asked to complete a word search in the allotted 5 minute time period with a goal of maximizing their numerical score as a measure of competition. Participants will be randomly assigned into groups of five into a control group, an individual competition, and a group competition testing situation. In addition, participant heart rate variability will be measured by emWave software, as a physiological measure of anxiety. The control group will complete two word searches with no incentive in order to gain a baseline measure of competition as well as heart rate variability. Those in the individual competition group will be instructed that the highest numerical score at the end of the second trial will receive an incentive. Those in the group competition setting will be told that all participants in their group must improve their scores on the second word search in order for everyone to receive an incentive. It is hypothesized that participants in the individual competition will have a lower degree of success, or number of words found, than their counterparts in the group competition. Furthermore, it is predicted that anxiety levels in the individual group will be higher as evidenced by their lower heart rate variability in combination with their lower word search score.

UP30

Quality of cross-cultural interactions in a Global Understanding course influence perspective-taking and communication anxiety, Melvenia Marie Truehill, East Carolina University, Greenville, NC

Allport’s (1954) Contact Theory addressed how intergroup contact can lead to reduced prejudice if certain conditions are present: equal status, common goals, cooperation, and support from authorities. Intergroup contact reduces prejudice by reducing communication anxiety and improving perspective taking; research has supported this theory but has also shown that all conditions are not required to have a significant effect on prejudice reduction (Pettigrew, Tropp, Wagner, & Christ, 2011), and quality of cross-group friendship is a crucial factor (Davies, Tropp, Aron, Pettigrew, & Wright, 2011). The purpose of this study was to examine the effects of intercultural contact and the development of friendship on intergroup communication anxiety, perspective taking, and social distance in the context of a course designed to give students opportunities to interact with students from different countries. I surveyed students enrolled in a Global Understanding course to examine changes in their cross-cultural attitudes prior to contact with students from other countries and at the end of the course. Students normally met with three countries and interacted via face-to-face video conferencing, in-class instant messaging, and they contacted international partners through e-mails outside of class. Overall, perspective taking increased from pretest to post-test and communication anxiety decreased. Consistent with my hypotheses, the amount of decrease in communication anxiety was significantly correlated with how satisfied students were with the quality of friendship they developed with their international partners. After completing the course students, who were more satisfied with their partner communications reported feeling less anxious and more competent when interacting with strangers from a different culture.

UP31

Comparing the rape scripts of hazardous drinking and non-hazardous drinking college women, Jade Vincent Quintero and Dr. Heather Littleton, East Carolina University, Greenville, NC

Sexual assault remains a significant problem on college campuses with over 15% of women reporting that they have been the victim of completed rape (e.g., Fisher, Cullen, & Turner, 2000). Although victims are never to blame for their victimization, there are certain behaviors that can
increase women’s risk for being sexually assaulted. One of these behaviors is binge or risky drinking, with between 15% and 20% of college women reporting that they engage in this behavior (Abbey, 2002; Clements, 1999). Prior research has also supported that individuals’ rape scripts (ideas about what occurs before, during, and after a typical rape) affect women’s risk for experiencing rape, conceptualization of their own rape experience (e.g., whether they view it as a rape or a less serious event), and potentially rape recovery (Littleton et. al., 2006). This brings up the question of whether women who are engaging in a known risk behavior for sexual assault recognize that this behavior is a risk factor and thus incorporate it into their rape scripts. Therefore, examining the rape scripts of women engaging in a rape-related risk behavior could be important in understanding the extent to which they view themselves as at risk, as well as their conceptualization of and recovery from a sexual assault. In the current study, 171 college women provided descriptions of their rape scripts. Specifically, they described what they think happens in a typical rape, including the thoughts, feelings, and behaviors of the individuals before, during, and after the rape. These scripts were then coded for the type of rape described (e.g., a violent stranger rape, a party/alcohol fueled rape) as well as other script themes (e.g., the victim was somehow vulnerable to being raped, the perpetrator experienced remorse for his actions). Differences in the rape descriptions of college women who are currently engaging in hazardous drinking will be compared to those who are not engaging in hazardous drinking. In particular, we are interested in differences of the extent to which alcohol is involved in the rape scripts of these two groups of women. In this way, we can evaluate if college women engaging in hazardous drinking incorporate this risk factor into their own rape scripts. These findings have implications for the development of more individualized rape prevention and intervention programs.

**UP33**

**Implicit Theories of Intelligence and Academic Persistence in First-Generation College Students**, Dayna Tahamara Rodriguez and Marion Eppler, East Carolina University, Greenville, NC

My senior thesis examines how Dweck’s (1999) implicit theories of intelligence influence first-generation college students’ academic success. People who hold a fixed view of intelligence believe that intelligence is an entity that cannot be changed or increased, and people who hold a malleable view believe that intelligence can be changed and increased. Implicit theories of intelligence can predict outcomes such as academic success and response to failure (Blackwell, Trzesniewski, & Dweck, 2007; Dweck, 1986, 1999). It is also possible to shape a person’s theory of intelligence (Aronson, Fried, & Good, 2002; Blackwell et al., 2007). The purpose of my study was to apply this theory to first-generation college students, who tend to struggle more academically than their non-first-generation counterparts (Padgett, Johnson, & Pascarella, 2012; Pascarella, Pierson, Wolniak, & Terenzini, 2004). I am comparing first-generation college students’ view of intelligence to that of non-first-generation college students and how it predicts their response to failure. Participants completed a questionnaire measuring (1) Dweck’s (1999) implicit theories of intelligence, (2) Elliot’s (1999) achievement motivational goals, (3) help seeking, and (4) demographic information. Students were randomly assigned to the malleable or fixed view of intelligence condition, and they watched a video that influenced their view of intelligence. Next, students answered questions about the video as a manipulation check. Then students completed three sets of anagrams. The first was an easy set to establish baseline performance. The second was a difficult set to challenge the students. The third set was easy to determine the students’ persistence after experiencing a challenge. My hypotheses are that first-generation college students are more likely to initially hold a fixed view of intelligence than non-first-generation college students. Overall, after shifting the students’ view of intelligence, I predict that those who watched the malleable video are more likely to persist longer after a challenge than those who watched the fixed video. Specifically, I predict that first-generation college students in the malleable group will persist longer than non-first-generation college students.
UP34

Medical Student Stress, Stress Management, and Perceptions Regarding Patient Care, David Sager, Christyn Delbier, Ph.D., East Carolina University, Greenville, NC

Introduction: High stress levels of medical students and associated negative effects (e.g., burnout, depression, profession attrition, medical errors, suboptimal patient care) are well-documented. However, little research examines stress across medical training, or personal practice of and openness to stress management. Addressing these knowledge gaps is crucial for understanding optimal conditions for stress management training for student well-being and use with their future patients. Doing so can also elucidate reasons for the gap in the translation of medical school curricula integration of psychosocial factors (of which stress and its management are key) into patient care. Purpose: The purpose of this study is to examine medical student stress, and stress management practice and training receptivity across the course of medical school, how these relate to each other as well as to perceptions regarding the integration of stress management into patient care. Method: The study employs a cross-cohort (years 1-4) survey of Brody School of Medicine (BSOM) students (N=320). Participant recruitment will occur in cohort classes/meetings with help from medical education directors. The survey will include questions assessing the variables of interest from the Physician Belief Scale and Health Care Provider Survey. Expected Results: Hypotheses: 1) stress, stress management practice and training receptivity will vary by year of training; 2) greater stress will relate to less stress management practice and training receptivity, lower perceived efficacy to and greater perceived barriers to addressing stress management with patients; 3) greater stress management practice will relate to greater training receptivity, perceived importance and effectiveness of, efficacy and intention to address stress management with patients; and 4) greater stress management training receptivity will relate to greater perceptions of importance and effectiveness of stress management. Results-based recommendations will be provided to BSOM medical education directors to aid in improving student well-being and their perceptions regarding the integration of stress management into patient care.

UP35

Personal Factors Affecting Oral Hygiene, Heather Nicole Sloan, Dr. Michael Baker, East Carolina University, Greenville, NC

When it comes to dating and social interaction people use different levels of self-presentation to avoid awkward situations. Self-presentation is used to display a certain image of oneself to others and make certain, often positive, qualities appear more prominent for an individual (Tseëlon, 1992). It has the ability to impact one’s self-esteem, mood, and affect (Schlenker and Trudeau, 1990). The concerns of self-presentation are motivated by social interaction, namely friendship, mating, and generally being accepted into society at large (Barber, 1996). Humans have adapted certain grooming tasks, many relating to cleanliness, to signal that they are in search of a new mate (Buss, 2012). Cleanliness relates to hair, skin, and oral hygiene behaviors. Oral hygiene is often understated in research and in most areas of the Western World, brushing and flossing are seen as important to overall healthcare, but not usually discussed with additional advantages such as mating. Our hypothesis states that if people are made to think that oral hygiene is important to mating success they will be more likely to maintain a regular dental hygiene regimen than the control condition. The participants for this study were eighty introductory psychology students from ECU. These students volunteered for the study for two weeks in exchange for partial credit towards course completion. The participants were given questionnaires to fill out confidentially to measure subject variables, then randomly assigned to one of our three conditions. For one condition we gave the students an article about the health benefits of good oral hygiene. For the second condition the article was about the mating advantages associated with good oral hygiene and the third read an article strictly about general dental hygiene care and statistics. At the end of the session they were given a tube of toothpaste, to use for the next two weeks. At the debriefing session we asked for the items back, to measure them. They were also given instructions on how to get to and fill out self-reports and journals every day, for additional data gathering. We debriefed the participants on the experiment in its entirety and our hypothesis to the participants in our final session. Our results were not supportive of our main hypothesis. This may have been due to the difficulty in changing a behavioral trait, such as our dependent variable, the amount the participant brushed their teeth.

UP36

A Gender Issue: Job satisfaction in the Tunisian informal sector, Sarah Taylor Best, East Carolina University, Greenville, NC

Job satisfaction is one of the most intensely analyzed concepts in the field of organizational behavior. The relationships of gender in a cultural perspective are a fundamental component in the research of job satisfaction. According to Lester (2008), the roles of men and women are shaped by the organizational culture. Some studies have shown that women are more satisfied in their jobs than men, whereas other studies have found the exact opposite (Bartol and Wortman, 1975). To build onto these studies, we obtained data from both men and women from an informal sector in Tunisia. Results of the independent sample t-tests show that when employees were asked challenges in their jobs, women reported more innovation and women had issues with financing difficulties. When asked if they had encountered any problems in their job, women were more likely to say yes than men. When asked the problems that prevented them from moving to a formal sector, women listed bureaucracy as being the main difficulty. Men listed nepotism and corruption as their main problem.
Enhancing Recruitment, Enrollment and Retention of Pregnant, Low-Income Women for a Prenatal Stress Management Intervention, Gillian Carney, Brittney Smith, Summer Anderson, Meghan Sharp, Christyn Dolbier, Department of Psychology, East Carolina University, Greenville, NC

Introduction: Prenatal stress negatively affects maternal-fetal health, especially for low-income women. Prenatal stress management interventions such as Mindful Motherhood Training (MMT) reduce stress. Low-income women often lack resources to take advantage of such programs. Purpose: To elicit ideas from pregnant, low-income women about enhancing prenatal stress management intervention recruitment, enrollment and retention. Method: English-speaking, pregnant women (N=9) were recruited from a southeastern prenatal clinic serving predominantly low-income women. Characteristics: Mage=27 years, Mgestation=23 weeks, Mcchildren=2, all singleton pregnancies; majority African American, single, unemployed, below poverty threshold, above high school education, and high risk pregnancy. The Principal Investigator facilitated three 1.5-hour focus groups. Using a coding scheme developed using focus group questions and narratives, paired researchers coded data and conducted thematic content analysis until reaching agreement. Results: Common recruitment themes: patient study awareness via flyers in multiple clinic areas (28%) and clinic staff direct communication (11%), informative study name (33%) and confidentiality emphasis (11%). Common enrollment themes: emphasis on social support (26%), stress management skills specific to pregnancy (22%) and beyond pregnancy (22%). Common participation obstacle themes: environmental constraints (e.g., transportation difficulties; 36%) and personal information concerns (e.g., invasion of privacy; 36%). Common retention themes: positive facilitator characteristics (35%), hands-on activities (17%) and small group size (17%). Conclusions: These findings are informing the implementation of a study testing MMT efficacy in reducing stress and enhancing glucose control in low-income, pregnant women with diabetes. Prenatal practitioners and researchers may begin to incorporate the themes reported here with their existing strategies for stress management intervention recruitment, enrollment and retention with low-income, pregnant women.

A Sustainability Literacy Assessment of Students at East Carolina University, Kelsey Wenzel, East Carolina University, Greenville, NC

Sustainability is achieved when social, environmental, and economic functions are operating in unity at maximum efficiency. This study takes a closer look at the sustainable knowledge of students at East Carolina University. An electronic survey of ten questions was developed and distributed through e-mail to over one hundred randomly selected ECU students. The data was then analyzed to identify whether or not there were patterns of knowledge in relation to gender, academic level, and college through which each student is pursuing their degree. The findings can be used to determine if there needs to be an increase in sustainable education at ECU and ultimately earn the university points towards being qualified as a sustainable institution by the standards of AASHE STARS.

Gender Differences in the Impact of an Early Warning System and Tutoring in College, Benjamin Peter Wigand, Tiffany Rose Vockerodt, Elizabeth Coghill, Jayne Geissler, Marieke Van Willigen, John Trifilo, East Carolina University, Greenville, NC

Increasing retention and graduation rates is a focus among colleges and universities across the country. At East Carolina University (ECU), these rates comprise three of the ten performance goals whereby ECU is measured. Research indicates college freshmen are often unaware of the programs offered by the university to support student success and that early academic alert systems can be effective in encouraging students to seek help. ECU’s early alert system allows faculty to efficiently notify students concerning their academic performance and connects students to campus assistance including tutoring. This research examines the fall 2012 first-time, full-time (FTFT) freshman cohort who received an academic alert fall or spring of their first year of attendance at ECU. These students were monitored to determine if an academic alert prompted them to attend tutoring at the Pirate Tutoring Center (PTC) and measured the relationship of tutoring to grade point average (GPA) and retention by gender. Results indicated the following: 1) Males were more prone to receiving an academic alert than females. However, females were more likely to seek tutoring than males once an alert had been received. 2) Both males and females who participated in PTC tutoring after receiving an alert had: a) Higher GPAs than students who did not attend tutoring b) Higher retention rates than students who did not attend tutoring c) Similar retention rates (contrary to the retention gap that was noted between the genders for the 2012 FTFT cohort). The research is continuing to follow these freshmen into their sophomore year where the relationships between academic alerts, tutoring, GPA, and retention will also be examined by gender.
Time Perspective and Illicit ADHD Medication Use Among East Carolina University Students, Hannah G Woolard, Richard Williams Ed.D, East Carolina University, Greenville, NC

The use of illegal drugs for recreational purposes has been a long-term issue on college campuses; however, more recently, students have begun to use non-prescribed attention deficit hyperactive disorder (ADHD) medications specifically for boosting academic performance. Due to the fact that there are many college students who have ADHD and are legally prescribed this drug, ADHD medications are more easily accessible than other drugs such as marijuana, cocaine, and heroin (Kapadia, 2012). Many students who use the drug illegally are misinformed about benefits of the medications and potential medical and legal consequences (Welty, 2012). The purpose of this study is to determine if there are relationships between the motivation for and frequency of illicit ADHD medication use and student time perspective. Time perspective, as defined by Zimbardo and Boyd in 1999, “is the often nonconscious process whereby the continual flows of personal and social experiences are assigned to temporal categories, or time frames, that help to give order, coherence, and meaning to those events.” While present-hedonism is normally associated with drug abuse, it is hypothesized that future-oriented students are more likely than other students to abuse ADHD medications for school-related purposes in order to perform better academically thus helping to achieve their future goals. A convenience sample of undergraduate students at East Carolina University who were over the age of 18 and were not prescribed ADHD medication was used for this study. The data were collected using an online survey on the Qualtrics platform with variables including time perspective, frequency of illicit study drug use, motivation for use, grade point average, and year in school. Data were analyzed using Pearson’s product moment correlation and descriptive statistics. Although the original hypothesis that there is a significant relationship between future-oriented time perspective and motivation for and frequency of illicit study drug use was rejected, we accepted the hypothesis that there is a significant relationship between present-hedonism time perspective and recreational motivation for study drug use. The data also revealed a positive correlation between future time perspective and GPA and a negative correlation between frequency of study drug use and GPA, all supporting existing literature.

Success Perception Differentiation within the African American Community, Chantel J. Miller, East Carolina University, Greenville, NC

Perception of success within the African American community are generally skewed. This poses the question: Do children perceived success differently than adults? Is this pattern limited to smaller, more rural areas, or widely accepted? Although research has been conducted to show how African American children perceive themselves in comparison to European American/ white individuals, there is not much information about the perception on various skin tones within their own race. My research focuses on the perceptions of young African American children (between ages 5 and 7) and college students and their thoughts on whether complexion had anything to do with success. My reasoning behind conducting this study with children has to do with the fact that children are very honest and blunt. In a class project during a previous semester, I carried out this study in Wilmington, North Carolina and in Greenville, North Carolina. All in all 20 children participated, 10 were between the ages of 5 and 7 and the other 10 were between the ages of 19 and 22. I conducted a series of interviews. By interviewing the college aged informants through informal and unstructured means (typically by gradually bringing up the topic in conversation) I was able to get them to elaborate on their views without them over-thinking the rather touchy subject. I used a semi structured interview instrument to engage in conversations with the elementary school age children and spent time conducting participant observation. Each group was asked the same questions. However, it was essential that the questions for elementary students were adjusted to their situation and language ability. When analysis was completed, the findings differed from my original hypothesis. I was able to compare and contrast the different perspectives of elementary students and college students. This project aims to present insights into African American perspectives on their own ability to obtain success. It also focuses on who they associate with success in regards to skin complexion within the African American community and why.

New Technologies in the Public Library, Jessica Lynne Chirico, East Carolina University, Greenville, NC

The nature of the public library is evolving with the continuous rise of new technologies. The purpose of this research is to analyze the current usage of new technologies in the Sheppard Memorial public library system and evaluate how the library can use Internet-related services and new technologies to improve ties with the community and accommodate the evolving needs of patrons. The study consists of a literature review examining services and technologies used by public libraries and a needs assessment survey of users of the Sheppard Memorial Library and its branches. The survey assesses how well the library has communicated the Internet-related services and new technologies that it offers to its patrons and how they in turn take advantage of the services offered. By analyzing the data, the research will allow for conclusions to be formed on how much patrons are taking advantage of provided technology resources and whether adaption is needed on the library’s part.

Illustrating the Appreciation of Hermeneutics Through Mark 5, Tyler Matthew Beasley, East Carolina University, Greenville, NC

Hermeneutics, the study of the principles of interpretation, has been utilized in the field of religious studies for centuries. While new types of hermeneutical approaches have been coined since the early days of its
usage (1737), older hermeneutical approaches remain effective in some degree. That is, hermeneutics are still utilized in the same fashion as in previous times. While some sources suggest that hermeneutics seek to warp or manipulate the original message(s) of sacred texts, scholars argue that this is, indeed, not the case. Rather, this practice hopes to assist in the educational practices of scholars by contextualizing the message. While four main hermeneutical approaches exist (Literal interpretation, allegorical interpretation, moral interpretation and analogical interpretations), several “sub-categories” have been fashioned from these primary forms. This paper will argue the importance of one specific hermeneutical approach—that is, the method of “Allegorical Interpretation.” Implicit connotations exist in numerous sacred texts. Essentially, this presentation will argue that, through understanding the importance of “Allegorical Interpretation,” one can more easily understand the unspoken messages of the specific texts. In this case, Mark 5 will be utilized to illustrate this idea of implicit connotation. This presentation seeks to communicate the importance of understanding both the explicit and implicit suggestions found within Mark 5. Through this, a grander argument is comprised; that is, hermeneutics should be understood to be a necessary practice in religious scholarship. With this understanding, it is my hope that the art of hermeneutics will be appreciated in a broader and fuller sense and employed as an aspect of biblical interpretation, as well as a method of study for a pantheon of diverse religions.

UP44

The Psychology of Interior Design, Rajib Saifuddin Alshareif, East Carolina University, Greenville, NC

According to the United States Environmental Protection Agency (2011), Americans on average, spend approximately 90 percent of their time indoors. The purpose of this research is to show the importance of interior design in buildings, since it has a major effect psychologically on people. There are ways to enhance the interior environment of a building, therefore enhancing the psychology of the occupants. Design preferences and selection are different from one person to another depending on their tastes. But, there are design elements that have been proven in studies to improve mood and social behavior. A number of studies that are showcased in the research confirm the relationship between interior design and the psychological effect it has on people. Although there are many interior design elements that can be incorporated in a building, the research was narrowed down to three; the use of windows, lighting, and variation in colors. These elements are interconnected and can significantly change the interior environment of a building. In a study by Ulrich (1984), he noticed that the views of landscapes out of hospital windows significantly reduced the amount of pain medication needed and sped up recovery times. Windows have a significant effect psychologically on occupants, they need to be oriented by outdoor views and provide good visibility to support situational awareness. In another study by Adams and Zuckerman (1991), they demonstrated that a reduction in lighting and a decrease in room size have similar effects psychologically on people. The third element in the research is the variation of colors in rooms depending on their usage. “Humans feel most comfortable in spaces that follow nature, instead of monochromatic bubbles.” said Barbara Stewart, a San Francisco-based architect (Green, 2012). There is a famous saying by Winston Churchill “We shape our buildings; thereafter they shape us”. This field is important and many people do not give it the attention that it needs. A person’s personal and professional life could be negatively impacted by poor interior design. The interior design of a building should make the occupants feel most comfortable and at peace. Given that people spend high percentage of their time indoors; it is important to study the significant of interior design on human psychology.

UP45

Fresh Eyes: Image Based Social Media and Interior Design Enrollment, Nicole Michele Lobell, East Carolina University, Greenville, NC

The ongoing recession, low home sales, and continued downward spiral of the US economy should have been enough to deter freshman students from enrolling in interior design programs, but that has not been the case. Enrollment in interior design has been increasing, despite the circumstances. What is driving this paradox? Is an increase in image-based social media and websites the source? Online design resources, architectural magazine sites, and image-driven repositories (Pintrest, Houzz, and Flickr) are all accessible to students who show an interest in design. Additionally, other types of visual media, such as television and film, have expanded to include and showcase more interior design, thereby making the field more accessible to the public. Has the increase in awareness of the field through these sources influenced incoming students and their choice of interior design as a major? Through focus groups and surveys, we have explored the influences of visual media on students both entering and graduating from a CIDA (does this need to be spelled out the first time you use it? accredited interior design program. This paper will explore the relationship these types of visual media have to the enrollment and interest in interior design programs.
UP46

The Ripple Effect: an Interior Design Concept for a Cancer Clinic, Lindsey Marie Westphal, Undergraduate Student, Susan Martin Meggs, Mentor, Dept. of Human Ecology, East Carolina University, Greenville, NC

Objective: to determine an effective design for treatment, waiting and office areas for the Leo Jenkins Cancer Center that meet the needs of the patients and staff. Methods: The research and design process has been set out in multiple steps over two semesters. Separate surveys, utilizing Likert Scales, were administered to patients and staff during the fall. Items on the scale for patients included privacy level and way finding, whereas the items on the scale for staff included design and storage. The scales consisted of items to be rated from one to five, measuring levels of agreement. Research on the types of patients that utilize the space was conducted during the fall semester, and was further conducted on the philosophy of healthcare design, the needs of healthcare patients, and the types of products available. Results: Interviews with clients and patients indicated that a calming, serene design is preferable. This research is utilized in the design of the space: examining the needs of patients that use the space, how their needs can be served, and how these needs can be incorporated into the design. The collected data was used in the design process. The next phase of the design process involved creating an overarching concept to guide the design development. The concept of “The Ripple Effect” was chosen to portray the idea that change can be caused with a single, simple act, such as throwing a pebble into a pond, creating concentric ripples in the water. The design will incorporate this to represent how recent research in healthcare has prompted innovation in healthcare products in order to better cater to patient’s needs. The use of repetition of forms, curvilinear pieces and a contemporary style are attributes of the concept that unify the design, and are design solutions that provide for a serene environment. The next step in the design process was to choose products and furniture to use in the space, and to address the spatial issues discovered in the research phase. It was important to develop a floor plan that best utilized the given space as a unified design. Lastly, the perspective drawings and materials presentation boards illustrate for the client the entire space, and how the concept was incorporated to address the needs of the clients.

UP47

Teacher as Researcher: Case study of a Multimodal Communication Intervention in a Special Education Classroom

Katherine S Engeman, East Carolina University, Greenville, NC

Functional communication has always been a challenge for individuals with severe intellectual disabilities and speech and language impairments, yet it is one of the most important aspects of our daily life as humans. It is what we use to convey our most basic wants and needs, transfer information, and interact socially with one another. Communication systems increases student independence which in turn decreases the amount of behavioral problems, mainly tantrums and self-injurious behaviors. These behaviors are usually present when students do not have an effective mode of communication (Sigafoos, Arthur-Kelly, &Butterfield, 2006). In the past few decades however, great strides have been made in improving the communication opportunities for these individuals and their communication partners. There has been in increase in popularity of both high tech and low-tech augmentative and alternative communication (AAC) devices, which according to the American Speech-Language-Hearing Association “includes all forms of communication (other than oral speech) that are used to express thoughts, needs, wants, and ideas. AAC systems can either be aided, meaning that they require external equipment in addition to the learner to communicate, or unaided meaning the learner is only using his or her body to communicate (ASHA, n.d.). This is a case study about the implementation of a multi-modal communication system and it’s effect on an individual learner’s expressive speech. The study is designed as action research done by a teacher in a special education classroom. Data is collected during communication activities, which are embedded into academic instruction and during the creation of contrived situations that facilitate the development of the learner’s communicative skills.

UP48

Green Spaces, Great Places: The Importance of Green Spaces in Urban Cities, Zane Alexander Gray, East Carolina University, Greenville, NC

This study was conducted to educate others and myself on the importance of green spaces in urban areas. Green spaces not only provide a home for local wildlife and vegetation, but add a space for the people in a city to relax and socialize. The goal was to answer important questions associated with green spaces in hopes to educate about the importance of green spaces. To identify the important questions associated with green spaces, a questionnaire was dispersed to 100 people on East Carolina University campus [enrollment of 27,500]. Although this sample size is relatively small, when distributed in a neutral (non-planning) college classroom setting it will feature participants from a wide variety backgrounds and understanding of green spaces. Through this study, five benefits have been researched: health, education, aesthetic, ecological, and social. Health benefits referred to air quality, recreational use, and relaxation. The educational benefits included teaching of plants, wildlife, and even the history of the city. The aesthetic benefits tied in with the ecological benefits which included provisions for rain water drainage, lowered city temperatures, and reduced of noise. The social benefits referenced the “meeting place” feeling of green spaces. They act as a common ground area that is often a landmark of a city and provide many eating and gathering places...
Many children learn about nutrition and healthy lifestyles through preschool and early childhood education programs such as Head Start. Educators use a wide variety of resources to teach nutrition. The purpose of this study was to identify resources useful to teachers educating preschool children about nutrition education in North Carolina-based (NC) Head Start preschool classrooms. Sixty-three individual, in-depth interviews were conducted with Head Start administrators (n=31) and teachers (n=32) between September 2011 and May 2012. Interviews were conducted by telephone, recorded, and transcribed verbatim. Researchers analyzed the transcripts using a grounded theory approach. Five major themes (i.e. funding, time, material resources, human resources, and training opportunities) were identified and used to develop a substantive-level model. Participants indicated time, funding, and access to training opportunities were limited resources that negatively impacted their ability to incorporate nutrition education within their classrooms. Material (e.g. classroom materials, standardized nutrition curricula) and human resources (e.g. community partners) were cited as helpful to implementing nutrition education, but only when these resources were easily accessible by teachers. The proposed model attempts to explain the impact resources have on nutrition education in NC Head Start Programs. Administrators and teachers can use this model to help identify availability and use of resources that may improve the quality of nutrition education provided within the classroom environment. Further research is needed to determine the most effective strategies for overcoming barriers to nutrition education within Head Start organizations with limited resources.

Trends in Dietary Intake among Middle School Students in Eastern North Carolina, Radford, B., Roseno, A., Duffrin, M.W. PhD, RD, LDN, & Carnaway-Stagg, V. PhD, RD, LDN, East Carolina University, Greenville, NC

According to North Carolina's Child Assessment and Monitoring Program (CHAMP), 74% of adolescents are not meeting the recommended intake of daily fruits/vegetables, and 30% reported consuming sugar-sweetened beverages three or more times a day. Dietary habits such as these have been linked to increased rates of overweight/obesity. The purpose of this study was to assess self-reported dietary behaviors of adolescents living in Eastern North Carolina (ENC). ENC was categorized into regions [i.e. Inner Banks (IBX), Outer Banks (OBX), and Southeastern (SE)] to provide a better representation of regional dietary trends. Researchers recruited students (n=246, 46.5% male) from 16 eighth-grade classrooms in 9 ENC counties to participate in the study. A modified Student Physical Activity and Nutrition (SPAN) questionnaire was administered to participating students in the fall of 2013. The survey featured 13 questions addressing intake of high fat foods; calcium-rich dairy foods; fresh fruits/vegetables; fruit juice; sugar-sweetened beverages; and water. Students were asked to report their dietary intake on the previous day using a 7-point scale (1=None; 7=5 or more times/day). Researchers analyzed data using basic descriptive statistics and analysis of variance. Findings revealed over 60% of students reported consuming water, fresh fruit, and milk at least once on the previous day; however, over 50% of students reported not consuming fresh vegetables on the previous day. Additionally, 50% of students reported consuming sugar-sweetened soda at least once on the previous day. Researchers also observed significant differences between all three regions for soda [F(2,217)=10.98; p=.00], fruit [F(2,217)=4.39; p=.02], and milk consumption [F(2,217)=4.08; p=.01]. In general the SE region consumed less milk and fruits, and more soda than the other two regions. No significant differences were observed between groups for the remaining foods analyzed in the study. Results from the SPAN questionnaire revealed the need to improve the diets of adolescents in ENC, especially in the Southeastern region. Nutrition educators developing health education materials aimed at improving dietary intake among adolescents living in ENC may find the results of this study useful. Targeted nutrition education may be helpful for improving dietary behaviors within this population.
UP51

Head Start Administrator and Teacher Perceptions of Parental Influence on Preschool Children’s Nutrition Education, Wilkerson, K., Lisson, S., Carraway-Stage, V., & Babatunde, O., East Carolina University, Greenville, NC

Social and economic disparities in a child’s life can reflect directly on their development and growth. Parents play a significant role in molding their child’s perceptions of nutrition and health. The purpose of this study was to explore parental influence on preschool children’s nutrition education from the perspective of Head Start administrators and teachers. Beginning September 2011 through May 2012, researchers conducted 63 in-depth, structured interviews with North Carolina-based (NC) Head Start Health/Nutrition Coordinators (n=31) and teachers (n=32). Researchers recorded interviews via digital audio format and transcribed them verbatim. Through open-coding, researchers identified four primary, emergent themes related to parental influence. Following a grounded theory approach, themes were then broken down to develop a substantive-level model. Outcomes revealed parent interaction involvement (e.g. parent meetings), educational opportunities offered through Head Start (e.g. parent education classes), community support programs (e.g. public funding, private organizations), and factors related to a parent’s own background (e.g. socio-economic status, food preferences) were principal parent-related-components that Head Start staff reported as being influential to preschooler’s nutrition education. The proposed theoretical model provides an initial understanding of the effect Head Start parents have on their child’s nutrition education. Initial findings suggest more training and education opportunities for parents may be needed to overcome their own nutrition-related knowledge and perceptions. Yet, participants often reported a lack of parental involvement as a barrier to educational opportunities offered to families through Head Start. Additional research may be needed to explore reasons behind this phenomenon. Despite barriers, teachers and local community partners should continue supporting parents in efforts to reinforce positive nutrition messages among preschool children. However, in order to better understand the impact of parent-related factors (e.g. involvement, influence) on children’s nutrition education, researchers should also explore these issues from the perspective of Head Start parents.

UP52

Eastern North Carolina Middle School Students Physical and Life Science Knowledge: Does Gender Make a Difference?, Williams, J., Roseno, A., Duffrin, M.W., PhD, RD, LDN, Carraway-Stage, V., PhD, RD, LDN, East Carolina University, Greenville, NC

Studies have found that gender differences in interests for specific science courses and fields begin as early as elementary school, with girls favoring life sciences (LS) and boys preferring physical sciences (PS). The purpose of this study was to compare Eastern North Carolina public school eighth-grade male and female students’ LS and PS knowledge. Researchers recruited students (n=238; 44.1% Male; Mean age=13.45±0.63 years) from 17 eighth-grade classrooms in 9 counties to participate in the study. At the beginning of the 2013-2014 academic year, a science knowledge exam (16-item) was created using Project 2061 multiple choice science questions. Researchers selected exam questions focused on LS (5 items) and PS (11 items) for middle school students. Researchers obtained parental consent and student assent prior to beginning data collection. Data were analyzed using basic descriptive statistics and independent t-tests. The average total score for participants was 7.53±2.57 (47.06% correct). The average score for PS was 5.06±2.04 (46.03% correct) and 2.47±1.09 (49.37% correct) for LS. Data indicated a significant difference between males (2.29±1.07) and females (2.59±1.07) for the LS (t=-2.20, p=.03). Higher percentages for correct responses for females on the LS questions are consistent with prior research findings that girls tend to favor LS. Future research should re-examine science knowledge among the same students at the end of 8th grade to determine if student knowledge improves and if differences between gender change.

UP53

Quantifying Erosion Rates on a Salt Marsh Platform, Cape Cod, Massachusetts, Kailey Adams, Thad Wasklewicz, Paul Gares, Megan Tyrrell, Stephen Smith, East Carolina University, Greenville, NC

Cordgrass initiates sediment accretion in salt marshes and protects the marshes from erosion and additional stresses that would limit other marsh species. Annual sediment loss within salt marshes in Cape Cod, Massachusetts has been exacerbated by pervasive cordgrass die-offs. These die-offs are thought to be caused primarily by increases in grazing pressure by a native species of marsh crab (Sesarma reticulatum) that has undergone a population explosion in recent years. Minimal research has been conducted to quantify the rates and amounts of erosion from these integral habitats in the Cape Cod National Seashore. We capture high-resolution point cloud data (xyz topographic points) with repeat surveys using terrestrial laser scanning to quantify sediment changes between May and October 2012 on a salt marsh platform near Wellfleet, Massachusetts. The initial surveyed point cloud of the marsh platform indicated a sediment loss of 26.75m3 as calculated using the cordgrass root wads as the initial erosional surface. A second analysis compared repeat 5cm planimetric resolution digital elevation models with the aid of ArcGIS and identified a spatially heterogeneous change in sediment transport across the platform. We will continue data collection over the Spring of 2014 to assess further changes and corroborate our existing findings.

UP54

Developmental Transitions of Otoliths in Zebrasfish, Taylor Jordan Bailey, East Carolina University, Greenville, NC

Otoliths are the small particles of calcium carbonate located in the inner ear of vertebrates used for sound reception and movement perception (Merriam Webster 2014; Encyclopedia Britannica 2014). They play an
important role in fish ecology, because otoliths can be used to determine many factors such as species, size, weight, diet, and age (Tennessee Wildlife Resources Agency). Otoliths vary among species, creating a need to study the unique progression and characteristics of each species. The aging process of otoliths has been studied in many saltwater species such as barramundi, Chilean jack mackerel, and yellowfin tuna, to name a few (Dougall 2004; Araya et al. 2001; Shih et al. 2014). However, fewer studies were found on otolith development in freshwater species. A commonly used freshwater species for laboratory research are Danio rerio, also known as zebrafish. Zebrafish are relatively easy to breed and culture; therefore, making them a primary test subject (Westerfield 2000). This study is intended to increase the understanding of the developmental process of otoliths in zebrafish. The purpose of this experiment is to determine the precise embryotic stage at which an otolith in a zebrafish transitions to resemble a mature adult otolith.

UP55

Subcritical Water Extraction of Salvia Miltiorrhiza, Jessica Biller, Yu Yang, East Carolina University, Greenville, NC

Traditional Chinese medicine (TCM) originated in ancient China but has evolved over the past thousands of years and is now used all over the world. Salvia miltiorrhiza, also known as Danshen, is an herb commonly used in Chinese medicine to treat cardiovascular and other diseases. As it has recently gained more recognition, this herb is currently being investigated for its anticancer properties. In traditional Chinese medicine, the patients extracted the prescribed herbs using boiling water, then consumed the extracts as medication. However, the extraction temperature of approximately 100 °C used in this traditional method may not be the most effective condition to remove the active pharmaceutical ingredients (APIs) from the herb. Our previous study shows that higher temperatures can more efficiently extract anticancer agents, such as tanshinones, from Salvia miltiorrhiza. The goal of this study is to determine the most efficient subcritical water extraction temperature that extracts the compounds, tanshinone I and tanshinone IIA. The extraction process was performed at four different temperatures: 75 °C, 100 °C, 125 °C, and 150 °C. After the high-temperature water extraction, the APIs in the water extracts were analyzed using high-performance liquid chromatography (HPLC). The results of this research will be presented.

UP56

Mitigation of Organophosphate-Induced Neurobehavioral Impairments Using Naltrexone in Rats, JoColl A Burgess, Lidia Yessenia Ortega, Kori Brewer, William Meggs, Tuan Tran, East Carolina University, Greenville, NC

Accidental poisoning with organophosphate compounds is used as nerve agents in chemical warfare and terrorist attacks. Some of the symptoms that persist after exposure include headaches, memory loss, confusion, and fatigue. Studies have shown acute poisonings can induce impairments on performance in neuropsychological tests. While acute physiological manifestations are well managed with atropine and pralidoxime, a large percentage of subjects eventually develop neurocognitive problems including, memory loss, confusion, anxiety disorders and increased aggression. An explanation is that an inflammatory cycle within the CNS may be a common mechanism of many neurological conditions. This suggests that novel anti-inflammatory drugs may be beneficial in minimizing the impact of inflammatory processes, thus reducing the onset of neuropsychological impairments. Naltrexone is a potent anti-inflammatory agent that is safe and readily available. Indeed, clinical trials have shown that naltrexone is effective in several inflammation-related diseases, such as neurogenic pain and movement disorders. This study involved a rodent model of acute organophosphate poisoning using diisopropylfluorophosphate (DFP), an irreversible acetylcholinesterase inhibitor, to determine if naltrexone can mitigate the development of neurocognitive problems in the weeks after exposure. Adult rats (n = 12/group) were given acute DFP (50 mg/kg), DFP + naltrexone (5 mg/kg), or naltrexone; rats were treated chronically with naltrexone for 12 weeks. Afterwards they underwent assessments for reference memory using the Morris maze (5 days of learning and 1 day of memory retention) and assess associative learning using trace eyeblink classical conditioning (6 days acquisition, 3 days extinction). Both tasks are known to be mediated by an intact hippocampus, which may be vulnerable to DFP. Preliminary results (n = 10/group) indicate that rats poisoned with DFP but treated with naltrexone show improvements in MM performance. Eyeblink assessments are still ongoing. Naltrexone has been shown to be neuroprotective against inflammation-mediated neurodegeneration and is therefore a good candidate in examining the prevention of neurological sequela from organophosphate poisoning.
Conservation and Expression of SNF2 Proteins in Chondrus crispus, Ethan K Caudell, East Carolina University, Greenville, NC

The SNF2 families of ATP-dependent helicases are the central catalytic subunits for chromatin remodeling complexes. The most widely studied is the multisubunit SWI/SNF complex, which has been found in plants, yeast, and model organisms. The SWI/SNF core subunit is a member of a smaller subgroup (SNF2 subfamily) within the larger SNF2 superfamily. In a recent study of two red algae, members of most SNF2 helicase subfamilies were found to be present, although it appeared unlikely that the multi-subunit SWI/SNF remodeling complexes were formed based on available gene expression data. The core SWI/SNF complex is made up of four major proteins; Swi2/Snf2, Swi3, Swp73, and Snf5. The complete genome of another red algae, Chondrus crispus, recently was sequenced and examined to see whether the major SWI/SNF components were conserved. Using known protein sequences obtained from model organisms, SWI/SNF complex protein sequences were searched using the BLAST tool found on the NCBI website. Paralogs from the broader SNF2 ATPase super-family were determined in Chondrus and carefully identified to subfamily using maximum-likelihood phylogenetic analyses. The combined bioinformatics analyses revealed that Chondrus contains sequences from each major group of the SNF2 protein complexes; however, expression data indicated that not every core protein from the SWI/SNF complex is expressed in a coordinated manner, suggesting the complex may not exist in red algae.

Mathematics in Image Processing, Kenneth Charles Chilcoat, Dr. Gail Ratliff, Professor, Department of Mathematics, East Carolina University, Greenville, NC

The presentation will focus on three digital image processing techniques: image segmentation, image sharpening, and noise reduction. Image segmentation is the process of finding edges in images, while the goal of image sharpening is to enhance the fine detail of an image. Noise reduction is the process of reducing random unwanted elements of the image that are normally a result of interference when the image was taken. Noise reduction is commonly performed prior to image segmentation or sharpening. A digital image is treated as a 2-dimensional array by a computer, camera, phone, etc., and this enables images to be manipulated with relatively simple 2-dimensional mathematical concepts from a basic calculus course. The mathematics behind digital image processing is of immense interest and is a continually expanding field. This presentation is based on a currently ongoing research project primarily designed to categorize and potentially improve on image segmentation and sharpening techniques. The goal of the project is to develop a criteria for deciding systematically what method to use to obtain the desired result for a given image. This poses a challenge in part due to the large variation among images and differing goals; however image processing for human inspection is a subjective process, currently performed on an image by image basis.

Co-Teaching Introductory Biology with Dr. Jason Gee, Jason Thomas Hance, Dr. Jason Gee (Mentor), East Carolina University, Greenville, NC

For my Senior Honors Project, I wish to co-teach an Introductory Biology, or Biol 1100, class alongside biology department faculty member Dr. Jason Gee. My overall goals for this project are to better master the concepts of basic biological principles as set forth by the course material, as well as, to become experienced in the art of projecting what knowledge I have learned in the field of biology from myself to the students who would be attending introductory biology. It is my hope that through this experience I will have a chance to give back to the university that has given me a quality education while simultaneously setting me up for success. During the first semester of my senior year, I took time to meet with Dr. Gee multiple times a week to set up a working knowledge of what exactly the objectives were for the introductory biology course. While this was being established I made sure that I understood the material to the best of my capabilities by reviewing the textbook and reviewing my own personal notes from when I took this class. Dr. Gee had me read a book entitled, “Teaching the Large College Class,” which helped me better understand what to expect and how best to engage the students. I also prepared multiple papers for Dr. Gee on which chapters from the textbook I would like to teach and why I felt it would be good for me to teach them. Essentially, this past semester I prepared myself for the upcoming semester when it actually comes time for me to step in front of the class and teach. The second semester I will teach the introductory biology course alongside Dr. Gee. My main avenue for teaching the topic to be covered for that day will be through PowerPoint presentations, as this is the method that most of my professors have used. However, whenever it is appropriate, I will also incorporate short videos, demonstrations and short side notes of my experiences in the field of biology to keep the academic scene original and interesting while maintaining the highest level of academic integrity. Outside of class I will undoubtedly be working on the required final paper. During this time I will reflect on my co-teaching experiences and how they are impacting my ever growing/evolving leadership and communication skills. This time will be one of great personal insight into how I can best better myself as a student of East Carolina and as a future physician in the field of cardiology.
calculated Shannon-Wiener index at four sites along the South Carolina coast: Winyah Bay, Charleston Harbor, Saint Helena Sound, and Port Royal Sound. The results differed among the sampling sites where, Winyah Bay diets consisted of mostly Atlantic Menhaden Brevoortia tyrannus (21.6%), while Saint Helena Sound had mostly benthic invertebrates (29.4%). The Shannon-Wiener index showed that Charleston Harbor had the most overall prey biodiversity $H' = 2.58$, Saint Helena Sound had the least amount of prey biodiversity $H' = 2.29$, Winyah Bay $H' = 2.52$ and Port Royal Sound $H' = 2.47$ were also calculated. Adult Red Drum in South Carolina are feeding mostly on Atlantic menhaden, and a diverse group of benthic or epibenthic marine invertebrates. This diversity may prove to be beneficial for these adult populations in the future that do not rely on a single species for production.

UP61
Is Aggression Mediated by Androgens in Females that Possess Male Ornaments?, Brittany P Lee, East Carolina University, Greenville, NC

Social and physiological mechanisms can greatly impact the development and evolution of colorful biodiversity. The phenotypic variation in threespine stickleback fish (Gasterosteus aculeatus) is a classic product of such mechanisms where, in some cases, populations harbor females that express atypical masculinized red-throats. While the mechanisms underlying the trait in females are not completely known, in males variation in red throat is associated with aggression and male-typical hormones. Thus, it was hypothesized that the female red throats may have evolved in the context of social competition and be mediated by the male typical hormone, 11-ketotestosterone (11KT), such that red-throated females are more aggressive and release higher levels of systemic 11KT. Using field-collected sticklebacks, we subjected resident females to a territorial intrusion simulation, and tested whether females with red throats were more aggressive and released more waterborne 11KT. While we observed a relationship between body size and red throat intensity and significant changes in throat coloration before and after the social interaction, our results revealed no clear relationship between throat color, aggression, and waterborne 11KT. Females with intense red throats were not more aggressive and did not mount an elevated hormone response after the social interaction. Interestingly, a hormonal pattern emerged where females released significantly more 11KT at 1hr and 2hr post-social interaction, suggesting that females may mount a slow socially driven-hormonal response rather than immediate. While we observed no strong association between the 11KT androgen, aggression and female throat coloration, our study provides insights on the covariation between a candidate hormone, behavior, and female ornamental traits.

UP62
Using Mosquitofish Gambusia affinis as Bioindicators for the Presence of Endocrine Disrupting Compounds, Allyson Beth Middleton, Department of Biology, East Carolina University, Greenville, NC

Endocrine disrupting compounds (EDCs) are compounds that arise from an assortment of manufactured sources, which have the potential to interrupt hormone pathways by mimicking hormones naturally produced in the body. The secondary sex characteristics of Mosquitofish Gambusia affinis respond to the presence of EDC's by becoming more masculinized or feminized, based on the type of compound and what it has the ability to mimic. Mosquitofish have proven to be model organisms to serve as bioindicators of whether EDCs are present in their environment due to their sexual dimorphism. The degree at which females develop masculinized features is directly proportionate to the concentrations of androgen-mimicking compounds they are exposed to. The most pronounced male secondary characteristic studies have observed induced on female mosquitofish is the development of male gonopodia, described by an elongation of anal rays 3,4, and 5. This study seeks to answer the question of whether mosquitofish exhibit such changes in local sewage effluent. Due to the increased use of phytosterols as well as other steroids or testosterones in various medications, which ultimately ends up in the local sewage plant, I predict that EDCs will be present. To determine this, mosquitofish samples will be taken from the sewage effluent of the Greenville Utilities Waste Plant as well as alternate sites for reference. The standard length, anal fin length, and anal fin ray widths of all fish will be measured and recorded. Observations will be recorded on any and all unusual secondary sex characteristics. A statistical analysis (ANOVA) will then be conducted on morphological characteristics and sex ratios observed between males and females and between fish living in effluent and reference sites. Results will be used to conclude whether endocrine disrupting compounds are present in the sewage effluent at Greenville Utilities.

UP63
Creating a research tool to illuminate the pathway of cholesterol metabolism within Mycobacterium tuberculosis, Amanda Lauren Morgan, East Carolina University, Greenville, NC

Mycobacterium tuberculosis (MTB) is a slow-growing pathogen that infects millions of individuals worldwide. MTB and its non-pathogenic cousin M. smegmatis are among the few bacteria that can utilize cholesterol, a hydrophobic steroid molecule that is normally found only in mammalian cells, as an energy source. The goal of my project is to prepare fluorescently-labeled sterols that can be used to track steroid metabolism within MTB. Preliminary studies from our lab have shown that MTB can hydrolytically remove fluorescent reporter groups that are attached via carbamate linkers, preventing the monitoring of cholesterol processing. We are therefore exploring new ways to attach fluorophores to the “A” ring of cholesterol. A direct covalent bond from the fluorophore nitrogen atom should result in a drug that inhibits the ability of MTB to access cholesterol.
An assessment of the polytypic status of the Namib darkling beetles Onymacris unguicularis and Onymacris rugatipennis, Rachel Pollard and Dr. Trip Lamb, Department of Biology, East Carolina University, Greenville, NC.

The genus Onymacris (family Tenebrionidae) comprises 14 named species of diurnal beetles largely endemic to sandy substrates in the Namib Desert. Six species are polytypic, containing two to four subspecies. Although behavioral and physiological adaptations of these beetles have been studied extensively, little is known about their evolutionary relationships, particularly regarding the validity of the currently recognized subspecies. We examined the polytypic status of two species: O. unguicularis and O. rugatipennis. One of the more intensely studied Namib beetles, O. unguicularis has been subject to much ecological, physiological, and behavioral research. Northern populations—isolated from southern populations by approximately 300 km of duneless land—compose the subspecies O. u. schulzeae, which exhibits only minor morphological differences from the southern subspecies, O. u. unguicularis. Similarly, Onymacris rugatipennis is classified as two subspecies: O. r. albottessellata is distinguished from O. r. rugatipennis by the presence of a white wax bloom that protects the integument. However, their ranges are contiguous and slightly overlapping, with O. r. albottessellata occurring primarily on dune bases and O. r. rugatipennis along sandy riverbanks. We examined DNA sequence variation in two mitochondrial genes to determine whether and to what degree genetic variation is congruent with subspecific morphological and geographic delimitation. We observed strong correspondence for the subspecies of O. unguicularis but little correspondence for those of O. rugatipennis.

Investigation Into Possible Intermolecular Interactions of Gd3N@C80(OH)n Using Fluorescence Spectroscopy, Kyle Campbell Purrman, East Carolina University, Greenville, NC.

The aim of this study was to investigate the intermolecular interactions of the endohedral metallofullerene complex, the probe molecule, with water and various metal cation solutions. These interactions were observed using fluorescence spectroscopy, a methodology that is very sensitive to environmental changes surrounding the probe molecule. Molecular interaction can include hydrogen-bonding and metal-ion charge transfer interactions. Changes in the intensity (I) of the fluorescence peak were monitored to characterize these possible interactions since variation in fluorescence intensity indicates the presence of intermolecular interactions. Certain types of interactions will enhance fluorescence while other modes of interactions will reduce fluorescence intensity. The probe molecule, Gd3N@C80(OH)n, was introduced into pure water to investigate possible hydrogen-bonding interactions, into a solution of Fe2+ (in the form of FeCl2) to investigate possible charge-transfer interactions and Cu2+ (in the form of CuSO4) to investigate changes in charge-transfer interactions between different types of ions (Fe2+ vs Cu2+). The results of this investigation are presented within this presentation.

Identification of Cholesterol Metabolites from Mycobacterium spp. Using HPLC, Jordan L. Stanley, Ashley N. Werbeksh, William E. Allen, East Carolina University, Greenville, NC.

Tuberculosis (TB) is caused by Mycobacterium tuberculosis (M. tb). This bacterium currently infects one-third of the world’s population. There is no cure for TB; treatment takes around six months to complete, and many patients will give up before finishing it. With the disease affecting such a large portion of the population, there is a growing demand for a faster-acting treatment. M. tb consumes cholesterol from its human hosts as a source of energy and carbon. We aim to exploit the organism’s need for cholesterol using a “Trojan horse” approach. Our research group has synthesized a drug-cholesterol conjugate that can be visualized in cells by fluorescence spectroscopy. The drug conjugate has been administered to M. smegmatis, a non-pathogenic analogue of M. tb. Preliminary results show that our drug conjugate has an effect on the growth and replication of M. smegmatis. Different forms of the drug conjugate seem to have slightly different effects. We have evidence that the bacteria are cleaving the fluorescent portion of the drug; under a black light the compound will glow green when it is not attached to cholesterol, and glows blue when it is attached. We are currently trying to identify the metabolites from the bacteria by high performance liquid chromatography and mass spectrometry.

GIS as a Conservation Tool: Measuring Distribution and Abundance of the Rare Herb, Thalictrum cooleyi, Clark I. Williams, A. Renee Fortner, and Claudia L. Jolls, East Carolina University, Greenville, NC.

Thalictrum cooleyi, commonly known as Cooley’s meadowrue, is a federally endangered dioecious plant, endemic to the coastal plain of the U.S. Most populations are found in North Carolina in fire-dependent wet pine savannas. This dioecious species has separate male and female plants, meaning the females must be pollinated by wind or insects in order for seed set to occur. Thus, reproductive success depends entirely on pollen availability to female plants. Given these limitations, we evaluated the proximity of flowering males to females to determine if a relationship existed between plant spacing and reproductive success. Geographic Information Science (GIS) was used to display spatial distribution of individuals at three study sites in Onslow and Pender Co., NC. ESRI’s ArcGIS 10.1 software was used in conjunction with aerial photographs to map the sites using geographic positioning system locations of plants. We created buffer zones in ArcGIS to display field-collected data of male plant and flowers relative abundances to the occurrence of females. Preliminary GIS analyses suggested that most females have no more than two male plants nearby, with distinctive differences in the average number of male flowers among sites, confirmed by statistical analyses. Such variation has implications for differences in pollen availability, genetic variation, and seed set among sites. GIS can help inform field studies and promote more effective land management decisions and conservation of rare taxa.
Impact of Disease Location on Wall Shear Stress in the Tibial Vessels Using Computational Fluid Dynamics, Alexandria Lauren Podolski, East Carolina University, Greenville, NC

Background: Diabetes is the leading cause of non-traumatic, lower extremity amputations in the United States [1], due to difficulty of unblocking narrow tibial vessels. Sometimes surgical procedures can be performed to reroute blood flow, however reduced blood flow can cause other complications. This study seeks to utilize computational fluid dynamics (CFD) to investigate the effect of blockage location in the tibial vasculature on downstream wall shear stress (WSS). Developing a better understanding of disease progression patterns could lead to better treatment plans. Methods: Four different idealized models of the lower tibial vessels, including the popliteal artery, tibioperoneal trunk, anterior and posterior tibial artery, and peroneal artery, were created in GAMBIT. One model simulated normal vessel geometry without a constriction, while the other three modeled a constriction decreasing the cross-sectional area by 75% at 8.5 mm, 45.75 mm, or 91.5 mm above the bifurcation of the popliteal artery. A CFD model representing unsteady flow utilizing a blunt inlet velocity (average systole flowrate of 2.55 mL/min) was developed for each model using FLUENT. One timestep during peak systole, and another during diastole were visualized and compared in Tecplot. The WSS magnitude was calculated and an average over the entire geometry found. Results: Results showed that WSS patterns are generally consistent between models and gradually decreases except on the outer walls of the bifurcation, where there is an increase. The most notable difference between models was during diastole, and was located in the peroneal artery. Because disease progression is more likely to occur in areas where wall shear stress is low or oscillatory, future research projects should focus on the peroneal artery when developing new treatment plans. Conclusions: Four models of the tibial vasculature were created, three with a blockage at a different location. The WSS in downstream vessels was affected by the location of the blockage with the lowest average WSS in the model with a constriction 8.5 mm above bifurcation. Future work includes development of CFD models from patient specific geometry and the introduction of stents into the models to further understand the downstream effect of peripheral artery disease and treatment.

Study in Fiber Morphology and Characteristics in Electrospinning Nano-Fibers, Richard Conlin Steiner; Arrington, Coriyon; Barefield, Layne; Sullivan, Stephanie; Muller-Borer, Barbara, East Carolina University, Greenville, NC

Introduction: A focus of the Cell Based Therapy and Tissue Engineering laboratory is to study the role of the microenvironment on stem cell survival, differentiation, and engraftment. This project used electrospinning methods to optimize construction of 3D nano fiber scaffolds (mats), and characterize the mats in a biological system to provide a simulated 3D tissue microenvironment for cell culture substrates. Methods: Using parameters established by Dr. Stephanie Sullivan, electrospinning techniques were used to create nano-fiber mats. A solution consisting of 8% PEO (Poly Ethyl Oxide), 12% BLG (Beta-Lacto Globulin), and .0025% Rhodamine was mixed and brought to room temperature (21°C). The mixed solution was placed in a syringe with a 20 gauge needle, positioned 12.5 cm from a collector plate. The solution was pumped at a rate of 0.01 mls per hour. A charge of 7.6 kV was applied to create the fiber structure on the collector plate. The solution was spun for 24 hours in a temperature and humidity controlled environment. Mats were crosslinked in a 100°C oven for either 72 hours (Sample1) or 96 hours (Sample 2). Fiber diameter was measured in “dry” mats and in mats placed in cell culture media for 48, 96, and 206 hours. In addition, rhodamine release and mat degradation was evaluated at 48, 96, and 206 hours using spectrophotometry measurements. Results: All dry mats showed stable fiber structure with an average fiber diameter size of 678.15 nm ± 7.00 nm (Sample 1) and 586.06 nm ±10.56 nm (Sample 2). The average fiber diameter for Sample 1 was 9.35% greater than Sample 2. When mats were placed in the cell culture media, fiber diameter was observed to decrease and fiber degradation was observed in Sample 1. For Sample 1, fiber diameter decreased on average to 588.51 nm ± 12.55 nm and Sample 2 mats decreased to 573.95 nm ±11.81 nm. Spectroscopy measurements showed elevated rhodamine release at 560 nm from the Sample 1 and Sample 2 at 206 hours in media. Conclusion: The results of this study suggest that cross-link time correlates with mat degradation, i.e. with increased crosslink time the electrospun nanofibers maintained their structure and composition for longer periods when placed in a wet environment. Future research will explore using the electrospun mats to evaluate stem cell viability and proliferation.
An Alternative Solution for the Energy Future of the Outer Banks, Charles Hegler. Department of Technology Systems. East Carolina University, East Carolina University, Greenville, NC

Renewable energy for the coast of North Carolina has gained an increase in interest, but not all residents of the outer banks community are for placing a wind turbine farm off the shores of their backyards. Many residents have had questions about the placement of a wind turbine farm and how they may become an eyesore for some. The wind turbines proposed by the Bureau of Ocean Energy Management can tower heights from 300 to 500 feet, which could be clearly visible from the shore of the Outer Banks. Even at night these wind turbines can be viewed by their flashing hazard lights that are required to warn pilots. Community leaders have their concerns about how these wind turbines could affect their vibrant tourist economy which their community thrives off of. They worry that the sight of the spires may deter tourist from selecting the Outer Banks as their vacation destination. The conflict between whether or not to green light the creation of the wind farm has been in discussion for over four years now. However there is an alternative that could subdue the concerns of community leader and residents of the Outer Banks area. The process of harvesting the energy form ocean waves has been constructed and has been placed in many areas around the world. Ocean wave energy (OWE) technologies can be installed in coastal and offshore areas. These wave power devices absorb energy directly from the surface motion of ocean waves. Conducting a comparison between the two processes of renewable energy would provide data of their effectiveness and flaws that they have acquired. Research through programs such as the spatial analysis of wave power potential in North Carolina provided by Duke University researchers Jeffrey Bower and Dr. Lincoln Pratson, a thesis provided by Brandon Paul Grant; a civil engineer graduate student through the program of North Carolina State University, and several other study groups would include what effects these devices will have on the marine environment in that area and whether they may change the coastal habitat. Other conducted research would include the impacts that these devices would have upon the waterway and air traffic of local and commercial activities. What type of device should be used for certain locations? Finally a cost analysis between the two will indicate which technology would be more feasible.

Assessment of Cooling Systems for Engine Testing, Christopher Phipps, Christopher Sparr, David Chen, Dr. Tarek Abdel-Salam, East Carolina University, Greenville, NC

The testing of automotive and marine engines requires adjustable cooling within an enclosed area. These systems are used to simulate many of cooling conditions that the engines may be subjected to in there intended applications. Generally these systems are designed to operate within a known level of engine specifications. As newer generations of more efficient and powerful engines are approaching the testing phase, these current systems can be overloaded by exceeding their intended capacities. We have evaluated one of these cooling systems to determine its ability to cool a more powerful line of engines. After an initial capability study it was found that the system in its current configuration would not be able to cool the purpose more powerful engine. After analysis of the thermal and flow capabilities of the system it was found that the system could be up-fitted without complete replacement. The systems heat exchanger and cooling supply water flow could be modified to allow sufficient overall cooling. The systems for temperature control of the engine cooling circuit where determined to be adequate for the more powerful engines. The methods used to assess system capacity for this case may be valuable to assess cooling system performance of many other fluid based cooling systems.
UP73

Magnetic Resonance Imaging of the Pulmonary Artery in Pulmonary Hypertension, Megha Sinha, Dr. Stephanie George, East Carolina University, Greenville, NC

Pulmonary hypertension (PH) is an increase in mean pulmonary arterial pressure (mPAP) at rest leading to right ventricular failure. PH is currently diagnosed by performing a right heart catheterization (RHC), which is an invasive and high-risk procedure, to directly measure the pulmonary artery pressure. The objective of this study is to investigate the use of magnetic resonance imaging (MRI) parameters of the pulmonary artery (PA) as surrogates from RHC diagnosis of PH. The long term clinical goal is the development of a non-invasive diagnosis and monitoring protocol for pulmonary hypertension.

UP74

The Current State of the Sonic Plaza, Rakan Abobakr, Cameron Justice, Fawaz Aljuwaie, Carlos Ramirez, Steven Bass, Abwaleed Alyahya, East Carolina University, Greenville, NC

This research will include the current state of the Sonic Plaza comprised of the Sonic Gates, Percussion Water Wall, Media Glockenspiel located in the Clock Tower, and the Ground Cloud. The Sonic Plaza was established in 1999 and is one of 62 pieces in the North Carolina Artworks in Public Buildings Collection owned by the people of North Carolina and administered by the North Carolina Department of Cultural Resources. The Sonic Gates enhances the existing columns through auditory sounds when people cross the sonic sensors located on the bottom of each column. The auditory sounds are controlled with a Arduino microchip connected to a Mac computer. The Percussion Water Wall is controlled using solenoids that open and close allowing water to shoot out in a rhythm that is also controlled with a Arduino microchip. Media Glockenspiel located in the 85 foot Clock Tower includes a circular ring of 24” video monitors that are controlled with a video router and displays video animations created by art students over the course of an evening. Iconic sculptures emerge from the Glockenspiel doors four times a day. At dawn the rooster appears, along with a sound of crowing. At noon the horns sculpture appears, and at sunset a abstraction of a cannon with smoke and sound of cannon fire. At midnight a Joker appears with a surprise sound. The Ground Cloud in the middle of the plaza is a circular water mist cloud that dances according to the whim of the wind. The cloud is lighted from sunset to sunrise by a light that shines through the grate.

UP75

Utilizing Lean Manufacturing Principles to Optimize the Customer Returned Hardware Process at AAR Cargo Systems, Joseph Blake Crowder, East Carolina University, Greenville, NC

The Customer Returned Hardware Process at AAR Cargo Systems in Goldsboro, NC has struggled to meet the expected goals of flexible, quick turnarounds for their customer returned hardware. The process requires members from several different functional groups within the organization to communicate quickly and clearly in order to perform the necessary tasks within the customers’ requirements in a timely manner. The goal of this project is to analyze the Customer Return Process into a future state value stream map that has eliminated the non-value added activities. This will be achieved by defining crucial points of data collection to determine the inefficiencies of the current process and implement corrective action to optimize the future state. The use of automated processes will help information travel more efficiently to the stakeholders impacted by the customer return process, so appropriate action may be taken by each department. The automated data collection process will be able to analyze the information on hand to determine what information is needed, provide a status for each return, and assign an anticipated reshipment date. All of these things working together should successfully eliminate any delays in the data collection and disposition process as well as clarifying communication between the different functional groups.

UP76

Re-Designing the Common Belt Buckle Using 3-D Printing, Elza Green, East Carolina University, Greenville, NC

The belt buckle is a common clothing accessory utilized by millions of people across the world every day. Current belt buckle designs are rigid as there are a set number belt holes which are spaced one inch apart to fit different sized waists. This typically leads to the utilization of a single hole which over time distorts rendering it unusable. The proposed design will eliminate the existing short coming by incorporating a new innovative design to lock the belt in place at any position or size one would like while preserving the aesthetics and functionality of the original belt. We plan to achieve this by creating a buckle by feeding the belt through a slot. The slot is accompanied by a cylindrical gear to align the belt with a spring-loaded locking pin. The locking pin in turn holds the gear in place once a desired fit is achieved. We will create a digital 3-D model of the proposed design which in turn will be 3-D printed to encapsulate the functionality using a Z Printer 650 currently housed in The Department of Technology Systems at East Carolina University. Part drawings, animations, 3-D representations and models of the buckle will be included in the presentation.
Innovative All-In-One Safety Glasses-Product Design and 3D Printing, Brandon Scott Jenkins, East Carolina University, Greenville, NC

Safety equipment is vital for the health and well-being of employees for different industries. Eye and hearing protection are two of the most important aspects of safety in any industry. Thousands of eye and hearing accidents are reported on a yearly basis. Many of these accidents can be eliminated with the use of proper protective equipment (PPE). Loss of the equipment may be the main reason that the products are not being used. Having to carry and store safety glasses, hearing protection, flashlights and Bluetooth devices is cumbersome. Misplaced equipment reduces the safety and productivity of companies because the employee has to stop and get more equipment or risk and perform without the proper safety equipment. Our product will address all the above mentioned shortcomings and revolutionize the industry by providing the first all-in-one pair of compact safety glasses. These glasses will provide the user with eye and hearing protection while offering various other functions through different accessories. These accessories will include but not limited to LED flashlights and radio communication (blue tooth enabled) which will be powered by a self-contained power source. All of this equipment can be stored in a compact carrying case that will be no larger than half the size of a normal eyeglass case. This innovation will help minimize accidents or near-miss accidents in the industry by providing majority of PPE packed into the proposed all-in-one device.

Blooming Technology for an Efficient Future, Christopher Lawson, Bradford Carter, Department of Technology Systems, East Carolina University, Greenville, NC

The Bloom Energy Company claims to have created a power supply system that uses solid oxide fuel cell technology to generate power in a more efficient way than past methods of generating electricity. The power system, also referred to as a “Bloom Box”, is a new class of distributed power generator that produces clean, reliable, and affordable electricity at the customer’s site, rather than transferring it from an outside location. Three benefits of this system are the low cost of materials used in the design, the high electrical efficiency, as well as the fuel flexible options available to power the system (Woody, 2010). Through the process of a literature review, research was conducted to further investigate the Bloom box to gain a better understanding of the technology and how it operates. The research focused on what causes this to be a “more efficient” option, the average cost of installing and operating one of these systems, and the efficiency of this technology versus traditional methods of generating power. To create a clear understanding of this new technology and put it in a local perspective, further research was done to compile the statistics on the amount of energy consumed on East Carolina University’s campus. With this information, the potential energy and cost savings that this type of technology may possibly have verses current power supply methods were calculated. The presence of savings from the Bloom Technology compared to traditional methods of power supply will allow for a conclusion to be drawn on whether or not this type of power has the potential to benefit ECU. If the Bloom System proves to be as efficient as claimed, then future research could be conducted to investigate the benefits of converting the entire East Carolina campus to this method of power supply.

Rehabilitation of Instron Testing Machine, Jacques Lorenzo Ray, Haroon Siddiqi, East Carolina University, Greenville, NC

East Carolina University’s Department of Technology accepted a donation of an Instron testing machine from ABB Inc. The donation is apart of a partnership that between the university and the company that gives students the opportunity to be involved in the rehabilitation of outdated equipment. The rehabilitation process uses skills obtained from the Engineering technology curriculum. The machine that is being rehabilitated is the Instron TTD Testing Machine. This machine is capable of testing the tensile, compressive strength of various products. The size of the machine allows for larger sized products to be tested. The Instron machine itself is not fully operational. The machine powers on and can apply compression and tensile stress to a chosen product. Upon completion of the rehabilitation the Instron machine will be able to display the numerical data from the test and allow for other material testing procedures to be performed. There are sections on the Instron machine interaction panel that suggest that there were options that could be added on to the machine for greater versatility. The research group will identify these options and decide whether these options will benefit in the education of future student. As a requirement from the lab supervisor the research group will construct an operator manual for the Instron machine.

NCLR Information System, Miranda Danielle Rogers, East Carolina University, Greenville, NC

The North Carolina Literary Review, published by ECU and the North Carolina Literary & Historical Association, desperately needed a database that was user-friendly, tailored to their specific needs, and could store all of the information that they have collected over the years from their contributors and subscribers. I am building an information system that will fulfill their needs by streamlining their processes and optimizing their work experience. The system I am building will store all of their data in one convenient database. Currently, they have 26 Excel files and each of these files contains multiple sheets of data. Rather than searching through every file and sheet for the data they need to locate, they will be able to request a specific search for data in the new system and will receive it instantly. Because the system’s design will be tailored to their needs, they will be able to locate data according to specific attributes such as subscriber status, amount of copies the contact receives, and expiring
subscriptions. Additionally, the system will provide customized email distribution. With the click of a button, they will be able to send emails to all poets to announce a competition, all in eastern NC to announce an event, those who have expiring subscriptions, or current subscribers and contributors to announce the new issue. This distribution will replace their current process of searching through each excel file to copy relevant addresses. By building this system, I have enhanced my programming skills and increased my knowledge about systems analysis and database management software, which has allowed me to expand upon the skills I have learned as a management information systems student. I hope to share this new knowledge by demonstrating the features of the system that I have created.

One main priority of tool design is to maximize the tools usefulness and utility in order to increase the workers efficiency. Creating a wrench with interchangeable attachments can aid a worker's productivity by decreasing the amount of down time needed to change tools. This new wrench design will also have outer guards to help protect the users hands and to help provide more gripping area if needed. Almost any type or size of wrench can be made using this system, making this truly a universal tool that incorporates several new safety features. We will provide design plans, solid models, animations, and rapid prototype models for the proposed design/product. 3D printing a physical model of the product will provide perceptive and tactile feedback that will directly influence and help us improve our design with respect to ergonomics and functionality.

Design and 3D Printing of an Innovative Interchangeable Wrench Set with Integrated Shield, Bryan J Tucker, East Carolina University, Greenville, NC

Previous studies demonstrated that ecdysone, an insect steroid hormone similar to human sex steroids, directly controls GSC activity, and ecdysone signaling is mediated by the ecdysone target E74. In cultured embryonic insect cells, the E74 locus is bound by both the Ecdysone Receptor and a chromatin-binding factor, Trl (also known as GAGA Factor or GAF). My results demonstrate that Trl is expressed in GSCs and their daughters, as well as the somatic cells which surround them. It is unclear, however, if Trl controls GSC activity. My current research investigates whether Trl is a positive regulator of GSC proliferation and maintenance. To assess whether Trl is required for GSC activity, I have utilized a Flippase/FRT-mediated recombination technique to create Trl mutant GSCs. I am currently analyzing two different Trl alleles: a hypomorph (Trl13C), which has reduced levels of Trl, and a null (TrlR85). This allows me to compare the phenotypic effects caused by the different mutations for the same gene. Trl mutant GSCs are recognized by the absence of a Green Fluorescent Protein (GFP) marker, in comparison to a wildtype control. To measure GSC activity, I am quantifying the rate of GSC proliferation and the frequency of GSC loss (a measure of GSC self-renewal). Proliferation rates are calculated as the percentage of Trl mutant GSCs labeled with EdU or phospho-histone H3, markers for DNA synthesis and mitosis, respectively. Maintenance is measured as a percentage of mosaic germaria harboring mutant GSC daughter cells, but no mutant GSCs. My initial results suggest that GSCs with reduced levels of Trl (using the hypomorphic Trl13C allele) are able to self-renew normally. Further research will be carried out on both the hypomorphic and null alleles to assess if Trl plays a role in the regulation of GSC activity in aged flies.

Investigating the role of Trl in germline stem cells of the Drosophila ovary, Kaitlyn Lindsay Allen; Elizabeth T. Ables, East Carolina University, Greenville, NC

Human cancers result from the unconstrained growth of malignant cells. In order to understand and ultimately treat cancers, it is beneficial to examine normal cells that share similar properties of limitless division and self-renewal. Stem cells provide a great tool to aid our understanding of the molecular mechanisms used by cancer cells, as they have comparable proliferation and maintenance processes. My research aims to understand how steroid hormones, which are frequently mis-regulated in cancers, control stem cell activity, using a model system that permits single-cell analysis within the context of the entire organism. The central goal of my laboratory is to examine female germline stem cell (GSC) activity in the Drosophila melanogaster ovary to understand the molecular mechanisms by which steroid hormones control stem cells.
Investigation of Mcm10 Heterochromatic function in C-Terminal Domain, Sidney Ethan Bedsole, Michael Reubens, Dr. Tim Christensen, East Carolina University, Greenville, NC

Mcm10 is a gene demonstrated to be involved in the initiation of DNA replication and heterochromatin formation, and has recently been cited as one of the top ten genes found to be altered in many cancerous states. Though recent research has associated aberrant Mcm10 expression with many types of cancer, the exact function of Mcm10 in replication and chromatin dynamics has remained elusive. As our understanding of the importance of epigenetic control of the genome grows, we have gained insight into the importance of chromatin structure on genome stability and proper gene expression; therefore, a thorough understanding of Mcm10’s function in the formation of chromatin states could further our understanding of the mechanisms underlying oncogenesis. This project focuses specifically the regions of Mcm10’s C-terminal domain that affect the heterochromatic function of the protein as a whole. To assess the regions of Mcm10’s C-terminal domain that play a role in chromatin dynamics, we have evaluated the impact of 20 different point mutations on the formation of heterochromatin using a position effect variegation (PEV) assay. By utilizing a white-mottled-4 reporter line we were able to assess the formation of heterochromatin using a simple spectrophotometric test. Through these investigations we have discovered regions of Drosophila Mcm10’s C-terminal domain that significantly impact the formation of heterochromatin. These results provide some insight into the possible correlation of cancerous states with altered Mcm10 expression, as improper chromatin establishment can have serious impacts on genome stability. These results combined with other data generated in our lab are adding to a growing body of data that will be used to assess the essential functions of Mcm10 in eukaryotes.

Synthetic Ion Channels with Relevance to Cystic Fibrosis, Radwa Behairy1, David Farrell2, William Allen*, East Carolina University, Greenville, NC

Cystic fibrosis (CF) is the most common fatal inherited disease in the United States, caused by a mutation in the CFTR gene. The average life span of a person with the disease is less than 40 years. Some of the symptoms of CF are the accumulation of thick mucus in the lungs, shortness of breath, and chest infections. These arise from the inability of small ions, such as chloride and bicarbonate, to cross cell membranes. The central idea of this project is to construct peptides, or small protein fragments, that are capable of recognizing and transporting anions across lipid bilayers. Work on this project began last semester and the first 29-residue peptide has been successfully synthesized and purified. Previously, CD spectroscopy has shown that its sequence has alpha-helical secondary structure. Bundles of the helices have demonstrated the ability to form channels in membranes. Current work is focused on incorporating ion-sensitive fluorescent side-chains into the 29-mer, and constituting it into liposomal model bilayers. We are also interested in treating live cells with the peptides, to determine if the new amino acids make them undesirably toxic.

The role of Mcm 10’s C-terminal domain in S-phase progression of Drosophila embryogenesis, Megan Billey, Michael Reubens, Tim W. Christensen, Department of Biology, East Carolina University, Greenville, NC

Mcm10 is a conserved DNA replication protein that is abundantly present in eukaryotic cells, and known to interact with members of both the pre-replication and elongation machineries. Mcm10 is composed of both conserved N-terminal and internal domains which are thought to be essential for protein interactions required for replication; however, higher eukaryotes, such as Drosophila, contain a conserved expanded C-terminal domain which suggests Mcm10 may potentially be involved in other cellular processes that have yet to be explored. Recent studies have suggested that aberrant expression of Mcm10 is highly correlated with many cancerous states, thus a better understanding of this protein may provide insight into the mechanisms of oncogenesis. Previous research conducted in our lab suggest that the C-terminal domain of Drosophila Mcm10 is required for interactions with proteins involved in the formation of heterochromatin and proper cell cycle progression; therefore, we are continuing to investigate the role of the conserved C-terminal domain in cell cycle progression and chromatin dynamics using a collection of four mutants which progressively truncate the conserved C-terminal domain. To investigate the role of Mcm10’s C-terminal domain in S-phase progression specifically we are observing the effects of our truncation panel on the early syncytial embryonic cellular divisions. Drosophila embryogenesis is extremely rapid, completing 13 nuclear divisions in three to four hours. These rapid nuclear divisions consist of S-phase and an incomplete M-phase without intervening gap phases; therefore, making the Drosophila early embryo a great model system to observe defects in S-phase progression. Observation of syncytial embryos in our truncation mutant panel strongly suggests that the last 388aa of the C-terminal domain of Mcm10 is not only required for proper S-phase progression, but also for maintaining nuclear integrity during these rapid syncytial divisions.

Role of Mitochondria in Skeletal Muscle Fatigue caused by Cancer Chemotherapy, Canden N. Byrd, Scott A. Hadding, John D. Wilson, Laura A. Gilliam, Patrick M. Rider, Biomechanics Laboratory, Department of Kinesiology, Department of Physiology, East Carolina University, Greenville, NC

Introduction: Muscle weakness and fatigue are major side effects of cancer and its treatments. Doxorubicin, an effective anticancer drug, contributes significantly to this muscle fatigue by elevating reactive oxygen species and increasing oxidation in striated muscle. Previous studies have shown an increase in oxidative stress in noncancerous tissues leads to mitochondrial separation and autophagy, causing modification of myofilament proteins and leading to contractile dysfunction. The association between changes in mitochondria and skeletal muscle fatigue as a result of cancer treatment is not entirely understood. The purpose of this study is to
examine the role of mitochondria in skeletal muscle fatigue caused by cancer chemotherapy. We believe cancer and chemotherapy compromises mitochondrial respiratory control and increases reactive oxygen species production resulting in a decline in the patient’s functional ability and an increase in quadriceps muscle fatigue. Methods: Eight healthy controls (28-51 yrs) performed stair ascent and descent and 6-minute walk tests to assess functional ability and completed a fatigue protocol using an isokinetic dynamometer. We plan to recruit ten newly diagnosed breast cancer patients for this study. The fatigue protocol included 24 isometric knee extensor contractions that were 5 seconds in length with 5 second breaks in between each contraction. Each contraction was a maximal effort and completed with the right leg. A fatigue index was calculated for each participant as a ratio of the torque produced during the first 5 contractions and the final 5 contractions. Results and Conclusion: The control data displayed an average knee extensor torque of 111.1 ± 3.2Nm at the beginning of the fatigue protocol and an average knee extensor torque of 90 ± 1.3Nm at the end, resulting in a fatigue index of 0.80 ± 0.08 and an approximate 19% decrease in knee extensor muscle torque throughout the fatigue protocol. The average distance traveled in the 6-minute walk test was 680.3 ± 120.5m. Stair ascent time averaged 4.7 ± 0.7s and stair descent time averaged 4.1 ± 0.6s. Our results were similar to results from other published studies with similar healthy participants. Muscular fatigue is a major issue that cancer patients face. The results from this study could explain the underlying mechanism contributing to fatigue in cancer patients and spark new research to investigate how to reduce fatigue associated with breast cancer treatment.

UP88

The Effects of a High Fat and High Sucrose Diet on the Development of Oxidative Stress Markers in Peripheral Sensory Neurons, Alyssa DaVolio, Jillian Dawkins, Shelley Burgess, Justin La Favor, Christopher J. Wingard PhD, Sonja K. Bareiss PhD, PT, East Carolina University, Greenville, NC

Diabetic neuropathy is a significant secondary complication of diabetes resulting in pain, tingling, or loss of sensation due to nerve damage. A Western style diet containing high fat and sucrose (HFHS) content induces hyperglycemia, a diabetic hallmark, which may lead to oxidative stress and result in peripheral neuronal damage. We hypothesized a Western diet induced oxidative stress in peripheral sensory neurons plays an important role in developing diabetic neuropathy and that exercise can help reverse or attenuate the effects brought on by a Western diet. Rat Dorsal Root Ganglia (DRG) from L4-5, were collected from four groups: 4 weeks HFHS, 8 weeks HFHS, 12 weeks HFHS, 12 weeks HFHS + Exercise (consisting of exercise 4 days/week). DRG were sectioned and stained for two markers of oxidative stress, 4-hydroxynonenal (HNE) and malondialdehyde (MDA). Additionally, sections were stained for a nociceptor marker IB4. Images were captured at 20x and 40x magnification for analysis of cell size distribution and quantitation of fluorescence intensities of the markers. These can then be used to relate the extent to which diet its duration and how exercise may influence sensory nerves and their susceptibility to oxidative stress.
N-Glycans Effect on E-Cadherin, Sahil Dayal, M Kristen Hall, Ruth A Schwalbe, Department of Biochemistry and Molecular Biology, Brody School of Medicine, East Carolina University, Greenville, NC

E-Cadherin is an N-glycosylated transmembrane protein, and functions as a cell-cell adhesion protein in epithelial cells. Previous studies in our lab have shown that the localization of E-Cadherin to the cell-cell border is regulated by the type of N-glycans attached to the protein. As the concentration of E-Cadherin at the cell surface impact targeting and retention of E-Cadherin at the cell-cell border, we treated E-cadherin transfected Chinese hamster ovarian (CHO) cells with PNGase F, an enzyme that removes complex, hybrid and oligomannose N-glycans from the cell surface. Cells were either treated with PNGase F prior to the establishment of cell-cell contacts or after establishment of cell-cell contacts. In both cases, treated cells were tested in parallel with non-treated cells utilizing TIRF microscopy and cell dissociation assays. Our data indicates a statistical difference between the two populations; it was found that the treated cells with less of the E-cadherin protein at the cell-cell interface also had decreased strength of cell-cell interactions. We conclude that localization of N-glycans at the cell surface have a considerable role in altering the cellular function of E-cadherin, and thus dysfunction of E-cadherin by abnormal N-glycosylation processing may lead to epithelial tumor formation and progression.

Evaluating the role of Mcm10’s C-terminal domain in the Drosophila endoreplication cycle, Lucas Thade Hopkins, East Carolina University, Greenville, NC

Mcm10 is a protein that has been demonstrated to play a role in DNA replication and the formation of heterochromatin in Drosophila. Recent studies have listed Mcm10 as one of the top ten genes found to be altered in many types of cancer. These recent studies have suggested that a better understanding of the essential functions of Mcm10 could provide powerful insight into future cancer diagnostics and/or treatments. Previous analyses in our lab have suggested that the C-terminal domain of Drosophila Mcm10 may be required for proper cell cycle progression and formation of heterochromatin. This study is specifically aimed at understanding the requirement of the C-terminal domain of Mcm10 for proper S-phase progression and chromatin packaging. To accomplish this we have made use of the specialized endoreplication cycle of the third instar Drosophila larvae, in conjunction with a collection of mutants that progressively truncate the C-terminal domain of Mcm10. This specific type of cell cycle consists of successive rounds of DNA synthesis without intervening mitosis phases, thus producing polytene chromosomes with condensation levels similar to that of interphase chromosomes. By evaluating the endoreplication process using a combined spectrophotometric and imaging approach, we will be able to discover the regions of the C-terminal domain that are required for proper S-phase progression and the establishment of chromatin states. It is our hope that this research will further our understanding of this conserved protein, and potentially prove useful for understanding the nature of Mcm10 in chromatin formation, DNA replication, and possibly oncogenesis.

Screening for Novel Antibiotic Compounds in Soil Samples Winnie Wai-Yin Hui, Lauren E. Anderson, Nicholas W. Faulkner and Eric S. Anderson, East Carolina University, Greenville, NC

Antibiotics are a significant defense mechanism against disease-causing microbes. In today’s biological community, many microbes exhibit antibiotic resistance or are prone to acquiring resistance. Part of the reason attributed to increased resistance is physician over prescription and patient noncompliance. Around 2 million people are infected with antibiotic resistant bacteria annually, and of those, approximately 23,000 individuals die as a result of these infections. With the morbidity and mortality rates on the rise and limited number of emerging antibiotics, it is imperative to identify new antibiotics for treatment. The development of antibiotics is strongly associated with the study of soil microbes. Many of the current and emerging antibiotics are developed from the study of soil microbes. In one gram of soil, there are approximately 10,000 species of bacteria. Due to the high numbers of soil bacteria present in the soil and limited resources, bacteria must compete for a particular niche and to survive. One way they do this is by producing antibiotic compounds. In an effort to identify new antibiotic compounds, a soil sample was collected and screened for antibiotic production. Upon screening, it was noted that when two of the cultured bacteria were combined, the presence of one organism enhanced the antibiotic activity of the other. Presently, studies are underway to identify the antibiotic compound produced by the one organism and the enhancing compound produced by the other. Additionally, we will evaluate the effect of the enhancing compound on the antimicrobial activity of other commercially available antibiotics.

Do markers of Alzheimer’s disease arise from a susceptible genetic makeup and early life exposure to an environmental agent?, Dakota Colton Johnson, Jamie DeWitt, Anna VonderEmbse, East Carolina University, Greenville, NC

The origins of neurodegenerative diseases such as Alzheimer’s disease (AD) may arise early in development, long before the brain has matured. AD is not a single-origin disease; it likely arises from a combination of genetic and environmental risk factors that occur in the “right” mix and at the “right” times to produce a phenotype that is indicative of AD. One cell that is associated with amyloid-beta plaques in the AD brain
is the microglia. Our laboratory is evaluating microglia, resident macrophages in the central nervous system, by exposing a vulnerable genetic model, the 3x-Tg-AD mouse, to an environmental contaminant (lead) during a critical window of susceptibility for microglia. We have administered lead (as lead acetate) in 100-ppm doses to offspring from postnatal day five (PNDS50, PNDS90, and PNDS180). The brains of one offspring of each sex per litter were evaluated for changes in microglia and amyloid-beta using several methods, including flow cytometry, enzyme-linked immunosorbent assay, and microscopy. We hypothesize that exposure of 3x-Tg-AD mice to lead during this period of postnatal susceptibility for microglia will alter levels of amyloid-beta to a greater extent or earlier in life than unexposed mice. Additionally, microglia in association with amyloid-beta plaques will differ in number and/or phenotype in the exposed mice relative to the unexposed mice. The nature of this project is extremely innovative, as the relationship between genetic and environmental risk factors in AD is not well studied. This study is the first to explore impacts of both environmental agents and critical windows of developmental susceptibility. AD is not a single-origin disease so this double-hit model more closely mimics realistic exposures than does a single-hit model.

UP94
Role of Integrin Linked Kinase in Liver Fibrosis Resolution,
Emily C Lafella, East Carolina University, Greenville, NC

Introduction: Chronic liver damage is a risk factor for the development of hepatic fibrosis, cirrhosis, and liver failure. Macrophage accumulation is associated with this transition to liver scarring through production of pro-fibrotic mediators (e.g., transforming growth factor beta) as well as the process of scar resolution through synthesis of matrix remodeling enzymes including matrix metalloproteases (MMPs). One regulator of macrophage function is the extracellular matrix (ECM), the network of proteins which provide the structure for normal liver cell architecture. Macrophages interact with the ECM through surface integrins linked to integrin linked kinase (ILK) which can positively or negatively regulate their function. The importance of the ECM, and more specifically, ILK in macrophage function in the fibrotic liver has not been investigated. Hypothesis: ILK activation in macrophages shifts their phenotype toward a more pro-fibrotic and less pro-resolution phenotype thereby enhancing hepatic fibrogenesis and limiting recovery. Methods: Liver fibrosis was induced by administration of carbon tetrachloride (CCL4; 1ml/kg) by gavage twice weekly for 4 weeks. Mice, either wild type (wt) or macrophage specific - ILK deficient, were sacrificed 3, 5, or 7 days following the final dose and composition of tissue fibrosis, macrophage accumulation, and MMP expression analyzed. Results: CCL4 induces significant fibrosis after 4 weeks of treatment in wt mice in conjunction with substantial macrophage recruitment. Loss of ILK in macrophages does not affect the initial progression of scar formation as assessed by collagen deposition within the liver, nor does it alter macrophage recruitment to the liver. Cessation of CCL4 treatment allows for resolution of tissue scarring by 7 days following the final dose in wild type mice. Absence of ILK in macrophages leads to accelerated resolution occurring at 5 days post CCL4 cessation which is correlated with increased MMP expression and phenotypic changes in hepatic macrophage populations. Discussion: ILK in macrophages inhibits matrix remodeling responses in these cells and prolongs the process of scar resolution without significantly affecting initial fibrosis induction or macrophage accumulation. Targeting ILK in macrophages may provide a new therapeutic option to enhance recovery from chronic liver injury.

UP93
N-Glycan Structures Contain Information for the Spatial Arrangement of E-cadherin in the Plasma Membrane, Sidhant Juneja, M. Kristen Hall, and Ruth A Schwalbe, Department of Biochemistry and Molecular Biology, Brody School of Medicine, East Carolina University, Greenville, NC

E-cadherin is an integral membrane protein of epithelial cells and undergoes N-glycosylation processing. It is a major component of adherens junctions which are involved in cell-cell interaction. The formation of adherens junctions is dependent on their interaction and adherence to the extracellular matrix. Our previous research demonstrated that distinct N-glycan structures of E-cadherin influence the amount E-cadherin in the cell-cell border. Higher amounts of E-cadherin in the cell-cell border is attributed to a stronger interaction between the cells. To gain insight of how to control cell-cell interactions would prove beneficial for improved treatment options for a variety of epithelial-derived cancers. We hypothesize that the N-glycans of the E-cadherin glycoprotein alter the level of the protein in the cell-cell border irrespective of the adherent matrix. To address our hypothesis, parental and N-glycosylation mutant Chinese hamster ovarian (CHO) cells transfected with E-cadherin were adhered and allowed to grow on cell culture dishes coated with polylysine, collagen, fibronectin, and laminin, independently. Total internal reflection fluorescence and differential interference contrast microscopy measurements were then employed to determine the amount of E-cadherin in the cell-cell border under the different conditions. Our results showed that N-glycans of E-cadherin change the level of the protein in the cell-cell border independent of the adherent matrix. However, the adherent matrix also contributed to the amount of E-cadherin at the cell-cell border. We conclude that N-glycans of E-cadherin have a vital role in modulating cellular properties of E-cadherin. Therefore, aberrant N-glycosylation processing of E-cadherin, along with extracellular matrix composition, likely impacts epithelial tumor formation and progression.
An Information-Theoretic Approach to Cellular Decision-Making Strategies, Joshua B Mangum, East Carolina University, Greenville, NC

Rate distortion theory, a branch of information theory, was originally developed to help improve the efficiency of data transmission in telecommunications. It’s currently being used as a major modeling method to provide a quantitative description of analyzing biological signaling pathways. Rate distortion theory provides a way to compute probability functions that describe how cells should respond given various stimuli or environmental changes, independent of the mechanism responsible for these decisions. In this thesis, mathematical models describing binary cell decisions will be studied and analyzed within the framework of rate distortion theory. In this project we discuss the history, terminology, mathematical structure, and major aspects of rate distortion theory. These aspects of the theory will then provide the foundation for how it can be applied in a biological context. The principle elements of these models depict cellular decision-making strategies as conditional probabilities, where environmental stimuli such as temperature fluctuations or concentration gradients are considered to be the input. The decisions made in response to these changing stimuli are the output of the algorithm. A rate distortion function defines the average amount of “incorrect” decisions given a stimulus, and a rate distortion curve quantifies stochastically, the fate of the given cell, given the stimulation. A Blahut Arimoto algorithm is used to compute the rate distortion curve that provides the optimal decision-making pathways. According to Perkins and Swain, (Perkins and Swain, 2009) cellular decision-making has the following main features: a cell must (1) estimate the state of its environment by sensing stimuli; (2) make a decision informed by the consequences of the alternatives; and (3) perform these functions in a way that maximizes the fitness of the population. The consistency of these axioms and the effort to investigate, explain, and interpret observable characteristics of cellular functions such as hysteresis, irreversibility, and random strategies will be discussed. This theory provides a method for explaining why cells partake in self-destructive behavior such as apoptosis in order to benefit the population of the cells. Further considerations providing additional applications of rate distortion theory in a biological context will be given.

Exploring Alternative Regression Models on Pediatric Peripheral Intravenous Catheter Data, Jennifer Mann (1), Jason Brinkley, PhD (2), Pamela Larsen, DrPH, DNSc, FNP (3), (1) Department of Mathematics, East Carolina University, (2) Assistant Professor, Department of Biostatistics, College of Allied Health, East Carolina University, (3) Clinical Faculty, Department of Pediatrics, Brody School of Medicine at East Carolina University, Greenville, NC

A large study conducted at two southeastern US hospitals from October 2007 through October 2008 sought to identify predictive variables for successful intravenous catheter (IV) insertion, a procedure that is potentially difficult and time consuming. The data was collected on a sample of 592 children that received a total of 1195 attempts to start peripheral IV catheters in the inpatient setting. The median age of children was 2.25 years, with an age range of 2 days to 18 years. This data was previously studied using a logistic regression model. Initial results indicated that nurse experience, day versus night shift, and child dehydration status all significantly contributed to the odds of a higher than usual number of IV attempts. However, the published regression models did not fully utilize all aspects of the data and it is possible that other effects could be discerned with a second pass at exploring the data. In particular it is suspected that the underlying data appears to have a negative binomial structure. The goal of this study is to determine the appropriateness of and use negative binomial regression to take a second look at the data, and to compare the results with previous work.

The Effects of the FTZ-F1 Nuclear Hormone on Cell Proliferation and Self-Renewal in Drosophila Stem Cells, Kendra LeAnn Meares, Elizabeth T. Ables, Department of Biology, East Carolina University, Greenville, NC

The nuclear hormone FTZ-F1 is hypothesized to act as a competence factor in the development of stem cells in Drosophila. The purpose of this research is to determine the role of FTZ-F1 in Drosophila and how this hormone impacts stem cell function. Germ line stem cells in the Drosophila ovary will be used as a model to determine the significance of FTZ-F1. Accurate nuclear hormone signals in stem cells allow for successful cell proliferation and self-renewal. I hypothesize that FTZ-F1 is a hormone required for correct cell proliferation and self-renewal. To test this hypothesis I will first use microscopy to determine where FTZ-F1 is being expressed. Being able to determine where large quantities of FTZ-F1 localize gives a major clue as to its role. Second, I will use RNA I to interfere with protein coding. This technique will be used to deplete FTZ-F1. Since a depletion in FTZ-F1 will decrease the production of adult Drosophila, Flip FRT mediated recombination will be used to generate adult flies that are homozygous for the mutant FTZ-F1 gene. This portion of the research will reinforce the significance of the FTZ-F1 hormone receptor found in part one. Results of this research will help to answer the question of how hormones aid in cell specific responses.
7,8-dihydrodiol-9,10-epoxide (BPDE), adducts DNA oligomers have been electrochemically detected. Determination of the number of adducts formed on the DNA oligomer from exposure to the xenobiotic is necessary for further insight into the damage reaction. Analysis of the damaged DNA samples by Electrospray Ionization Mass Spectrometry (ESI-MS) allows for observation of structural features by separation of the ions present by mass. Using tandem mass spectrometry to obtain data, MS/MS spectra are interpreted for the damaged DNA and used to determine the location of the damage by observing a corresponding change in mass due to the reaction of DNA with the xenobiotic. Tandem mass spectrometry allows for the isolation of certain peaks in the spectrum to further separate and compare to similar spectra of undamaged DNA. Further collection of spectra is necessary before preliminary findings can be reported.

**UP99**

**ABSTRACT WITHDRAWN FOR IP PROTECTION**

**UP100**

**Vaccinia Virus A35R Virulence Gene and Leukocyte Migration**, Shayna N. Mooney, Gwendolyn B. Jones, Rachel L. Roper, East Carolina University, Greenville, NC

Smallpox killed an estimated 500 million people in the twentieth century alone. Although this fatal infectious disease was eradicated from the world over thirty years ago, it remains an important concern as a bioterrorism agent. Vaccinia virus, the live virus vaccine for smallpox, is extremely dangerous for immunocompromised individuals. Since this cohort comprises a significant portion of the world’s population, a safer vaccine is needed. The vaccinia virus A35R gene is highly conserved, and our lab has shown that it increases virulence by inhibiting the body’s anti-viral immune responses. When A35R is removed from the virus to create an A35R deletion mutant, the virus becomes attenuated, and immune responses are improved. This study compares the responses of lung leukocyte populations between WR wild type virus infected mice and A35R deletion mutant infected mice to understand the mechanism of A35R immunosuppression. Mice were infected with vaccinia virus (WR and A35RDel), lungs were harvested three days later, and cell populations were quantified using flow cytometric analysis. The data suggest that vaccinia virus infections alter lung leukocyte populations and that A35R may decrease the percentage of several leukocyte populations in the lung.
UP101
Transcriptional inhibition of the GATA transcription factors by the HTLV-1 encoded protein HBZ, Stephanie T Nguyen, Kimson Hoang, Isabelle Lemasson, East Carolina University, Greenville, NC

The retrovirus Human T-cell Leukemia virus type 1 (HTLV-1) is a virus that mainly infects CD4+ T-cells potentially resulting in the development of a fatal cancer. HBZ, a unique protein studied in our laboratory and encoded by HTLV-1, has been found to bind to various cellular transcription factors and affects how these proteins work. GATA is an important family of transcription factors that control the development of tissues. GATA4, found mainly in heart cells, has been shown by our laboratory to have repressed transcriptional activity in the presence of HBZ. GATA3 is found in CD4+ T-cells, and plays a major role in T-cell development, differentiation and function. Our hypothesis is that HBZ represses the transcriptional activity of the protein GATA3, as it does for GATA4; consequently, altering the function of the HTLV-1-infected CD4+ T-cells. This process in turn allows inflammatory and uncontrolled growth often seen in the cancer associated with HTLV-1. To date, I have performed luciferase assays using the GATA4-luciferase reporter construct transfected into Jurkat T-cells, in combination with HBZ wild type, or HBZ mutants having different HBZ domains deleted. I have confirmed that HBZ wild type repressed GATA4 activity and that the activation domain of HBZ is involved in this repression. I have obtained and amplified GATA3-luciferase construct along with GATA3 expression plasmid and I am currently working with them. Due to the similarity of GATA3 and GATA4, we believe HBZ will repress GATA3 transcriptional activity. After completion of the luciferase assays, I plan to determine how HBZ represses GATA transcription. I will perform co-immunoprecipitation and GST pull-down assays to determine whether GATA3 and HBZ interact and if HBZ sequesters GATA factors from their binding sites.

UP102
The role of claudin-7 in human lung cancer cell migration, Michael James Shea, Do Hyung Kim, Yao-Hua Chen, East Carolina University, Greenville, NC

Lung cancer is the second most common form of cancer and the leading cause of cancer death in the United States. Over 90% of the lung cancer originates from the epithelial cells of bronchial or bronchioles. Claudins are a family of tight junction membrane proteins with at least 24 members and play very important roles in maintaining epithelial cell adhesion and integrity. Claudin-7 is normally expressed in bronchial epithelial cells of human lungs, but its distribution pattern is either down-regulated or disrupted in human lung cancer. To study the role of claudin-7 in lung cancer, we have suppressed claudin-7 expression in HCC827 human lung cancer cells using Lentivirus shRNA technology. We have shown previously that claudin-7 knockdown (KD) cells displayed a higher cell proliferation rate as well as defective cell-matrix interactions due to the reduced expression level of integrin 1. However it is unclear whether claudin-7 affects lung cancer cell migration or invasion. In this study, we investigated the migration ability of lung cancer cells after claudin-7 gene has been suppressed. Since claudin-7 KD cells are poorly adhered to the cell culture dish, we coated the culture plates with extracellular matrix protein collagens. The control and claudin-7 KD cells were seeded in P60 plates and grew to full confluence. The monolayer of cells was incubated in the serum-free medium for 12 hours and then the cells were scratched using a pipette tip to create a wound. The plates were washed three times with PBS to remove floating cells before adding the 20% serum-containing medium to the plates. The cell migration distances were photographed at 0, 1, 3, 6, 9, 18, and 24 hours after the scratches were made. Three fields were randomly selected for each experiment and three independent experiments were performed to calculate the migration distance using Metamorph software. Our results showed that claudin-7 KD cells revealed a slower cell migration rate in the wound healing process when compared to control cells. In addition, claudin-7 KD cells displayed less motile morphology under the live-cell imaging. Cell migration is coordinated by focal adhesion kinase (FAK), which directs cell migration and movement. We found that the expression level of FAK was significantly reduced in claudin-7 KD cells compared to that of control cells. It is known that FAK is a downstream target of integrin 1 and its expression is regulated by integrin 1. Therefore, we conclude that the reduced cell migration ability of claudin-7 KD cells is mediated through FAK via integrin 1 signaling pathway.

UP103
Pulmonary exposure to multi-walled carbon nanotubes decreases cardiac cAMP concentrations, Nicole L. Sheehan, Leslie C. Thompson, Jillian T. Odom, Nathan A. Holland, David A. Tulis, Christopher J. Wingard, Department of Physiology, Brody School of Medicine, East Carolina University, Greenville, NC

Multi-walled carbon nanotubes (MWCNT) are engineered nanoparticles found in many industrial environments, biomedical applications and consumer products. The surface chemistry of commercial grade MWCNT (C-grade) can be modified by the addition of functional groups (N2-doped and COOH) to give them unique properties. MWCNT are biopersistent and pulmonary exposure to MWCNT has been shown to exacerbate cardiac ischemia/reperfusion injury. Cyclic adenosine monophosphate (cAMP) is a secondary messenger often down-regulated in tissues during inflammation. cAMP maintains electrical excitability in cardiac tissue, impacting heart rate and ECG conduction. Reduction of cAMP alters cardiac function and may enhance myocardial infarction. We hypothesized that pulmonary exposure to MWCNT induces a response capable of down-regulating cAMP in cardiac tissue, which may contribute to the enhanced myocardial infarction. Adult male CD-1 ICR mice were instilled with 100 ug of one of 3 forms of MWCNT (C-grade, Carboxylated or Nitrogen doped). 24 hours after instillation lung and heart tissues were harvested and flash frozen in liquid nitrogen. Portions of the frozen tissues were homogenized using a bead beater in 0.1M HCl. A cAMP ELISA kit (ENZO, USA) determined the cAMP concentration in the tissue homogenates. No significant differences were observed in the
lung tissue after normalizing to total protein (nmole/mg). Concentrations of cAMP (pmole/mg protein) decreased in heart tissue (p < 0.05) in both C-grade-instilled and N-doped-instilled mice when compared to the Vehicle group, but not for the COOH group. These findings provide evidence of altered cAMP production following pulmonary exposure to MWCNT. We speculate that reductions in cardiac cAMP may serve as a mechanism of cardiovascular injury 24 hours following pulmonary exposure to MWCNT and the addition of functional groups, such as COOH may prevent reductions in cardiac cAMP concentrations.

Benzo[a]pyrene is a carcinogen associated with tobacco smoke that can damage DNA after it is metabolized by enzymes into highly reactive forms. Identifying the resulting DNA adducts can give greater insight into the mutations and cellular carcinogenesis that frequently occurs in lung cancer. This research aimed to identify damaged DNA adducts from exposure to benzo[a]pyrene in a key sequence of the TP53 gene. This gene codes for the p53 protein, which is frequently mutated in cancers. Polystyrene microspheres were treated with layers of cationic PDDA polymer, the oligomeric DNA sequence, and myoglobin. Each component was adsorbed via exposure to individual solutions, so they were bound to the spheres electrostatically. Myoglobin acted as an heme enzyme mimic, and provided similar chemistry to bio-relevant cytochrome P450 enzymes that are involved in the metabolism of substances like benzo[a]pyrene. Adsorption of DNA and myoglobin on the spheres enhanced the kinetics of the reaction, allowing higher concentrations of enzyme and DNA in a small volume. The spheres were exposed to benzo[a]pyrene and hydrogen peroxide to activate the myoglobin. The DNA adducts were then released via acid hydrolysis and collected via centrifuge filtration. LC-MS will be used to identify adducts from the DNA molecule.

Protein PA3433, a potential transcriptional repressor of holin genes in Pseudomonas aeruginosa, Tafadzwa Hlangabeza, Kyle Tipton, Everett Pesci, East Carolina University, Greenville, NC

Pseudomonas aeruginosa is an opportunistic pathogen that can infect almost any site on the body. Once an infection is established, the formation of biofilms and persister cells with increased antimicrobial resistance makes treatment difficult. The development of a treatment that induces cell lysis could be an efficient and efficacious method of therapy for P. aeruginosa. Based on structural analysis and sequence homology, it is likely that P. aeruginosa encodes holom homologs. In S. aureus, holins accumulate and oligomerise in the cell membrane to form holes which allow endolysins and murein hydrolases to digest the peptidoglycan wall causing the cell to collapse under osmotic pressure. While other studies have focused on a functional analysis of holin homologs encoded by genes PA3431 and PA3432, this study has focused on a putative Lys-R type transcriptional regulator encoded by the gene PA3433. This gene is divergently transcribed from the putative holin/anti-holin pair that we are studying and is similarly located to the holin-controlling CidR of S. auerus. To investigate whether protein PA3433 controls cell lysis, we constructed a plasmid that contains an arabinose inducible PA3433 gene that allows controlled expression in P. aeruginosa. SDS-PAGE analysis confirmed that protein PA3433 was expressed in an inducible manner. However, no change in growth pattern was observed when the protein was expressed. In addition, plate assays exhibited no change in colony morphology when PA3433 was induced. This suggests that protein PA3433 is not an activator of genes PA3431-32 and that it could be acting as a repressor for these genes.
Identification of Bacteroides fragilis proteins targeted by the Thioredoxin superfamily, Ferys Warren, Anita Parker, Edison R. Rocha and C. Jeffrey Smith, Department of Microbiology and Immunology, Brody School of Medicine, East Carolina University, Greenville, NC

The opportunistic pathogen Bacteroides fragilis is the most frequent anaerobe isolated from human infections such as, intra-abdominal abscesses and bacteremia. B. fragilis withstands long periods of oxygen exposure by inducing a robust and protective oxidative stress response (OSR) against oxidative damage. The thioredoxin redox system consisting of a thioredoxin reductase (TrxB) and six thioredoxin homologues TrxA, D, E, F, G and P with the canonical CxxC motif is known to play a crucial role in its OSR. All Bacteroides spp lack a glutathione system and therefore the couple of TrxB/Trx is the major thiol-disulfide redox system. To understand the role of abundant Trx orthologs in cellular redox balance, site directed mutagenesis was used to construct Trx mutations with CxxS active sites. This mutation allows the attacking active Cys residue to bind the target proteins irreversibly as the second redox Cys residue is absent. All Trx CxxS mutants were fused to a C-terminus His-tag and purified using Co++-agarose affinity resin. Purified Trx-CxxS-6xHis proteins were covalently bound to a cyanogen bromide activated sepharose resin. Then crude extracts of B. fragilis trx deletion mutant strains were passed through the different CNBr affinity resins. After washing, the bound target proteins were eluted with 50 mM DTT, concentrated and separated on 10% SDS-PAGE for protein profile analyzes. Protein bands of interest were excised from the gel for LC-MS/MS spectroscopy identification. Thus far, we have identified the major potential targets for the periplasmic TrxP protein as Alkyl hydroperoxidase subunit C, AhpC (BF638R_1276), Thioredoxin peroxidase, Prx (BF638R_2372) and Thiol peroxidase, Tpx (BF638R_2786). Elongation factor Tu, EF-Tu, (BF638R_4059) and Glyceraldehyde 3-phosphate dehydrogenase, GapA (BF638R_0945) and an uncharacterized protein (BF638R_2939). We expect that the identification of additional Trx target putative redox-regulated protein will contribute to our understanding of the thiol-disulfide homeostasis balance in anaerobes during oxidative stress response.

Epigenetic Effects of a High-Fat-Diet on Drosophila Melanogaster Metabolic Phenotype, A. Ajmera1, A. Amin1, A.K. Murashov1, 1Department of Physiology, Brody School of Medicine, East Carolina University, Greenville, NC

Obesity is a growing world-wide epidemic. Overweight population is prone to variety of morbidity conditions including diabetes type 2, cardiovascular diseases, and cancers. The catastrophic increase in obesity rates is largely attributed to sedentary life style and high-fat diet (HFD). Epigenetic studies show maternal obesity is a risk factor for metabolic syndrome in offspring; furthermore, evidence suggests obese fathers may also contribute to offspring metabolic phenotype, so we questioned whether a paternal HFD may produce transgenerational effects on offspring metabolic phenotype using Drosophila Melanogaster as a model. Specifically, this research sought to look at the effects of a HFD on whole body composition and the change in expression of various metabolic genes and microRNAs in Drosophila F0, and F1 generations. To test the effects of a HFD, groups of male virgin flies were exposed to either 5 days of HFD (control diet supplemented with 30% coconut oil) or control diet and then mated with control virgin females overnight. Offspring were collected after hatching and subjected to a normal or HFD challenge for 5 days. After 5 days, animals were analyzed for triglyceride content and trehalose/glucose levels in F0 and F1 generations. Metabolic gene expression (Drosophila insulin-like peptides, Chico and DAkt) and microRNAs (miR-14 and miR-278) in F0 and F1 were done with qPCR. Results indicate a significant increase in amount of triglycerides in flies on a HFD in both generations and a concomitant change in expression of metabolic genes and microRNAs dependent upon phenotype.

Epigenetic Effects of a High-Fat-Diet on Drosophila Melanogaster Metabolic Phenotype, A. Ajmera1, A. Amin1, A.K. Murashov1, 1Department of Physiology, Brody School of Medicine, East Carolina University, Greenville, NC

Obesity is a growing world-wide epidemic. Overweight population is prone to variety of morbidity conditions including diabetes type 2, cardiovascular diseases, and cancers. The catastrophic increase in obesity rates is largely attributed to sedentary life style and high-fat diet (HFD). Epigenetic studies show maternal obesity is a risk factor for metabolic syndrome in offspring; furthermore, evidence suggests obese fathers may also contribute to offspring metabolic phenotype, so we questioned whether a paternal HFD may produce transgenerational effects on
Student Knowledge of Sustainable Design Solutions, Aidan Cruz, East Carolina University, Greenville, NC

The purpose of this study was to identify myths and misconceptions surrounding residential sustainable energy solutions. Since the Industrial Revolution, America and other nations throughout the world have continuously released toxic chemicals and gases into our environment. For over a century, these emissions have gone unchecked. Beginning in the mid-20th century, public attitude towards environmental conservation began to shift. Despite growing efforts and dramatic changes, particularly in the industrial sector, the United States remains in the top five countries emitting greenhouse gases. According to the US Energy Information Administration (2000), nearly 50% of the total greenhouse gas emissions in the United States are created by the construction of buildings and the energy of the ongoing operations. The environmental cost of residential structures rivals that of the transportation and industrial sectors (Battles & Burns, 2000). Our objective was to establish our fellow East Carolina University student’s knowledge of tangible methods of sustainable design and energy solutions. Due to its relatively new prominence within not only the construction and design industries, but to the general public alike, the term sustainability is often misunderstood, misused and even abused. A philosophy that is often confused as a passing fad, sustainability is an approach to design that focuses on ensuring comfort and security in building design along with ensuring the materials, resources and methods do not cause long-term detrimental damage to the environment. Using the quantitative research method, we created a questionnaire consisting primarily of closed questions and multiple-choice answers based on a numerical scale that gauges the surveyors’ knowledge about sustainable residential energy solutions. The survey was hosted on a dedicated webpage. We provided the web address to the students of ECU via social media and e-mail. Based on the ECU undergraduate student population of 21,589, we used a sample size of 100 students, as was determined using a confidence level of 95% and confidence interval of 10. After compiling and analyzing the data, we determined specific areas of misconception.

Proposed Sustainable Parking Deck for East Carolina University, Jordan Paul Korzelius-Klein, East Carolina University, Greenville, NC

Sustainable design is a design philosophy that seeks to maximize the quality of the built environment, while minimizing or eliminating negative impacts to the natural environment (McLennan 4). “The most serious adherents of the sustainable design movement are not content with merely limiting damage—and from project to project continually look to up the ante, finding ways to enhance comfort while further raising the bar in environmental performance” (McLennan 5). East Carolina University is continuously searching for further methods of being more sustainable or going “green.” We designed a sustainable parking deck to be present on our campus, which helps reduce and eliminate negative impacts on the environment by reducing the carbon footprint unlike an average parking lot. Solar power is the electric source of the parking deck. Charging stations are present for electric cars. The best available parking spaces are reserved for bicycles and carpoolers. Rain water collected is filtered through the plants to help absorb chemicals. The excess water is stored in rain barrels and reused. The columns supporting the structure are coated with materials that plants adhere to in order to reduce the heat island effect. Plants located throughout the parking deck help replenish oxygen in the area while absorbing some of the carbon outputs.

The top level of the parking deck is a courtyard with grass and other plants to address lost green space that the parking deck took being built. This courtyard spans the length of the top floor and is accessible to all students wishing to enjoy study time and delight in the open aesthetically pleasing atmosphere. While parking decks are not considered sustainable because it is said that it allows for more cars in the area, it is known that the use of cars will not decrease anytime in the near future. Through research we have been able to find sustainable and energy efficient designs, engineering, and planning that has led us to generate the most suitable sustainable parking deck for the environment of Greenville, while also being able to provide the needs of the people. Our designs are derived from research of parking decks from across the country and our own ideas. Research provides us with a comparison of current parking lots at ECU with the parking deck we designed. A cost analysis is conducted with the materials used and an estimated budget to maintain the parking decks between our design and other parking decks.

Saving Energy in Brewster, Kimberly Lockhart, East Carolina University, Greenville, NC

We want to focus on making the Brewster building on the main campus of East Carolina University more energy efficient. According to the East Carolina University Comprehensive Master Plan for the year of 2013 electricity is the main contributor of greenhouse gas emissions on campus. Since Brewster is one of the oldest buildings on campus, we will be comparing the way newer buildings on campus go about reducing energy consumption. We contacted a university engineer named Paul Carlson who will hopefully answer questions regarding all energy output sources and how they can be reduced individually. Also, how we can receive the data of the sources energy output for the Brewster Building, so we can focus on lowering the sources that are the highest. We will personally walk through Brewster to inspect what newer buildings on campus go about reducing energy consumption. During our inspection we will see what type of windows and lights are being used. It is ideal to have weatherproof windows and doors throughout the building and motion sensor lighting to cut down the amount of electricity used. Another improvement that could be implemented into Brewster to save energy would be adding power strips (smart strip) throughout the building. These smart strips can sense the difference between when computers and other devices are on or off, doing so will stop phantom power from occurring which saves electricity and reduces carbon output. While examining the bathrooms in Brewster, we will see if the faucets have low-flow aerators to reduce water consumption and automatic hand
dryers. If not already installed, look into installing timed thermostats so the HVAC isn’t on when unnecessary. We will be presenting these ideas in the form of a business proposal to East Carolina University. We hope to show them the benefits of being more energy efficient, by showing them it will not only be a more ‘green’ building, but will save them money.

UDP4

Effects of blood meal source on Aedes albopictus life table characteristics and vector competence for dengue virus, Joshua Wolf Tippett, East Carolina University, Greenville, NC

Commercially available blood can be used to feed mosquitoes, as an alternative to using live animals; however, the extent to which alternative blood sources affect mosquito vector competence is unknown and may have implications for laboratory vector competence experiments. Hence, we analyzed the extent to which blood source affects fecundity, fertility, and vector competence of Aedes albopictus mosquitoes for dengue virus (DENV, family Flaviviridae, genus Flavivirus). Two bovine blood treatments (N=40 mosquitoes/group) were tested at two temperatures for DENV-infected and –uninfected groups: defibrinated,27°C; citrated,27°C; defibrinated,30°C; citrated,30°C. Each fully engorged mosquito was transferred to an individual cage containing an oviposition cup and substrate. Four days post-feeding, water was added to oviposition cups and the presence of eggs was checked daily for 2 d. If eggs were observed, the oviposition substrate was removed and the number of eggs counted (fecundity). Eggs were allowed to hatch and larvae were counted (fertility). After 14 d, 15 individuals were taken from each infected group to test for presence of DENV in their bodies (infection), legs (dissemination), and saliva (transmission). qRT-PCR was used to quantify DENV. Mosquitoes fed DENV-infected defibrinated blood showed higher DENV body titer, fecundity, and fertility compared to mosquitoes fed DENV-infected citrated blood. Temperature did not affect fecundity, fertility, or vector competence in any DENV-infected groups. No differences were observed in DENV leg titers between treatments. No DENV transmission was observed in any group. Infected mosquitoes showed higher fecundity than uninfected mosquitoes; however, fertility was lower in infected compared to uninfected mosquitoes. Eggs of DENV-infected mosquitoes hatched faster than the uninfected groups. We expect the findings of this study to improve methods for mosquito colony propagation and inform research using artificial blood delivery methods to assess vector competence.
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RESEARCH & CREATIVE ACHIEVEMENT WEEK
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The RCAW Committee would like to thank all of those who participated and attended.

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We look forward to see you all again next year in 2015.

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