

East Carolina University.

2013

**RC  
AW** RESEARCH  
& CREATIVE  
ACHIEVEMENT  
WEEK

**7th**  
Annual

Research and Creative  
Achievement Week

**April 8th - 12th 2013**

East Carolina University  
Mendenhall Student Center

A week long celebration recognizing research,  
scholarship, artistry and other forms of creative  
activity of East Carolina University's  
undergraduate and graduate students.



We would like to give a special thanks to ECU School of Art & Design graphic design undergraduate students Vincent Meadows, for his cover design and poster art, and Gioia Hackett, for her design of the brochures and program.

We would also like to recognize ECU College of Business Master of Business Administration student Zachary Hewett, for his development and management of the program.

2013  
**RESEARCH** &  
CREATIVE  
ACHIEVEMENT WEEK

April 8<sup>th</sup> - 12<sup>th</sup>, 2013  
East Carolina University  
Mendenhall Student Center



# RCAW

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Research and Creative Achievement Week

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## Letter from the Vice Chancellor



Division of Research &  
Graduate Studies  
Greenville Centre Ste 1500  
2200 S. Charles Blvd  
Mailstop 157  
Greenville, NC 27858-4353

Ronald L. Mitchelson, PhD  
Vice Chancellor, Interim  
252-328-9471  
252-328-2769 fax

April 2013

Dear ECU Community:

You are invited to participate in the Research and Creative Achievement Week on the campus of East Carolina University. The week of April 8-12, 2013, has been set aside to highlight the extraordinary accomplishments of our students in research and creative activity. Please 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: Graduate School, Brody Graduate Association, Graduate and Professional Student Senate, Office of Undergraduate Research, and Sigma Xi, The Scientific Research Society.

There will be over 270 student presentations, an impressive number that reflects the growth in student research and creative activity across all disciplines. Oral presentations will take place on Monday, April 8 (Graduate Day) and Wednesday, April 10 (Undergraduate Day) with posters on display for an additional day each.

In addition to presentations by students, we also will be recognizing four of our own outstanding faculty for their research and engagement accomplishments through presentations and at the awards ceremony. As a kick-off event, on March 18, the RENCI Visualization Challenge will be held. The International Scholars Symposium and the Sigma Xi Lecture and Meeting will be held on Tuesday, April 9. The Scholar-Teacher Awards and Symposium and the College of Education Lecture will be held on Thursday, April 11. The whole week is capped off with the announcement of the student participant winners on Friday, April 12.

**Please consider encouraging your classes to attend specific discipline-related oral student presentations on Monday and Wednesday (April 8 and 10) 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 Schedules).

This is 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.

Sincerely,

A handwritten signature in black ink that reads 'Ronald L. Mitchelson'.

Ronald L. Mitchelson, PhD



## 2013 PROGRAM SPONSORS

Division of Research and Graduate Studies

Graduate School

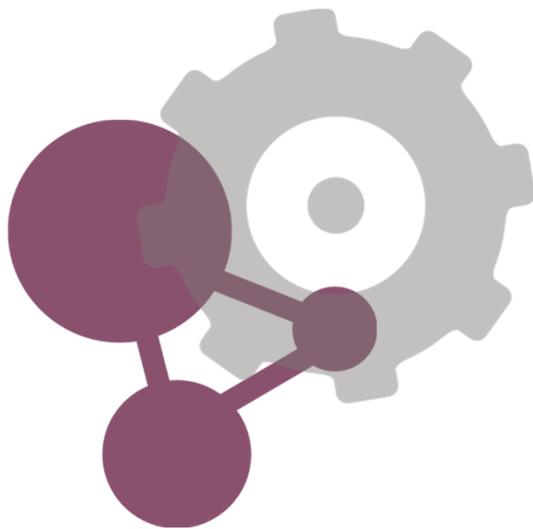
Brody Graduate Association

Division of Health Sciences

Graduate and Professional Student Senate

Office of Undergraduate Research

Sigma Xi, The Scientific Research Society



## **Planning Committee** Research and Creative Achievement Week

Tom McConnell: The Graduate School,  
Chair RCAW

Mary Farwell: Biology, Research and  
Graduate Studies, Co-Chair RCAW

Abbie Brown: Mathematics, Science, and  
Instructional Technology Education,  
College of Education

Evelyn Brown: Engineering, College of  
Technology and Computer Science

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

Zachary Hewett: MBA Student, College  
of Business

Derrick Isler: The Graduate School

Meaghan Johnson: Student,  
Occupational Therapy, & VP of the  
Graduate & Professional Student  
Senate (GPSS)

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

David Martinson: Student, Microbiology  
and Immunology, & Treasurer, GPSS

Taylor Mattox, Student, Pharmacology  
& Toxicology

Margaret Pio: Research & Graduate  
Studies

Amy Tripp: The Graduate School

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

## **Technical Committee**

Josh Brown

Tony Cooke

Wendy Creasey

Laurie Godwin

Derrick Isler

Matthew Powell

Ginny Sconiers

John Southworth

**April 8th- April 16th**

East Carolina University Research and Creative Achievement Week

MON.

**4.8.2013****Graduate Student Presentations all day** (8:30 am – 5:00 pm)

Oral sessions in MSC Great Room (GR) 1

Oral sessions in MSC Room 244

Graduate posters in MSC Room 221

Graduate posters in MSC Social Room

Graduate posters in MSC 2nd floor balcony

**Women of Distinction Awards**, Harvey Hall, Murphy Center (4:30 – 6:30 pm)

TUES.

**4.9.2013****Graduate Posters will remain up for viewing until 3 pm****International Scholars Symposium**, MSC Room 244 (1:00 - 5:00 pm)**Sigma Xi Lecture & Meeting**, MSC 244 (5:00 – 7:00 pm)

WEDS.

**4.10.2013****Undergraduate Student Presentations all day** (8:30 am – 4:30 pm)

Oral sessions in MSC Room 244

Oral sessions in MSC GR 1

Undergraduate posters in MSC Social Room

Undergraduate posters in MSC Room 221

Undergraduate posters, MSC 2nd floor balcony

**Distinguished Faculty Luncheon** (Invitation only)Lifetime, Scholarship of Engagment and Five-Year Awards, MSC GR 2 & 3  
(noon-1:30 pm)**Lifetime Achievement Seminar**, MSC Room 244 (5:00 – 6:30 pm)

THU.

**4.11.2013****Undergraduate posters remain up until 3:00 pm****College of Education Invited Faculty Research Lecture**, MSC 244 (9:30 – 11:00 am)**Scholar-Teacher Luncheon** (Invitation only), MSC GR 2 & 3 (noon - 1:30 pm)**Scholar-Teacher Symposium**, MSC GR 1, MSC 244 (1:30 – 4:00 pm)**Scholarship of Engagement Seminar**, MSC 244 (5:00 – 6:30 pm)

FRI.

**4.12.2013****Student Awards Luncheon** (Invitation only), MSC GR 1, 2 & 3 (noon - 1:30 pm)

RCAW Awards

Thesis/Dissertation Awards

RENCI VISLAB Challenge Award

Faculty Mentor Awards

Carol F. Volkman Awards

MON.

**4.15.2013****Five-Year Achievement Seminar**, Bate 1032 (5:00 - 6:30 pm)

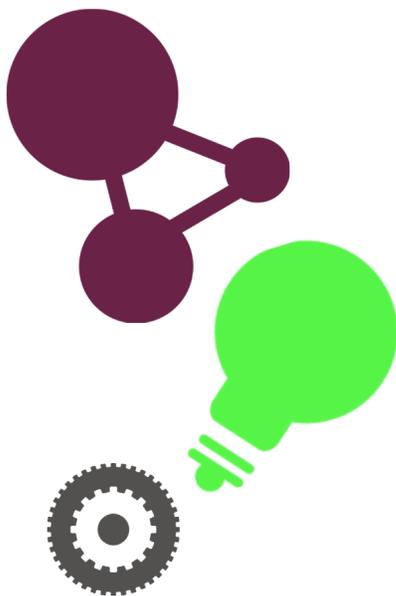
TUES.

**4.16.2013****Five-Year Achievement Seminar**, Bate 1032 (5:00 - 6:30 pm)



## FACULTY RECOGNITION

East Carolina University Research and Creative Achievement Week



Lifetime Achievement Award

Scholarship of Engagement Award

Five-Year Achievement Awards

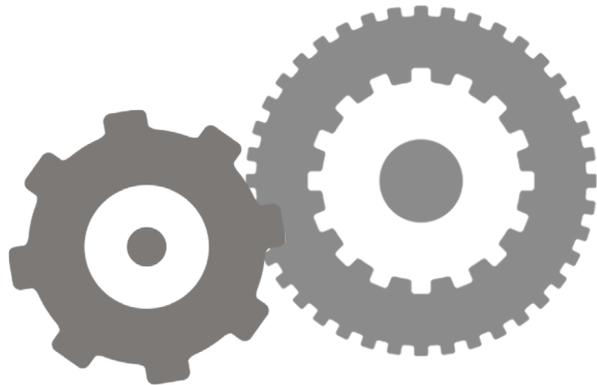
Inventors & Innovators



East Carolina University

## Achievement Awards for Excellence in Research and Creative Activity

Recipients of the Achievement for Excellence in Research and Creative Activity Award are recognized for the originality and excellence of their research and creative activities, as evidenced by sustained high quality work performed at ECU. Recipients of the lifetime achievement award are recognized for accomplishments made across the entire span of their professional career, and recipients of the five year award are recognized for their achievements during five years of continuous service at ECU. All recipients were nominated by their peers in acknowledgement of their achievements. Awardees were selected by the Vice Chancellor for Research and Graduate Studies upon recommendation of the Faculty Senate Academic Awards Committee.



# Lifetime Achievement Award for Excellence in Research & Creative Activity

**Roger A. Rulifson, Ph.D.,**

**Professor,** Department of Biology, Thomas Harriot College of Arts & Sciences

**Senior Scientist,** Institute for Coastal Science & Policy, Division of Research & Graduate Studies

## “Fish Tales and Trails: 30+ Years of Tracking the Elusive Striped Bass”



Dr. Rulifson was born, bred and raised in the mid-western town of Manchester Iowa. The old homestead was across the street from a large municipal park and two houses away from the Maquoketa River and backwater. These two attributes surely played important roles in his chosen profes-

sion of fisheries and fish ecology, and Marine biology. The third critical factor was an undergraduate school at the University of Dubuque, where he majored in biology and attempted to minor in French. However, the university would not allow a minor in French with a Bachelor of Science degree (only a BA degree). This forced Rulifson to get a double major in biology and French, which resulted in fulfilling his desire for a BS degree. Friends and colleagues often wonder if these three attributes (park lands, aquatic habitat, and French) caused him to desire working with Jacques Cousteau in Marine biology. That never happened, but he did have dinner one night with Cousteau's grandson at the wedding reception of one of his graduate students.

Dr. Rulifson obtained his MS degree in Marine Science and Engineering at North Carolina State University in Raleigh, after which he worked for one year on the Hudson River for the Ecological Services Group of Texas Instruments, Incorporated. Interestingly, his apartment was in the village of Fishkill, New York. After one year in private consulting, he returned to NC State where he obtained his Ph.D. degree in Marine Science and Engineering (1980) working with Dr. BJ Copeland to assess the vulnerability of penaeid shrimp to the water intake screens of the Brunswick Steam Electric Plant at Southport, NC. Dr. Rulifson also conducted a postdoctoral study at

NC State developing an anadromous fish management plan for the southeastern United States for the US Fish and Wildlife Service. It was this management plan that truly focused his research on anadromous fish species and long distance migration for the next 30 years.

After two years teaching at Unity College in Maine, Rulifson was offered a position (1983) at East Carolina University with the Institute for Coastal and Marine Resources (ICMR, now Institute for Coastal Science and Policy - ICSP). A former graduate student colleague of his from NC State, Dr. Don Stanley, was a member of the ICMR staff. At Copeland and Stanley's urging, Rulifson accepted the position with ICMR, and has held a split position with the Institute and Biology Department since that time.

Rulifson's lab has had a long history of working with the commercial fishing industry. Roger has worked extensively in commercial gear development including menhaden purse seines in Chesapeake Bay, Turtle Excluder Devices (TEDs), By-catch Reduction Devices (BRDs), Finfish Separator Devices (FEDs), traveling screens for water intakes, push nets for small skiffs, and gillnet calibration for the spiny dogfish shark. Also, Rulifson was one of the research team responsible for introducing skimmer trawls to the North Carolina commercial shrimp fishery. More recently, he and students have worked with commercial gillnetters and trawlers studying the ocean migratory routes of the spiny dogfish shark.

Dr. Rulifson's prolific career has included 175 publications and reports, 84 of which were on striped bass. Rulifson has served on 72 graduate committees, 45 of which were his MS students in Biology, and his 8 Ph.D. students were from the programs in Coastal Resources Management (CRM) and Interdisciplinary Program in Biological Sciences (IDPBS). Also, 39 undergraduate students have worked in his lab. Rulifson and his students have given 289 oral and poster presentations at professional meetings, and brought in over \$6 million in 96 grants while at ECU. Currently, his 12 graduate students are researching two main areas: the long distance migration of the spiny dogfish shark, and the otolith (earbone) chemistry of anadromous fishes.

# Scholarship of Engagement Award

# RCAW

**Rebecca Dumlao, Ph.D.,**  
**Associate Professor,** School of Communication,  
College of Fine Arts and Communication

## “Exploring Partnership Communication in Engaged Teaching and Scholarship”

Dr. Rebecca Dumlao earned bachelor’s degrees in Home Economics Education and Early Childhood Education from Pennsylvania State University. After teaching, leading a nonprofit organization and freelance writing, she earned her master’s degree in Scientific and Technical Communication from Oregon State University and her Ph.D. in Mass Communication from the University of Wisconsin-Madison.

After coming to East Carolina University, Dr. Dumlao began her community engagement work by developing and teaching the first service-learning course in the School of Communication. Her students have developed brochures, short videos, PowerPoints, news articles, flyers, campaign/awareness plans, and other communication tools that met community needs identified by local agencies. Service-learning students engage in community projects, and then deepen their learning by reflecting on their experiences in light of academic knowledge, civic learning and personal/professional growth. Since 2001, over 1,600 seniors taking the Communication Capstone Course have contributed more than 18,000 hours of community service while learning about professional development. Last year, Dr. Dumlao served as the chair of ECU’s Service Learning Committee. She recently received the Robert L. Sigmon Award for Service-Learning awarded by North Carolina Campus Compact.

Dr. Dumlao also supports public engagement through her scholarship. After graduating from the first class of ECU’s Engagement and Outreach Scholar’s Academy, she studied communication practices used by campus-community partners working with Project Heart. Since then, she has mentored numerous graduate students and scholars from multiple disciplines as they develop their own community-engaged scholarship.



In 2010, Dr. Dumlao started the Health Communication Puppetry Program along with her communication colleague Dr. Deborah Thomson. Working in partnership with the Honors College, the Volunteer and Service Learning Center, Boys and Girls Clubs, Pitt County Schools and Recreation, and the Leslie Gorham Intergenerational Center, this program has taken puppet shows on healthy eating and diabetes prevention to hundreds of children. Students learn about communities, communication, and health issues while planning and presenting the puppet shows.

Dr. Dumlao’s research agenda explores community-campus partnership processes, service-learning pedagogy, and communication in families representing diverse cultures. She presents regularly at professional conferences and has published in *Best Practices in Experiential and Service Learning in Communication*, *The Journal of Family Communication*, *Health Communication*, *Science Communication* and *The Journal of Higher Education*, *Outreach and Engagement*. She serves on the editorial boards of *Partnerships: A Journal for Service-Learning and Civic Engagement* and the *International Journal of Research on Community Engagement*. Dr. Dumlao is currently writing a book on collaborative communication processes and practices to assist community partners, faculty and students as they work together in community-engaged teaching and scholarship.

## Five-Year Achievement Awards for Excellence in Research and Creative Activity



**Thomas Herron, Ph.D.**  
Associate Professor, Department of English,  
Thomas Harriot College of Arts and Sciences

### “Spenser, Shakespeare, Sir Walter Raleigh and Ireland: New Directions”

published by Four Courts Press in Dublin. Both books seek to establish a better understanding of Ireland’s history and culture, including literature, within the context of the English and European renaissance.

Herron has published 15 significant articles in book collections and journals, as well as shorter pieces, and in 2011 co-edited a special double-issue of *Sidney Journal*.

He is currently on the board of the International Spenser Society and is co-organizing their next conference, in Dublin, in 2015. He is on the board of the book series, *The Manchester Spenser*.

He has sought to tie local, North Carolina interests in with his studies, including by editing a late-19th century published work, *Sir Walter Raleigh in Ireland*, which focuses on Raleigh’s rapacious experience as a colonial settler, along with Spenser, in southern Ireland at the end of the 16th century. Early modern Ireland shares parallels with the early American colonial experience. He has also helped to organize numerous lectures and colloquia on Irish and other renaissance topics during his years at ECU, including the conference, *Raleigh and the Atlantic World*, that first brought scholarly light to the so-called “Manteo” portrait of Queen Elizabeth owned by the Elizabethan Gardens in the Outer Banks.

Herron is co-curator of an exhibit, *Nobility and Newcomers in Renaissance Ireland*, two years in the planning, which is currently on view until May 19 at the Folger Shakespeare Library in Washington, DC, and that produced a sizeable catalog.

Since 2010, he has been editor of the 40-year-old internationally recognized multidisciplinary journal, *Explorations in Renaissance Culture*, which he brought to produce at ECU.

Thomas Herron is a southerner by adoption, having moved from Des Moines, IA, to attend the Paideia School in Atlanta, GA, from 1976-1986. He then headed north and graduated BA from Carleton College, MN, in 1990 and earned his MA and PhD in English Literature, with a minor in History, at the University of Wisconsin-Madison.

Herron taught for a year at his alma mater while finishing his dissertation, and spent a year in Galway, Ireland, after that on a post-doc, in 2001-2. He then returned to the South as a visiting professor at Hampden-Sydney College in VA, before coming here to ECU in 2005 on the tenure track. He was tenured and promoted to associate professor in 2012. He has two daughters and a German wife, Antje.

Herron has spent much of his career working on the profound relationship between Ireland’s places, history and culture and the life and works of the famous (and infamous) canonical poet and colonial administrator Edmund Spenser. Herron published his monograph, *Spenser’s Irish Work: Poetry, Plantation and Colonial Reformation* with Ashgate Press in 2007. It was based partly on his dissertation work.

Since then, he has published two editions co-edited with Irish archaeologist and historian Michael Potterton: *Ireland in the Renaissance, ca. 1540-1660* and *Dublin and the Pale in the Renaissance, c. 1540-1660*. Both works are

**Baohong Zhang, Ph.D.**  
**Associate Professor**, Department of Biology,  
 Thomas Harriot College of Arts and Sciences

### “MicroRNAs: Identification and Functional Analysis in Plants”

Dr. Baohong Zhang was born in a small village in eastern China. Dr. Zhang attended Beijing Agricultural University although he had a dream to become a scientist in mathematics. After earning a bachelor's degree in Plant Genetics and Breeding, Dr. Zhang worked as a research scientist at the Cotton Research Institute of Chinese Academy of Agricultural Sciences, the Chinese national research center for cotton. After more than a decade of research, Dr. Zhang went back to school and studied at Texas Tech University where he earned his Ph.D. in Environmental Toxicology in only 2.5 years.

Before coming to the U.S. for his doctoral study, Dr. Zhang was already established as a well-recognized scientist in the field of agricultural biotechnology. He led a research team working on plant biotechnology and transgenics; he was one of the major contributors to the transgenic cottons in China; some transgenic cultivars had been widely adopted by farmers in China and around the world. Dr. Zhang also published the first scientific book on transgenic cotton. Based on his achievements, he earned several prestigious national awards and holds honored professorships of several Chinese universities.

After earning a Ph.D. degree at Texas Tech University, Dr. Zhang immediately received an offer of a tenure-track faculty position in the Biology Department at ECU. Since joining ECU in 2007, Dr. Zhang has been dedicated to research and education and generated an outstanding research record. Dr. Zhang works on a wide range of research topics with both plants and animals, from major agriculturally important crops to bio-fuel crops, and from understanding the molecular mechanism to agricultural and biomedical application at the individual, physiological, cellular and molecular levels. His current research focuses on the following: 1) multigenerational impact of abused drugs, environmental pollutants and pharmaceuticals; 2) understanding the biological mechanisms of plant and animal response to abiotic and biotic stress; 3) identification and functional analysis of small non-coding RNAs in multiple biological and metabolic processes; 4) development of computational software pipeline and database; and 5) development of novel

biomarker for different diseases, including breast cancer, traumatic brain injury, and chemical-induced diseases. Dr.

Zhang is one of the major contributors to the Operation Re-Entry North Carolina (ORNC) program and he strongly supports our wounded warriors,

combat veterans and their families. Dr. Zhang's research has been well-supported from a wide range of funding agencies, from NIH, NSF, DoD to USDA as well as the NC Biotech Center, and biotechnology corporations, including DuPont and Cotton, Inc. Based on his research, he has published more than 150 papers in peer-reviewed international journals, including *Plant Journal*, *Plant Molecular Biology*, *Journal of Cellular Physiology*, *Developmental Biology*, and *Environmental Health Perspectives*. He has also published two scientific books since joining ECU, entitled “Transgenic Cotton” and “RNAi and microRNA-Mediated Gene Regulation in Stem Cell”.

Dr. Zhang's professional service also brings international prominence to ECU. Since joining ECU in 2007, he has been serving as editor on the editorial board for 11 international journals. Recently, he was appointed as the co-Editor-in-Chief for a new international biomedical journal, entitled *World Journal of Experimental Medicine*. He also serves as an ad hoc reviewer for more than 69 journals and 27 international funding agencies, and has served on grant review panels for the USDA and the US Department of Energy.

To enhance international perspectives, Dr. Zhang has developed many research collaborations with scientists from other countries, including China, Turkey, Germany, Poland and Spain. Recently, he developed an international student exchange program between ECU and Chinese universities. Dr. Zhang is keen on training the next generation of scientists. In the past five years, he has mentored two postdoctoral scholars, two Ph.D. students, six Master students and served on 21 other Ph.D. and Masters Student committees.



## Inventors and Innovators

### **Inventors Recognition Ceremony: Wednesday, April 3, 2013 5:30 - 8:30 pm East Carolina Heart Institute**

#### **KEYNOTE SPEAKER:**

**Dr. George R. Newkome**

Chief Research Officer, The University of Akron  
President & CEO; Member, Board of Directors; Univ. of Akron Research Foundation  
President & CEO, Akron Innovation Campus  
President & CEO, Ohio Research Foundation  
Chairman of the Board, The Student Venture Funds at The University of Akron

#### **INVENTORS:**

**Darrell Neuffer<sup>1</sup> and Ethan Anderson<sup>2</sup>**

<sup>1</sup>East Carolina Diabetes and Obesity Institute and Department of Physiology

<sup>2</sup>Department of Pharmacology

Patent # 8,088,727

Method For Reducing The Risk, Lessening The Symptom, Or Delaying The Onset  
Of Insulin Resistance By Administering SS-31  
Issued 1/3/2012

**Rachel Roper**

Department of Microbiology & Immunology

Patent # 8,202,521

Methods and Compositions for Poxvirus Lacking A35R Protein  
Issued 6/19/2012

**Michael Rastatter, Joseph Kalinowski, and Andrew Stuart**

Department of Communication Sciences & Disorders

Patent # 8,257,243

Frequency Altered Feedback For Treating Non-Stuttering Pathologies  
Issued 9/4/2012

**Gregg Givens**

Department of Communication Sciences & Disorders

Patent # 8,287,462

System, Methods And Products For Diagnostic Hearing Assessments Distributed  
Via The Use Of A Computer Network  
Issued 10/16/2012



## **LECTURES & SYMPOSIA**

East Carolina University Research and Creative Achievement Week



## VisChallenge

RENCI@ECU

March 18, 2013 in Brewster C-202

Graduate and undergraduate students are challenged to use their imagination and talent in the RENCi @ ECU Visualization Challenge. Do you have a scientific research project, class project or idea that uses visual representations to tell the story? Do you use computer graphics that you would like to see in a large display? Want to see your work on the VisWall?

The VisChallenge is an opportunity for students to advance and showcase their visual insights and creativity and to use ECU's 21 6-foot visualization wall ("VisWall"), a high-resolution, immersive display in Brewster C-202. All students interested in scientific, creative, and educational visualization are encouraged to participate. Last year's entries ranged from 3D archeological ship reconstruction to landslide assessments to genetic disease research using fruit flies.

Training and technical assistance using the VisWall is provided by RENCi faculty and staff. Presentations are approximately 10 minutes open questions from the audience. Student participants will also receive an incentive stipend.

Faculty judges will evaluate the entries. The first place entry will be recognized during the 2013 Research and Creative Achievement Week.

Entry form due date January 28, 2013. Available at <http://www.ecu.edu/renci/>

For further information, contact Michelle Covi, [covim@ecu.edu](mailto:covim@ecu.edu) or 737-1772



*Think Like a Woman,*

*Change the World*

The biennial ECU Women of Distinction Awards recognize outstanding contributions by ECU women. Nominees for the awards may include current and past ECU faculty, staff, students and administrators. Nominations may also be made for outstanding ECU alumnae who serve as community leaders.

The awards recognize qualities such as leadership, commitment, determination, generosity of spirit and time, community building, and the ability to empower and mentor others. Areas in which the nominees demonstrate outstanding contributions may include, but are not limited to, academics/education; professions; research; health care/services; management/administration; politics; social services; volunteer, charity, community outreach organizations; and athletics.

Contact Beth Velde (veldeb@ecu.edu) or Marsha Hall (hallm@ecu.edu) for more information.

WOD Awards  
 April 8th, 2013  
 Harvey Hall, Murphy Center  
 East Carolina University  
 4:30-6:30 pm

The purpose of the CCSW, established in 1971, is to advise the Chancellor, Provost and other university leaders on the planning, implementation and evaluation of policies and practices to promote equity and further the welfare of all women associated with East Carolina University. The committee actively encourages women's professional and educational development, establishes a climate where women can advance without barriers, and at the same time protects the rights of fellow human beings.

Celebrating ECU Women of Distinction and their Impact on the World

# International Scholars Symposium

East Carolina University

SPONSORED BY: International Faculty And Staff Committee in association  
with ECU Research And Creative Achievement Week 2013

TUES.

Tuesday, April 9, 2013  
1:00 PM - 5:00 PM  
Mendenhall Student Center  
Room 244

## Purpose and Goal:

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

## Presentation Schedule

### 1:00-1:15 Opening Remarks:

Dr. Nehad Elswaf: International Scholar Symposium chair and organizer.  
Dr. James (Jim) Gehlhar: Associate Vice Chancellor for International Affairs

### SESSION 1: SESSION CHAIR- DR. NEHAD ELSAWAF

- 1:15-1:40 Financial Implications of Recruiting International Students to the University of North Carolina System.** Cheryl McFadden, Department of Higher, Adult and Counselor Education, East Carolina University, Greenville, NC, Cathy Maahs-Fladung, School of Teacher Education and Leadership, Utah State University, Logan, UT, 84322 and William Mallett, Office of International Affairs, East Carolina University, Greenville, NC
- 1:40-2:05 A New Multi-color Illuminator for Automatic Optical Inspection** Guangjie Xiong<sup>a</sup> and Jason Yao<sup>b</sup>, a. School of Material and Mechanical Engineering, Beijing Technology and Business University, Beijing, 100048, China; b. Department of Engineering, East Carolina University, Greenville, NC
- 2:05-2:30 Laughter and Comedy and the Cuban Experience: How Islanders Use Humor To Cope With The Daily Stresses of Life.** Luci M. Fernandes, Department of Anthropology, East Carolina University, Greenville, NC

BREAK 2:30 PM - 3:00 PM

### SESSION 2: SESSION CHAIR- DR. NEHAD ELSAWAF

- 3:00-3:25 Creating Opportunities for International Dialogue with Videoconferencing at East Carolina University,** John Southworth, Information Technology and Computing Services, East Carolina University, Greenville NC
- 3:25-3:50 A cross-cultural student teaching experience: The story of a Chinese student teaching in the United States,** Ran Hu and Judith Smith, Department of Literacy Studies, English Education and History Education, East Carolina University, Greenville, NC
- 3:50-4:15 A Comprehensive Cloud-based Tele-audiology Assessment System,** Daoyuan Yao and Jason Yao, Department of Engineering, East Carolina University, Greenville, NC
- 4:15-4:40 Internet Addiction Among Elderly Adults,** Shu Mou Hua Xu Juan Xu, Department of Psychology, Teachers' college of Beijing Union University, Beijing, China,100011

**4:40-5:00 Concluding Remarks**

## 2013 College of Education Invited Faculty Lecture

Date: Thursday, April 11, 2013  
Time: 9:30 AM - 11:00 AM  
Location: MSC 244

### Presenters and Research Studies:

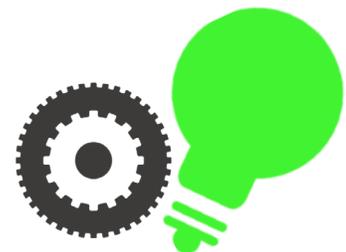
**Ryan, C. L.** (2011). Talking, Reading, and Writing about Lesbian and Gay Families in Classrooms: The Consequences of Different Pedagogical Approaches. In C. Compton-Lilly & S. Greene (Eds.), *Bedtime Stories and Book Reports: Connecting Parent Involvement and Family Literacy* (96-108). New York: Teachers College Press.

**Evans, C.** and **Weiss S.** (2012). Teacher Perceptions and Behavioral Strategies for Students with Emotional Disturbance across Educational Environments. *Preventing School Failure: Alternative Education for Children and Youth*, 56( 2), 82-90.

**Chan Evans** is an associate professor of special education in the Department of Special Education, Foundations, and Research. Her research interests include academic and behavioral support for students with emotional/behavioral disorders across educational environments, teachers-as-researchers, and universal design for learning.

**Stacy L. Weiss** is an assistant professor of special education in the Department of Special Education, Foundations, and Research. Her research interests include characteristics of students with high incidence disabilities, curriculum-based measurement, and instructional practices in reading and written expression.

**Caitlin L. Ryan** is an assistant professor in the Department of Literacy Studies, English Education and History Education in the College of Education at East Carolina University. Her research interests center on the relationships among children's literature, literacy, social positioning, and educational equity, especially at the elementary school level. Her current research examines the normative ways that gender and sexuality are communicated in elementary school literacy curricula and how teachers might approach literacy instruction, classroom contexts, and multicultural children's literature to interrupt such normative messages. Her work has been published in *The Journal of Literacy Research*, *Language Arts*, *The Handbook of Research on Teaching the English Language Arts*, and *Journal of LGBT Youth*.



## Scholar-Teacher Awards and Symposium

“Celebrating the Synergy between Scholarship and Teaching”

Sponsored by the Office of the Provost and Senior Vice Chancellor for Academic Affairs

### April 11, 2012 – 12:00 – 3:30 - Mendenhall Student Center

12:00 -1:15 pm

Awards Presentation and Reception for Recipients and Invited Guests, Great Rooms 2+3

1:30 – 3:30 pm

Presentations in Mendenhall Great Room 1 and 244

(Concurrent session schedule and titles to be finalized)

12:00 – 3:30 pm

Poster Display – Mendenhall Great Rooms

*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: April 8-12. Prior to the symposium, 2013 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!*

<p><b>Dr. Thad Wasklewicz</b> Associate Professor of Geography Thomas Harriot College of Arts and Sciences</p>	<p><b>Dr. Kylie P. Dotson-Blake</b> Assistant Professor of Higher, Adult &amp; Counselor Education College of Education</p>
<p><b>Dr. Kim Larson</b> Associate Professor of Nursing College of Nursing</p>	<p><b>Dr. Philip A. Rothman</b> Professor of Economics Thomas Harriot College of Arts and Sciences</p>
<p><b>Dr. Carol Goodwillie</b> Associate Professor of Biology Thomas Harriot College of Arts and Sciences</p>	<p><b>Dr. Andrew Herdman</b> Assistant Professor of Management College of Business</p>
<p><b>Ms. Patricia Clark</b> Associate Professor of Theatre and Dance College of Fine Arts and Communication</p>	<p><b>Dr. Qin Ding</b> Associate Professor of Computer Science College of Technology and Computer Science</p>
<p><b>Dr. Paige Averett</b> Assistant Professor of Social Work College of Human Ecology</p>	<p><b>Dr. Charles P. Humphrey</b> Assistant Professor of Health Education and Promotion College of Health and Human Performance</p>



## **ECU Chapter of Sigma Xi, The Scientific Research Society**

Helms Award Lectures and Spring Induction Ceremony

### **SCHEDULE**

**Speaker Presentations**

**Induction Ceremony**

**Reception**

Tuesday, April 9, 2013

Mendenhall Room 244

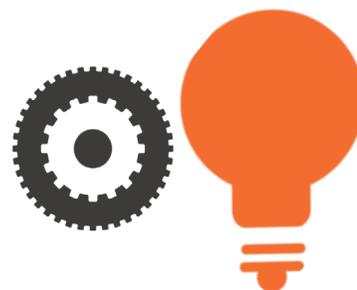
5:00 – 7:00 PM



## ORAL AND POSTER PRESENTATIONS

East Carolina University Research and Creative Achievement Week

Mentor Listing &  
Presenter Schedule by Index Number





## Mentor Listing

East Carolina University Research and Creative Achievement Week

Abdel-Rahman, A.	DeVita, Paul	Lai, Hsiao	Roper, Rachel
Aeby, Victor	DeWitt, Jamie	Lamb, Alfred	Rulifson, Roger
Agarwala, Ranjeet	DeWitt, Regina	Lamson, Angela	Russell, Mona
Allison, Leslie	Dolbier, Christyn	Landry, Craig	Ryan, Caitlin
Anderson, Ethan	Domire, Zachary	Larson, Kim	Sanders, Janet
Balanay, Jo Anne	Donica, Denise	Lemasson, Isabelle	Scemama, Jean-Luc
Ardon-Sayao, Marcelo	Dudley, Wade	Littleton, Heather	Schrenk, Matthew
Avenarius, Christine	Duffrin, Melani	Littlewood, Kerry	Sias, Shari
Averett, Paige	Egan, Ashley	Liu, Xuan	Sira, Natalia
Baker, Michael	Eppler, Marion	Love, Brian	Smith, Charles
Bareiss, Sonja	Ferreira, Rosana	Luczkovich, Joseph	Soderstrom, Kenneth
Bassman, Michael	Fonooni, Hamid	Macdonald, Rebecca	Song, Borim
Bauer, Margaret	Geyer, Christopher	Mahar, Matthew	Sperry, Ann
Bean, Eban	Goodwillie, Carol	Malek, Janet	Spuches, Anne
Becker, Craig	Greer, Annette	Mallinson, David	Stiller, John
Bertrand, Brenda	Grieve, Susanne	Manda, Alex	Taylor, Alan
Bonner, Heidi	Griffith, David	Mannie, Mark	Taylor, David
Bosse, Solveig	Gross Mcmillan, Amy	Mathews, Holly	Thomassen, Mary
Boudreaux, Edmond	Hapke, Holly	McKinnon, Jeffrey	Thompson, Beth
Bowler, Mark	Hee Lee, Myon	McMillen, Brian	Tisnado, James
Brault, Jeffrey	Hegde, Archana	McRae, Susan	Tulis, David
Bridges, Lance	Heidal, Kimberly	Mitra, Siddhartha	Valrie, Cecelia
Brown, David	Heimann Rios, Adriana	Morris, Jonathan	Van Dross, Rukiyah
Carpenter-Aeby, Tracy	Hines, Ian	Motalieb, MD	Van Scott, Michael
Chalcraft, David	Hodson, Patricia	Muller-Borer, Barbara	Vance Chalcraft, Heather
Chalovich, Joseph	Horne, Carolyn	Murashov, Alexander	Verbanac, Kathryn
Chambers, Crystal	Horsman, Eric	Nassehzadeh-Tabrizi, Moha	Vilkomir, Sergiy
Chin, Robert	Houmard, Joseph	Neal, Donald	Vohra, Nasreen
Christensen, Timothy	Hvastkovs, Eli	Palmer, Leonard	Wallen, Michelle
Clay, Maria	Jenkins, Walter	Pan, Xiaoping	Walsh, John
Clemens, Stefan	Jones, Terry	Perry, Jamie	Willson, John
Collier, David	Jubran, Hanna	Pokorny, Marie	Wingard, Christopher
Cooper, Nelson	Jung, Jae	Pravica, David	Wirtz, Derrick
Corbett, David	Kalinowski, Joseph	Raedeke, Thomas	Witczak, Carol
Crawford, Alleah	Keiper, Brett	Richards, Stephanie	Wolfe, Linda
Culver, Stephen	Kennedy, Anthony	Rigsby, Catherine	Yang, Li
Curtis, Walter	Kimmel, David	Robidoux, Jacques	
Day, Orville	Kline, Carol	Romack, Timothy	
Dean, Jian	Knudson, Warren	Roop, Roy	

# Graduate Oral Presentations

MSC Room 244

Biomedical Sciences – Graduate  
(8:30am – 4:45pm)

- |             |      |   |
|-------------|------|---|
| 8:30-8:45   | GO1  | Anandamide-metabolism by Cyclooxygenase-2 is necessary for induction of endoplasmic reticulum stress in tumorigenic keratinocytes, Eman Soliman   |
| 8:45-9:00   | GO2  | Fatty acids induce transient changes in mitochondrial redox homeostasis, which primes human preadipocytes to the metabolic consequences of NAD <sup>+</sup> depletion, Artie Carlyle Rogers |
| 9:00-9:15   | GO3  | PPP1R42, a testis specific PP1 binding protein, regulates centrosome dynamics in ARPE-19 cells, Nicole DeVaul   |
| 9:15-9:30   | GO4  | Induction of cap-independent BiP (hsp-70) synthesis during germ cell apoptosis, J. Kaitlin Morrison   |
| BREAK       |      |   |
| 9:45-10:00  | GO5  | In <i>Brucella abortus</i> 2308, Irr Controls Iron-Responsive Gene Regulation and Its Activity is Modulated by Iron-Dependent Degradation, David Martinson                                  |
| 10:00-10:15 | GO6  | Activation of CaMKK1 Signaling Increases the Expression of GLUT3 in Mouse Skeletal Muscle, J. Matthew Hinkley   |
| 10:15-10:30 | GO7  | Prohibitin coordinates an anti-inflammatory/antioxidant feedback loop from mitochondria to nucleus to protect the heart from severe inflammatory stress, Taylor Ann Mattox                  |
| 10:30-10:45 | GO8  | Retinoic acid reprograms human cutaneous lymphoma cells adhesion, Lei Wang  |
| 10:45-11:00 | GO9  | Pilot Testing the Augmentech Body Position Sensor on the Morbidly Obese Patient, Mark C. Hand   |
| BREAK       |      |   |
| 11:15-11:30 | GO10 | Potential Protection from Chemotherapy-induced Peripheral Neuropathy by Rho GTPase Inhibition, George A Howard IV   |
| 11:30-11:45 | GO11 | Effect of Hypoxia on Tumorigenesis in <i>C. elegans</i> Germline, Udaya Sree Datla  |
| 11:45-12:00 | GO12 | High-fat diet induced obesity increases serum myostatin but does not accelerate skeletal muscle atrophy, Steven L. Roseno   |
| 12:00-12:15 | GO13 | Micro RNA Regulation of Macrophage Activation, Matthew K. McPeck  |
| 12:15-12:30 | GO14 | Reliability of Ultrasound Obtained Subject Specific Parameters, Josh Leonardis  |
| BREAK       |      |   |

## MSC Room 244

Biomedical Sciences – Graduate  
(8:30am – 4:15pm)

1:30-1:45	GO15	How does dispersal through time interact with spatial dispersal to form zooplankton communities?, Lauren C. McCarthy
1:45-2:00	GO16	Urban and rural population structures of the invasive Tree-of-Heaven ( <i>Ailanthus altissima</i> ) along the eastern seaboard of the United States, Matthew S. Hansen
2:00-2:15	GO17	A Social Network Analysis of international trade of spiny dogfish, Andrea Dell’Apa
2:15-2:30	GO18	Ife-1: A Key Regulator of Germ Cell Protein Synthesis, Andrew J. Friday
2:30-2:45	GO19	Gastric evacuation and feeding ration of Atlantic spiny dogfish ( <i>Squalus acanthias</i> ) using a nonlethal lavage technique, Charles W. Bangley
2:45-3:00	GO20	Use of Praseodymium-142 in microsphere brachytherapy for treating Hepatocellular Carcinoma, MC Ferreira
BREAK		
3:15-3:30	GO21	Conservation of the CSS Neuse: Contemporary Approaches to 50 Years of Preservation, Jessica Caudill
3:30-3:45	GO22	Graphically and numerically, the Theory of General Relativity is shown to predict some properties of gravitational waves which agree with non-relativistic Quantum Mechanics, Shawn Culbrith
3:45-4:00	GO23	Does Nutrient Addition Mediate Top-Down Forces of Gape limited Predation in <i>Rana sphenoccephala</i> ?, Zachary Aardweg
4:00-4:15	GO24	Genetic analysis of reproductive behavior in a coastal population of the king rail, Carol Brackett
4:15-4:30	GO25	Hybridization in <i>Triodanis</i> , Emily Stewart
4:30-4:45	GO26	Determination of the Phylogeny and Taxonomy of <i>Pueraria</i> , William Cagle

## Great Room 1

Social Sciences – Graduate  
(8:30am - 12:00pm)

8:30-8:45	GO27	A comparative study of biomass cook stove exposure in Sri Lanka, Michael Phillips
8:45-9:00	GO28	A comparison of class performance by gender: health and physical activity class, Margie Clark
9:00-9:15	GO29	Visitor's Economic Value of Cape Hatteras National Seashore, Alyson Lewis
9:15-9:30	GO30	Body Image as a Mediator of the Relationship between Cancer-Related Changes in Appearance and Sexual Adjustment in Breast Cancer Survivors, Lindsey Rosman
9:30-9:45	GO31	Forgotten Maritime Prosperity of Seal Cove, Tremont, Maine, Baylus C. Brooks
9:45-10:00	GO32	What is the best response option configuration in online-administered Likert scales?, Hotaka Maeda
10:00-10:15	GO33	A Study of Foodie Markets through Tourism in Minneapolis, Erin Green
BREAK		
10:30-10:45	GO34	The Differential Framing Measure for Procrastination: An Implicit Measure of Procrastination Cognitions, Zachary Parker
10:45-11:00	GO35	Impact of exogenous changes on output: A forward looking perspective, Yu-Chieh Wang
11:00-11:15	GO36	Understanding Counterproductive Work Behavior: How Aggressive Employees Respond to Leader-Member Exchange, Steven B. Clark
11:15-11:30	GO37	Predicting Subjective Grammaticality Rating from 6 Different Sentence Categories, Nazenin Gurel
11:30-11:45	GO38	ABCD Model and Relational Cultural Theory as the Foundation for Community Engagement, Jason Radosevich
11:45-12:00	GO39	Interactions and Relationships between Kindergarten teachers and English Language Learners, Brittany Sullivan

## Great Room 1

Technology and Computer Sciences Graduate  
(1:00pm - 4:00pm)

1:00-1:15	GO40	Cloud Testing of Mobile Systems, Oleksii Starov
1:15-1:30	GO41	Cloud Computing Security Framework with Parity-based Partially Distributed File System, Ali Shahbazi
1:30-1:45	GO42	Velum and pharynx wall tracking system in MRI sequences using synchronized audio and HMM, Pooya Rahimian
1:45-2:00	GO43	Experimental Evaluation of Effectiveness of Modified Condition/ Decision Coverage Testing Criterion, Prudhvi Kumar Alapati
2:00-2:15	GO44	A Generic Framework for Online User Profile Creation from Text Documents, Majid Darabi
2:15-2:30	GO45	Lean Six Sigma Black Belt Project at Carolina Donor Services, David James Wilson
BREAK		
2:45-3:00	GO46	Knowledge is Power& and Sometimes Profit!, Erin Younge
3:00-3:15	GO47	House and Home, Aisling Millar
3:15-3:30	GO48	Wanderings, Cathy Perry
3:30-3:45	GO49	The Changing Relationship to Site, Placement, and Material, Patrick Hutti
3:45-4:00	GO50	Recontextualizing the Ceramic Vase, Gaines Bailey

**Monday****4.8.2013**

# Graduate Poster Presentations

MSC Room 221

Biomedical Sciences – Graduate

8:30 to 10:00 am

- GP1 Intratracheal Exposure to Silver Nanoparticles Promotes Enhanced Coronary Vascular Tone, Leslie C. Thompson
- GP2 Bioenergetic supply-demand mismatch in diabetic heart: role and redox-dependency of mitochondrial calcium influx, Fatiha Moukdar
- GP3 Assessing the decay of heterologous tolerance to morphine after varying lengths of treatment via intraperitoneal (I.P.) injection, Ben Thompson
- GP4 In Utero Bisphenol-a (bpa) Exposure, The Developing Immune System and Memory, Jason N. Franklin
- GP5 Evaluating The Potential Of Fish Oil To Enhance Antibody Production In A Model Of Diet-Induced Obesity, Mark Melton
- GP6 HTLV-1 basic leucine zipper factor (HBZ) interacts with cellular transcriptional coactivators to repress their activity, Diana Wright
- GP7 Perfluorooctanoic acid-induced cytotoxicity in primary cardiomyocyte culture, Qixiao Jiang
- GP8 Glutathione Peroxidase-4 plays a critical role in protection from metabolic syndrome and cardiac remodeling caused by diet-induced obesity, Lalage A. Katunga

10:00 to 11:30 am

- GP9 Cytokine peptide fusion protein therapy inhibits Experimental Autoimmune Myocarditis in the Lewis Rat, Shaun Reece
- GP10 Antagonism of CB1 Cannabinoid Receptors Alters Neuronal Morphology when Given in Adulthood but not during Vocal Development: Evidence for Adult-onset Endocannabinoid Tone, Tessa L. Holland
- GP11 SMAD3 and FoxO coordinately regulate MuRF-1 transcription, Lance M. Bollinger
- GP12 Extracellular processing of aggregate and its effect on CD44-mediated internalization of hyaluronan, Ben Danielson
- GP13 Velopharyngeal data on African American Children Using MRI, Lakshmi Kollara Sunil
- GP14 Effects of the Vaccinia O1L Protein on T-Cell Activation and Antibody Production, Anastasia Weeks
- GP15 AMP-Activated Protein Kinase Inhibits Vascular Smooth Muscle Cell Growth in a Vasodilator-stimulated Phosphoprotein-dependent Manner, Joshua Stone
- GP16 Human T-cell Leukemia Virus type 1 encoded protein HBZ modulates cell adhesion and migration, Ana Laura Fazio-Kroll

## MSC Room 221

## Biomedical Sciences – Graduate

1:30 to 3:00 pm

- GP17 Avian Synaptopodin 2 (Fesselin) Inhibits Actomyosin Dissociation By Atp And Alters The Structure Of Smooth Muscle Myosin Filaments, Nathaniel Kingsbury
- GP18 A possible role for the spinal Dopamine D3 receptor and the PKA-cAMP pathway in the emergence of morphine tolerance, A. Marley Jensen
- GP19 Identification of TBC1D1 and TBC1D4 as novel substrates of CaMKK1 in vitro, Jeremie L.A. Ferey
- GP20 Discovery and characterization of cyclic-adenosine monophosphate (cAMP) second messenger signaling system in *Borrelia burgdorferi*, Ki Hwan Moon
- GP21 Activation of central nicotinic acid receptor GPR109A increases blood pressure in conscious rats, Samar Rezaq
- GP22 Mechanism of Central Atypical Cannabinoid Receptor GPR18-Mediated Hypotension in Conscious Rats, Anusha Penumarti
- GP23 Functional dissection of Mcm10: exploring the essential functions of a replication factor, Michael Reubens
- GP24 Cytokine-neuroantigen fusion proteins as antigen-specific tolerogens in experimental autoimmune encephalomyelitis, Daniel S. Wilkinson
- GP25 Activation of the proton sensing G-protein coupled receptor, GPR4, decreases cell spreading and regulates focal adhesion dynamics through the G12/13/Rho signaling pathway, Calvin R. Justus

3:00 to 4:30 pm

- GP26 Investigating the Interaction of RecQ4 and Mcm10 in *Drosophila melanogaster*, Wayne A. Rummings, Jr.
- GP27 Intravenous vs. Intratracheal Administration of C60 Differentially Promotes Constriction or Impairs Relaxation of the Isolated Coronary Artery, Nathan.A. Holland
- GP28 Study of Imaging <sup>142</sup>Pr Microspheres Using the Gamma Emission Spectrum in a Clinical Setting, Christopher Pelletier
- GP29 Using LCM to examine MADS-box gene expression in the upper and lower floral meristems of maize, Kate Nukunya
- GP30 Comparison and optimization of different RNA extraction procedures for circulating microRNA analysis, Dorothy Dobbins
- GP31 Hunting for the Collar Protein Seen in *Borrelia burgdorferi* Periplasmic Flagella, Aaron Yerke
- GP32 Paternal Exercise and Diet Epigenetically Programs Energy Expenditure and Insulin Metabolism in Mice Offspring, Michael Koury

Monday

4.8.2013

## MSC Room 221

## Education - Graduate

3:00 to 4:30 pm

- GP33 Impacting Health Perceptions of 4th Grade Students with a Food-based Science Curriculum, Jenna Little
- GP34 Effectiveness of a Therapeutic Hand Skills Camp on Handwriting Skills, Brittany Woerner
- GP35 Examining the use of the Shore Handwriting Screening to assess the handwriting skills of pre-kindergarteners, Erin Schofield
- GP36 Integrating Coordinated School Health Program And Clinical Interventions To Prevent Suspension and Academic Failure, Garrett M. Wingate
- GP37 WhyTry Program's Impact on Student Motivation and Emotional Literacy, Amber Nichole Dew
- GP38 Parental Perceptions of Nondisabled Preschoolers in Inclusive Classroom Settings, Erica L. Maine
- GP39 Graduate Programs' Instructional Preparation Activities: Perspectives from Former Doctoral Candidates & Dissertation Advisors, Misty Joyner

## MSC Balcony

## Human Health - Graduate

8:30 to 10:00 am

- GP40 Increased public awareness of HIV/AIDS and HIV testing does not stem the increasing rate of HIV infection in rural Swaziland, Africa, Hunter Johnson
- GP41 The Effects of Footwear on Gait Parameters: A comparison of traditional running shoes, minimalist footwear, and barefoot running, Justin Loss
- GP42 Relationship Between Muscle Stiffness And Strength: A Pilot Study, Jamie E. Hibbert
- GP43 Measuring pelvic tilt with a smartphone inclinometer application, Michelle Spencer
- GP44 Oral Strengthening Exercises in Patients with Parkinson's Disease, Graham Schenck
- GP45 Effects of Step Length on Patellofemoral Joint Stress in Female Runners with and without Patellofemoral Pain, Olivia Ratcliff
- GP46 The Association of Knee Extension Power with Chair Rise Performance at Varied Knee Angles, Kathryn Vick
- GP47 The Predictive Validity Of The Sway Sled® As A Measure Of Fall Risk In Community-Dwelling Older Females, Brittany Fowler
- GP48 Stuttering Inhibition during the Perception of Infrared Kinematic Marker Movement, Lin Sun

## MSC Balcony

### Human Health – Graduate

**10:00 to 11:30 am**

- GP49      The Effects Of Alzheimer’s Disease On Skeletal Muscle’s Response To Exercise, Kristen A. Lattimore
- GP50      Lipid oversupply remodels DNA methylation in genes that play vital roles in fatty acid oxidation, Jill M. Maples
- GP51      Effects of Increased Muscle Strength on Hip and Knee Motion During Stance Phase of Walking in Adolescents Who are Obese, Melissa B. DeCarlo
- GP52      Psychological and Physiological Effects of a One-Week Mindfulness-Based Intervention, Summer Anderson
- GP53      Skeletal Muscle Mitochondria With Alzheimer’s Disease, Polly S. Martin
- GP54      Effects Of Resistance Training On Lower Extremity Muscle Strength In Adolescents Who Are Obese, Jennifer Edwards
- GP55      The Influence of Foot Type and Gender on Frontal Plane Motion at the Hip During a Single Leg Landing, Elizabeth Kitchens
- GP56      Physicians Manage Patient Cultural Beliefs through Counseling, Aniqa Shahrier

**1:00 to 3:00 pm**

- GP57      The Impact of Return-to-Work Programs, Michelle Glasgow
- GP58      Gait Biomechanics Of Healthy Old Adults Do Not Change After Twelve Weeks Of Plantarflexor Strength Training, Rachel Tatarski1
- GP59      Gait Biomechanics Alter Due to Variations of Locomotion Surfaces, H. Bennett
- GP60      Post-disaster implications of policy changes to North Carolina mosquito control programs Jonathan Harris

**3:00 to 4:30 pm**

- GP61      Effects of mentor-based exercise on overweight adolescents’ physical self-perceptions and aerobic fitness, Sawyer, M
- GP62      Effects of Video Feedback on Football Player’s Skill Development, Charles Addison Harvey Jr
- GP63      Aromatherapy Rest Period on an Inpatient Cancer Services Unit, Amy M. Jones
- GP64      The Effect Of Carrying A Load On Patellofemoral Joint Forces In Males And Females During Inclined Walking, Rebecca Krupenevich
- GP65      Applications of Stochastic Processes in Cancer Research, Kristin Steely

**Monday      4.8.2013**

## Social Room

## Natural Sciences – Graduate

8:30 to 10:00 am

- GP66 The origin and evolution of the C-terminal domain of the largest subunit of RNA Polymerase II, Chunlin Yang
- GP67 The Migration of Salt Marsh Zonation Across Latitude, Casey B. Nolan
- GP68 Migration patterns of spiny dogfish as inferred from mark-recapture, acoustic, fishery landings, and fishery independent data, Jennifer L. Cudney
- GP69 How far past metamorphosis do the impacts of predators on larvae last?, Scott P. Jones
- GP70 What do you know about water quality? Using Cultural Consensus Analysis to determine the educational value of citizen-based water quality monitoring programs and other environmental-themed groups, M. Chad Smith
- GP71 Are the sea nettles *Chrysaora quinquecirrha* in the Neuse River Estuary sexually reproducing?, Mahealani Y. Kaneshiro-Pineiro
- GP72 Shoreline Change Analysis of the Twenty Coastal Counties of North Carolina, David W. Hawkins
- GP73 Submarine Groundwater Discharge in the Antarctic, Jared Crenshaw

10:00 to 11:30 am

- GP74 Effects of Saltwater Intrusion on the Survival of Bald Cypress (*Taxodium distichum*) Forested Wetlands, Amanda S. Powell
- GP75 Maternal Strontium Input of Striped Bass (*Morone saxatilis*) to their Progeny: Determining a Mother's life history from the Progeny, Brie A Elking
- GP76 Major and trace element composition of gahnite as an indicator of rare element granitic pegmatites, Jason Yonts
- GP77 Investigation of the stratigraphy and petroleum geology of the Alexander siltstone in the Appalachian foreland basin, West Virginia, USA, Katie Cummings
- GP78 The redox state of the ocean during the formation of 1.69 Ga late Paleoproterozoic Banded Iron Formations, Erica Serna
- GP79 Estuarine shoreline change along the Outer Banks barrier-island system: Insights from Ocracoke to Nags Head, NC, Ian Conery
- GP80 Using Garnets as a Granitic Pegmatite Classification Tool, Leatha Moretz
- GP81 Does the quantity of resources in the environment alter the impact of multiple predators on their prey?, Tyler R. Gelles

## Social Room

## Natural Sciences – Graduate

1:30 to 3:00 pm

- GP82 The Thermodynamics of Cadmium Binding to Human Cardiac Troponin C: Investigating new Mechanisms of Cadmium Toxicity, Lindsay Fulcher
- GP83 Assessing the Monophyly of Red Algae and Green Plants Via Conserved Core Informational Genes, Justin Perry
- GP84 Natal Origin of Cape Fear River Striped Bass (*Morone saxatilis*) Inferred Through Otolith Chemistry, Evan Knight
- GP85 Urban Stormwater Wetland Restoration Project: Putting Rainwater Back In Its Place, C. Ryan Poythress
- GP86 Habitat Utilization of 2 Separate Stocks of Adult Striped Bass, *Morone saxatilis*, in the Inshore and Offshore Waters of North Carolina Inferred through Otolith Microchemistry, Daniel Zurlo
- GP87 2011 Mississippi River Flood Deposition and How it Compares to Other Event Deposits, David R. Young
- GP88 Defining Past Morphodynamic and Paleoenvironmental Conditions Associated with Barrier Island Collapse Events, Nick Zaremba
- GP89 A record of post-Last Glacial Maximum East Asian Monsoon variability from Sunda Shelf sediments, Anna Lee Woodson
- GP90 Thermostatistical Analysis of Financial Markets, Frank R. Brown

3:00 to 4:30 pm

- GP91 Emplacement mechanisms, timing, and flow characteristics of the intrusive sheet network on the southern margin of Mount Hillers, Henry Mountains, southern Utah, ErikThornton
- GP92 Radio-tracking king rails in northeastern North Carolina, Jaan R. Kolts
- GP93 Mineralogy and Geochemistry of the Valentines Iron Formation, Eastern Uruguay , Lancaster, Heather
- GP94 Translocation of myopodin during differentiation in HT-29 cells, Kelli Shortt
- GP95 Mitotic chromosome phenotypes associated with a panel of Mcm10 mutants in *Drosophila*, Ritu Dalia
- GP96 Electrochemical Detection of Bioactivated Benzo[a]Pyrene Genotoxicity at TP53 Oligomers, Caitlin M. Trumbo
- GP97 Tracing Saltwater Intrusion and its Effects on Local Stands of Atlantic White Cedar at the Preyer Buckridge Coastal Preserve, James Pitt
- GP98 Notes on the total mercury concentration in muscle tissue of longnose gar, Jillian H. Osborne

Monday

4.8.2013

## Social Room

## Social Sciences – Graduate

8:30 to 10:00 am

- GP99 Birth Factors in Relation to Sexual Orientation and Views about Sexual Orientation, Ashley E. Robinson
- GP100 Mexico's Lost Decade: The Peculiar Consequences of the North American Free Trade Agreement, Maria Esther Hammack
- GP101 Lost in Translation? Seasonal Forecasting for North Carolina Tourism Businesses, Emily Ayscue
- GP102 Operationalizing Student Use-of-Self in Social Work Education, Tamyra Jovel
- GP103 An Analysis of Burial Clusters Within Structure 7 at the Town Creek Site, Montgomery County, North Carolina, Heidi Rosenwinkel
- GP104 Exploring Mental Illness Stigma in the U.S. Army, Jessica Handloff
- GP105 A Comparison of the Effects of Different Themed Residential Living-Learning Communities on Alcohol Use, Non-Prescription Amphetamine Use and Sexual Health Risk Behaviors in First-Year College Students, Anne Corinne Carroll

10:00 to 11:30 am

- GP106 An exploration of marital status and stress among military couples, Meghan H. Lacks
- GP107 Recreational factors that affect positive youth development through outcome-based programming, Brittany Washington
- GP108 Intergroup Contact, Intercultural Communication Apprehension, and Social Perspective Taking, S. Austin Cavanaugh
- GP109 Recreation, Planning, and the Rural Community - The relationship between the professions and its effect on rural communities, Justin Oakes
- GP110 Factors related to Self-Esteem in Children and Adolescents with Sickle Cell Disease, Alaina E. Boyle
- GP111 Making the Transition: Biofeedback with Military Personnel, Dominique M. Clemmons-James
- GP112 Recycling Behavior Change, S. JaNell Lewis

## Social Room

### Social Sciences – Graduate

1:30 to 3:00 pm

- GP113 Modern Memories: Religious Differences in Remembering the Battle of Guilford Courthouse, Zachary Parker
- GP114 An Exploration of Biopsychosocial and Marital Health in Military Couples Using Heart Rate Variability, Amelia Muse
- GP115 An Importance- Contribution Assessment of Leadership Skills among Collegiate Club Sport Participants, Brittany Hopewell
- GP116 Lack of education, time, and transportation are the most prevalent barriers to access of preventive care services among the migrant farmworker community in Eastern NC, William Dalrymple
- GP117 Certified Safe Logging, Demetria Powell
- GP118 Ergonomics Evaluation of a “5-gang” Drill/Tap, Ronan McAleenan
- GP119 Automobile Technician Productivity Improvement using Lean Six Sigma Techniques, Telford Locklear

**Monday 4.8.2013**

# Graduate Online Presentations

## Graduate Online Oral Presentations

General Category



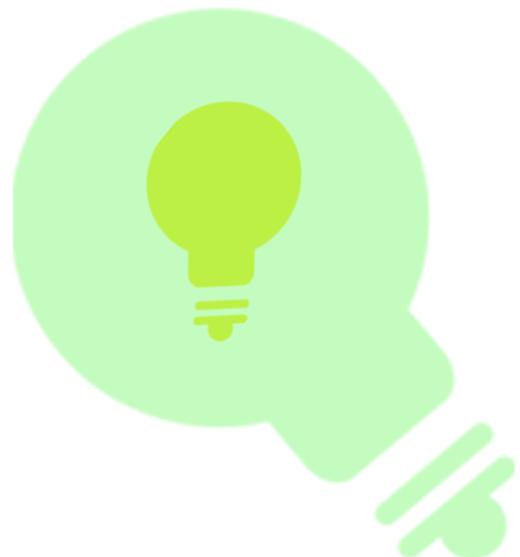
- GDO1 iPads in Middle School Health Education, Amy Johnson Stadiem
- GDO2 Teen Pregnancy: A comparison of Educator Curriculum and Making Proud Choices, Mark Whitman
- GDO3 Teacher instruction: Pretest/posttest analysis of student knowledge, Matt McDaniel
- GDO4 Cumberland County Landfill Six Sigma Implementation, Brittany Ryan
- GDO5 Migration of Legacy applications using NoSQL database, Pouyan Ghasemi
- GDO6 Six Sigma Minimizes the Erosion, Robert A. Johnson
- GDO7 Examining The Online Behavior Of The Visually Impaired, Julian Brinkley
- GDO8 Optimization Strategies for Cloud / Mobile Interaction, David Bleicher

## Graduate Online Poster Presentations

Education and Health

Online

GDP1	2011-2012 Grades in Healthful Living, Susan Buzzard
GDP2	The Hidden Value of Art, Rachel Vieira
GDP3	Academic Failure: Coordinated School Health Model, Brandi Wilson
GDP4	A comparison of 9th grade student's body mass index, body weight, skin fold measurement and blood pressure, Adam Hamrick
GDP5	A Comparison of End-of-Course scores in the Health Sciences Classroom, Jacqueline O. Watson
GDP6	Nutritional Guidance in Pre-Adolescent Female's Food Intake: Teaching Girls to Make Better Food Choices, Dixie Holden
GDP7	Does an integrated nutrition education program affect Body Mass Index and knowledge retention of fifth grade students?, Erika M. Dawson
GDP8	The Effects Of Ankle Mobilizations On Hip Strength, Zachary Long
GDP9	Current Status of Mosquito Control Programs in North Carolina: The Need for Cost-Effectiveness Analysis, Katie L. Supler



# Undergraduate Oral Presentations

## MSC Room 244

### Biomedical Sciences – Undergraduate (8:30am –9:45am)

- |           |     |   |
|-----------|-----|---|
| 8:30-8:45 | UO1 | Molecular Control of Dedifferentiation By RNA-Binding Proteins in <i>C. elegans</i> Germ Line, Austin Brokamp                           |
| 8:45-9:00 | UO2 | The Role of Mitochondrial Biogenesis in Human Mesenchymal Stem Cell Differentiation and Acquisition of a Cardiac Phenotype, Arun Ajmera |
| 9:00-9:15 | UO3 | Role of NKT Cells in fibrosis of the liver, Edward Sanderlin  |
| 9:15-9:30 | UO4 | Differential aging-related changes in Dopamine receptor expression levels (D1, D2, and D3) in the striatum, Mukund Patel                |
| 9:30-9:45 | UO5 | Two similar protein synthesis factors (IFE-3 and IFE-1) have very different roles in sperm and oocyte development, Jacob Subash         |

BREAK

### Humanities – Undergraduate (10:00am– 11:15am)

- |             |      |   |
|-------------|------|---|
| 10:00-10:15 | UO6  | Eastern North Carolina Teachers' Attitudes Toward Using LGBT-Inclusive Literature in Elementary School Classrooms, Karen Ackiss |
| 10:15-10:30 | UO7  | Historical Literature and the 1898 Wilmington Race Riot, Alyssa Champine  |
| 10:30-10:45 | UO8  | Righteous Gentiles of the Holocaust, Sandra Trybus  |
| 10:45-11:00 | UO9  | Forgiveness, The Cure for Evil in William Faulkner's 'Sanctuary' and Tim Gautreaux's 'The Missing', Rachel Ward                 |
| 11:00-11:15 | UO10 | Turning On the Volume: Anthony Minghella's film adaptation of Charles Frazier's Cold Mountain, Maizul I. Cobeo                  |

BREAK

## Great Room 1

### Natural Sciences – Undergraduate (1:30pm-2:45pm)

- |           |      |   |
|-----------|------|---|
| 1:30-1:45 | UO11 | LuCIDD Optical Setup, Dr. Regina DeWitt, Mary E. Taylor   |
| 1:45-2:00 | UO12 | The Theory of General Relativity predicts some results which are in agreement with Non-Relativistic Quantum Mechanics, even though Einstein published the theory 9 years (1916) earlier than Quantum Mechanics was known, Maneesh Jeyakumar |
| 2:00-2:15 | UO13 | Delayed self-fertilization in <i>Triodanis perfoliata</i> , an annual plant species, Hetal Patel  |
| 2:15-2:30 | UO14 | On the validity of the northern fog-basking beetle ( <i>Onymacris unguicularis schulzeae</i> ): molecular phylogenetics complement previous morphological assessment of this Namib Desert endemic, Rachel Pollard                           |
| 2:30-2:45 | UO15 | Proposed origin of black mats found at the Younger Dryas boundary, Abigail Maiorana-Boutillier  |

BREAK

### Social Sciences – Undergraduate (3:00pm-4:30pm)

- |           |      |  |
|-----------|------|--|
| 3:00-3:15 | UO16 | Dietary Patterns of Female Hispanic Immigrants, Kimberly Opsal   |
| 3:15-3:30 | UO17 | Police Integrity: The promotion of ethical behavior and elimination of the abuse of power from police officers, Dany Hernandez                         |
| 3:30-3:45 | UO18 | Sea-level Rise Literacy and Perceived Risk in Eastern North Carolina, Alyssa Randall   |
| 3:45-4:00 | UO19 | FoodMASTER Science Curriculum Increases 4th Graders Multidisciplinary Science Knowledge, Caitlin Collins   |
| 4:00-4:15 | UO20 | There Is No Planet B: The Most Frequently Used Green Initiative Practices of North Carolina Bed and Breakfasts, Mary Stuart Sanderson                  |
| 4:15-4:30 | UO21 | Effects of Implicit Theory of Personality and Big 5 Personality on Responses to Biased Statements during Intercultural Communication, Michelle Collins |

**Wednesday 4.10.2013**

# Undergraduate Poster Presentations

MSC Room 221

Biomedical Sciences – Undergraduate

8:30 to 10:00 am

- UP1 Epigenetic Effect of Paternal Diet and Exercise on Offspring Activity Level, Matthew Parker
- UP2 Inhibition of Vascular Smooth Muscle Growth by the Soluble Guanylyl Cyclase Activator BAY 60-2770, Danielle N. Martin
- UP3 Characterization of the specific interaction between HTLV-1 encoded protein HBZ and DNA helicase RecQL5, Astor Ankney
- UP4 Impacts of nicotine on the nAChRs and selected microRNA in *Caenorhabditis elegans*, Joseph Ryan Polli
- UP5 Investigating metal oxide nanoparticles toxicity and mobility in aqueous environment: impacts of pH and temperature, Tommy Zhang
- UP6 Translational control during neonatal male germ cell development, Evelyn P. Kaye
- UP7 Combination of Dendritic Cell Therapy with Conventional Chemoradiation Therapy Improves Survival for Rectal Cancer in a Murine Model, Jasmine Walker
- UP8 Genetic analysis of pollen color, number and viability in two subspecies of *Triodanis* and their hybrids, Joshua Thigpen

10:00 to 11:30 am

- UP9 The Effect of Lithium Chloride Combined With a Mineral Mix in a Rat Model of Mania, Cara E. Carr
- UP10 The Human T-cell Leukaemia Virus type 1 (HTLV-1) encoded protein, HBZ, stabilizes and up regulates the c-Jun protein and gene, Martin Pearce
- UP11 Changes in foot strike pattern and running mechanics following accommodation to minimalist footwear, Jennifer Warren
- UP12 Does volitional consumption of ethanol by the mHEP rat produce tolerance?, Shelby N. Barry
- UP13 Effects of the Viral A35 Protein on MHC Class II Protein Trafficking, Corey Boles
- UP14 A Pilot Study of Foot Stiffness in Barefoot and Traditionally Shod Runners, Erica A. Bell
- UP15 Regulation of Germline Stem Cells via PUF proteins & Regulation of de-differentiation via HIF-1 proteins, Quan Nguyen
- UP16 NigD lipoproteins encoded by BF638R\_1335, 0588 and 0743 aid in the protection of *Bacteroides fragilis* against prolonged oxidative stress, Samantha Palethorpe
- UP17 The Effects of A35R on Lymphocyte Subpopulations in Mouse Lung, Shayna Mooney

## MSC Room 221

### Human Health - Undergraduate

**1:30 to 3:00 pm**

- UP18      Cardiovascular risk factors relating to alcohol consumption in students at East Carolina University, Hannah Woolard
- UP19      Comparison Of Hip Worn And Wrist Worn Activity Monitors For Assessment Of Physical Activity, Thomas F. Mahar
- UP20      Fast Food Consumption and Weight Change Among College Students, Based on Culinary Knowledge, Lisa Bacon
- UP21      Satisfaction among Patients and Families in a Pediatric Healthy Weight Treatment Center, Kristen Everett
- UP22      The Effects Of Exercise On Skeletal Muscle In Alzhiemer's Disease, Mary A. Greyard

**3:00 to 4:30 pm**

- UP23      Effects of Exercise on Blood Biomarker Profiles in a Triple-Transgenic Mouse Model of Alzheimer's Disease, Morgan Haskins
- UP24      GSK-3-Beta Activation as a Means to Reduce Maladaptive Neuronal Sprouting Associated with Spinal Cord Injury Pain, Angela Korleski
- UP25      An Examination of Cigarette Smokers and Dietary Habits, Julie Barthel
- UP26      Evaluation of metabolic risk factors in lean ECU undergraduate students, Maidah Atta
- UP27      Exploring the Use of Social Media for Health Education in a Rural High School Population, Ashley N. Minton
- UP28      Improving Health Literacy Among Latino Mothers in Duplin County, Emily O'Farrell

**Wednesday**

**4.10.2013**

## Social Room

## Natural Sciences – Undergraduate

8:30 to 10:00 am

- UP29 Controlled burning and Eastern bluebird reproductive success at the West Research Campus, East Carolina University, Taylor G. Abernethy
- UP30 Biofilms as a Physiological Response to pH Stress in Extreme Alkaliphiles, Megan Shaia
- UP31 Investigating Saltwater Intrusion in the southern Albemarle Estuarine System, North Carolina, Jessica Kegel
- UP32 Settlement Patterns and Success Rates in Eastern Bluebirds, Rachel J. Smith
- UP33 Developing a Panel of Microsatellite Markers for Common Moorhen (*Gallinula chloropus*) as a Research Tool for Population Studies, Matthew T. Edwards
- UP34 Non-Reducing sugars as cryopreservatives, Morgan Barker
- UP35 Behavioral Correlates of a Masculinized Trait in Female Threespine Stickleback: Does Social Complexity Matter?, Benjamin Woodall
- UP36 Tectonic Evolution of the Contentnea Creek pluton Wilson, North Carolina, Richard Burns

10:00 to 11:30 am

- UP37 Biometric analysis of morphological traits differentiating two subspecies of *Triodanis* Jonathan Caban
- UP38 Determining the accuracy of a single-beam SONAR devices' ability to measure the abundance of submerged aquatic vegetation, Audrey Pleva
- UP39 East Coast Vs. West Coast Typhoons in the Philippines, Mark Nissenbaum
- UP40 Synthesis of Potentially Biologically Active Compounds via Oxidative Cyclizations, Alex Simmons
- UP41 Evaluation of the use of electrospray ionization mass spectrometry (ESI-ToF) as an online detector for Gel permeation chromatography characterization of synthetic polymers, Jocelyn Francis
- UP42 Mineralogical Record of the Change in Direction of the Brazil Current and the Fate Amazon-derived Sediments during Periods of North Hemisphere Glaciation, Katie Erb
- UP43 Synaptopodin-2 Isoform A Expression in Human Colon Adenocarcinoma Cells, Chase Stocks
- UP44 Mapping of the maize mutant, indeterminate floral apex1, Richard Ullberg

## Social Room

### Social Sciences- Undergraduate

1:30 to 3:00 pm

- UP45 Water We Eating? Developing a Nutrition Science Activity for a Water Quality Awareness Summer Camp Experience, Kimberly Kruse
- UP46 A Comparative Study of Infant Chimpanzee Behavior in Captivity: Asheboro, NC, Adam Johnson
- UP47 Are There Really Rules and Expectations in Talking Relationships? Gender Differences in Relationship Formation among Young Adults, Anne E. Phoenix
- UP48 Assessment on the Necessity of Sustainability Education, Courtney Leffelman
- UP49 The Effects of Self-Deprecating Humor on Candidate Approval when Appearing on Late-night Comedy and Soft News Programs, Jeffrey Coleman
- UP50 Comparison of Mental Health Between First-Year College Students Residing in Living Learning Communities and Traditional On-Campus Housing, Heather Wiles
- UP51 Mediating Effects between Perceived Self-Esteem, Self-control, and Health Risk, Juliann Stalls
- UP52 FoodMASTER Summer Science Camp Experience Impacts Participants' Attitudes Towards Nutrition and Cooking, Sarah Sykes
- UP53 Are we just TALKING or are we actually DATING?: Examining the transition from talking relationships to committed, dating relationships among young adults, Ashley P. Johnson

3:00 to 4:30 pm

- UP54 Personality, Aggression, and Hockey, Andrew Theado
- UP55 Long-Term Effects of Brief Intercultural Interactions Via videoconferencing, Taylor Gulley
- UP56 Integrated Food-Based Science Curriculum Increases Fourth Graders Math Knowledge, Callan Hoerdemann
- UP57 Utilizing a Single-Session Medication Adherence Intervention to Improve Disease Management Among African American Women with Diabetes, Sarah Williamson
- UP58 An Examination of Women's Roles and Status in the Aztec Empire, Alexandra Terry
- UP59 What does talking really mean to young adults? Perceptions of talking behaviors in today's relationship formation, Ayrien F. Davis
- UP60 The Mindful Motherhood for Pregnant Women Project, Kristen Williams
- UP61 Carryover Effects of Emotions on Persuasive Messages, Monique Heath
- UP62 Aztec Music Education Before and After The Spanish Conquest, Stormy De Lucia

**Wednesday**

**4.10.2013**

## Balcony

## Technology and Computer Science

8:30 to 10:00 am

- UP63 Is there a link between “green” certification and job attainment in today’s competitive market? Matthew Dickerson
- UP64 Lyman filament extruder, Brad Raynor
- UP65 Value of AutoCAD in Manufacturing Industry as compared to New Technology Standards, J. Blake Crowder
- UP66 Spool Mold Design, Will Garren
- UP67 Effects of Lost Worktime In a Manufacturing Facility, Shane Siver
- UP68 Re-Design Of Core-Winding Area Layout For The Gct Area Of Abb, Masato Nagakane
- UP69 Mitsubishi Industrial Robot, Mohammed T. Abdo

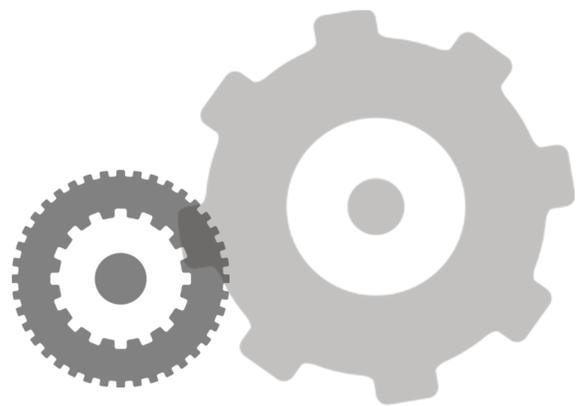
# Undergraduate Online Presentations

## Undergraduate Online Poster Presentations

General Category

Online

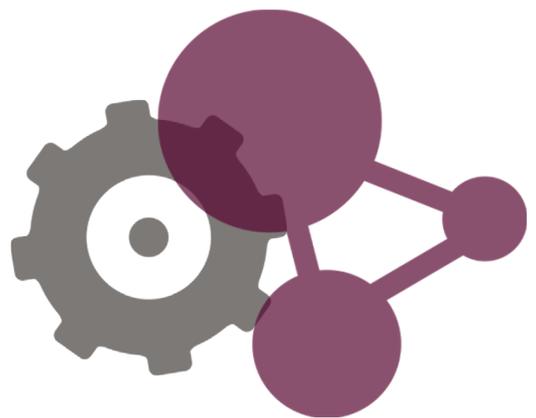
UDP1	Real time bioluminescent monitoring of circadian clock gene expression, Khoa Do
UDP2	Litholink stone risks in a pediatric nephrology practice in Eastern North Carolina, Axita C. Patel
UDP3	A Water Consumption Audit of Selected ECU Dormitories, Ryan Knapp
UDP4	Solar Panel Installation on ECU Warehouse Campus, Scott Barber
UDP5	Insect Succession on Pig Carcasses in Eastern North Carolina, Victoria Banks
UDP6	The Benefit of Energy Efficient Lighting, William Pate





# **ABSTRACTS: GRADUATE**

Oral, Poster, & Online Presentations



# Graduate Oral Presentation Abstracts (Face-to-Face)

G01

**Anandamide-metabolism by Cyclooxygenase-2 is necessary for induction of endoplasmic reticulum stress in tumorigenic keratinocytes,** Eman Soliman<sub>1</sub>, Allison Danell<sub>2</sub>, and Rukiyah Van Dross<sub>1,1</sub> Department of Pharmacology and Toxicology, Brody School of Medicine, <sub>2</sub> Department of Chemistry, East Carolina University, Greenville, NC

Non-melanoma skin cancer (NMSC) is the most common cancer in the United States. NMSC overexpresses cyclooxygenase-2 (COX-2), differentiating them from normal epithelial cells. COX-2 metabolizes arachidonic acid to prostaglandins of the E-, F-, D-, and J-series. J-series prostaglandins induce apoptosis by induction of endoplasmic reticulum (ER) stress. In response to excessive ER stress, sensors such as PKR-like ER kinase (PERK) and activating transcription factor 6 (ATF6) are activated and initiate the apoptotic cascade by increasing the expression of C/EBP homologous protein (CHOP 10). Anandamide (AEA), an endogenous cannabinoid neurotransmitter, is metabolized by COX-2 to ethanolamide conjugates of E-, F-, and D-series prostaglandins. Our previous study showed that J-series prostaglandins are also metabolic products of AEA however, the identity of the specific J-series prostaglandins produced was unknown. In the current study, we test the hypothesis that the ethanolamide conjugates of J-series prostaglandins (PGJ2-EA) produced by AEA initiate AEA-induced ER stress in NMSC cells.

To determine if AEA induces ER stress in NMSC cells we examined the phosphorylation of PERK and eukaryotic initiation factor 2 alpha (eIF2 $\alpha$ ), the induction of CHOP 10 expression and the nuclear translocation of ATF 6 by Western blot or immunocytochemical analysis. Our data show that AEA increased PERK and eIF2 $\alpha$  phosphorylation, CHOP 10 expression and ATF 6 nuclear localization. To determine whether COX-2 is necessary for AEA-induced ER stress, non-tumorigenic HaCaT keratinocytes, which express low basal levels of COX-2, were transfected with a plasmid containing human COX-2 cDNA or an empty vector and the cells treated with AEA or drug vehicle. We observed that AEA-induced phosphorylation of PERK and eIF2 $\alpha$  occurred only in the presence of COX-2. To identify the specific J-series PGs synthesized from AEA in NMSC cells, JWF2 keratinocytes were treated with AEA, the PGs produced in the culture media analyzed using LC/MS. Our data show that ethanolamide conjugates of 15-deoxy" 12, 14PGJ2, "12PGJ2, and PGJ2 are metabolic products of AEA.

These findings suggest that COX-2 mediates the induction of ER stress by AEA which may be responsible for the pro-apoptotic activity of AEA in tumor cells. As such, AEA could be an ideal topical agent for the eradication of NMSC.

G02

**Fatty acids induce transient changes in mitochondrial redox homeostasis, which primes human preadipocytes to the metabolic consequences of NAD<sup>+</sup> depletion,** Artie Carlyle Rogers, Barbara Davis, Jacques Robidoux, East Carolina University, Greenville, NC

Adipose tissue dysfunction has been implicated as a major risk factor in the development of obesity-associated metabolic abnormalities. One hypothesis as to why adipose tissue function diminishes is that preadipocytes fail to replace older and dysfunctional lipid filled adipocytes. How an obesogenic environment causes a loss of preadipocyte adipogenic potential is not fully understood. Using conditionally immortalized human preadipocytes, we tested the effects of a physiologically relevant mixture of fatty acids (FA) on mitochondrial and cellular redox, metabolic fitness and cell viability. We report that a FA concentration above 600  $\mu$ M initiates a transient, rather than a persistent, elevation of intramitochondrial superoxide (< 30 min), hydrogen peroxide (< 60 min) and inner mitochondrial membrane lipid peroxide (< 120 min) production that could be prevented by use of mitochondrial selective scavengers of superoxide and alkyl radicals. Similar changes in cytosolic redox parameters were not observed within the first twelve hours, demonstrating that mitochondrial reactive oxygen species (ROS) buffering systems were able to buffer this initial increase. A delayed and massive surge in cytosolic ROS eventually occurs, but it is preceded by a progressive depletion of NAD<sup>+</sup> and coincides with the collapse of the inner membrane potential, the opening of the mPTP, as well as a decrease in ATP synthesis and ultimately death. Together our results reveal that FA induced ROS production does not follow the current paradigm of a massive ROS/oxidative event leading to cell death, but rather suggests that transient changes in redox homeostasis can prime preadipocytes for mitochondrial dysfunction and cell death.

## G03

**PPP1R42, a testis specific PP1 binding protein, regulates centrosome dynamics in ARPE-19 cells**, Rong Wang, Nicole DeVaul, and Ann O. Sperry, Department of Anatomy and Cell Biology, Brody School of Medicine, East Carolina University, Greenville

Most cases of male infertility are idiopathic and only 10-20% of cases can be successfully treated. In order to design appropriate treatments for male infertility, the molecular mechanisms underlying spermatogenesis must be better understood. Spermiogenesis, the third phase of spermatogenesis, involves transformation of germ cells from round, non-polar spermatids into elongated spermatozoa. This transformation involves dramatic reorganization of the microtubule cytoskeleton with formation of unique microtubule structures including the manchette and flagellum. We have previously identified PPP1R42 as a regulatory subunit of protein phosphatase-1 (PP1) in testis. PPP1R42 is first associated with the manchette followed by translocation to the centrosome at the base of the flagellum in elongated spermatids. In addition to its localization at the centrosome, PPP1R42 is expressed in ciliated tissues suggestive of a role for this protein in flagellar biogenesis. Co-immunoprecipitation and immunofluorescence experiments demonstrate that PPP1R42 forms a complex and co-localizes with 3-tubulin at the base of cilia in the polarized cell line, ARPE-19, indicating a conserved role for PPP1R42 at the centrosome. In order to further investigate the role of PPP1R42 in centrosome function we used siRNA to knockdown the expression of PPP1R42 in these cells. This treatment resulted in an increase in the number of centrosomes per cell, an increase in cells found in G2 of the cell cycle, and an increase in cell death. In addition, reduction in PPP1R42 expression caused an increase in phosphorylated, and inactive, PP1 and a decrease in the overall expression of PP1. These results support the hypothesis that PPP1R42 is a positive regulator of PP1 activity important for control of centrosome dynamics. Our finding that a conserved PP1 regulatory protein associates with centrosomes in both spermatids and polarized epithelial cells and regulates centrosome number suggests an important role for this protein in flagellar biosynthesis and/or function.

## G04

**Induction of cap-independent BiP (hsp-3) synthesis during germ cell apoptosis**, J. Kaitlin Morrison, Andrew J. Friday, Vince Contreras, Enhui Hao and Brett D. Keiper, East Carolina University, Greenville, NC

Germ cell apoptosis is the process by which superfluous oocyte progenitor cells are eliminated by committing themselves to die via signaling through the cell death (ced) signaling pathway. Nearly half of all germ cells in the *C. elegans* gonad are fated for death before reaching maturity. These cells are believed to act as nurse cells providing cytoplasmic components needed by their sibling cells. During apoptosis changes in protein synthesis occur upon activation of caspases that cleave the translation initiation factor, eIF4G, which is involved in the cap dependent recruitment of mRNA to the ribosome. Our study focuses on the relative contribution of the *C. elegans* eIF4G (IFG-1) cap dependent and independent isoforms (p170 and p130) to shifts in the protein synthesis mechanism and the selection of germ cells to die. Specifically, we are assessing the effect of such mechanisms on the translation of *C. elegans* BiP (hsp-3) and Apaf-1 (ced-4) mRNA variants. The translational efficiency of these messages after the induction of cap independent protein synthesis was assayed in worms depleted of either IFG-1 p170, or CED-9. Overall, our findings suggest a physiological link between translational control by IFG-1 and the expression of HSP-3 allowing for stress response during the induction of germ cell apoptosis.

# Graduate Oral Presentation Abstracts (Face-to-Face)

G05

## **In *Brucella abortus* 2308, Irr Controls Iron-Responsive Gene Regulation and Its Activity is Modulated by Iron-Dependent Degradation,**

David Martinson and R. Martin Roop II, Department of Microbiology and Immunology, Brody School of Medicine, East Carolina University

Members of the genus *Brucella* belong to the alpha-proteobacteria group of Gram negative bacteria. 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 depots. 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 streptonigrin 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. Putative Irr binding motifs (ICE box) are present in the promoter regions of a number of these mis-regulated genes. We are currently using DNase footprint assays to confirm the nucleotide sequence for the ICE box. The iron responsive activity of the *B. abortus* Irr protein is unique, in that when intracellular iron levels are high, Irr is degraded and can no longer function as a transcriptional regulator. In closely related bacteria, the degradation of Irr is driven by interactions between the heme biosynthesis protein HemH, heme and Irr. 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 dependent iron responsive degradation of Irr in *B. abortus* in an effort to better understand how Irr coordinates the expression of iron metabolism genes.

G06

## **Activation of CaMKK1 Signaling Increases the Expression of GLUT3 in Mouse Skeletal Muscle,**

J. Matthew Hinkley and Carol A. Witczak, Departments of Kinesiology, Physiology, and Biochemistry & Molecular Biology, Brody School of Medicine, and the East Carolina University Diabetes & Obesity Institute, East Carolina University, Greenville, NC

Diabetes currently afflicts ~26 million Americans and is the 7th leading cause of death in the United States. Type 2 diabetes, which accounts for ~90% of all diagnosed cases, is characterized by impaired insulin-stimulated glucose uptake into skeletal muscle. Exercise increases muscle glucose uptake in both healthy and diabetic patients by altering the expression and/or localization of muscle glucose transporters; however, the intracellular signaling mechanisms by which exercise induce these changes is unclear. Intracellular Ca<sup>2+</sup> regulates many processes associated with exercise, including muscle glucose uptake, and our exciting data indicate that expression of a constitutively active form of Ca<sup>2+</sup>/calmodulin-dependent protein kinase kinase 1 (CaMKK1) in mouse muscle for 2 weeks stimulates glucose uptake by ~2.5-fold. It is currently unknown whether this is due to increased expression of muscle glucose transporters. GOAL: To determine whether CaMKK1 stimulates glucose uptake by increasing the expression of one or more muscle glucose transporter isoforms (i.e. GLUT1, GLUT3, GLUT4, GLUT5, GLUT8, and GLUT12). METHODS: Plasmid DNA (100 Qg) containing either constitutively active CaMKK1 or empty vector were transfected into mouse tibialis anterior muscles by in vivo electroporation. Two weeks later, muscles were collected and stored in RNAlater to preserve RNA integrity prior to isolation. Isolated RNA was reverse transcribed to cDNA, then utilized to assess CaMKK1 and glucose transporter mRNA levels by real time RT-PCR. RESULTS: Muscles transfected with active CaMKK1 exhibited an ~12-fold increase in active CaMKK1 expression relative to endogenous CaMKK1, a level previously shown to stimulate glucose uptake. Active CaMKK1 did not alter GLUT1 and GLUT8 mRNA levels, while GLUT4 (~24%) and GLUT12 (~35%) were reduced, and surprisingly there was no detectable expression of GLUT5. Intriguingly, GLUT3 mRNA was increased by ~135% with active CaMKK1, demonstrating for the first time that CaMKK1 regulates the expression of GLUT3. CONCLUSION: Activation of CaMKK1 signaling in muscle for 2 weeks increases the expression of GLUT3, suggesting that GLUT3 may be the glucose transporter responsible for CaMKK1-induced muscle glucose uptake.

## G07

**Prohibitin coordinates an anti-inflammatory/anti-oxidant feedback loop from mitochondria to nucleus to protect the heart from severe inflammatory stress**

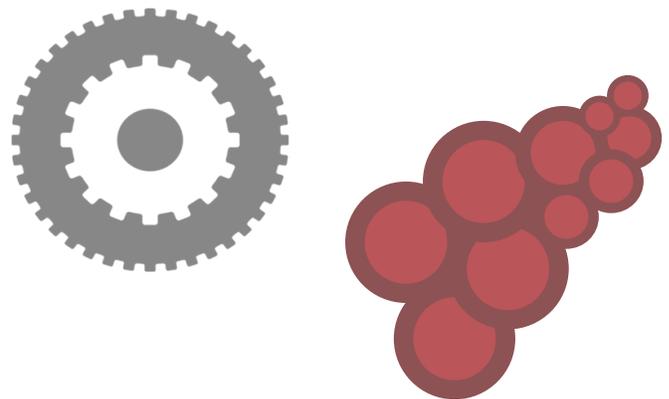
Taylor Ann Mattox<sup>1,2</sup>, Kathleen Thayne<sup>1,2</sup>, and Ethan J Anderson<sup>1,2</sup>, 1 Department of Pharmacology and Toxicology, 2 East Carolina Heart Institute, East Carolina University, Greenville NC

Cardiovascular and mitochondrial dysfunctions are well-known complications of sepsis. Prohibitin (PHB), a mitochondrial protein, has been implicated in experimental models involved in coordinating inflammatory signaling; its mechanisms are unknown. We investigated the role of PHB in the heart during sepsis using an in vivo model (LPS) and in vitro model (TNF3/IL1) in HL1 cardiomyocytes (HL1c). Sepsis caused reductions in mitochondrial function in both models. In rats, LPS reduced PHB expression in the whole heart at 4 hours and 24 hours post exposure. While the total cardiac PHB decreased, serum levels spiked 3-fold and the remainder became concentrated in the nucleus. In vitro overexpression of PHB in HL1c attenuated the cytokine-induced reductions in O<sub>2</sub> consumption, ATP generation, and Ca<sup>2+</sup> retention, and prevented a rise in H<sub>2</sub>O<sub>2</sub> in response to these cytokines. oPHB and recombinant PHB (rPHB) protected the HL1c from TNF3/IL1-induced cytotoxicity. oPHB and rPHB reduced TNF3/IL1-induced NF $\kappa$ B activation and transcription of its downstream targets while enhancing Nrf2 activation and transcription of its downstream target genes in HL1c. These findings uncover a novel role for PHB and suggest that it can act as a mobile signal transducer which can suppress inflammation and oxidative stress during sepsis. We anticipate that these findings will lead to novel therapies that exploit the pleiotropic functions of PHB, protecting the heart from diseases in which inflammation and oxidative stress are common.

## G08

**Retinoic acid reprograms human cutaneous lymphoma cells adhesion**, Lei Wang, Jianming Chen, Jarrett Whelan, Lance Bridges, East Carolina University, Greenville, NC

Retinoids, the oxidative metabolites of Vitamin A, play essential roles in a spectrum of biological processes including fertilization, development, and immunity. More recently, retinoids and their structural analogs have emerged as viable therapeutic agents for a variety of lymphomas including cutaneous T-cell lymphoma (CTCL). However, the exact mechanism of action elicited by retinoids to ameliorate select types of lymphomas is poorly defined. Mechanistic understanding of retinoids will improve the clinical specificity and efficacy of retinoid-based therapies. Here we report that retinoic acid (RA) significantly augments the adhesion of HuT 78, a human CTCL cell line, to immune ligands by modulating the expression of specific integrin adhesion receptors. We determined that RA exposure selectively impacts the expression of  $\alpha$ 1 and  $\alpha$ 7, two predominant integrins expressed on lymphocytes. Therefore, RA treatment reprograms the CTCL cells from skin-homing ( $\alpha$ 1) to gut-homing ( $\alpha$ 7). The change in integrin repertoire may alter the lymphoma dissemination and account for the reported therapeutic benefit of retinoids in CTCL. Importantly, the integrin-dependent adhesion induced by atRA is attenuated by 1,25(OH)<sub>2</sub> vitamin D<sub>3</sub>. This particular form of Vitamin D induces lymphocytes to target biological niches in the skin. Our results provide novel insight into the therapeutic bases of retinoids in the treatment of CTCL.



# Graduate Oral Presentation Abstracts (Face-to-Face)

GO9

**Pilot Testing the Augmentech Body Position Sensor on the Morbidly Obese Patient**, Mark C. Hand RN, MSN, CNE1, Mary Ann Rose, RN, MSN, EdD1, Marie E. Pokorny, RN, PhD1, Ricky T. Castles, PhD3 Frank Watkins, BSN, RN2, Mary K. Kirkpatrick, RN, EdD1; Mel Swanson PhD1, Martha Engelke, MSN, PhD1, Rachel Moore, RN, BS, RPSGT2, Qiang Wu, PhD1, Mr. Kaun Chen MSC1, 1East Carolina University College of Nursing, Greenville, NC, 2Vident Medical Center Greenville, NC, 3Department of Engineering, East Carolina University, Greenville, NC

**OBJECTIVE:** Prevention of pressure ulcers in the hospitalized patient is a major responsibility of nursing. Turning and repositioning of dependent patients are important preventative measures for pressure ulcers and are generally carried out every two hours. What is unknown is the optimum positioning schedule for morbidly obese patients. Turning and repositioning the morbidly obese patient requires more staff, more time, and often the use of assistive equipment. The Augmentech Body Position Sensor (ABPS) has not been tested on the obese patient.

The Augmentech Body Position Sensor (ABPS), a device for monitoring patient repositioning, was tested for use in morbidly obese patients. Specific aims were to: determine whether there was correspondence between data on patient turning and repositioning from the ABPS and data gathered through human observation; determine whether the ABPS is an acceptable instrument for measuring body movements in morbidly obese patients in terms of ease of use, comfort and ability to stay in place.

**DESIGN:** Descriptive study. Data from the ABPS recording patients' body positions were compared with data from videotapes taken of the same patients during the same time period.

**SETTING:** The Sleep Center of a tertiary care facility in the southeastern United States.

**PATIENTS:** Ten participants with BMI  $\geq 30$  were selected from patients referred to the Sleep Center for Polysomnography.

**INTERVENTION:** Positioning the device on the patient's thigh, data were collected from midnight until discharge. The patient also completed a survey concerning satisfaction with the device. Videotapes taken of the same patient during the same time period were examined for changes in body position over time.

**RESULTS/CONCLUSIONS:** Initially the device appeared to overestimate the number of position changes. The data were then "smoothed" by engineers, eliminating some of the "noise" that was recorded as the patient moved the leg. Data were re-examined and there was strong correspondence between the videotape data and the ABPS data. The device was comfortable and not irritating to the patient. The APBS can be a useful measure for determining changes in body position but further study should be undertaken to test other sites for placement.

GO10

**Potential Protection from Chemotherapy-induced Peripheral Neuropathy by Rho GTPase Inhibition**,

George A Howard IV<sup>1,2</sup>, Amy M Friesland<sup>3</sup>, Keith Pittman<sup>2</sup>, Zhiying Weng<sup>3</sup>, Jered C Meyers<sup>2</sup>, Kathryn M Verbanac<sup>2</sup>, Qun Lu<sup>3</sup>, <sup>1</sup>Department of Biology, East Carolina University, <sup>2</sup>Department of Surgery, East Carolina University, <sup>3</sup>Department of Anatomy & Cell Biology, Brody School of Medicine, East Carolina University, Greenville, NC

Chemotherapy is a primary treatment modality for patients with metastatic cancer however it results in significant toxicity to normal tissue. Damage to peripheral nerves can both debilitate patients and limit chemotherapy. Our lab has previously studied the effect of GTPase signaling inhibitors on cisplatin-induced peripheral neuropathy (CIPN). Administration of the p160ROCK/Rho kinase inhibitor Y-27632 (Y27) to mice with CIPN resulted in significant recovery from neuropathy. The hypothesis of the current study is that treatment with Y-27632 concurrent with cisplatin chemotherapy provides effective neuroprotection. Initial toxicity studies determined the optimal dose and timing of drug administration in healthy C57Bl/6 mice (n=5 per group). Although concurrent cisplatin (6 ug/gm i.p. weekly) and Y27 (10 or 20 ug/gm i.p. qod) treatment had toxic effects, concurrent staggered treatment each week with cisplatin (5 ug/gm) and Y27 (10 ug/gm) was well tolerated. The VonFrey test for sensory evaluation measured paw withdrawal to monofilament in these mice; after 4 weeks, mice receiving only cisplatin (CIS) were less sensitive to stimuli compared to baseline, a sign of peripheral neuropathy. The sensitivity of mice receiving both CIS + Y-27 was the same or increased. We next turned to the Lewis Lung adenocarcinoma (LLC) mouse model ( $5 \times 10^5$  cells s.c.), starting drug treatment 12d post LLC injection at mean tumor volume of  $110 \text{ mm}^3$  (n=10 per group). Groups receiving CIS (with or w/o Y-27) had significantly slower tumor growth compared to untreated mice or mice treated with Y-27 only. The CIS treatment regimen also improved survival; median survival for CIS only, CIS + Y27, Y27 only and untreated Controls was 36, 35, 27 and 27d, respectively. Significant CIPN by Von Frey was first evident at week 4. By week 5, CIS-treated mice showed significantly decreased peripheral sensitivity compared to mice treated with CIS + Y27 and naïve mice (p=0.052, p=0.049, respectively). These data support the hypothesis that concurrent blockade of GTPase signaling protects mice from CIPN. The study will be repeated with drugs initiated earlier and at higher dosage. This clinically applicable drug regimen may help decrease debilitating neuropathy in patients, thus not only improving the quality of life but also allowing completion of chemotherapy to maximize the potential for cure.

## G011

**Effect of Hypoxia on Tumorigenesis in *C. elegans***

**Germline**, Udaya Sree Datla, Young Chul Kwon, Quan Minh Nguyen, Myon-Hee Lee, Dept. Of Oncology, Brody School Of Medicine, East Carolina University, Greenville, NC

The HIF-1 (Hypoxia inducible factor) transcription factor that plays a key role in oxygen homeostasis during hypoxic conditions for the survival of the organism has been studied for its pronounced effect on tumorigenesis taking *C. elegans* as animal model system. We have primarily focused on the effect of hypoxia on tumorigenesis in *puf-8(q725); lip-1(zh15)* tumor mutant germline - used to study tumorigenesis via dedifferentiation and *glp-1(ar202)* tumor mutant germline - used to study GLP-1/Notch-mediated tumorigenesis.

In *C. elegans*, the germline stem cells at the distal end that initially divide mitotically then enter meiosis and differentiate into gametes as they progress towards the proximal end. In *puf-8; lip-1* mutant, the proximal germline tumor is formed as a result of dedifferentiation where the 2 spermatocytes revert back to form cancer stem cell-like cells due to knockout of PUF-8 (Pumilio and FBF RNA binding protein) and LIP-1 (MPK-1/ERK phosphatase), the two RNA binding proteins that are essential to inhibit MPK-1 (ERK homolog in mammals) signaling primarily responsible for the dedifferentiation process. Whereas in the *glp-1(ar202)* gain-of-function mutant, the tumor development occurs via a different pathway where the germline stem cells are inhibited from differentiating into the gametes at the proximal end and instead self-renews and in the process of self-renewal forms the cancer stem cell-like cells. Results: Our preliminary results indicate that under hypoxic conditions or under the conditions that mimic hypoxia (by exposing the worms to cobalt chloride, a chemical inducer of hypoxia), the percentage of *puf-8; lip-1* worms with germline tumors is less than that in normoxia. While in *glp-1(ar202)* worms, the results are just the contrary.

These results hence indicate that HIF-1 activation under hypoxic condition inhibits tumorigenesis via dedifferentiation in *puf-8; lip-1* mutant while it promotes GLP-1/Notch-mediated tumorigenesis in *glp-1(gf)* mutant, thus playing a different role in tumorigenesis in these mutants. These results are furthermore confirmed by the generation of the *puf-8; lip-1; hif-1* and *glp-1(gf); hif-1* mutants lacking *hif-1* gene and also by mutants lacking *vhl-1* (Von Hippel-Lindau) gene which enhances expression of HIF-1.

## G012

**High-fat diet induced obesity increases serum myostatin but does not accelerate skeletal muscle atrophy**

Steven L. Roseno and Jeffrey J. Brault, Human Performance Lab, Dept. of Kinesiology, East Carolina University, Greenville, NC

Myostatin is a potent negative regulator of muscle mass, i.e. high levels of myostatin induce loss of muscle. Surprisingly, severely obese humans and obese mice have elevated levels of serum myostatin, but the role of myostatin in controlling muscle mass during obesity is largely unknown. The aim of this study is to determine if obesity induced by a high-fat diet will decrease skeletal muscle mass or sensitize muscles to factors that induce muscle atrophy. Thirty male C57BL/6 mice were divided into three groups: 12-wk control diet (CD), 9-wk control diet then 3-wk high-fat diet (3wHF), and 12-wk high-fat diet (12wHF). At 10 weeks with each diet, the left sciatic nerve was cut (surgical denervation, a model of nerve damage), and contralateral was sham operated. At 12 weeks, EDL, soleus, tibialis anterior, plantaris, and gastrocnemius muscles were excised and weighed; body composition was measured by MRI; and serum myostatin was measured by ELISA. The rates of protein degradation were determined by the net amount of tyrosine released from incubated EDL and soleus muscles. As expected, the 12wHF resulted in a profound increase in fat mass (800%), with less in 3wHF (470%) and CD (240%). The concentration of myostatin in serum was significantly higher ( $P < 0.05$ ) in the 12wHF group (657 pg/ml  $\pm$  85) than both the 3wHF (455 pg/ml  $\pm$  46) and CD (311 pg/ml  $\pm$  29). In spite of this, there were no differences in the rates of protein degradation (16.83 to 17.90 nmol/g/hr) or in muscle mass of the innervated muscles between diets. After denervation, muscles lost 15 to 39% mass, depending on the muscle, but there were no differences among diet groups, with the exception of greater atrophy ( $P < 0.05$ ) of the soleus in the 3wHF group (26% versus 16% for CD and 15% for 12wHF). Denervation increased the rate of protein degradation by ~42% in the soleus muscles regardless of diet. In the denervated EDLs, the 3wHF group was ~87% faster, but no differences were found between the innervated and denervated EDLs of either the CD or 12wHF groups. In summary, diet induced obesity increases circulating myostatin but does not affect skeletal muscle mass, protein degradation rate, or the amount of muscle mass loss due to denervation. This demonstrates that obesity may cause muscles to become resistant to the catabolic actions of myostatin.

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G013

## **Micro RNA Regulation of Macrophage Activation,**

Matthew K. McPeek, Pulmonary, Critical Care, and Sleep Medicine, Department of Internal Medicine, Brody School of Medicine, East Carolina University, Greenville, NC

Peroxisome proliferator activated receptor gamma (PPAR gamma) is a member of the nuclear receptor superfamily. In different cell types PPAR gamma plays distinct roles which include the regulation of inflammatory mediators. Our previous studies have shown the constitutive expression of PPAR gamma in healthy alveolar macrophages. Deficiency of PPAR gamma in alveolar macrophages results in their activation and the elevation of pro-inflammatory cytokines and chemokines.

MicroRNAs (miRNAs) are approximately 22 nucleotide noncoding RNAs that regulate gene expression by either inhibiting translation or promoting degradation of their target messenger RNAs. Numerous cellular processes are affected by micro RNAs. Because of their role in gene regulation, we hypothesized that miRNA expression would be dysregulated in alveolar macrophages from macrophage-specific PPAR gamma knockout mice.

To address the question of miRNA regulation in the absence of PPAR gamma, miFinder plates were utilized. MiFinders profile the expression of 84 common and well characterized miRNAs by Real Time PCR (RT-PCR). The miFinder plates revealed differential expression of six miRNAs with a >2 fold increase in pooled alveolar macrophages deficient of PPAR gamma compared to controls (n=3, p<0.05). Mir-27b has been implicated in adipocyte differentiation and regulation of PPAR gamma. The miFinder assay revealed an increase of 3.4 fold (p=0.002) and individual assays show an increase of 2.6 fold (n=6, p=0.002) of miR-27 in PPAR gamma deficient alveolar macrophages. MiR-23b was also shown to be increased 3.6 fold in PPAR gamma deficient macrophages and has been associated with chemokine production in the literature. These results suggest that regulatory micro RNA plays a role in the pro-inflammatory phenotype of PPAR gamma deficient alveolar macrophages.

G014

## **Reliability of Ultrasound Obtained Subject Specific Parameters,**

Josh Leonardis<sup>1</sup>, Jordan Black<sup>1</sup>, Jacob Ridings<sup>1</sup>, Patrick Rider<sup>1</sup>, and Zachary Domire<sup>1</sup>, <sup>1</sup>Bio-mechanics Laboratory, Department of Kinesiology, College of Health and Human Performance, East Carolina University, Greenville, NC

Knowledge of a muscles moment arms is critical to the accurate estimation of its force producing capacity. Traditionally, moment arm measurements are obtained from cadavers, where findings are often difficult to translate to the living human, or in vivo, using expensive and commonly inaccessible imaging methods. Currently, diagnostic ultrasonography has provided a cost-effective and portable alternative, being successfully used to obtain moment arm measurements of many muscles with low variability between repeated measures, and accuracy comparable to that of traditional methodology. This technique, however, has not been tested on quadriceps musculature.

The purpose of this study is to determine the reliability of ultrasonography-obtained moment arm measurements of the vastus lateralis. During a single visit, moment arms of the vastus lateralis will be obtained from 6 adults (3 men and 3 women) between the ages of 18 and 35, and of varying heights and weights. After giving their consent, volunteers will be positioned sitting upright, with their right leg secured to a HUMAC NORM isokinetic dynamometer (CSMi, Stoughton, MA). The dynamometer head and seat position will be adjusted individually for each subject before moving each participant's right knee through a 100 degree range of motion, pausing for a short time at 5 degree increments. A 10-second video of the distal musculotendinous junction of the vastus lateralis will be captured during each change in joint position using an Aixplorer ultrasound unit (Supersonic, France). This will be repeated twice while the knee is moved from extension to flexion and twice from flexion to extension, so that multiple videos are taken at each joint position.

Moment arms will be measured using the tendon excursion method. This method quantifies moment arms as the distance of fascicle excursion with respect to the change in joint position. The reliability of our data will be determined as the variability between repeated measurements, while our measured moment arms will be compared to those in the literature to determine accuracy.

## G015

**How does dispersal through time interact with spatial dispersal to form zooplankton communities?**

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The colonization of habitats via dispersal is a critical process generating biodiversity within ecological systems. In addition to dispersing in space, individuals of many species can also disperse through time, because they have dormant stages that exist from ancestral to contemporary populations. For example, zooplankton produce dormant eggs that accumulate in pond sediment and both active and dormant life stages can spatially disperse via wind and animal vectors. Although many have investigated how spatially dispersing organisms affect community structure, less work has examined the combined influence of spatial and temporal dispersal on the development of ecological communities. We examined how spatial dispersal of zooplankton from a natural pond affected the development of a zooplankton community in artificial ponds that either contained, or did not contain, a zooplankton egg bank. We found differences in spatial and temporal dispersal had no effect on the number of species present in a pond, but the influence of temporal dispersal on both the abundance and composition of species present in a pond depended on the extent of spatial dispersal. Temporal dispersal had a weaker effect when spatial dispersal was high, but temporal dispersal greatly altered the abundance and species composition of a pond when spatial dispersal was low. Our results indicate that changes in the rates of either form of dispersal into a pond could have important consequences for the zooplankton assemblage present in the pond. Depending on the degree of isolation of the ponds, temporal dispersal may have a greater role in species persistence than spatial dispersal. Yet, understanding how spatial and temporal dispersal interact is critical for restoration efforts after anthropogenic disturbances or invasive species introductions, since both forms of dispersal allow for re-establishment after anthropogenic influences. However, communities may develop differently depending on the strength and type of dispersal, species identity, and evolutionary adaptations of the organisms; thus highlighting the importance of management and conservation decisions in aquatic systems.

## G016

**Urban and rural population structures of the invasive Tree-of-Heaven (*Ailanthus altissima*) along the eastern seaboard of the United States**

Matthew S. Hansen<sup>1</sup> and Roland P. Roberts<sup>2</sup>, <sup>1</sup>Biology Department, East Carolina University, Greenville, NC, <sup>2</sup>Department of Biological Sciences, Towson University, Towson, MD

This study investigated the genetic structure of 716 individuals of *Ailanthus altissima* collected along two 1,000km transects between New Hampshire and North Carolina. Specifically, we assessed the extent of gene flow within and among populations of *A. altissima* found along Interstate 95 (I-95) and a parallel transect established 100km west of I-95. The study employed the use of nine neutral genetic markers to ascertain the degree of population admixture. Pairwise  $F_{st}$  values ranged from 0.0079 to 0.096, with most comparisons (52%) exhibiting  $F_{st} < 0.050$ . Thirteen comparisons exhibited  $F_{ST} > 0.050$ , these comparisons involved at least one rural population and six were between two rural populations. Pairwise Jost  $D_{st}$  values ranged from 0.040 to 0.38 and followed a similar pattern of distribution as  $F_{st}$ . Bayesian analyses conducted with Structure and BAPS estimated fewer genetic clusters along the I-95 transect (two and one, respectively) compared to the rural transect (six and four, respectively). There was indication of significant isolation by distance among the I-95 ( $R^2 = 0.13$ ,  $p = 0.00010$ ) and rural ( $R^2 = 0.086$ ,  $p = 0.00020$ ) populations based on Rousset's distance against geographic distance with regression slopes of 0.019 and 0.063, respectively. These different patterns of population structuring may be due to varying introduction histories or unequal levels of contemporary gene flow.

## G017

**A Social Network Analysis of international trade of spiny dogfish**

Andrea Dell'Apa, Jeffrey Johnson, David Kimmel, and Roger Rulifson, ICSP-Institute for Coastal Science and Policy, East Carolina University, Greenville, NC

The spiny dogfish (*Squalus acanthias*) is a shark of significant international commercial value and there is concern over its conservation status. The major demand for its meat is from the European Union (EU) market, with the US and Canada as its two major contributors. The US has yet to support a spiny dogfish listing in the CITES Appendix II, although the US Atlantic stock is under a fishery management plan (FMP) that proved to be successful in providing a certified sustainable fishery. We employed a cumulative sum technique to compare trade data

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for frozen spiny dogfish export from US and Canada to the EU in relation to the FMP adoption. We also constructed a social network to visualize changes in the European trade scenario for spiny dogfish after adoption of the FMP and to predict future trade flow potentially affecting the conservation status of regional dogfish stocks in relation to recent management measures introduced in Europe. The social network analysis revealed that the exclusion of spiny dogfish from trade regulation lists eventually will affect the conservation status of dogfish stocks in Africa, Asia, South America, and the Mediterranean and Black Seas. Our results suggest that the species listing would provide an economic benefit for the US Northwest Atlantic fishery, and will eventually foster the conservation status of other regional stocks worldwide and the search for a more sustainable global exploitation of spiny dogfish.

G018

**Ife-1: A Key Regulator of Germ Cell Protein Synthesis**, Friday, A. J., Morrison, J.K., Henderson, M. A., and Keiper, B. D., East Carolina University, Greenville, NC

Gamete development is governed largely by regulated translation initiation on stored mRNAs. The rate limiting step is their recruitment by translation initiation factors (eIF's) to polyribosomes. eIF4E isoforms are the first translation factors to interact with mRNAs, specifically recognizing their methylated guanosine cap structures. Our lab has shown that three of the five *C. elegans* eIF4E isoforms (IFE-1-5) recruit unique subsets of mRNAs. Consequently, individual IFE gene knockouts result in unique phenotypes in the soma and/or germ line. IFE-1 is the only isoform found in P-granules and associated with PGL-1 in the germ line. Loss of IFE-1 causes temperature-sensitive sterility due to defective cytokinesis in secondary spermatocytes as well as diminished oogenesis and reduced viability of oocytes. Reintroduction of flag-tagged IFE-1 into the *ife-1(bn127)* null mutants caused a partial recovery of fertility and gametogenesis phenotypes. In order to further understand the mechanistic role of IFE-1 in mRNA translation during oocyte and spermatocyte development, polysomal microarray analyses were performed to identify the unique set of mRNAs recruited by IFE-1. Furthermore, mutants expressing 3' UTR reporter constructs for identified target mRNAs were depleted of IFE-1 via RNAi treatment. Some of these reporters showed dependence on IFE-1 for efficient translational recruitment. Current evidence suggests that key post-meiotic steps in gametogenesis are regulated by IFE-1 action on a specific subset of mRNAs.

G019

**Gastric evacuation and feeding ration of Atlantic spiny dogfish (*Squalus acanthias*) using a nonlethal lavage technique**, Charles W. Bangley and Roger A. Rulifson, Institute for Coastal Science and Policy, East Carolina University, Greenville, NC

Spiny dogfish (*Squalus acanthias*) have long been suspected of damaging more valuable fish stocks by directly consuming or outcompeting those species. Despite much research interest in the trophic dynamics of this shark, currently no estimate of its food ration requirements exists for the Northwest Atlantic population. To assess food requirements of dogfish on the U.S. east coast, 40 adult spiny dogfish were captured in the vicinity of Cape Lookout, NC and transported to the Carteret Community College aquaculture facility in Morehead City, NC. While kept in captivity, dogfish were allowed to feed voluntarily on pre-weighed portions of frozen fish. After a pre-determined digestion period, remaining food was recovered from the stomach using nonlethal stomach tube gastric lavage and weighed. Regression analysis was used to estimate gastric evacuation rate, which was used with average stomach content weights from previous diet studies to determine daily food ration. This will allow accurate estimates of fish prey consumed by spiny dogfish and will allow fisheries managers to better assess the potential impact of dogfish predation on fish stocks.

G020

**Use of Praseodymium-142 in microsphere brachytherapy for treating Hepatocellular Carcinoma**, MC Ferreira (1), T Podder (2), and JW Jung (1), (1) Department of Physics, East Carolina University, Greenville, NC, (2) Department of Radiation Oncology, University Hospitals Case Medical Center, Cleveland, OH

The aim of this work is to perform a dosimetric study of the beta-minus emitter Praseodymium-142 (Pr-142) (96.3% beta and 3.7% gamma) and to propose its use in microsphere brachytherapy for treating Hepatocellular carcinoma (HCC). This rare earth element (REE) has recently gained increased attention among therapeutic beta sources. One aim is to determine whether the dose due to the Pr-142 gamma yield could be clinically relevant in regard to the patients' healthy organs and tissues. Furthermore, it is intended to determine whether its gamma component could be effective in performing pre-treatment quality assurance (QA) and dosimetry, as well as post-treatment bio-distribution imaging and dose distributions of permanently implanted Pr-142 brachytherapy sources. In order to analyze the proposed radionuclide, MCNPX2.6 Monte Carlo and Dose Point Kernel using BRAIN-DOSE code simulation methods were used to determine the dose distributions of 142-Pr sources. In addi-

tion, the biological effective dose (BED) for different tumor doubling times (DT) for HCC was determined using the linear quadratic (LQ) model. MCNPX2.6 Monte Carlo code was used to simulate the dose delivered by a given ensemble of homogeneously distributed microspheres within a tumor for both beta and gamma contributions for Pr-142. A spherical tumor immersed in water was used in this model, with sizes based on values for liver cancer reported in the literature. Spherical volume sources were modeled and a series of three-dimensional mesh tallies were positioned along the dose tally points. The dose rates obtained using MCNPX2.6 and BRAIN-DOSE were 0.1174 Gy/h/MBq and 0.1224 Gy/h/MBq respectively, at 0.5 cm away from the source. For the highest DT considered (720 days) calculated BED for Pr-142 was 99.6 Gy, representing a 56.3 % increase in the BED from the currently used radionuclide Y-90. Total dose contribution due to gamma yield of Pr-142 was small and may not be clinically relevant. This gamma yield, however, could be a possible benefit for biodistribution, dose distribution, and dosimetry assessment.

#### G021

**Conservation of the CSS Neuse: Contemporary Approaches to 50 Years of Preservation,** Jessica Caudill, MA Public History, Candidate, East Carolina University

The CSS Neuse is one of North Carolina's most important artifacts. It is one of the few surviving commissioned Confederate ironclads from the Civil War. The Neuse has a unique history in her naval experience, and archaeological excavation and artifact conservation. Over the past 20 years the wooden hull of the vessel has been approached with various conservation methods including linseed oil, as a cellular bulking agent, and Timbor, a biocide, which were applied through a spray coating. This research focuses on past and current conservation treatments of the ship's hull to determine the present condition and the effectiveness of the conservation treatments. An analysis of the wood structure utilizing scanning electron microscopy will reveal the structural stability of the wood and penetration of the applied treatments. Fourier Transform InfraRed spectroscopy will be used to determine chemical properties and reactions occurring within the wood. This research will provide a baseline on the condition of the Neuse's hull and assist site managers in creating long-term preservation strategies. Preliminary investigation has revealed a void in the scientific literature related to the use of linseed oil as a preservative in shipwreck conservation and this research aims to contribute to current knowledge. The CSS Neuse represents a valued state treasure and serves as a great opportunity for increasing our understanding of historical preservation techniques.

#### G022

**Graphically and numerically, the Theory of General Relativity is shown to predict some properties of gravitational waves which agree with non-relativistic Quantum Mechanics,** Shawn Culbrith, East Carolina University, Greenville, NC

Graphically and numerically we are able to demonstrate that the form of the effective gravitational potential energy curves (obtained from General Relativity) for photons and gravitons circling a non-rotating black hole are actually similar to classical (non-relativistic) harmonic oscillator curves. This is discussed in relation to several of the lowest quantized values of photon and graviton angular momenta measured with respect to an origin situated at the center of the black hole (that is, for angular momentum quantum numbers equal to  $L=1, 2, 3$ , etc., for photons and  $L= 2, 3, 4$ , etc., for gravitons). Though the Theory of General Relativity is often considered incompatible with Quantum Mechanical predictions, this work constitutes an original demonstration that the General Relativistic theory, published by Einstein 9 years before Quantum Mechanics, contained predictions matching nicely with those of non-relativistic Quantum Mechanics.

#### G023

**Does Nutrient Addition Mediate Top-Down Forces of Gape limited Predation in *Rana sphenoccephala*?** Zachary Aardweg, East Carolina University, Greenville, NC

Nutrient levels, principally of nitrogen and phosphorus, are increasing in aquatic ecosystems as development and agriculture increase near waterways. Often the short term consequences of nutrient additions include an increase in algal and plant biomass but the long term consequences, as well as the interactive effect of nutrients and biotic factors, are currently not well understood. Both nutrients and predation can influence life history traits in an organism, change food webs, and alter community structure and ecosystem processes. There is a growing interest in the interactive effects of nutrient influx and predation; however no previous experiments have investigated the potential of elevated nutrient levels to mediate top-down forces of predation by a gape limited predator. I performed a mesocosm experiment to evaluate if nutrient additions can create sufficient additional consumable resources, in the form of algae, to allow larval amphibians (southern leopard frogs, *Rana sphenoccephala*) to grow enough to escape predation by gape limited predators (bluegill fish, *Lepomis macrochirus*). The experiment constructed 40 artificial ponds in which nutrient levels and

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predation were manipulated using a response surface design which allows for the examination of the effects of gradients of both nutrient levels and predation pressure to be examined without replication of each treatment. Nutrient levels covered a gradient from 0.0 to 4 mg/l of nitrogen, and predation levels were comprised of no predator, a small gaped predator, or a large gaped predator. I expect that the amount of consumable resources will be greater in ponds with higher nutrient levels. I also expect that prey will outgrow predation by gape limited predators (i.e., those with a small gape) and have higher survival in higher nutrient treatments compared to low nutrient treatments. No differences in survival based on nutrient treatment are expected with the large gape predators. A better understanding of the effects of nutrient influx and predation is important in understanding how trophic levels are constructed and how the community structure in an environment may change with nutrient addition.

## G024

**Genetic analysis of reproductive behavior in a coastal population of the king rail.** Carol Brackett and Susan B. McRae, East Carolina University, Greenville, NC and North Carolina Center for Biodiversity

The king rail (*Rallus elegans*) inhabits freshwater and brackish wetlands of the southeastern U.S. It is considered a priority species of conservation concern by the U.S. Fish and Wildlife Service. Yet, little is known about its behavior and reproductive ecology. We are investigating reproductive strategies and dispersal patterns of a population of king rails at MacKay Island National Wildlife Refuge in coastal North Carolina. We collected genetic samples from adults and young, and membranes collected from partially depredated and unhatched eggs. We developed a panel of species-specific microsatellite markers to determine parentage and examine population structure. Neighboring pairs were found to nest as close as 15 m from one another, providing opportunities for reproductive interference. We will determine whether there are incidences of extra pair copulation or conspecific brood parasitism, and investigate differences in natal philopatry between the sexes by comparing allele distributions of breeding males and females. Insight into genetic structure of king rails at the familial and population levels will be used to extend our knowledge of king rail reproductive behavior and dispersal.

## G025

**Hybridization in *Triodanis***, Emily Stewart, Department of Biology, East Carolina University, Greenville, NC

The presence of a cleistogamous (obligately selfing) plant breeding system is theorized to have implications for reproductive isolation between species; the effects of this reproductive system on plant hybridization have previously received little consideration. *Triodanis perfoliata* subsp. *perfoliata* and *Triodanis perfoliata* subsp. *biflora* are two annual sister taxa which co-occur across most of their distribution. The sister taxa have been reported to hybridize and differ in their allocation to cleistogamy. In this study, the extent of hybridization between *Triodanis perfoliata* subsp. *perfoliata* and *T. perfoliata* subsp. *biflora* was estimated at four local zones of contact in Greenville, NC. Components of fitness for hybrids were also estimated. Hybrids were identified using AFLP genetic markers and morphological data. A transect was set up at each site, and between 40-75 individuals of *Triodanis* were marked for sampling at two meter intervals without regard to diagnostic features. In addition, ten individuals of each parental subspecies were sampled at each site. Leaf tissue was collected from sampled plants for DNA extraction. Four pre-screened primer pairs were used to genotype each individual for AFLP (amplified fragment length polymorphisms markers). Putative hybrids were identified by comparing morphological data in parental and transect individuals and were confirmed with genetic markers using Structure and Hindex population genetic software programs. Components of hybrid fitness were estimated by measuring biomass, total fruits produced, and seed set in parental taxa and in hybrids identified by genetic markers. Results quantified the amount of hybridization in local zones of occurrence and estimated components of fitness in hybrids.

## G026

**Determination of the Phylogeny and Taxonomy**

**of Pueraria**, William Cagle and Ashley N. Egan, Department of Biology, East Carolina University, Greenville, NC

Invasive plant species can have many negative effects on an ecosystem and its biodiversity. In the U.S. ~1000 species are in danger in some way due to invasive species. Kudzu has been in the U.S. since 1876 and has seen consistent expansion across the country. Since that initial introduction Kudzu has damaged thousands of square miles and has infested between 2 million and 7 million acres in the Southeast. Kudzu is a part of the genus *Pueraria* containing ~20 species, all of which are native to Southeast Asia. Despite careful documentation of its characteristics and others, its taxonomical classification remains in question. In 1977 Lackey put forward a classification that divides *Pueraria* into four distinct groups. Based on these groups he advocated removing some species from the genus but ultimately chose to impose no revision. Beginning in 1985 Van der Maesen took Lackey's work and came up with 17 different species spread across not 4 but 5 groups. Like Lackey, Van der Maesen has not made any changes to the genus *Pueraria*, instead calling for further biosystematic research to be done.

A phylogenetic and taxonomic analysis of the genus performed by us falls under the heading of biosystematic research. Our objectives have been to determine the genetic diversity and number of distinct evolutionary lineages within *Pueraria* and to determine how those lineages are dispersed throughout phaseoloid legumes. To that end we have been performing phylogenetic analysis on two gene regions and a possible third across ~113 genera with a minimum of two species per genus. The two gene regions being analyzed are the AS2 and matK (partial) with the possible third coming from trnSG. Standard PCR reactions and gel electrophoresis have been carried out on extracted samples, with sequencing carried out in house at ECU. Sequences are edited in sequencer and aligned in mafft. Maximum parsimony, Bayesian inference, and maximum likelihood analysis will be performed on these alignments to determine taxonomical classification. Current preliminary data supports the polyphyly of *Pueraria* and reinforces the need for taxonomical revision.

## G027

**A comparative study of biomass cook stove exposure in Sri Lanka**, Michael Phillips (1) (3), Jonathan Thornburg (1), Sumal Nandasena (2), Myles Elledge (1), Vanessa Thornburg (1), Paul Mosquin (1), Charles Rodes (1), Katherine Bronstein (1), Kibri Everett (1), (1) RTI International, (2) Sri Lanka Ministry of Health, (3) East Carolina University, Greenville, NC

Biomass fuel is the main source of cooking fuel for most developing countries, and indoor air pollution (IAP) created from cooking with biomass fuels may kill up to 4 million people annually. The realization of the enormity of this problem has led to new research efforts to reduce the morbidity and mortality from primitive cook stoves. Researchers from Sri Lanka and RTI International conducted a comparative study of cook stove exposures in Sri Lanka during the summer of 2012. Approximately 78% of the Sri Lankan households use primarily wood biomass fuels to cook with. Women engage in most of the cooking, often with small children nearby. Cooking activities usually take place on 3 stone fires in poorly ventilated or unventilated (i.e., without chimneys) kitchen environments. A small subset of the population use "improved" cook stoves such as the "Anagi", a clay stove that originated in Sri Lanka and has been adopted in several regions of the country. This study was designed to measure personal air pollution exposure levels (i.e., particulate matter and carbon monoxide) in kitchens using 3 stone and Anagi stoves with and without chimneys, and to compare the results to identify the least hazardous exposure scenario. Personal exposure monitoring was conducted by having cooks wear portable battery operated MicroPEM® monitors. The MicroPEM® are small, state of the art monitors that are proven to produce detailed, reliable and robust data. Personal and indoor exposure data were captured in real time every 10 seconds over two consecutive 24 hour periods. Kitchen characteristics and cooking habits were obtained via documented observation and surveys. We collected exposure and questionnaire data from 50 households in a village near the city of Kandy. Homes with traditional cook stoves without chimneys had the highest exposure levels with an average personal exposure level of 200.5 Qg/m<sup>3</sup>, with some of the peak exposure levels exceeding 6,000 Qg/m<sup>3</sup>. The average filter data show the improved Anagi stove reduced both indoor and personal exposure by 36%, while a chimney reduced exposure by 60-70%. After the study concluded, the researchers and a local health official met with the participants, presented them with an Anagi stove and described precautions to reduce IAP while cooking.

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# Graduate Oral Presentation Abstracts (Face-to-Face)

G028

**A comparison of class performance by gender: health and physical activity class**, Margie Clark, East Carolina University, Greenville, NC

The participatory action research proposal focuses on the question, Could same gender health and physical activity classes improve the performance level of middle school girls? An alarming number of middle school girls appear unmotivated and seem to be just plain lazy but, the problem may be deeper, the literature indicates that same gender classes improve performance. If this premise is true then health and physical activity classes could be restructured to provide the benefits of single gender instruction: increased levels of activity, and improved performance. While participating in both of these situations it is anticipated that a difference in female activity levels and performance will exist. The female students will wear a step counter and after each lesson and each situation, the step counter will be recorded in order to compare activity levels in both atmospheres. This action research project will initiate data collection March 1, 2013 and completed by April 1, 2013. The data will come from my class of participants. The study will contribute to a greater understanding of mixed gender and same gender activity classes.

G029

**Visitor's Economic Value of Cape Hatteras National Seashore**, 1 Craig E. Landry, 2 Alyson R. Lewis, 2 Hans Vogelsong, 1 Department of Economics, East Carolina University, Greenville, NC, 2 Coastal Resource Management PhD Program, East Carolina University, Greenville, NC

The objective of this presentation is to estimate a travel cost and recreation demand model, examining visitation and visitor expenditure patterns to Cape Hatteras National Seashore (CHNS) on the Outer Banks, North Carolina. The CHNS is one of the largest protective barrier islands on the East Coast and is comprised of nearly 30,000 acres along 70 miles of shoreline. Data collection was administered at various beaches along the CHNS between May 2001 and May 2002, containing on-site visitation behaviors and expenditure quantities. In order to control for endogenous stratification, stemming from the on-site sampling bias, a count data model was utilized. The corrected expenditure estimates were shown to be significantly different from the original raw estimates. By estimating and comparing visitation, the subsequent economic impacts on the CHNS will be explained and discussed during the Research and Creative Achievement Week here at East Carolina University.

Key Words: travel cost, recreation demand, endogenous stratification, count data, beach visitation, economic valuation

G030

**Body Image as a Mediator of the Relationship between Cancer-Related Changes in Appearance and Sexual Adjustment in Breast Cancer Survivors**, Rosman, L. & Littleton, H., East Carolina University

For breast cancer survivors, physical changes in appearance as a result of treatment are common and potentially influence how women perceive themselves and their bodies, which may increase risk for long-term sexual problems. Although general body image concerns have been documented among survivors, the extent to which these relate to treatment-induced changes in appearance and sexual adjustment, has garnered little attention. Therefore, the current study examined three body image variables (body shame, concern about the obviousness of changes in appearance, and dysmorphic appearance concern) as mediators of the relationship between number of cancer-related changes in appearance and sexual satisfaction and sexual dysfunction in a sample of 219 breast cancer survivors who completed an online survey on the topic. Participants' mean age was 47.3 years, (SD = 11.1 years) with an average time since diagnosis of 4.4 years (SD = 4.4 years). Women were predominantly European American, married, diagnosed with Stage I or II breast cancer, had a lumpectomy and/or mastectomy, and received adjuvant treatment. A 13-item summed measure of cancer-related appearance changes assessed changes in the breast(s), hair, finger nails, weight, skin, and genitals. Bootstrapping was used to evaluate potential mediated relationships. Results indicated that higher levels of body shame, concern about the obviousness of changes in appearance, and dysmorphic concern all mediated the relationship between having a higher number of changes in appearance and lower levels of sexual satisfaction. Higher levels of body shame and dysmorphic concern also significantly mediated the relationship between having a higher number of changes in appearance and risk for sexual dysfunction. Results suggest that cancer-related changes in appearance may lead to the development and persistence of body image concerns and in turn, increase risk for long-term sexual problems. This study highlights the need for further research as well as the need for routine assessment and treatment for these difficulties among survivors.

## G031

**Forgotten Maritime Prosperity of Seal Cove, Tremont, Maine**, Baylus C. Brooks, Masters Candidate, Maritime Studies Program, East Carolina University, Researched in conjunction with the Seal Cove Shipwreck Project, Institute of Maritime History, project team, Franklin Price (director), Steve Delk, Christa Shere, Baylus C. Brooks (project historian)

Seal Cove, today a beautiful yet inconspicuous village in the town of Tremont on the western coast of Maine's Mount Desert Island once held great economic status. Contrary to its current appearance, during the nineteenth century, Seal Cove once attained an independent and prosperous status as the largest shipbuilding locale in Tremont. Hammers, saws, and riggers once created a boisterous and animated reputation, evolving a vibrant cycle of trade as a result. Varied produce of lumbering, farming, brick-making, quarried stone, and the sea provided cargos and ballast for Seal Cove ships that ranged all across the Atlantic Ocean. Seal Cove ship crews could boast of great adventures in New York, Boston, Philadelphia, and even Mexico and Spain. As the latter half of the nineteenth century passed, corporate business dominated the labor of Tremont and modern methods of sea transport transcended the facility of locally-built craft. The prosperity of Seal Cove village dwindled. The Heath family lumber mill that supplied the primary cargo for Seal Cove's merchant vessels fell into disrepair and locals found work in new corporate fish canneries miles away. Seal Cove craftsmen began to build smaller craft. Their fishermen focused upon local waters for menhaden, herring, porgie and lobster, providing raw materials for the restaurants and canneries. Today, as local historian and writer LaRue Spiker penned in 1961, it is a quiet little cove, usually serene and frequently lonely, holding but faint memories of the buzzing activity that livened the area.

## G032

**What is the best response option configuration in online-administered Likert scales?**, Hotaka Maeda and Matthew T. Mahar, Department of Kinesiology, East Carolina University

Several approaches have been proposed to offset Likert scale selection biases while avoiding the use of negatively worded stems, but these approaches have not been investigated extensively. The purpose of this study was to experimentally explore the effects of response option orientation and directionality in Likert scales administered online on internal consistency reliability, factorial validity, measured score, completion time, and mouse click counts. A positively stemmed 15-item 5-point Likert scale was administered to 1,693 adults,  $M(SD)$

age = 30.2(13.3) years. Six treatment groups were constructed by modifying the response option configurations. The configurations were vertically or horizontally oriented, and unidirectional-ascending (strongly disagree to strongly agree), unidirectional-descending (strongly agree to strongly disagree), or bidirectional (mixed). Differences in internal consistency reliability were not evident ( $p = .123$ ). When Likert scales validated with unidirectional response options were modified to a horizontal-bidirectional configuration, their factorial validity diminished modestly. There was a horizontal selection bias to the left side by 0.13 increments ( $p = .030$ ), but no selection bias for vertical response options ( $p > .05$ ). Bidirectional and vertical response options took the longest time to complete, and horizontal unidirectional response options took the shortest ( $p < .05$ ). Vertical response options took 0.47 more clicks to complete than their horizontal counterparts ( $p < .05$ ). In conclusion, a single best response option configuration for Likert scales administered online was not found. Vertical unidirectional response options should be used to avoid the left-side selection bias. In situations where the left-side bias is not a concern, horizontal unidirectional response options can be used to take advantage of its faster completion time.

## G033

**A Study of Foodie Markets through Tourism in Minneapolis**, Erin Green, M.S. student in Sustainable Tourism, Dr. Carol Kline, Assistant Professor in Sustainable Tourism, East Carolina University, Greenville, NC

People who identify themselves as foodies may do so for vastly different reasons. From the upscale gourmet foodie to the organic and local foodie, they differ in their lifestyles and behaviors. Through a tourism lens, one type of foodie may travel longer or spend more money during their travels. This study looks at potential tourists to Minneapolis, Minnesota. Using the theory of recreation involvement, foodie tourists and their travel habits will be studied. Types of foodies will be segmented based on cluster analysis of their frequency of involvement in food-related activities. The travel habits of the clustered groups will be investigated to learn more about their effect on the destination. This information will be gathered an online survey distributed to people who have requested information about the Minneapolis. This information is valuable for destination marketing organizations in order to know which types of foodies should be focused on in marketing efforts or what food-related activities available in Minneapolis should be featured in advertisements.

# Graduate Oral Presentation Abstracts (Face-to-Face)

G034

**The Differential Framing Measure for Procrastination: An Implicit Measure of Procrastination Cognitions**, Zachary Parker, East Carolina University, Greenville, NC

Procrastination is the irrational delay of tasks that results in missed deadlines or inferior work when task completion is attempted before an imminent deadline. Procrastination in the workplace can be identified as employees postponing work engagement that costs companies large amounts of money in the form of unproductive employee hours or missed opportunities to receive discounts. Previous research has delved into identifying those who engage in procrastination behaviors using tests designed to explicitly examine procrastination; however, the shortcomings of these explicit tests has been well documented (James, 1998). New measures using Conditional Reasoning response items force participants to use their Justification Mechanisms to choose between scenarios (James, 1998), thus indicating their predilection for engaging in such behavior. Extending from the Conditional Reasoning response approach are Differential Framing Tests (LeBreton, 2002), which uses differentially primed synonym items to identify the participant's propensity to justify their behavior as normal. The present study examines two core procrastination issues; why current procrastination measures are limited and what justification mechanisms are used when people procrastinate. The present study builds upon previous research to propose a novel method for identifying those likely to procrastinate. This research is currently being conducted so there are no results to mention at this time.

G035

**Impact of exogenous changes on output: A forward looking perspective**, Yu-Chieh Wang, Xuan Liu, Department of Economics, East Carolina University, Greenville, NC

We are interested in how exogenous tax changes affect output change. The effects tax changes have over output is an interesting topic that a lot of papers focus on. This paper was inspired by the Romer and Romer 2010 AER paper. They used narrative method to distinguish tax changes into endogenous and exogenous ones. According to Romer, the impact fiscal policies have on output wasn't only statistically significant but also economically significant. Their estimates suggest that a tax increase of 1% of GDP decreases the output over the next three years by nearly 3% which by a glance seems too strong. As we all know, stimulus fiscal policy not only enhances the output but possibly also the aggregate demand. The price will increase if there's an increase in aggregate demand. With price increase, it is pos-

sible that there is indirect impact of exogenous tax changes on output through monetary policy channel. Recent studies shows strong and long lasting impact of exogenous tax changes on output which implies inflation and interest rates will change in long periods as well. It's logical to expect changes in inflation expectations. Thus from what we know so far, it's logical to suspect that conclusions drawn in the reference paper ignoring the indirect impact through the monetary policy channel might be biased. In this case the regressor and error term used in Romer's paper are correlated with each other. In other words, since the impact of exogenous tax changes are long-lasting, assuming fixed inflation estimates is likely to lead to a biased result. Since the indirect impact may work both through the response of inflation estimates and the response of interest rates, we will discuss the indirect impact through monetary policy channel with inflation expectations and interest rates. We are interested in whether adding the inflation estimates will change the conclusion of Romer (2010 AER). Thus in this paper our innovation is to focus on indirect impact exogenous tax changes have upon inflation and interest rates. We use the narrative method to distinguish tax changes then we add inflation estimates into our model. Our results show significance on both direct and indirect impacts. However, unlike the conclusion drawn from Romer, our conclusion suggests that direct impact isn't as strong as shown in recent literature.

G036

**Understanding Counterproductive Work Behavior: How Aggressive Employees Respond to Leader-Member Exchange**, Steven B. Clark, Mark C. Bowler, Karl L. Wuensch, Jennifer L. Bowler, East Carolina University

The proposed study seeks provide further understanding of counterproductive work behavior by investigating how aggressive employees interpret and respond to different Leader-Member Exchange (LMX) relationships. Specifically, utilizing the integrative typology proposed by Bing and colleagues (2007), the differential perceptions of LMX relationships made by aggressives, manifest aggressives, prosocials, and overcompensating prosocials will be examined. To this end, the typology incorporates both explicit (i.e., self-report) and implicit (i.e., conditional reasoning) measures of aggression. Participants' perceptions will then be measured using a series of vignettes that will be created to simulate various workplace scenarios and LMX relationships. Keywords: aggression, conditional reasoning, counterproductive work behavior, leader-member exchange

## G037

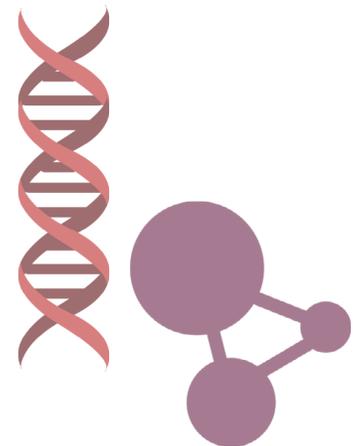
**Predicting Subjective Grammaticality Rating from 6 Different Sentence Categories,** Nazenin Gurel, East Carolina University

Studies have attempted to understand what grammaticality is and several theories of linguistic competence, the ability to correctly classify sentences into proper categories, exist (Chomsky, 1965). Research has found perceptions of grammaticality vary between cultures (Schulz, 2002). Participant (n=105) status as a native speaker of English (native=59, non-native=46), age (16-20=3, 21-25=34, 26-30=32, 30+=36), education level (high school=1, some college=13, bachelors=52, Masters=37, PhD/professional degree=2), and gender (male=56, female=49) were measured. Roughly half of the sample was primed to describe grammaticality before viewing items (primed=52, non-primed=53). 59 sentences in categories of completely grammatical sentences, completely ungrammatical sentences, garden path sentences, regional vernacular sentences, grammatical but nonsensical sentences and sentences that included made up words were rated on a 5-point scale for grammaticalness, similar to previous research (Cleary & Langley, 2007). We hypothesized being either a native or a non-native speaker would influence judgments. Primed participants were hypothesized to rate sentences as having lower grammaticality. Novel contributions include an online non-college sample, as well as the use of a prime, garden path items, and regional dialect items for exploratory purposes. Multiple regression was used to identify predictors of averaged subjective grammaticality rating for each category of sentences. Models for categories other than fully ungrammatical sentences were non-significant ( $p > .05$ ), meaning the resulting formulas for predicting ratings were no more accurate than using average participant responses. Results for predictors of averaged grammaticality ratings for ungrammatical stimuli found a statistically significant model ( $F(5, 96) = 6.40, p < .05$ ) explaining 25% of the variance in the criterion. Results indicate participant age ( $b = -.22, t = -2.50, p < .05$ ), gender ( $b = -.37, t = -2.56, p < .05$ ), and status as a native speaker of English ( $b = -.46, t = -3.07, p < .05$ ) were significant predictors for ungrammatical stimuli. Of the 3 significant predictors from this model, only status as a native English speaker demonstrated a stable trend in its relationship to the criterion (negative) in other models. The hypotheses concerning native speakers were supported, while those concerning priming were not.

## G038

**ABCD Model and Relational Cultural Theory as the Foundation for Community Engagement,** Tracy Carpenter Aeby, PhD, LCSW, Jason Radosevich, MSW Candidate 2013, East Carolina University, Greenville, NC

The Asset Based Community Development (ABCD) model has been used across the globe to engage communities in proactive action however the interpersonal dimensions of this process have not been explored in great detail. The ABCD model often focuses solely on the macro environment with little attention being given to the micro environment. However Relational Cultural Theory, most often used in interpersonal relationships, can be utilized to create growth fostering relationships which bridge the gap between community changes and interpersonal changes. Through a meta-analysis of Academic Search Complete, ERIC, psychARTICLES, psychINFO, Social Work Abstracts, SocINDEX with Full Text, and Women's Studies International, the authors hope to elucidate the nature of this model and theory as it applies to practice and how these theories can best be used to complement each other in clinical and community practice. Often social workers have their feet in both of these fields without a sturdy bridge between them. By combining these concepts, practitioners may be able to confidently serve their communities by helping to promote client growth by building trusting relationships and developing community partnerships in a positive manner.



# Graduate Oral Presentation Abstracts (Face-to-Face)

G039

## **Interactions and Relationships between Kindergarten teachers and English Language Learners.**

Brittany Sullivan, Department of Child Development and Family Relations, East Carolina University, Greenville, NC

The presence of the English Language Learner (ELL) population is ever-increasing in our Kindergarten-Grade 12 sector (Batt, 2008; Clair, 1995; Dellicarpini, 2008; Han & Bridglall, 2009). With this influx of students who may need specialized attention, it is essential for educators and teacher education programs alike to focus on preparation for serving such a population (Batt, 2008). While research depicts a lack of training, it also elicits an assumed responsibility to successfully educate these students. The aims of this study are to: 1) examine relationships between native-English speaking kindergarten teachers and ELL and non-ELL children within their own classroom and 2) examine if native-English speaking kindergarten teachers differ in their interactions with ELL and non-ELL children within their own classrooms. Through theoretical application of Vygotsky's Sociocultural Theory and Bronfenbrenner's Ecological Systems theory, classrooms in Eastern North Carolina were surveyed, using a demographics survey and the Student Teacher Relationship Scale (STRS) (Pianta, 1999), and observed, using the Emerging Academics Snapshot, EAS, to determine the process quality of each classroom and the relationships that teachers maintain with their ELL students.

G040

**Cloud Testing of Mobile Systems**, Oleksii Starov, Department of Computer Science, East Carolina University, Greenville, North Carolina

Modern mobile development includes critical mobile applications and systems with higher-level quality requirements. To guarantee high levels of mobile applications reliability and security, sufficient testing is required on a variety of heterogeneous devices as well as different versions of operating systems (OS). The current study develops an approach to increasing the effectiveness of testing for mobile development. A Cloud Testing of Mobile Systems (CTOMS) testing framework will be presented in the form of a cloud service that facilitates testing by providing the ability to run tests on a variety of remote mobile devices. The framework is based on a heterogeneous networked system that connects operational computers, mobile devices, and databases with software applications. The current research focuses on building a prototype of CTOMS that supports testing Android mobile applications in cloud. CTOMS allows multidirectional testing providing the oppor-

tunities to test an application on different devices and/or OS versions, to test new device models on compatibility with the newest OS versions and the most popular applications, etc. Another new aspect is to embed the test model, i.e., appropriate testing techniques for mobile development, within the framework. For user it will serve as suggestions provided by CTOMS about test methods, criteria, and test coverage for software-hardware combinations. Suggestions will be based on available configurations, statistics, and resource constraints.

G041

## **Cloud Computing Security Framework with Parity-based Partially Distributed File System.**

Ali Shahbazi, Department of Computer Science, East Carolina University, Greenville, NC

One of most important issues in cloud computing is increased security risks. Now days many cloud structure and services provided but as an inevitable concomitant to these new products, security issues increase rapidly. Availability and integrity of data as well as security and privacy issues are also of great importance to cloud computing users; they may be more skeptical of the cloud services when they feel that they might lose the control over their data. Incidents like recent downtime of Amazon's S3 presents very clear examples of the above mentioned concerns. Some products like torrents file has less security while some others like Google product, Google File System (GFS), has more security on cloud environments.

In this project we discuss the circumstances and terms which must be satisfied in cloud security. From user's perspective, Confidentiality, Integrity, and Availability (CIA) concepts are what should be expected from cloud provider and this will be a very important decision making factor to whether or not to use cloud services. Because of deferred control of data from customer to cloud provider and unknown number of third parties involvement between real cloud service provider and customers, it is almost impossible to apply traditional security methods. We present our Cloud Computing Security Framework with Parity-based Partially Distributed File System in simple abstract mode with a master server and enough number of chunk servers. We use fixed chunk size model for large sequentially distribution file system with 4 separated key to decryption/ encryption. We then analyze the risk model using PPDFS Security Risk Model. Finally, we discuss the advantages and benefits of Cloud Computing Security Framework with Parity-based Partially Distributed File System; the security concerns are further analyzed.

## G042

**Velum and pharynx wall tracking system in MRI sequences using synchronized audio and HMM,**

Pooya Rahimian, Department of Computer Science, East Carolina University, Greenville, NC

Automatic tongue, velum (i.e., soft palate), and pharyngeal movement tracking systems provide a significant benefit to analysis of dynamic speech movements. Studies have been conducted using ultrasound, x-ray, and magnetic resonance imaging (MRI) to examine the dynamic nature of the articulators during speech. Simulating movement of the tongue, velum, and pharynx is often limited by image segmentation problems. Traditionally, movements of the oral structures are segmented through manual tracings. These methods are extremely time-consuming. Noise, motion artifacts, air interfaces, and refractions often complicate the process of computer based automatic tracings. In addition, in oral cavity image segmentation, traditional image processing techniques suffer from leakage issue, due to low quality of MRI and no recognizable boundary of velum and pharynx in the contact moments. Computer based tracing algorithms can overcome these disadvantages by utilizing machine learning techniques. Analysis of corresponding speech signals can be considered as prior information. The purpose of this study is to illustrate a methodology to track the velum and pharynx from a sequence of MR Images using Hidden Markov Model (HMM) and Power-Normalized Cepstral Coefficients (PNCC).

Auditory models such as Mel-Frequency Cepstral Coefficients have been widely used in automatic speech recognition systems. Due to the noisy environments, PNCC were applied to extract audio features. Outer boundaries of velum and pharynx were tagged (selected pixel) by a novel method to deduct the search space and improve HMM performance. Error rate was measured by calculating distance between predicted pivot points and actual tags. The proposed model traced and animated dynamic articulators during speech process in real-time with overall accuracy of 71% considering one pixel threshold. The predicted pivot points (pixels) segmented desired structures, even though the contours of contacted areas were fuzzy and not recognizable. This project is being conducted through a collaborative effort between Department of Communication Science and Disorders and Department of Computer Science, under supervision of Prof. Tabrizi and Dr. Perry.

## G043

**Experimental Evaluation of Effectiveness of Modified Condition/Decision Coverage Testing Criterion,**

Prudhvi Kumar Alapati, Perry Chauncey, Department of Software Engineering, East Carolina University, Greenville, NC

Software testing has lately become a very important part of the development process. There are development methodologies which prefer writing test codes even before the real code is actually written. Usually, software testing methods are classified under white-box testing and black-box testing. White-box testing is more about testing the internal structure of the software. Modified Condition/Decision Coverage (MC/DC) is one the code coverage testing techniques employed during white-box testing. The main aim of MC/DC is to make sure that the code under scrutiny satisfies the following rules: Each decision takes every possible outcome at least once. Each condition in a decision takes every possible outcome at least once. Each entry and exit point is invoked. Each condition in a decision shows to independently affect the outcome of the decision.

The main aim of this project is to measure the effectiveness of MC/DC coverage criteria itself. To measure the effectiveness, we first have to create test cases satisfying MC/DC for a given Boolean expression. This can be a lengthy task depending on the Boolean expressions we actually come across. So to ease the process of creating MC/DC test cases we created a tool which generate MC/DC test cases when provided with Boolean expressions. The tool assumes that the user enters a valid Boolean expression. This tool takes Boolean expression as input and runs this expression through a series of algorithms, and outputs all possible MC/DC test case sets into a series of text files in a folder.

The test cases generated using this tool and the Boolean expression are then given as input to Fault Evaluator Tool, which evaluates the effectiveness of the test cases generated. This presentation includes: Description of MC/DC testing criteria. Description of the tool. Example of user inputs and outputs. Demonstration of the tool. Experimental results of MC/DC effectiveness for different logical expressions and different types of faults.

# Graduate Oral Presentation Abstracts (Face-to-Face)

G044

**A Generic Framework for Online User Profile Creation from Text Documents.** Majid Darabi, Department of Computer Science, East Carolina University, Greenville, NC

Recently, recommendation systems have widely used in online applications to create personalized contents for users. For example, news websites recommend specific news to each user based on their interests. One possible approach to the design of recommendation system is finding users' interests and then suggesting items that are related to their interests. In this method, the first step is extracting users' interests that called user profile. In this study, we propose a novel method to automatically create the user profile from text documents. Our text document analyses framework uses hierarchical clustering to construct a tree of terms that represents the user interests. We use Aging theory in order to calculate the user interest level over a period of time. The framework can generate a sorted list of top N user's interests including predicted interests in real time. Finally we report the results of an experiment conducted using real data to evaluate our framework that shows significant improvement.

G045

**Lean Six Sigma Black Belt Project at Carolina Donor Services.** David James Wilson 1, Dr. Janet Sanders 1, Mrs. Kim Koontz 2, 1 Department of Technology, East Carolina University, Greenville, NC, 2 Director of Tissue Services: Carolina Donor Services

In the quest for process improvement the focus of this Lean Six Sigma Black Belt (LSSBB) project investigation takes place at Carolina Donor Services (CDS). They are a federally designated organ procurement organization. CDS services a great majority of North Carolina as well as an area around Danville, Virginia. The tissue recovery process is the area in which my investigation takes place. In an overview, the process of tissue recovery includes gaining approval from donor's family for tissue recovery. Once a family gives consent the donor is transported from a hospital to a CDS recovery center in Durham, North Carolina. Time is of the essence in this process. From the time the donor is declared deceased to the beginning of tissue recovery there is only a 24 hour window. After the donor arrives on site at CDS, all of the donor's medical records are reviewed to ensure the greatest chance of a viable tissue recovery. The tissue recovery occurs in an operating suite within CDS's facility. After tissue recovery is completed the donor is returned to the family. The tissue that

was recovered is then packaged and shipped to the appropriate tissue processor. During my initial investigation it became apparent that CDS struggles with scheduling and resource allocation. Therefore this LSSBB project has been defined by the fact that CDS has had to turn away a significant number of viable donors due to the lack of proper resource utilization. This project has been measured with the use of time studies, process mapping, and policy/procedure review for effectiveness. There has been thoughtful analysis of all data collected. Several key areas of improvement/deficiencies have been noted and will be the focus of the improve phase of this project. During the improvement phase new work schedules have been created. Productivity enhancements have been put in place in the operating room setting. In addition, a great emphasis has been placed on standardized work and improved recovery methodologies. The control phase of this project is centered on recovery times and the number of donors processed through CDS. The ultimate goal of this LSSBB project is to improve the organization process of tissue recovery so that additional donors can be processed. In 2011 thirty-three donors had to be turned away due to the lack of resources, which represents \$234,000 lost revenue.

G046

**Knowledge is Power& and Sometimes Profit!** Erin Younge, School of Art and Design, East Carolina University, Greenville, NC

My work focuses on stories that convey some of the pivotal learning moments within recent medical technology that came with a price. My research examines diseases, medical devices, and failed experiments, while debating our development of the scientific method around unethical practices; this is often seen as quackery. Our search to understand and treat physical and psychological ailments acknowledges a desire to improve the quality of life, but our intentions do not always match these desires. Doctor: "I've got very bad news - you've got cancer and Alzheimer's" Patient: "Well, at least I don't have cancer"

**G047**

**House and Home**, Aisling Millar, School of Art and Design, East Carolina University, Greenville, NC

Our childhood home is one of the most intimate of settings. The atmosphere created inside the home and the cultural environment surrounding the home, both have a huge impact on an individual's identity and development. Using both the physical representation of a house or Irish iconography, I reference my childhood home, and the lasting effects of immigration. These works are used in an autobiographical manner and represent both my own idea of self, Belonging, and the balancing act between two cultural identities.

**G048**

**Wanderings**, Cathy Perry, School of Art and Design, East Carolina University, Greenville, NC

The dynamics of a domestic environment and the cycles of the natural world are explored through the use of plant materials captured in bronze, welded steel sculptures that are inspired from the shapes of this natural material, and ideas carved into wood. Materials I use for the bronze casting must be in a state of transition; on the verge of bloom, at full flower or going to seed. These plants flow through their natural process, remembering the forms they need to achieve to create new life. The shapes that are welded steel and carved wood are reflections of wind vortexes, rushing water, and earth moving around roots.

One of the most vivid memories of my childhood is playing under the overhanging bramble branches around our home. This environment seemed especially made by nature to envelope me into a world of my own imagination. The memory of those vines has become a metaphor for the interconnectedness of family and community in my adult life. Like the roots of a tree my family is my core, yet I realize this stable unit is ever evolving with the growth of my children and changes within myself.

By harvesting the foliage in a state of transition and casting them in bronze I can freeze time much like freezing moments within a memory. However, these static forms convey the vibrancy of life they once possessed through weaving the dead materials into new motions. Whether using soft or hard materials the act of weaving becomes an allegory within my work further exemplifying my ties to community through my family. The weaving in particular, opened a door into my oldest family roots through their tradition of quilt making and sewing. While I cherish these old traditions I have found ways to push these materials into new forms through my soft sculptures.

Complexities within the natural world and the sociality of human existence combine to create ties that

bind me to both. This work is an exploration of humanity seen through a natural lens and functions, for me, as a vehicle for understanding changes in my life. Using the age old traditional methods of casting metal into reflections of contemporary life, through installation as a means of reaching new levels of exploration in conceptual art, and combining both into cohesive reflections of life it is my goal to express this understanding through object making

**G049**

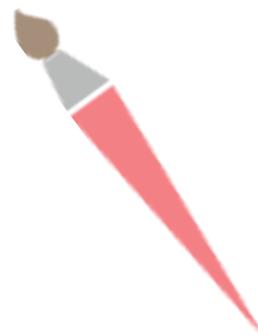
**The Changing Relationship to Site, Placement, and Material**, Patrick Hutti, School of Art and Design, East Carolina University, Greenville, NC

My research is about obtaining a specific type of surface that occurs in the wood firing process. Starting with the proliferation of wood firing in the 1970s, I will be discussing kiln design and its relationship to site and placement. Through site and placement, I will be showing the aesthetic shift of an ancient practice in a modern global context.

**G050**

**Recontextualizing the Ceramic Vase**, Gaines Bailey, School of Art and Design, East Carolina University, Greenville, NC

My research investigates how vases are used and perceived. I will present a selected history of forms, followed by my own work reinterpreting them. These works conceptualize the vase as imagery and function, exploring different relationships between the two.



# Graduate Poster Abstracts (Face-to-Face)

GP1

## **Intratracheal Exposure to Silver Nanoparticles Promotes Enhanced Coronary Vascular Tone**, L.C.

Thompson<sup>1</sup>, A.K. Vidanapathirana<sup>1</sup>, J. O. Dawkins<sup>1</sup>, M. Herco<sup>1</sup>, S. Sumner<sup>3</sup>, T.R. Fennell<sup>3</sup>, J.M. Brown<sup>2</sup> and C.J. Wingard<sup>1</sup>, <sup>1</sup>Department of Physiology, East Carolina University, Greenville, NC, <sup>2</sup>Department of Pharmacology & Toxicology, East Carolina University, Greenville, NC, and <sup>3</sup>RTI International, Research Triangle Park, NC

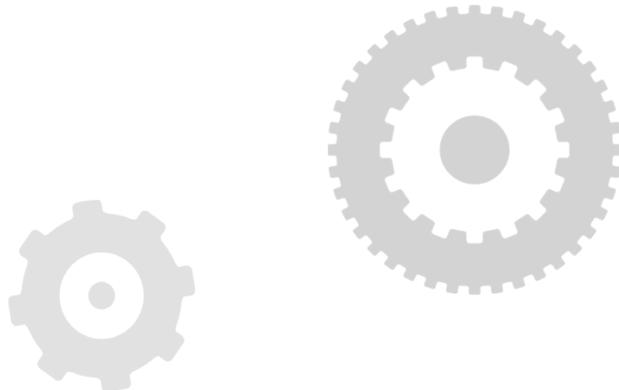
Silver nanoparticles (AgNP) have physicochemical and antimicrobial properties that make them useful in both industrial and biomedical applications. In regard to human exposures, little is known about the way AgNP may impact physiological systems. We tested the hypothesis that coronary responsiveness to serotonin (5-HT) and acetylcholine (ACh) would be augmented 24 hrs following exposure to AgNP, and be dependent on particle sizes and the dispersants used to coat the particles. We used male Sprague-Dawley rats (10-12 weeks old) and delivered AgNP (1 mg/kg), of either 20 nm (SS) or 110 nm (LS) diameters, and suspended in either polyvinylpyrrolidone (PVP) or citrate (Cit), by intratracheal (IT) instillation or intravenous (IV) injection. After 24 hrs we isolated segments of the left anterior descending coronary artery for wire myography analysis of 5-HT and ACh dose-responses. Our data indicate no differences in coronary responses from AgNP groups compared to their vehicle groups. We did observe some unique dispersant- and AgNP size-dependent comparisons in the coronary responses. Maximal 5-HT stresses were higher ( $P < 0.05$ ) in the SSCit-IT group ( $4.3 \pm 0.5$  mN/mm<sup>2</sup>) compared to the SSPVP-IT group ( $2.9 \pm 0.3$  mN/mm<sup>2</sup>) or the LSCit-IT group ( $3.2 \pm 0.4$  mN/mm<sup>2</sup>). ACh responses were impacted in a dispersant-dependent manner, shifting the EC<sub>50</sub> from  $106.6 \pm 16.6$  nM in the LSPVP-IT group to  $50.4 \pm 19.9$  nM in the LSCit-IT group. We found no significant differences between coronary responses from rats exposed intravenously to AgNP or their vehicles. We conclude that pulmonary exposure to AgNP activates biological response pathways that are sensitive both the dispersant and AgNP size. This work is supported by NIH U19 ES019525.

GP2

## **Bioenergetic supply-demand mismatch in diabetic heart: role and redox-dependency of mitochondrial calcium influx**, Fatiha Moukdar<sup>1</sup>, Ruben C. Sloan<sup>1</sup>,

Hetal D. Patel<sup>1</sup>, Luke M. Stewart<sup>1</sup>, Phillip A. Bostian and David A. Brown<sup>1, 2</sup>, <sup>1</sup>Department of Physiology, <sup>2</sup>East Carolina Diabetes and Obesity Institute, Brody School of Medicine, East Carolina University, Greenville NC

Bioenergetic inefficiency is a hallmark of diabetic cardiomyopathy and contributes to heart failure and premature death. Through parallel activation, intracellular Ca<sup>2+</sup> simultaneously activates the myofilaments and stimulates oxidative phosphorylation to match ATP supply with increased demand. Decrements in mitochondrial Ca<sup>2+</sup> influx have been observed in the diabetic heart, but the underlying causes of this decrease are not understood. We hypothesized that lower mitochondrial Ca<sup>2+</sup> uniporter (MCU) activity was redox-dependent, and tested our hypothesis that this contributes to cardiac inefficiency in the diabetic heart in two models of diabetes: streptozotocin and ZDF rats fed a high fat diet. In isolated perfused hearts, basal myocardial oxygen consumption (MVO<sub>2</sub>) was higher in diabetic hearts, consistent with previous reports of higher uncoupled respiration in diabetic hearts. Diabetic hearts showed a smaller increase in MVO<sub>2</sub> after increased cardiac demand. Neither total mitochondrial respiratory capacity nor  $\dot{V}_{Em}$  was different between groups. Across both experimental models, Ca<sup>2+</sup> influx in isolated mitochondria was impaired in diabetic versus non-diabetic rats. Treating mitochondria with the thiol reductant dithiothreitol restored Ca<sup>2+</sup> influx to control levels (conversely, the thiol oxidant diamide slowed Ca<sup>2+</sup> uptake). Finally, we utilized a combination of immunoprecipitation and fluorescent labeling of free thiols to show that MCU is susceptible to redox modification. Future experiments determining the redox status of MCU subunits in our diabetic models, as well as studies where restoring MCU activity is expected to rescue supply-demand mismatch in diabetic heart, are ongoing. We conclude that MCU activity is redox-dependent, and may lead to bioenergetic supply-demand mismatching in the diabetic heart.



## GP3

**Assessing the decay of heterologous tolerance to morphine after varying lengths of treatment via intraperitoneal (I.P.) injection**, Ben 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 the decay of tolerance in animals pretreated with twice daily i.p. injections of morphine for 4 or 7 days. Tolerance to the analgesic effects of morphine was assessed using the paw pressure test while the heterologous nature of tolerance was evaluated using the response of the LM/MP to DAMGO and 2-CADO at 0, 1, 2, or 4 days after treatment cessation. The data indicated that the time for return to baseline was correlated to the magnitude of tolerance that was a function of the length of treatment. The tolerance generated in animals treated for 4 days was nearly 4-fold and decayed to baseline within 2 days after the treatment ended while tolerance observed in animals treated for 7 days was nearly 6-fold and returned to baseline levels 4 days after treatment cessation. 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.

## GP4

**In Utero Bisphenol-a (bpa) Exposure, The Developing Immune System and Memory**. JN Franklin, Q Hu, and JC DeWitt. Department of Pharmacology and Toxicology, Brody School of Medicine, East Carolina University, Greenville, NC

Exposure to exogenous agents during susceptible stages of neurodevelopment may be associated with the onset of neurological disorders. The emerging contaminant bisphenol A (BPA) is a widely used ingredient in the production of plastics and resins utilized in food and beverage packaging. Our hypothesis is that developmental exposure to BPA induces neural and behavioral alterations and that these alterations will be associated with developmental immunotoxicity. C57BL/6 female mice were given 0, 25, 50, or 100 mg/kg of BPA in a corn oil vehicle by gavage, beginning at pairing with males and ending at weaning of pups. Littermates were assessed on a Barnes maze at postnatal day 21 (PND21), PND42, and PND60. Splenic lymphocytes, including B cells, natural killer cells (NK cells) and T cells (CD3, CD4, CD8, and CD25 subclasses), were immunofluorescently labeled to determine the immunophenotype of offspring from each treatment group. In the Barnes maze, which is a reliable indicator of hippocampal-dependent learning and memory that has been used to link immune dysfunction with altered neurodevelopment, the time to initially reach the escape hole did not significantly differ among treatment groups. A significant interaction between sex and dose was detected in offspring immunophenotype, indicating that immune cell subpopulations responded differently between sexes by dose. Livers weights increased in adult offspring by dose, although this trend was not statistically significant. Our data indicate that developmental exposure to BPA does not alter aspects of learning and memory as evaluated by the Barnes maze, but may induce differences in immunophenotype between sexes that may confound behavioral responses. Additional work is ongoing to evaluate changes to hippocampal neurons induced by developmental BPA exposure.



# Graduate Poster Abstracts (Face-to-Face)

## GP5

**Evaluating The Potential Of Fish Oil To Enhance Antibody Production In A Model Of Diet-Induced Obesity**, Mark Melton and Saame R. Shaikh, East Carolina University, Greenville, NC

Fish oil is a popular dietary supplement that is increasingly being promoted as a natural alternative to help attenuate several inflammatory based diseases. The bioactive components of fish oil responsible for the proposed anti-inflammatory effects are the omega-3 fatty acids docosahexaenoic acid and eicosapentaenoic acid. However, generalizing the oil as anti-inflammatory is presumptuous because there is not a conclusive understanding of the molecular targets and mechanisms of fish oil. While fish oil has been shown to be immunosuppressive in specific contexts, other studies have demonstrated that it also enhances functions of the immune system. Data from our laboratory show that lean mice fed a diet containing fish oil have enhanced B-cell activation. Enhancing immune function would be useful in situations when the immune response is attenuated such as obesity. As a result of a crippled immune system, obesity is associated with high rates of infection, poor responses to vaccination, and increased risk of cardiovascular diseases such as atherosclerosis. One particular component of the immune system that is diminished in obesity is B-lymphocytes in both number and function. Increasing B-cell populations and function have been shown to improve vaccination responses and decreased atherosclerotic plaque formation. Thus, finding ways to increase B-cell populations and function could help to resolve obesity related dysfunctions through helping to boost immunity. Our hypothesis is that fish oil can enhance B-cell antibody production in obese mice in response to immunogenic challenges by targeting the biophysical organization of plasma membrane proteins vital for B-cell function. We will address how fish oil alters B-cells and their function in a physiologically relevant model of diet-induced obesity. We will also address one possible mechanism of action for fish oil by determining if fish oil can reorganize the molecular membrane clustering of vital proteins necessary for B-cell activation and subsequent antibody production. Very little is known about how obesity affects B-cell function or if fish oil can be used to enhance immunity in the context of obesity. Our long-term goal is to determine if fish oil is a viable option to enhance the immune system which could, in-turn, help to increase the life span of those suffering from obesity and its associated

## GP6

**HTLV-1 basic leucine zipper factor (HBZ) interacts with cellular transcriptional coactivators to repress their activity**, Diana Wright, East Carolina University, Greenville, NC

The tumor suppressor protein p53 stimulates apoptosis and cell death in response to genotoxic stress, and because of these vital functions, p53 is the most mutated or inactivated gene in tumors. Several cellular coactivators such as p300, its homologue CBP, and p300/CBP associated factor (p/CAF), are known to acetylate p53 after genotoxic stress. Within these coactivators is a specific domain called histone acetyl transferase (HAT) that transfers an acetyl group from acetyl-CoA to lysine residues located on histone tails and transcription factors. In the case of p53, multiple acetylations by p300/CBP and p/CAF increase p53 DNA binding activity and therefore transcription of genes responsive to p53. Adult T-cell Leukemia (ATL), a fatally aggressive non-Hodgkin's lymphoma, is caused by the retrovirus Human T-cell Leukemia Virus type 1 (HTLV-1). Interestingly, ATL patients do not have a high incidence of p53 mutation. Therefore, it has been speculated that viral proteins encoded by HTLV-1 inhibit p53 function. HTLV-1 basic leucine zipper factor (HBZ) is expressed in all infected patients and in patients suffering from ATL in contrary to other viral proteins. We previously reported that HBZ binds the HAT domain of the cellular coactivators p300/CBP. The interaction of HBZ and p300-HAT domain inhibits p53 acetylation in vitro and in vivo. Using co-immunoprecipitation assays, we recently found that HBZ also binds p/CAF. Through in vitro HAT assays, we demonstrate that the binding of HBZ and p/CAF also inhibits acetylation of p53 by repressing HAT activity. Since p/CAF, along with p300/CBP, is responsible for acetylating p53, we tested the mRNA levels of two p53 target genes GADD45A and NOXA. We found that both of these genes have reduced mRNA levels in the presence of HBZ. Furthermore, in infected cells stably expressing a shRNA against HBZ, GADD45A and NOXA exhibit much higher mRNA levels. Overall, these results suggest that in targeting p300/CBP and p/CAF HAT activities HBZ lessens p53 function, which could contribute to the development and maintenance of ATL.

## GP7

**Perfluorooctanoic acid-induced cytotoxicity in primary cardiomyocyte culture.** Qixiao Jiang and Jamie C. DeWitt, Department of Pharmacology and Toxicology, East Carolina University, Greenville, NC

Perfluorooctanoic acid (PFOA) is a perfluorinated compound (PFC) that is widely used in the production of fluoropolymers. We have previously reported that PFOA induces developmental cardiotoxicity in late-stage chicken embryos and hatchlings. To investigate the mechanism, we isolated primary cardiomyocytes from embryonic day ten (ED10) chickens. Two types of cultures were evaluated: in vitro cells were isolated from untreated embryos and exposed to 0, 0.1, 1, 10, 50, 75 or 100 ug/ml PFOA in medium; ex vivo cells were isolated from embryos exposed to vehicle or 2 mg of PFOA/kg of egg weight in ovo. Cell viability and contractility were assessed for the two cultures. Reactive oxygen species (ROS) generation was assessed in the in vitro cultures. In vitro, 100 ug/ml of PFOA decreased viability by 72.4% (N=4-6, P<0.05) after one hour of exposure; 75 and 100 ug/ml of PFOA decreased viability by 26.4% or 69.4%, respectively (N=4-6, P<0.05) after thirty-six hours of exposure. In ex vivo cultures, in ovo PFOA exposure had no statistically significant impact on cell viability under normal culture conditions or under conditions of serum starvation. When contractility was evaluated, cardiomyocytes in the in vitro cultures took 38.2% longer to return to 50% baseline (N=9-16, P<0.05) at dose of 1 ug/ml relative to controls. Cardiomyocytes in the ex vivo cultures had a 40.3% decrease in the time to maximum departure velocity and a 25.0% decrease in cell length at peak contraction (N=29-30, P<0.05). After one hour of exposure to 50 ug/ml of PFOA in vitro, ROS generation increased by 316.8% relative to the vehicle group (N=3, P<0.05). These data indicate that while direct exposure of cardiomyocytes to relatively high doses of PFOA can induce cytotoxicity and ROS, in ovo developmental exposure does not induce cytotoxicity or ROS generation. Therefore, developmental cardiotoxicity observed in late stage embryos and hatchlings is not likely mediated via PFOA-induced cytotoxicity or ROS generation, but by interference of upstream signals that regulate early heart development.

## GP8

**Glutathione Peroxidase-4 plays a critical role in protection from metabolic syndrome and cardiac remodeling caused by diet-induced obesity,** Lalage A. Katunga<sup>1</sup>, Taylor A Mattox<sup>1</sup>, Scott Abernathy<sup>1</sup>, Timothy M. Darden<sup>1</sup>, Jitka Virag<sup>2</sup>, Ethan J Anderson<sup>1</sup>. <sup>1</sup> Department of Pharmacology & Toxicology, East Carolina University, Greenville, NC, <sup>2</sup> Department of Physiology, East Carolina University, Greenville, NC

Peroxidation of polyunsaturated fatty acids (PUFAs) generates a number of highly reactive lipid peroxidation products (LPPs), and the seleno-enzyme glutathione peroxidase-4 (GPx4) is an antioxidant enzyme that selectively neutralizes LPPs. To determine the contribution of LPPs to the pathogenesis of cardiomyopathy precipitated by diet-induced obesity, male WT and litter-mate GPx4- deficient (GPx4<sup>+/-</sup>) mice were placed on a n-6 PUFA enriched high fat high sucrose (HFHS) diet for 24 weeks, along with a control group of WT mice (CTL) fed low-fat standard chow. At termination of diet, adipose tissue mass and glucose intolerance were markedly higher in the GPx4<sup>+/-</sup> HFHS group compared to WT-HFHS group, although both HFHS groups were significantly more than CTL. Blood pressure and cardiac function were not significantly different between groups, although left ventricular size and cardiomyocyte diameter was increased in WT-HFHS group compared to CTL. Cardiac fibrosis was also markedly higher in both HFHS groups, but substantially more so in GPx4<sup>+/-</sup> compared to WT. Mitochondrial O<sub>2</sub> consumption was higher in WT-HFHS but not GPx4<sup>+/-</sup> HFHS, compared to CTL. Surprisingly, the HFHS diet reduced mitochondrial H<sub>2</sub>O<sub>2</sub> by ~3fold in WT vs. CTL, but stayed similar between CTL and GPx4<sup>+/-</sup>. These findings implicate GPx4 as a critical enzyme necessary for the heart to positively adapt to the oxidative stress induced by obesity.

# Graduate Poster Abstracts (Face-to-Face)

GP9

## **Cytokine peptide fusion protein therapy inhibits Experimental Autoimmune Myocarditis in the Lewis Rat**

Shaun Reece 1, Xiaojia Wang<sup>3</sup>, Chris Jones<sup>1</sup>, Kenneth Salleng DVM 4, Robert Lust PhD 1, Mark Mannie PhD 2, Michael Van Scott PhD<sup>1</sup>, 1 Department of Physiology, East Carolina University, 2 Department of Microbiology and Immunology, East Carolina University, 3 Department of Pharmacology, East Carolina University, Greenville, NC, 4 Department of Pathology, Microbiology & Immunology, Vanderbilt University, Nashville, TN

Viral, bacterial, and fungal pathogens can generate auto-reactive T cells and antibodies against cardiac epitopes leading to myocarditis. If the cardiac inflammation persists, myocardial necrosis and fibrosis can result. The large cardiac capacity of most individuals can result in injury going undetected until extensive cardiac damage and remodeling has occurred. Current pharmacotherapy for myocarditis involves managing cardiac output as well as reducing inflammation. However, no therapies currently exist to prevent myocarditis or to selectively manage auto-reactive immune cells. The Lewis rat model of experimental autoimmune myocarditis (EAM) was used to study a novel therapy for autoimmune myocarditis. EAM induction was induced by injection of a peptide comprised of amino acids 1052-1076 of the human cardiac myosin beta chain, a dominant myocarditic epitope of myosin, after emulsification in Complete Freund's Adjuvant. EAM was assessed longitudinally by echocardiography. On days 19-20, afflicted rats had significant fluid accumulation around the heart (pericardial effusion). Pericardial effusion was associated with thickening of the myocardium, dilation of the left ventricle, and reduced ejection fraction. Hearts were harvested on day 21, and histological examination showed high levels of cellular infiltration in rats with pericardial effusion. The current study sought to determine if pretreatment with a novel cytokine-antigen fusion protein could prevent myocardial inflammation in EAM. The fusion protein (GMCSF-Myo) consisted of granulocyte macrophage colony stimulating factor (GM-CSF) covalently bound to myosin 1052-1076. Both domains of the fusion protein were validated in specific bioassays before use in pretreatment protocols. Pretreatment with GMCSF-Myo once a week for 3 weeks prior to EAM induction significantly reduced the presence of leukocyte infiltration into heart tissue. These experiments show promise for the use of fusion proteins as specific inhibitors of cardiac autoimmune disease. Future studies aim to determine the mechanism of action as well as the full therapeutic window for treatment of autoimmune myocarditis.

GP10

## **Antagonism of CB1 Cannabinoid Receptors Alters Neuronal Morphology when Given in Adulthood but not during Vocal Development: Evidence for Adult-onset Endocannabinoid Tone**

Tessa L. Holland, Marcoita T. Gilbert, and Ken Soderstrom, Department of Pharmacology and Toxicology, Brody School of Medicine, East Carolina University, Greenville, NC

Exogenous CB1 agonists, such as THC, are well-known to impair cognition and alter mood. Of interest is the role of endocannabinoids as neuromodulators in plasticity involved in learning and stress-related processes. Zebra finches possess a developmental sensitive period for vocal learning. A change we found after developmental agonist treatment was altered dendritic spine densities within a subset of brain regions necessary for song learning (Area X) and production (HVC). Dendritic spine dynamics are important to long-term plasticity necessary for learning and memory. Efficacy of exogenous agonist to alter both learning and related neurophysiology implies that endocannabinoid signaling may be important to normal vocal development. We have treated developing and adult male zebra finches (n=4) with daily injections of the CB1-selective antagonist SR141716A (6 mg/kg) to block endocannabinoid activity. Following Golgi impregnation and 3D reconstruction of neurons, the spine densities of SR141716A-treated adults increased 93.7% in Area X and 60.8% in HVC (p<0.01) compared to vehicle-treated controls. Surprisingly, no changes occurred in animals treated during vocal development. Also, mean dendritic lengths decreased 56.6% in Area X (p<0.05) following adult but not developmental treatments. These results suggest that song region dendritic spine densities in adulthood, but not during vocal development, are under tonic inhibitory endocannabinoid control, implicating this neuromodulatory system in maintenance of mature neural phenotypes. Antidepressants have been shown to promote neural plasticity, and we are interested in the possible role of endocannabinoid neuromodulation in this drug effect, particularly in light of clinical data implicating SR141716A in producing depression in humans. In a preliminary, acute experiment (n=1), we administered monoamine oxidase inhibitor (MAOI) phenelzine (2 mg/kg) once to adult male zebra finches followed by silence or novel song exposure. After Golgi impregnation and 3D reconstruction of neurons, we found modest phenelzine-induced increases in spine density in both silence and song exposures in HVC, and in song exposure but not silence exposure in Area X, compared to vehicle-treated controls. In future experiments, we will determine if chronic exposure to the MAOI is able to reverse physiological changes induced by SR141716A.

## GP11

**SMAD3 and FoxO coordinately regulate MuRF-1 transcription**, Lance M. Bollinger and Jeffrey J. Brault, Department of Kinesiology, East Carolina University

During muscle atrophy, Muscle-specific RING finger-1 (MuRF-1) targets muscle contractile proteins for rapid degradation. The transcription factors SMAD3 and FoxO mediate transcription of many atrophy genes and are known to coordinately regulate expression of several genes. However, it is not known whether these transcription factors coordinately regulate transcription of MuRF-1. Purpose: To determine the mechanism of the synergistic effect of SMAD3 and FoxO on MuRF-1 gene transcription. Methods: The MuRF-1 promoter region of three species, *mus musculus* (mouse), *rattus norvegicus* (rat), and *homo sapiens* (human), were analyzed for putative FoxO Response Elements (FRE, A/GTA-AAC/TA), SMAD Binding Elements (SBE, AGAC), and sequence homology using open-access software. Human embryonic kidney (HEK293) cells were co-transfected with plasmid DNA encoding GFP (control), FoxO1, FoxO3, SMAD3, FoxO1+SMAD3, or FoxO3+SMAD3 and luciferase reporters for the 5 kilobase upstream promoter region of MuRF-1, 6xSBE, or 6xFRE. Results: We identified a highly conserved sequence, containing a single FRE and two SBEs, within the proximal promoter region (-32 to -1 nucleotides from the transcriptional start site) of all three species. Overexpression of FoxO3 (3.9 fold), but not FoxO1 or SMAD3, significantly increased MuRF-1 gene transcription. Co-expression of FoxO1+SMAD3 (3.6 fold) or FoxO3+SMAD3 (6.6 fold) synergistically increased MuRF-1 gene transcription. Furthermore, co-expression of FoxO1+SMAD3 (12.1 fold) or FoxO3+SMAD3 (14.4 fold) significantly increased SBE-induced gene transcription to a greater extent than FoxO1 (1.2 fold), FoxO3 (1.1 fold), or SMAD3 (9.5 fold) alone. FoxO1 (4.2 fold) and FoxO3 (1.8 fold) increased FRE-induced gene transcription, but no synergistic effect was noted when co-expressed with SMAD3. Conclusions: FoxO, but not SMAD3, is sufficient to induce MuRF-1 gene transcription. Further, FoxO and SMAD3 synergistically increase MuRF-1 gene transcription. FoxO1 and FoxO3 enhance SMAD3-induced gene transcription, but not vice versa. The synergistic effect of FoxO and SMAD3 on MuRF-1 transcription is likely due to a direct interaction between these transcription factors which enhances SMAD3 binding at the SBE, thus augmenting SMAD3-induced gene transcription at the highly conserved SBEs within the proximal promoter region.

## GP12

**Extracellular processing of aggregate and its effect on CD44-mediated internalization of hyaluronan**, Ben Danielson and Warren Knudson, Department of Anatomy & Cell Biology, East Carolina University, Greenville, NC

Enhanced hyaluronan catabolism is a key metabolic alteration associated with degenerative osteoarthritis. Hyaluronan is a large glycosaminoglycan composed of repeating disaccharide units. Hyaluronan is bound to the cell surface of chondrocytes via interaction with a hyaluronan receptor, CD44. Aggrecan, a large extracellular proteoglycan, is also retained at the cell surface through CD44 due to its adherence to hyaluronan. Several aggrecans tether to a hyaluronan filament and form an aggregate complex with a mass that exceeds 107 Da. CD44 is responsible for internalizing hyaluronan for its eventual degradation within low pH vesicles in the cell. The mechanisms that regulate the internalization of hyaluronan by CD44 are poorly understood. Previous studies have shown that some degree of proteolytic cleavage of aggrecan complexes must occur before hyaluronan can be internalized by CD44 but, the extent remains unknown. We hypothesize that there is a size threshold of aggrecan that is permissive for hyaluronan internalization. To address this hypothesis, aggrecan has been isolated and semi-purified from extracts of bovine articular cartilage using DEAE or ligand affinity column chromatography. Biochemical analyses based on size and sensitivity to aggrecan-degrading enzymes were performed to confirm that the material purified was primarily aggrecan. The core protein of the aggrecan was fluorescently labeled using dansyl chloride and allowed to re-aggregate with exogenous hyaluronan of known size. An alternative approach was to prepare labeled hyaluronan (biotinylated) for use in re-aggregation. The size of hyaluronan was altered by varying duration times of microtip sonication to steadily decrease the size of hyaluronan. The next step carried out was a controlled, sequential degradation of the core protein using clostripain or trypsin, followed by rapid inactivation. The resulting truncated aggrecan fragments, still bound to hyaluronan, were then; (1) analyzed to verify the extent of truncation and; (2) added to monolayer cultures of primary chondrocytes and changes in the level of binding and internalization determined. Thus far two model cell systems of chondrocytes have been explored namely; primary cultures of bovine articular chondrocytes and a rat chondrosarcoma cell line that displays several phenotypic features of chondrocytes.

# Graduate Poster Abstracts (Face-to-Face)

## GP13

**Velopharyngeal data on African American Children Using MRI**, Lakshmi Kollara Sunil, East Carolina University, Greenville, NC

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 2500 African Americans are born with a cleft (Suleiman, Hamzah, Abusalab, & Samaan, 2005). A cleft palate refers to an opening in the roof of the mouth. An incidence of cleft palate negatively affects normal functioning of the levator veli palatini muscle and the surrounding velopharyngeal mechanism which are critical for speech, swallowing, and breathing. Though racial variations have been reported in the incidence of cleft palate, the exact reason for this has not been reported. Research has been done on levator veli palatini muscle morphology on Caucasian children. However, there is very little data on the same for African American children. Normative anatomical and physiological data is crucial for surgical planning and post-operative rehabilitation in patients with cleft palate. Thirty seven percentage of preschoolers with repaired cleft palate were found to have persistent hypernasality post primary palate repair (Hardin-Jones & Jones, 2005). This could be due to limited data regarding what constitutes as normal and abnormal levator muscle anatomy. Also, the effects of race on these normative measures are not fully known. This study aimed at providing normative levator veli palatini muscle measurements and velopharyngeal data on African American children between the ages of 4 and 8. There is currently no data regarding these measures for this particular group of children. It would be inadequate to plan surgical management for these children, based on data obtained from Caucasian children. This is particularly relevant as race has been shown to influence velopharyngeal morphology. Data measures for the regions of interest were obtained using a 1.5 Tesla Fonar MRI scanner. The MRI images are being analyzed using 3D visualization software. Data from this study could help tailor patient specific surgery, which will subsequently decrease the need for secondary surgeries. Data analysis is in progress.

## GP14

**Effects of the Vaccinia O1L Protein on T-Cell Activation and Antibody Production**, Anastasia Weeks, Gwendolyn Jones, and Rachel Roper, Department of Microbiology and Immunology, Brody School of Medicine, East Carolina University

Many members of the Poxviridae family infect humans, most notably Variola virus, the causative agent of smallpox. Outside of a potential as a lethal biowarfare agent, smallpox has been eliminated as an ongoing threat to the population due to the success of the Vaccinia virus vaccine. Vaccinia is also successfully being used as a vector in recombinant vaccines for HIV, malaria and even cancer. However, Vaccinia virus based vaccines are still unsafe and contraindicated in a large portion of the exposed population. Our lab studies viral genes that increase virulence and suppress immune responses. These genes maybe be used clinically to turn off undesired immune responses and their removal improves safety and efficacy of poxvirus based vaccines. A novel putative virulence factor, the Vaccinia virus O1L gene, is being studied by the Roper lab. To assess potential activity of the O1L protein upon the host immune response, Balb/C mice were intranasally administered either wild type Vaccinia virus Western Reserve strain (WR), one of two O1L deletion mutants (1A1 and 3A2), or mock infected (saline). Mice were monitored for 7 days and then euthanized. Spleens and blood were collected, processed and analyzed to determine if O1L affected T cell activation and antibody production. We are employing an ELISPOT assay to analyze the numbers of virus specific interferon gamma producing cells generated in mice infected with virus with and without the O1L gene. Preliminary data from an ELISA assay used to detect the quantity of mouse antibody production in response to Vaccinia virus demonstrated that there was a significant increase in antibody production in response to the O1L deletion mutant compared to antibody response to WR. Our results suggest that the O1L protein is immunoregulatory.

## GP15

**AMP-Activated Protein Kinase Inhibits Vascular Smooth Muscle Cell Growth in a Vasodilator-stimulated Phosphoprotein-dependent Manner**

Joshua Stone; Avinash Narine, MD, MPH; Jackson Vuncannon; Patty Shaver; Andrew Holt; David Tulis, PhD, F.A.H.A., East Carolina University, Greenville, NC

Abnormal vascular smooth muscle cell (VSMC) growth is a major contributor to vascular disease etiology. We have previously reported that the metabolic switch protein AMP-activated protein kinase (AMPK) has ability to inhibit vascular growth in vivo and in vitro. The actin cytoskeletal associated vasodilator-stimulated phosphoprotein (VASP) has been implicated in cell growth via dynamic actin cytoskeleton and focal adhesion (FA) complexes, increased Rho-A GTPase activity, and Rho-A-mediated serum response element (Sre)-dependent transcriptional activity. Published data by our lab and others reveals direct signaling between AMPK and VASP; therefore, it was the hypothesis of this study that AMPK reduces VSMC growth through inhibition of VASP. Our data reveal that activation of AMPK by the AMP-mimetic AICAR in commercial rat VSMCs increases inhibitory Ser 157 and Thr 278 phosphorylation of VASP with concomitant increased G- to F-actin ratio compared to control conditions. Additionally, compared to controls, reduced catalytic Tyr 397 phosphorylation of focal adhesion kinase (FAK), increased cytoskeletal-associated membrane-bound paxillin, and reduced Rho-A activity were observed in AICAR treated VSMCs. Functionally, AICAR inhibited VSMC transwell migration and cell cycle progression after 24 hours. To determine if these events were VASP-dependent, we cultured lentiviral-mediated VASP-deficient VSMCs and found that with and without AICAR, VASP deficiency reversed the AMPK-mediated cell cycle inhibition and anti-migration observed in wild type cells. Taken together, these findings suggest that AMPK has ability to reduce serum-stimulated VSMC growth by inhibiting VASP-directed actin cytoskeletal dynamics that play key roles in cell migration as well as transcriptional activity implicated in cell growth. This discrete signaling network provides further insight into the anti-growth properties of AMPK and provides rationale for further exploration of AMPK as a target for the inhibition of vascular growth disorders.

## GP16

**Human T-cell Leukemia Virus type 1 encoded protein HBZ modulates cell adhesion and migration**

Ana Laura Fazio-Kroll, Nicholas Polakowski and Isabelle Lemasson, Dept. of Microbiology and Immunology, East Carolina University

Human T cell leukemia virus type I (HTLV-1) is the etiologic agent of several diseases, including Adult T-cell Leukemia (ATL), an aggressive type of T-cell malignancy that develops in less than 5% of infected individuals after a long period of incubation. ATL is characterized by leukemic cell infiltration into different visceral organs and skin, and represents a serious clinical problem that negatively affects the disease profile and prognosis. The mechanisms through which infected T-cells invade these organs remain unclear. HBZ, a nuclear basic leucine zipper (b-ZIP) protein, is encoded by the complementary strand of the HTLV-1 genome. This protein is constitutively expressed in ATL cells and has been associated with many pathological aspects of the progression of ATL.

We are interested in determining the role of HBZ in cell motility and invasion capability, using cell clones expressing HBZ or HBZ mutants. We examined the homotypic aggregation of several of these clones, and found enhanced self-aggregation that correlated with the increased transmigration capacity across activated endothelium of cells expressing HBZ compared to controls. Through wound healing assays, we found that the expression of HBZ increased cell motility compared to cells expressing HBZ mutants and controls.

HBZ may affect the expression and activity of several elements involved in cytoskeleton remodeling, such as actin and microtubules, resulting in enhanced cell migration. Our results have shown that HBZ is able to upregulate specific genes involved in adhesion and migration processes. Using a microarray that allowed comparison of gene expression profile among cells expressing HBZ and control cells (empty vector), we found significant modifications in the expression of several genes related to the actin cytoskeleton and extracellular matrix components. Quantitative real time PCR confirmed a difference in the expression pattern of these genes in cells expressing HBZ but not in control cells.

Taken together, these findings suggest that HBZ protein might constitute one of the main inducers of cytoskeletal reorganization, and so promoting the infiltrating phenotype of infected CD4+ T cells. Therefore, we propose that HBZ plays an active role in the leukemic progression of ATL. A better molecular understanding of the pathological strategy through which HTLV

# Graduate Poster Abstracts (Face-to-Face)

GP17

## **Avian Synaptopodin 2 (Fesselin) Inhibits Actomyosin Dissociation By Atp And Alters The Structure Of Smooth Muscle Myosin Filaments,**

Nathaniel Kingsbury 1, Randall Renegar 1, Mechthild M. Schroeter 2 and Joseph M. Chalovich 1, 1Brody School of Medicine, East Carolina University, Greenville, NC and 2 Institut für Vegetative Physiologie, University of Cologne

Fesselin or avian synaptopodin 2 stimulates actin polymerization in a Ca<sup>2+</sup>-calmodulin dependent manner. Synaptopodin 2 binding to F-actin inhibits myosin S1 binding and yet fesselin binds with moderate affinity to smooth muscle myosin. These properties suggest that synaptopodin 2 could tether actin and myosin together in an inactive complex as caldesmon does. This possibility was tested by observing the effect of synaptopodin 2 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 pyrene actin fluorescence (a specific measure of actin-myosin binding). Synaptopodin 2 reduced the multi-exponential rates of change of light scattering and pyrene fluorescence in a concentration dependent manner. Each light scattering trace had a rapid initial transition that was not present in pyrene fluorescence traces. That rapid light scattering change was probably due to dissociation of filamentous myosin. The reduction in rate of that rapid process could mean that synaptopodin 2 alters the structure and dissociation kinetics of smooth myosin filaments. We examined changes in smooth muscle myosin with electron microscopy. ATP caused dissociation of myosin filaments in both the presence and absence of synaptopodin 2. In the absence of ATP, synaptopodin 2 increased the size of myosin filaments. Furthermore, the filaments were arranged in parallel arrays. These results indicate that synaptopodin 2 cross-links myosin to actin and also organizes myosin filaments in solution.

GP18

## **A possible role for the spinal Dopamine D3 receptor and the PKA-cAMP pathway in the emergence of morphine tolerance,**

A. Marley Jensen and Stefan Clemens, PhD, Department of Physiology, Brody School of Medicine, East Carolina University

Morphine tolerance in the long-term pain management has become a major hurdle in the successful treatment of chronic pain. Morphine acts on the cAMP-dependent protein kinase A (PKA) pathway, predominantly via the Q-opioid receptor (MOR). The dopamine (DA) system, in the D3 receptor, plays an important role in tolerance, and both MOR and D3 receptors employ similar intracellular signaling mechanisms. We hypothesize that a dysfunction of the D3 receptor prevents morphine from being effective, and that the cAMP-PKA pathway in the spinal cord controls this switch. Using electrophysiological and pharmacological approaches in the in vitro spinal cord, we tested the reflex modulation of morphine, DA receptor ligands and cAMP-modulators. Spinal cords from wild type controls (WT) and D3 receptor knockout (D3KO, age: P5-14) mice were harvested and electrodes placed on lumbar dorsal and corresponding ventral roots, to stimulate and record spinal reflexes. Reflexes were evoked by current stimulation of the dorsal roots (100-500 QA, 100-500 Qs, intervals of 30-120 s) and responses were amplified, recorded, and digitized for later analysis. Drugs and control solutions were bath-applied for periods of 30-60 minutes. We found that in WT, a single application of morphine led to a decrease in the reflex amplitude, while application of a cAMP-analog increased the reflex responses. In contrast, in D3KO, morphine did not decrease the reflex amplitude, and increasing cAMP levels led to a decrease in overall reflex amplitude. Intriguingly, isolated WT spinal cords treated with a D3 receptor antagonist showed a D3KO-like response when also treated with morphine. Our data suggest that an acutely-induced dysfunction of the D3 receptor in the spinal cord produces a phenotype similar of morphine tolerance, and that an alteration in the PKA-cAMP pathway may be underlying this behavior. It is tempting to speculate that by altering cAMP responses in a morphine tolerant model, the lack of drug effectiveness might be reversed and tolerance avoided.

## GP19

**Identification of TBC1D1 and TBC1D4 as novel substrates of CaMKK1 in vitro**, Jeremie L.A. Ferey, J. Mathew Hinkley, Carol A. Witczak, Departments of Kinesiology, Physiology, and Biochemistry & Molecular Biology, Brody School of Medicine, and the East Carolina University Diabetes & Obesity Institute, East Carolina University, Greenville, NC, Support: NIH R00AR056298, ECU start-up funds

Ca<sup>2+</sup>/calmodulin-dependent protein kinase kinase 1 (CaMKK1) is a Ca<sup>2+</sup> activated serine/threonine protein kinase; and previous work from our lab has shown that expression of a constitutively active form of CaMKK1 in mouse skeletal muscle can stimulate muscle glucose uptake by ~2.5 fold. Unfortunately, the intracellular signaling mechanism by which CaMKK1 induces muscle glucose uptake is currently unknown. TBC1D1 and TBC14 are Rab-GTPase activating proteins, and earlier work has shown that increased phosphorylation of TBC1D1 and TBC1D4 on threonine residues can stimulate skeletal muscle glucose uptake. To date, no studies have examined whether CaMKK1 can directly phosphorylate or regulate TBC1D1 or TBC1D4. AIM: To determine whether CaMKK1 phosphorylates TBC1D1 and/or TBC1D4 in vitro. METHODS AND RESULTS: Recombinant human CaMKK1, TBC1D1 and TBC1D4 proteins were purchased from commercial vendors. To assess whether CaMKK1 phosphorylates TBC1D1 or TBC1D4, CaMKK1 protein (0.1 ug) was placed in tubes containing TBC1D1 (0.335 ug) or TBC1D4 (0.335 ug) with or without ~2 mM free Ca<sup>2+</sup> and 7 uM calmodulin. Reaction mixtures were heated at 37 degrees C for 30 min, and the reactions stopped by the addition of Laemmli's buffer and heating to 95 degrees C for 5 min. Proteins were separated by SDS-PAGE, and then transferred onto membranes. Membranes were stained with MemCode Reversible Protein Stain to verify equal protein loading, blocked and then incubated with phospho-threonine primary antibodies, which were designed for global phospho-threonine binding and detection. Horse-radish peroxidase-conjugated secondary antibodies were added, and the membranes were visualized using chemiluminescence. Excitingly, the results of 3 independent experiments showed that in the presence of Ca<sup>2+</sup>/calmodulin, CaMKK1 increased threonine phosphorylation on both TBC1D1 (26-fold) and TBC1D4 (5-fold). CONCLUSION: Ca<sup>2+</sup>/calmodulin activated CaMKK1 is able to phosphorylate TBC1D1 and TBC1D4 on at least one threonine site, suggesting that phosphorylation of TBC1D1 and TBC1D4 may be the way in which CaMKK1 regulates skeletal muscle glucose uptake.

## GP20

**Discovery and characterization of cyclic-adenosine monophosphate (cAMP) second messenger signaling system in *Borrelia burgdorferi***, Ki Hwan Moon and MD Motaleb, Department of Microbiology & Immunology, Brody School of Medicine, East Carolina University, Greenville, NC

Bacteria alter their gene expression by using signal transduction pathways which are mediated by a variety of second messengers. *Borrelia burgdorferi*, the causative agent of Lyme disease, is exposed to disparate host environments comprised predominantly of an Ixodes tick vector and a vertebrate host. This organism regulates its gene expression profile by utilizing c-di-GMP; the only second messenger signaling system currently identified in this pathogen. *B. burgdorferi* lacks classical adenylate cyclases in its genome; however, it does encode for an unrelated adenylate cyclase, BB0723 (a putative *cyaB*), which is a class IV adenylate cyclase. Furthermore, we also found a potential cAMP hydrolyzing phosphodiesterase candidate (BB0504; a conserved hypothetical protein) through BLAST comparison, which shares homology with the nucleotide phosphodiesterase of *Borrelia hermsii*. In order to verify the existence of a functional cAMP signaling system in *B. burgdorferi*, a "cyaB mutant strain was constructed to measure intracellular cAMP concentration. The adenylate cyclase activity of CyaB was confirmed by performing a cAMP enzyme assay on recombinant *B. burgdorferi* CyaB expressed and purified from *Escherichia coli*. To complete the blueprint of cAMP signaling system in *B. burgdorferi*, construction of the "bb0504 mutant strain is underway, and analysis of cAMP hydrolyzing enzymatic activity will follow as well. If BB0504 is found to be functional, other components of the cAMP signaling system, such as a cAMP-receptor protein (CRP), will be investigated. Additionally, since cAMP is known to have a central role in regulating motility and virulence in several other bacterial species, the role it plays in *B. burgdorferi* will also be determined via in vitro and in vivo assays. Swarm plate assays will be performed using "cyaB and "bb0504 strains to determine if cAMP plays a role in motility. We will also test to determine not only the infectious capability of these mutant strains, but also their transmission and survivability in the tick vector and mammalian host. Together, these results will reveal the existence of a functional cAMP signaling system and its contribution to motility and the infectious life cycle of *B. burgdorferi*.

# Graduate Poster Abstracts (Face-to-Face)

GP21

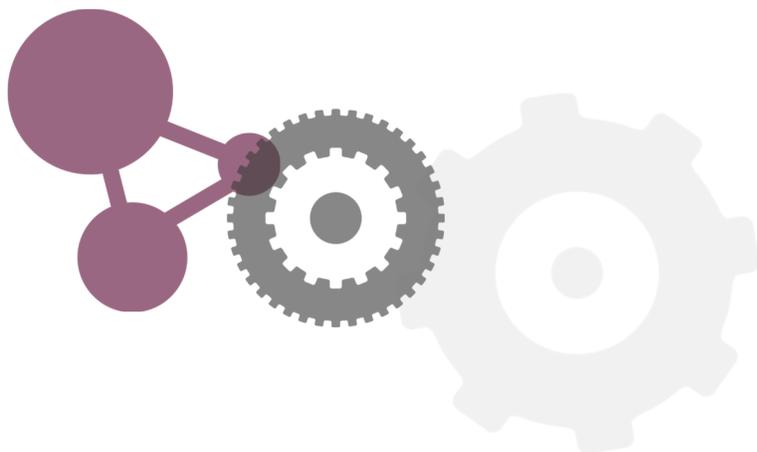
**Activation of central nicotinic acid receptor GPR109A increases blood pressure in conscious rats.** Samar Rezq, Abdel A. Abdel-Rahman, Department of Pharmacology, The Brody School of Medicine at East Carolina University, Greenville, North Carolina 27858, USA.

The commonly used anti-hyperlipidemic drug nicotinic acid elicits unpleasant flushing reaction in patients who use different drug formulations, and this effect was proven to be related to the release of different prostaglandins (PGs) via nicotinic acid GPR109A receptor activation. Currently, there are no reports on the consequences of GPR109A-mediated release of PGs or other neuromodulators in the rostral ventrolateral medulla (RVLM), a major cardiovascular regulating neuronal pool, despite evidence that nicotinic acid crosses the blood brain barrier. An important experiment in this novel study was the demonstration, for the first time, of GPR109A in the RVLM (Western blot). A functional role for RVLM GPR109A was sought following microinjection of its agonist nicotinic acid into the RVLM in conscious rats. Nicotinic acid was microinjected in an estimated dose range expected to reach this neuronal pool following systemic administration of the nicotinic acid therapeutic dose. Intra-RVLM nicotinic acid caused sharp brief elevation in blood pressure and a reduction in heart rate. Ongoing integrative and molecular studies will determine whether PGs especially PGE<sub>2</sub>, which is known to produce similar effects on blood pressure centrally, accounts for this effect or not. The findings are clinically relevant because they will elucidate the mechanisms of a centrally mediated deleterious effect of nicotinic acid on blood pressure and yield new insight into the potential use of concurrent therapeutics to circumvent such deleterious effect.

GP22

**Mechanism of Central Atypical Cannabinoid Receptor GPR18-Mediated Hypotension in Conscious Rats.** Anusha Penumarti, Abdel-Rahman AA, Department of Pharmacology and Toxicology, Brody School of Medicine, East Carolina University, Greenville, NC

Background and objectives: Vascular GPR18 activation causes vasodilation, and our preliminary findings are the first to show: (i) GPR18 expression in tyrosine hydroxylase (TH) immunoreactive neurons in the rostral ventrolateral medulla (RVLM); (ii) RVLM GPR18 activation (Abn CBD) and blockade (O-1918) dose-dependently reduced and increased blood pressure (BP), respectively, in conscious male Sprague Dawley rats. Here we tested the hypothesis that NO generation, via ERK1/2 activation, coupled with reduced reactive oxygen species (ROS) generation in the RVLM underlies GPR18-mediated hypotension. We complemented the integrative studies with signaling studies in differentiated PC12 cells (catecholamine expressing cells with neuronal phenotype) to elucidate the molecular mechanisms implicated in GPR18 signaling. Key results: Ex vivo studies on RVLM neuronal tissues, collected during the hypotensive response elicited by intra-RVLM GPR18 activation in conscious rats, revealed increases in ERK phosphorylation and NO level and reduced ROS while RVLM GPR18 blockade, which increased BP, elicited opposite molecular responses. In PC12 cells, GPR18 is associated with lipid rafts, and its activation replicated the molecular responses obtained in the RVLM. Conclusion: RVLM GPR18 activation lowers BP by reducing oxidative stress and increasing NO (via ERK1/2 phosphorylation). Similar molecular findings in PC12 cells support the validity of this model system in ongoing pharmacologic/genetic studies that aim at elucidating the role of the lipid rafts and their major protein, caveolin, in GPR18 signaling. Our findings yielded new insight into a novel role for RVLM GPR18 in the neurobiology of BP control.



## GP23

**Functional dissection of Mcm10: exploring the essential functions of a replication factor**, Michael Reubens and Tim W. Christensen, East Carolina University, Department of Biology, Greenville, NC

Life depends on a series of highly orchestrated and regulated biochemical processes collectively known as the cell cycle. It is through these heavily regulated stages that cells grow, divide, and accurately transmit their genetic material. The preservation of cellular identity and genomic stability through these stages requires that DNA replication take place with high fidelity, and that chromatin states are accurately passed from one generation to another to ensure the proper transcriptional state of the resulting cells. It has become more apparent that the processes of DNA replication and the establishment of epigenetic chromatin states are more intimately linked than once thought. A protein common to both processes, Mcm10, has become an interesting avenue of research in an attempt to better understand the dynamic link between these two processes. By utilizing an established collection of 29 independent Mcm10 mutant fly lines consisting of twenty two missense point mutations, four truncation alleles, two homozygous lethal alleles, and one hypomorphic allele we have begun to elucidate regions of this conserved protein that are either essential for, or dispensable for, given biological functions. Analysis of a hypomorphic allele demonstrates that reduced protein levels result in abnormal chromosome condensation phenotypes. Our truncation alleles have suggested that the only the N-terminal 388 amino acids of the protein are required for viability; however, the C-terminal 388 amino acids are required for female specific fertility, and the extreme C-terminal 65aa are required for proper endoreplication. The C-terminal 388 amino acids have been shown to contain a region important for the interaction with HP1 which overlaps with regions important for genomic stability, heterochromatin formation, and contains two independent homozygous lethal alleles. It is our hope that further analyses using this mutant collection will shed light on the essential nature of Mcm10 in *Drosophila*, and aid in a better understanding of replication, chromosome biology, and potentially oncogenesis.

## GP24

**Cytokine-neuroantigen fusion proteins as antigen-specific tolerogens in experimental autoimmune encephalomyelitis**, Daniel S. Wilkinson, Ashton E. Thomason, Mark D. Mannie, Ph.D., Department of Microbiology & Immunology, Brody School of Medicine, East Carolina University, Greenville, NC

Multiple Sclerosis (MS) is an inflammatory demyelinating autoimmune disease of the central nervous system (CNS). The disease is characterized by focal inflammatory lesions and plaques of demyelination in the white matter of the brain and spinal cord. MS is estimated to affect around 400,000 people in the United States and around 2.5 million people in the world. The cause of MS is uncertain, but evidence suggests that environmental and genetic factors both play a role in its etiology. Current MS therapies rely on anti-inflammatory mechanisms or broad-spectrum immunosuppression, which can have serious adverse complications. The development of antigen-specific vaccines that induce tolerance to a particular self-antigen will avoid many of these complications. Our lab has taken a novel approach of inducing tolerance through the administration of cytokine-neuroantigen (NAg) fusion proteins. These fusion proteins consist of a native cytokine covalently linked to the major encephalitogenic epitopes of myelin (i.e., the NAg) that cause experimental autoimmune encephalomyelitis (EAE), the animal model of MS. Several of these fusion proteins inhibited disease incidence when given as prophylactics and halted disease progression when administered after onset of EAE. The cytokine fusion partner that showed the best inhibitory activity was granulocyte-macrophage colony stimulating factor (GM-CSF). In this study, murine GMCSF-NAg was mutated at a specific residue in GM-CSF that was previously shown to antagonize the biological activity of GM-CSF in humans (Hercus et al 1994). Our preliminary studies showed that the murine mutant fusion protein, known as GMCSF(E21R)-MOG, induced maximal proliferation of MOG specific T-cells indicating that the MOG antigenic domain was fully active. However, the GM-CSF(E21R) domain had substantially reduced cytokine potency compared to wildtype GM-CSF or GMCSF-MOG in a GM-CSF bioassay. Overall, these preliminary data indicated that GMCSF(E21R)-MOG targeted the MOG antigen to dendritic cells like the wildtype fusion protein but lacked the *in vitro* immunosuppressive activity normally associated with GMCSF-MOG. This mutant fusion protein will help elucidate the role of the CSF2RB beta-chain receptor in tolerance induction by cytokine-NAg fusion proteins in EAE.

# Graduate Poster Abstracts (Face-to-Face)

## GP25

### **Activation of the proton sensing G-protein coupled receptor, GPR4, decreases cell spreading and regulates focal adhesion dynamics through the G12/13/Rho signaling pathway**

Calvin R. Justus & Li V. Yang, Division of Hematology/Oncology, Department of Oncology, Brody School of Medicine, East Carolina University, Greenville, NC

The tumor microenvironment is acidic due to inadequate blood perfusion, inflammation, altered tumor cell metabolism, and hypoxia. Low pH in the tumor microenvironment has been reported to degrade extracellular matrix proteins, therefore increasing the dissemination of cancer cells into the blood stream or lymph system. On the other hand, the low pH found in this environment has also been shown to activate the proton sensing G-protein coupled receptor, GPR4, and subsequently decrease B16F10 melanoma cell migration as well as reduce pulmonary metastasis in mice post tail vein injections. In this study we investigated the cell attachment, spreading, and migration of B16F10 melanoma cells genetically engineered to express the GPR4 receptor at a high level, that is B16/GPR4 cells. We demonstrate that following activation of the GPR4 receptor by acidic pH in B16/GPR4 cells, cell attachment, spreading, and migration is severely decreased. To determine the G-protein pathway that is responsible for these effects we used several chemical inhibitors and activators. The results indicate that following the application of CT04 (C3 transferase), a direct Rho inhibitor, or by using a G12/13 dominant negative construct in B16/GPR4 cells, that cell spreading was restored back to a level resembling the control B16/vector cells. Furthermore, we examined the Gs and Gq pathways using DDA and 8-bromo-cAMP or Thapsigargin and a Gq dominant negative construct, but the effects were non-significant when compared to the control groups. Due to the importance of focal adhesion proteins in cell attachment, spreading, and migration, we investigated two important focal adhesion proteins focal adhesion kinase and paxillin. We determined that the localization of pPaxillin Y118 and pFAK Y397 in spreading cells and pPaxillin Y118 in migrating cells is altered, indicating less dynamic focal adhesions at the cell periphery or vital locations such as the lamellipodia and tail region. These results indicate that activation of the GPR4 receptor triggers the G12/13 pathway and subsequently Rho, which decreases cell spreading and migration in vitro.

## GP26

### **Investigating the Interaction of RecQ4 and Mcm10 in *Drosophila melanogaster***

Wayne A. Rummings, Jr. and Tim W. Christensen, Department of Biology, East Carolina University, Greenville, NC

Instability of the genome through misregulation of the highly orchestrated events of the cell cycle is thought to play an important role in the development and progression of cancer and has also been implicated in the aging process. RecQ4 is one of the five RecQ helicases found in humans. It is a 1208 amino acid protein with a highly conserved Superfamily II (SFII) helicase domain that is important for maintaining cell viability. Mutations in the helicase domain of the conserved protein lead to distinct clinical diseases with increased cancer rates and premature ageing. The protein also has a unique N terminus with a 200 a.a. sequence that shares homology with yeast DNA replication initiation factor, Sld2. RecQ4 is the least characterized RecQ protein and recent studies have shown its role not only in DNA unwinding but with DNA damage repair and telomere maintenance. Given these potential roles, especially in replication, efforts have focused on elucidating specific protein-protein interactions that provide insight into the cellular processes in which RecQ4 may be involved. The mini-chromosome maintenance protein (Mcm10), a highly conserved protein first discovered in *Saccharomyces cerevisiae*, has essential roles in DNA replication and heterochromatin formation. Work in 293T cells and in *Xenopus* extracts shows a direct interaction between the two proteins with Mcm10 mediating RecQ4's association with the Mcm2-7 helicase and GINS complex. Taken together, it is of interest to determine if an interaction exists between RecQ4 and Mcm10 in the genetic model organism, *Drosophila melanogaster*. To confirm the interaction of the two proteins a yeast two-hybrid approach will be implemented to analyze the protein interaction. In addition genetic interactions will be tested using flies with mutations in both proteins. The use of these studies will aid in dissecting the cellular functions of these essential proteins along with increasing our understanding of the mechanisms of the disease states resulting from their associated defects.

## GP27

**Intravenous vs. Intratracheal Administration of C60 Differentially Promotes Constriction or Impairs Relaxation of the Isolated Coronary Artery,**

N.A. Holland<sup>1</sup>, L.C. Thompson<sup>1</sup>, A.K. Vidanapathirana<sup>1</sup>, J. O. Dawkins<sup>1</sup>, S., Sumner<sup>3</sup>, A. Lewin<sup>3</sup>, T.R. Fennell<sup>3</sup>, J.M. Brown<sup>2</sup> and C.J. Wingard<sup>1</sup>, Departments of <sup>1</sup>Physiology, <sup>2</sup>Pharmacology & Toxicology, East Carolina University, NC, 27834 and <sup>3</sup>RTI International, Research Triangle Park, NC

The potential uses of C60 fullerenes have grown to include roles in both commercial industry and medicine, but the impacts on human health are not completely understood. Data from our lab suggests that C60 may exacerbate cardiac ischemia/reperfusion injury. We hypothesized that exposure to C60 would promote enhanced vasoconstriction and impaired endothelial-dependent relaxation responses of the coronary artery. Male Sprague-Dawley rats were exposed to a single 93.3 Qg/kg dose of intravenous (IV) or intratracheal (IT) C60 or polyvinylpyrrolidone vehicle. Twenty-four hours following exposures, coronary artery segments were isolated and evaluated using wire myography. Cumulative dose responses to serotonin (5-HT), acetylcholine (ACh), or sodium nitroprusside (SNP) were constructed. We found that IT exposure to C60 resulted in a leftward shift ( $P = 0.05$ ) of the 5-HT EC<sub>50</sub> (558.4  $\pm$  104.5 nM) compared to vehicle (870.7  $\pm$  129.7 nM), but that IV exposure to C60 did not significantly shift the 5-HT EC<sub>50</sub> values (C60: 762  $\pm$  112.3 nM vs. vehicle: 669.3  $\pm$  59.4 nM). Conversely, IV exposure to C60 led to a rightward shift ( $P = 0.09$ ) in the EC<sub>50</sub> for ACh (232.5  $\pm$  68.9 nM) compared to vehicle (100.9  $\pm$  48.8 nM), but IT C60 exposure did not produce any differences in ACh EC<sub>50</sub> (C60: 245.7  $\pm$  37.4 nM compared to vehicle: 222.4  $\pm$  31.6 nM). The relaxation responses to SNP were not different between any groups. The route of exposure to C60 appears to influence an enhancement of smooth muscle contraction by IT and impaired endothelial relaxation by IV administration. Based on these data we conclude that C60 exposure could enhance coronary vascular tone, possibly compromising dilatory flow during reperfusion, and thus exacerbating myocardial infarction. This work is supported by NIEHS U19 ES019525.

## GP28

**Study of Imaging <sup>142</sup>Pr Microspheres Using the Gamma Emission Spectrum in a Clinical Setting,**

Pelletier, C, Jung, J., Hightower, J., East Carolina University, Greenville, NC

Since early 2000 intra-arterial yttrium-90 (Y-90) microspheres have been used for the treatment of liver cancer. Since Y-90 is a pure beta emitter imaging of bremsstrahlung photons is the only viable method to determine isotope distribution. While this method has been useful it has inherent weakness, most notably poor spatial and energy resolution. Praseodymium-142 (Pr-142), a dual beta/gamma emitter, has been proposed as a possible source for the treatment of unresectable hepatic primary or metastatic cancer. A fundamental question with using this modality is whether the high energy gamma (1.575 MeV) emitted by Pr-142 can be detected in a clinical setting. Three detector geometries are simulated. First, a clinically available single photon emission computed tomography (SPECT) scanner is simulated to determine if the high energy gamma can be detected with no modification to the equipment. Second, modifications to the collimator geometry are simulated to determine if spatial resolution can be improved with a reasonable collimator design. Third, novel detector geometry, the Compton camera, is simulated to determine if spatial resolution can be further increased. In order to validate simulation clinical scans are performed for a readily available high energy gamma source, Europium-152 (Eu-152). Simulations of the detector geometries are performed using GATE v6.1, a Monte Carlo simulation program, for Pr-142, Y-90, and Eu-152. Results indicate that it is possible to detect the gamma spectrum of Pr-142 using a clinical SPECT system with no modifications. Simulations show a clear peak of 1.575 MeV gamma in the detected spectrum for Pr-142, though point spread functions indicate the level of collimation on the clinical scanner is insufficient. Point spread functions for Y-90 are consistent with results found in the literature. Initial simulation of the modified collimator design indicates that spatial resolution is increased when compared to clinically available collimator.

# Graduate Poster Abstracts (Face-to-Face)

GP29

## **Using LCM to examine MADS-box gene expression in the upper and lower floral meristems of maize,**

Kate Nukunya and Beth Thompson, East Carolina University, Greenville, NC

MADS-box transcription factors are important regulators of flower development in all flowering plants. In the grasses, flowers (called florets) are contained in spikelets. Maize spikelets contain two florets (the upper and lower florets) that are morphologically identical, although development of the lower floret is delayed compared to the upper floret. Floral meristems are groups of undifferentiated cells that give rise to floral organs. *bearded-ear (bde)* encodes a MADS-box transcription factor required for multiple aspects of floral development. *bde* mutants affect the upper and lower florets differently, suggesting the gene regulatory network in the upper and lower floral meristems are different. In addition, two other MADS-box transcription factors (*zmm8* and *zmm14*), are expressed only in the upper floral meristem (UFM), but not in the lower floral meristem (LFM). Together, these data suggest that the gene regulatory networks in the UFM and LFM are distinct and some genes, including MADS-box genes are differentially expressed. The long-term goal of this research is to globally identify genes specifically expressed in the UFM and LFM. Floral meristems cannot be manually dissected, so we are using laser capture microdissection (LCM) to specifically isolate UFM and LFM. LCM allows specific cells to be isolated from fixed, sectioned tissue using a laser. This tissue can then be used for downstream applications, including RNA isolation. The goal of this project is to isolate UFM and LFM using LCM and test for the expression of maize MADS-box transcription factors using RT-PCR. We have optimized fixation and RNA isolation protocols for LCM, and we are able to isolate high quality RNA from sectioned tissue. In addition, we have successfully isolated floral meristems from sectioned tissue using LCM, and extracted RNA for amplification. After amplification, we will test for the expression of several control genes using RT-PCR. If successful, we will isolate UFM and LFM, and test the expression of MADS-box genes using RT-PCR.

GP30

## **Comparison and optimization of different RNA extraction procedures for circulating microRNA analysis,**

Dorothy Dobbins, Baohong Zhang, and Xiaoping Pan, East Carolina University, Greenville, NC

The optimization of the diagnostic process is achieved when the most minimally invasive technique is utilized. Peripheral biomarkers have been instrumental in this regard. Recent evidence suggests that circulating microRNAs are promising biomarkers indicative of various diseases including neurological disorders. MicroRNAs (miRNAs) are a class of non-coding endogenous small RNAs, which regulate more than 30% of protein-coding genes. Circulating miRNAs present in blood cells, plasma extracellular fluid, and plasma micro vesicles. While various experimental procedures are available for extracting RNA from blood, achieving consistent and reliable results remain a challenge, especially when a large amount of blood may not be accessible in smaller model organisms. The purpose of this study is to compare and optimize different RNA extraction procedures for circulating miRNA detection. We have compared the efficiency of three different blood RNA extraction kits currently available (Mirvana, Quiagen, and Ribopure). Influential factors including anticoagulants, temperature and sample storage duration have been examined utilizing both whole blood and serum specimen. Optimal experimental parameters have been identified. Using the optimized method, we have successfully detected the baseline expressions of selected miRNAs extracted from healthy rat blood using quantitative real-time PCR. Experimenting with various protocols led to the development of a refined procedure using a minimal amount of blood to yield a consistent and reliable RNA product from which miRNA expression could be analyzed.

## GP31

**Hunting for the Collar Protein Seen in *Borrelia burgdorferi* Periplasmic Flagella**, Aaron Yerke<sup>1</sup>, X. Zhao, J. Liu<sup>2</sup> and M. A. Motaleb<sup>1</sup>, <sup>1</sup> Dept. of Microbiology and Immunology, East Carolina University, <sup>2</sup> Dept. of Pathology and Lab Medicine, University of Texas Medical School at Houston, Houston, TX

The most prevalent vector-borne disease in the United States is Lyme disease, and is caused by the spirochete, *Borrelia burgdorferi*. Carried by Ixodes ticks, infection with *B. burgdorferi* can cause numerous debilitating disease symptoms such as erythema migrans, cardiac anomalies, Lyme arthritis, and nervous system disorders. Motility is crucial for *B. burgdorferi*'s virulence its ability to disseminate from the bite site in the skin to the colonization sites (joints, heart, and nervous system), and migration within ticks. Our goal is to further our understanding of the mechanism of *B. burgdorferi*'s motility by examining the periplasmic flagellar motor rotation or assembly. Several of the main proteins in flagellar apparatus are still unidentified. An example of this is the collar -a structure unique to spirochetes. This structure may provide structural support for the periplasmic flagella, and therefore may be linked to motility. In Cryo-electron tomography (Cryo-ET), *B. burgdorferi*'s periplasmic flagellar apparatus, the structure appears as a large collar-shaped organelle encompassing the p-ring. The p-ring is a bushing that houses the flagellar rod in the peptidoglycan. *B. burgdorferi*'s bb0526 is a gene of unknown function with no significant homology to other bacterial species outside of spirochetes. Bioinformatics indicated that it had homology to an unconfirmed motility gene in *Treponema pallidum*. Bb0526 is located in a bistrionic operon with a putative transcriptional activator of the Baf family. Once inactivated and confirmed, the mutant bacteria were observed under a dark-field microscope and their flagellar apparatus was examined using Cryo-ET. The mutant cells were motile and had a flat-wave morphology, but, their swimming velocity was significantly lower and, using Cryo-ET, it was shown that they lacked a portion of the collar structure seen in wild-type cell. These results indicate that bb0526 is involved in motility and periplasmic flagellar assembly. We are investigating if this mutant is able to survive in mouse, colonize tick midgut, and migrate from the tick to the mouse using our established mouse and tick-mouse infection models.

## GP32

**Paternal Exercise and Diet Epigenetically Programs Energy Expenditure and Insulin Metabolism in Mice Offspring**, M. Koury, A. Ajmera, M. Parker, M. Jeyakumar, O. Williams, E. Pak, D. Walters, D. Neuffer, and A.K. Murashov, Department of Physiology, East Carolina University, Greenville, NC

It is currently estimated that a third of Americans suffer from metabolic syndrome, an obesogenic disease which increases the risk for developing type 2 diabetes (T2DM) by five-fold (Diabetes Care, 2012). In an effort to explain the heritable etiology underlying this prevalent disease, researchers have thoroughly investigated mechanisms of epigenetic reprogramming via maternal descent but the paternal contributions remain unknown. Using C57BL/6J mice our model will examine the transgenerational effects of prolonged paternal exercise and diet on offspring's susceptibility to glucose intolerance. Founder fathers (F0) were randomly divided into three groups (10% fat-diet // 60% fat-diet // 10% fat-diet with exercise wheel). After 12 weeks of a high-fat diet or chronic exercise F0 males were mated with control females. At 4 weeks of age male offspring (F1) were assigned to either a 60% high-fat or 10% low-fat diet for 12 weeks. Metabolic profiles were assessed via metabolic cages, glucose tolerance testing (GTT), fasting plasma insulin, eMRI imaging (fat/lean body composition), as well as monitoring of developmental milestones. A comparison between offspring on post-natal day 7 revealed a significantly lower mean birth weight in the fat-father offspring (FFO); a factor shown to predict impaired glucose tolerance in adulthood (Bhargava et al 2004). Additionally, when challenged with a 60% high-fat diet only exercise father offspring (EFO) exhibited impaired glucose metabolism, fasting hyperinsulinemia, lower energy expenditure, as well as increased body weight and adiposity. To better understand the molecular mechanisms driving these observations quantitative real-time PCR is being utilized to examine the epigenetic profile and gene expression in liver, pancreas, gastrocnemius muscle, and white adipose tissue. Preliminary data shows intriguing differences in expression of several metabolic genes such as: OGT, OGA, PDK4, Glut-4, and Ptpn1. These novel findings suggest that offspring have a phenotype that is epigenetically programmed to thrive under the same experimental conditions as their respective fathers.

# Graduate Poster Abstracts (Face-to-Face)

GP33

## Impacting Health Perceptions of 4th Grade Students with a Food-based Science Curriculum,

Jenna Little, RD1; Virginia Carraway-Stage, MS, RD, LDN1; Sara Butler, MS, RD, LDN2; Melani Duffrin, PhD, RD, LDN1, 1East Carolina University Greenville, NC, 2Cape Fear Valley Hospital Fayetteville, NC

Food-based education can be an effective approach to learning in the classroom. Food encourages a hands-on approach to education, using multiple senses to involve everyone in the learning process. Additionally, food-based learning can help children learn how to make healthy choices related to dietary and lifestyle patterns. The Food, Math, and Science Teaching Enhancement Resource (FoodMASTER) Intermediate is a hands-on curriculum that uses food as a tool to teach math and science. During the 2009-2010 school year, FoodMASTER Intermediate was implemented in 4, 4th grade classrooms in North Carolina. A total of 68 students were exposed to the curricula, while 31 students served as a control group. Students completed a researcher-developed instrument consisting of two open-ended questions and a creative drawing. Researchers asked students to define the word "healthy", provide a piece of health advice to a friend/family member, and draw their interpretation of what it meant to be "healthy." Researchers analyzed data concentrating on memoing and open coding to identify three primary emergent themes: Health terminology, dietary recommendations, and physical activity recommendations. Intervention students more often used specific nutrition terminology (e.g., food group, calories, low fat) when defining and providing health advice. Additionally, FoodMASTER students also included more of a variety of foods in their definition, health advice, and drawings compared to the control group. Finally, both groups more often defined the term healthy in the context of food and diet versus physical activity. Outcomes suggest the food based learning initiative, FoodMASTER intermediate, may be more effective than a standard science curriculum when educating students about food and nutrition.

GP34

## Effectiveness of a Therapeutic Hand Skills Camp on Handwriting Skills,

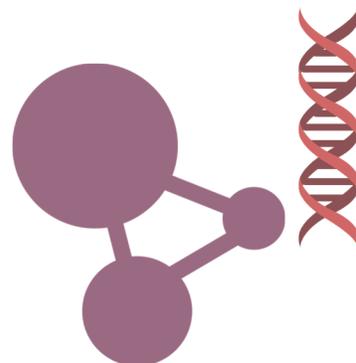
Brittany Woerner<sup>1</sup>, Winne Miller, COTA<sup>2</sup>, Denise Donica, DHS, OTR/L, BCP<sup>1</sup>, 1 Department of Occupational Therapy, East Carolina University, Greenville, NC, 2 Vidant Medical Center, Greenville, NC

Objective: This study measured handwriting improvement found in 10 participants of a short duration high intensity hand skills camp offered to pre-k and elementary students.

Method: The study used a pre-test/post-test design to compare results of three separate writing groups (Pre-K: Capital Letters, Manuscript Writing, and Cursive Writing). The Check Readiness was used to measure the Capital Group. The ETCH and Screener of Handwriting Proficiency were used to measure the Manuscript and Cursive Groups. Each group received 1 hour of handwriting instruction 2 times a week for a 4 week duration.

Results: All 6 participants made individual improvements on the Check Readiness. Three of the four participants made progress on the Screener of Handwriting Proficiency. When comparing pre-test and post-test, each participant in the cursive group made improvements on all 3 subtests of the ETCH. The participant in the Manuscript group made improvements on 2 subtests (Word and Letter Legibility) on the ETCH.

Conclusion: Children who participated in the hand skills camp had improved skills at the conclusion of the camp. This study supports the need for further research to determine effectiveness of the program. However, this is a first step in exploring the potential benefits of focused camps for students struggling with handwriting.



## GP35

**Examining the use of the Shore Handwriting Screening to assess the handwriting skills of pre-kindergarteners**, Erin Schofield; Denise Donica, DHS, OTR/L, BCP; Department of Occupational Therapy, East Carolina University, Greenville, NC,

This purpose of this study was to examine the use of the Shore Handwriting Screening (Shore; Shore, 2003) along with a Shore scoring sheet that has been created by researchers at East Carolina University to assess the handwriting skills of pre-kindergarteners. Standardized assessments to measure handwriting skills of pre-kindergarten students are lacking (Puranik & Lonigan, 2009; Feder & Majnemer, 2003; Rosenblum, Weiss, & Parush, 2009). The primary reason students are referred to occupational therapy in school is because of handwriting difficulties and fine motor problems (Feder, Majnemer, & Synnes, 2000). In order to provide the most effective intervention for students, it is important that occupational therapy practitioners are appropriately evaluating students' skills. Pre-kindergarten students' scores on the Shore were compared to their scores on a portion of a standardized fine motor assessment, the Bruininks-Oseretsky Test of Motor Proficiency, Second Edition (BOT-2; Bruininks & Bruininks, 2005). Testing the Shore and BOT-2 across two socioeconomic groups provided an opportunity to compare the scores across a broad range of pre-kindergarten students. Fourteen students from a private pre-kindergarten classroom and 36 students from a pre-kindergarten Head Start classroom completed the Shore and BOT-2 and scores were compared within and across the two classrooms. Initial results show that the Shore displays moderate to strong correlations with three subtests of the BOT-2, fine motor precision, fine motor integration, and manual dexterity, across both classrooms ( $r=.614$  to  $r=.783$ ). Students from the private pre-kindergarten classroom obtained higher scores on both the Shore and three of the four subtests of the BOT-2 in comparison to the Head Start classroom. In conclusion, the Shore and Shore Score Sheet is a functional handwriting screening that shows moderate to strong correlations with the BOT-2, which provides support of its ability to measure students' handwriting skills. Students from a higher SES also obtained higher scores on the Shore and the BOT-2, supporting previous research.

## GP36

**Integrating Coordinated School Health Program And Clinical Interventions To Prevent Suspension and Academic Failure**, Garrett M. Wingate, Dr. Victor Aeby, East Carolina University, Greenville, NC

In 2005, the CDC proclaimed that dropout prevention was a national health concern because education can determine how successful one is in life and the quality of life that one may have. While many families and youth may not consider education a priority, poor health and mental health behaviors may contribute to deficits in education. This study focused on integrating the Coordinated School Health Program (CSHP) into school health and school-based mental health interventions as mandated by North Carolina Department of Instruction. Specifically, the purpose of this study was to identify the self-reported health and mental health behaviors of a small sample of students (N=5) who attended both Ayden Middle School and the Straightway After-school Program and implement interventions using the CSHP model. Participants were chosen based on referrals from community partners who interacted with the students and deemed them to have potential despite poor academic achievement, negative behavior, and factors that contributed to their risk of academic and personal failure. The mixed method design utilized genograms and ecomaps to enhance understanding of data from the Youth Risk Behavior Survey, Psycho-Socials, Fitness Gram, Grades, and Attendance. Based on the literature, researchers would expect that students may be at-risk for specific health, and mental health issues, low academic achievement; therefore in need of intensive school intervention in order to improve their potential for quality of life and success.

# Graduate Poster Abstracts (Face-to-Face)

GP37

**WhyTry Program's Impact on Student Motivation and Emotional Literacy**, Amber Nichole Dew, Department of Health Education and Promotion, East Carolina University, Greenville, NC

Young people today have many stressors and challenges that they face as they are growing up. It is essential that students handle these situations in an emotionally literate manner. Emotional literacy has been defined as the practice of interacting with others in ways that build understanding of our own and other's emotions, then using this understanding to inform our actions. With the removal of health and physical education from the curriculum due to extra stress on academics, students have lost the mental and emotional health component from their education. The purpose of this study is to determine if the use of the WhyTry program will result in greater student motivation and increase mental and emotional health literacy. Forty-eight first-time freshmen, who are at least one grade level behind their peers, will be participating in the WhyTry study. The WhyTry study addresses the issues of stereotyping, decision making, defense mechanisms, positive relationships, overcoming problems, time management, self-discipline, and positive support systems. Students will be divided into a control and treatment group based on their student id numbers. Both groups will take a pre- and post-test at the beginning and end of a 10-week period. The treatment group will receive the 10-week WhyTry program once per week. A t-test will be used to determine if any relationship exists. Data will be collected by March 29, 2013 and analyzed by April 5, 2013. It is anticipated that there will be a statistical difference between the control and the treatment group. The proposed study explores the WhyTry program and its impact on student motivation and emotional literacy. The results of this study will hopefully provide evidence that with additional mental and emotional health education, motivation in school will increase.

GP38

**Parental Perceptions of Nondisabled Preschoolers in Inclusive Classroom Settings**, Erica L. Maine, Natalia Sira, Department of Child Development and Family Relations, East Carolina University, Greenville, NC

Within the special education community, policies regarding the inclusion of disabled children into general education classrooms have been highlighted and criticized over the past few decades. Classroom inclusion has been shown to affect children and their families in varied ways. Parents hold both positive and negative standpoints regarding inclusion (Garrick Duhaney & Salend, 2000; Odem, Buysse, & Soukakou, 2011). Examining parental perceptions

and identifying concerns could assist in enhancing inclusive programs and increasing parental support within the classrooms to provide the highest quality educational development for both children with and without disabilities. This study will look at parental perceptions to identify general perceptions of those whose 3 to 4 year old typically developing children are enrolled in the inclusive child development center, Nancy W. Darden Child Development Center, on East Carolina University's campus. The estimated sample size will be 7 to 10 parents. The author will conduct semi-structured interviews, approximately 45 minutes long, with participants individually in a private office space. Semi-structured interviews allow for discovery and elaboration through the use of several key questions that aid in defining specific areas of exploration. Participants will have the flexibility to discuss details that may not have been previously important to researchers. A demographic survey will include age, gender, race, years of education, marital status, household income, and number of children.

GP39

**Graduate Programs' Instructional Preparation Activities: Perspectives from Former Doctoral Candidates & Dissertation Advisors**, Misty Joyner, Crystal Chambers, East Carolina University, Greenville, NC

Doctoral education is a time for socialization of doctoral students to engage in faculty work, such as research, service, and teaching. While most doctoral programs have candidates occupied in service and research, there seems to be a deficiency in the amount of attention given to instructional training. To gauge this phenomenon, a mixed methods approach was piloted to measure select candidates' activeness in instructional preparation activities and attitudes towards their participation from the perspectives of both the candidates and faculty mentors. Results indicate candidates' desire to and appreciation for participating instructional preparation activities scored higher on preparedness to instruct during their first year as faculty than those candidates who desire not to participate in those activities. The qualitative results indicate a significant difference on two of the items, including doctoral advisor's guidance and support in participating in instructional preparation activities and the department's willingness or ability to provide a course or training in instruction. Overall, both methods appear to support the positive impact instructional preparation activities have on doctoral candidates as future faculty. Department heads and mentoring faculty can use these findings to revise or strengthen strategies that concern instructional preparation activities for doctoral candidates.

## GP40

**Increased public awareness of HIV/AIDS and HIV testing does not stem the increasing rate of HIV infection in rural Swaziland, Africa**, Hunter Johnson, Brody School of Medicine, East Carolina University, Greenville, NC

Since the discovery of HIV/AIDS, millions of dollars have been invested globally in research, treatment, education, testing and prevention of this devastating disease. Despite these efforts, countries in sub-Saharan Africa, such as Swaziland, continue to lose the battle against HIV due to cultural practices and lack of education, finances, and infrastructure. I hypothesized that the Swazi people are not being tested for HIV as a direct result of these obstacles as well as the stigma, which currently surrounds HIV in Swaziland. Using a translator and a set of 13 pre-determined questions, I interviewed 15 women who live in the rural areas of Swaziland. Thirteen of the women were previously tested for HIV, and 12 of the 15 believed fear is the main reason most Swazis refuse to be tested. These women stated Swazis often view a positive HIV test as a death sentence, and many fear being shunned by family and community members due to the belief HIV is a sign of promiscuity. According to those interviewed, the stigma surrounding HIV also results in a lack of compliance to treatment plans. While limited funding has made testing available, the women reported a constant shortage of ARVs as well as money for monthly transport to the clinic. From the results, it can be concluded that many Swazis have access to HIV testing facilities but are often intentionally choosing to remain unaware of their HIV status due to personal fear and the stigma HIV holds. Others are aware of their HIV status but do not have the funds to care for themselves and maintain treatment. From the interviews it can also be concluded that polygamy, sexual abuse, and myths of how HIV is contracted, spread, and cured continue to flourish in the Swazi culture contributing to this country's struggle with HIV/AIDS. Unlike my original hypothesis, Swazis seem to be aware of HIV/AIDS and have access to HIV testing, but in spite of that, the HIV rate in Swaziland continues to rise. Reduction in HIV rates may require alternative strategies other than a focus on testing.

## GP41

**The Effects of Footwear on Gait Parameters: A comparison of traditional running shoes, minimalist footwear, and barefoot running**, Justin Loss, SPT, Dr. John D. Willson, Ph.D., MPT, East Carolina University, Greenville, NC

Up to 70% of runners sustain an injury over any one-year period. Rate of impact loading has been implicated in the etiology of many overuse running injuries. Rate of loading may be reduced by adopting a midfoot strike pattern; a pattern common among people who traditionally run barefoot. The Vibram FiveFinger (VF) is a popular minimalist shoe purported to simulate a barefoot experience. Research testing this claim is scarce and has utilized all male subjects with differing degrees of barefoot running experience. The purpose of this study was to evaluate the immediate effects of minimalist footwear on rate of loading relative to barefoot running, among female runners. In this study, nineteen healthy female runners with no prior barefoot running experience ran over-ground (3.52-3.92 m/s) while shod in traditional running shoes (TS), the VF, and barefoot (BF). Vertical loading rate and ankle angle at footstrike data were recorded for five foot contacts per condition using 3-D motion analysis and a force platform embedded in the runway. Differences between conditions were evaluated using a repeated measures ANOVA ( $\alpha = 0.05$ ). Our results show that loading rate while running in the VF shoes (121.29 BW/s) was not different than running BF (109.56 BW/s) ( $p = 0.05$ ). However, loading rates in both the VF and BF condition were greater than the TS condition (76.1 BW/s) ( $p = 0.05$ ). Dorsiflexion angle at initial contact was smallest in the BF condition (1.94 deg), followed by VF (4.37 deg) and TS (12.12 deg) ( $p = 0.05$ ). These results suggest that among runners with no previous barefoot running experience, the average immediate response to running with VF or BF may be higher loading rates and smaller ankle angles at initial contact. Higher loading rates may increase an individual's risk for certain running-related overuse injuries.

# Graduate Poster Abstracts (Face-to-Face)

GP42

**Relationship Between Muscle Stiffness And Strength: A Pilot Study**, Jamie E. Hibbert, Zachary J. Domire, Biomechanics Laboratory, College of Health and Human Performance, East Carolina University, Greenville, NC

Sarcopenia is the degeneration of muscle mass and strength with age. It is a significant predictor of mortality and is associated with decreased independence in older adults. A novel possible cause for sarcopenia is a decreased response to mechanical stimuli caused by increased muscle stiffness. It has been shown that older adults have a diminished hypertrophic response to exercise when compared to their young counterparts. One possible explanation for this attenuated response is decreased mechano-transduction into the myocytes due to stiffening of the extracellular matrix with the aging process; thus muscle cells will experience less strain and therefore less mechanical signaling for any given force applied. If muscle stiffness does decrease response to exercise, it would be expected that there is an inverse relationship between strength and muscle stiffness.

The purpose of this study is to determine the relationship between muscle stiffness and muscle strength in older adults. Data on muscle stiffness and strength were collected for 11 healthy women (age 70-80). Stiffness measurements were taken of the vastus lateralis using ultrasound elastography. Stiffness was determined by selecting a region of interest 50% of the distance between the greater trochanter and lateral joint line of the knee and calculating the mean shear modulus from this region. Strength was measured on a HUMAC isokinetic dynamometer. Subjects then performed 5 repetitions of maximal isokinetic knee extension at 60 degrees per second and strength was calculated as the overall peak torques.

There was a moderate correlation ( $r=-0.37$ ) between strength and muscle stiffness. There was no relationship ( $r=0.07$ ) between strength and age. A trend exists for a moderate relationship between strength and muscle stiffness. The lack of a relationship between strength and age is likely explained by the small sample size and that most subjects fell within a relatively narrow age range. Additional subjects, with particular emphasis on subjects over 75, are currently being recruited to improve statistical power. Future research will be focused on ways to modulate muscle stiffness and examine the effect that has on response to mechanical stimuli.

GP43

**Measuring pelvic tilt with a smartphone inclinometer application**, Hodson, Patricia & Spencer, Michelle. East Carolina University Doctor of Physical Therapy Program.

Pelvic tilt is defined as the orientation of the pelvis which is quantified by determining the angle of the horizontal to a line drawn from the Posterior Superior Iliac Spine to the Anterior Superior Iliac Spine. This measure is often neglected when objective range of motion (ROM) measurements are taken in the clinical setting due to the lack of a time and cost efficient means of evaluation. Pelvic tilt is an informative measure which can lend itself to determining causes of back pain as well as offer a means to measure improvements in posture and core strength as a result of physical therapy intervention. With the growing popularity of smartphones and the availability of both the phone and the free inclinometer applications, there is promising evidence that an inclinometer application can be used in the clinic to measure pelvic angle. A study for within-day reliability of shoulder ROM conducted in 2012 found that a Samsung smartphone with a free inclinometer application provided a reliable and repeatable means to effectively measure ROM (Shin et al. 2012). The present study examined three means of measuring pelvic tilt to determine the inter-rater; intra-rater reliability; and therefore, whether a smartphone could be effectively used in a clinic setting. The present study involves three steps. First, a literature review, based on the development of an expedient and inexpensive method to measure pelvic tilt (Sander & Stavrakas 1981) was conducted, focusing on goniometric; inclinometric; and trigonometric means of measurement. The review was broadened to include the use of smartphones in a medical setting. The hypothesis we wish to present at the Research and Creative Achievement Week is the potential of utilizing a smartphone as a means of measuring pelvic tilt in a physical therapy clinic to increase the documentation of pelvis ROM, as well as the results of physical therapy intervention. Second, pelvic tilt data was collected by two different raters, each utilizing the Sanders & Stavrakas method, a traditional inclinometer, and a smartphone inclinometer on 40 healthy adults. Lastly, the analyses conducted explored the reliability between each measurement and between each rater. The results indicate that a smartphone can be used with the same confidence as traditional methods and proves to be more time efficient and easily accessible.

## GP44

**Oral Strengthening Exercises in Patients with Parkinson's Disease**

Graham Schenck 1, 2, Jamie Perry 2, Rita Bailey 3, 1 Department of Communication Sciences and Disorders, Illinois State University; 2 Department of Communication Sciences and Disorders, East Carolina University; 3 Department of Communication Sciences and Disorders, Illinois State University; Graham Schenck is now at Department of Communication Sciences and Disorders, East Carolina University. Rita Bailey is now at Office of the Provost, Illinois State University.

Because physical activity and exercise may counteract the degenerative nature of Parkinson's disease (de Goede et al., 2001; Tsai et al., 2002), physical activity treatments such as tongue strengthening for dysphagia in patients with Parkinson's disease may provide benefits. Potential benefits of physical activity to counteract the symptoms of degenerative disorders (e.g., Parkinson's disease) include increasing tongue strength to improve speech production and intelligibility, swallowing, and overall quality of life (Robbins et al., 2008).

Research objectively documenting the effects of oral-motor exercise on tongue strength and markers of hypokinetic dysarthria (e.g., decreased speech intelligibility, dysphagia, decreased vocal intensity) in patients with Parkinson's disease is limited. The effects of an oral motor exercise protocol with use of the Ora-Light Oral Motor Exercise System® (Kapitex Healthcare, 2004) in patients with Parkinson's disease have not been determined. This investigation is based on the hypothesis that oral-motor exercises derived from principles of motor learning and neural plasticity can increase tongue strength, improve intelligibility, and decrease markers of hypokinetic dysarthria in patients with Parkinson's disease. I will be assessing changes in tongue strength and clinical markers of dysarthria in 7 patients with Parkinson's disease following an oral-motor exercise based intervention.

## GP45

**Effects of Step Length on Patellofemoral Joint Stress in Female Runners with and without Patellofemoral Pain**

Dr. John Willson, Ph.D, MPT, Olivia Ratcliff, DPT, East Carolina University, Greenville, NC

Many individuals choose to participate in running which is often accompanied by overuse injuries such as patellofemoral pain syndrome (PFPS). The etiology of PFPS is primarily attributed to increased patellofemoral joint stress (PFJS). The purpose of this study was to examine the effects of step length changes on PFJS in female runners with and without PFPS. It was hypothesized that reducing step length would decrease PFJS. Participants (10 females with PFPS, 13 healthy females) performed 5 running trials under 3 conditions: preferred step length, long step length (+10%), and short step length (-10%). Running speed was consistent at 3.7 m/s 35% for all conditions. Kinematic and ground reaction force data were collected. Using this model, PFJS was calculated during stance by dividing patellofemoral joint (PFJ) reaction force by patellofemoral joint contact area. In the literature, PFJ contact area estimates as a function of knee flexion angle were gender specific values. Dependent variables of interest were peak knee extensor moment, PFJ reaction force and PFJS and PFJS-time integral. Because changing step length affects the number of steps necessary to run a given distance, PFJS-time integral/mile was also calculated. The effect of step length on the variables of interest was analyzed using 2-way mixed ANOVAs and follow-up tests ( $\alpha = .05$ ). No group main effects were observed. However, step length main effects and linear trends were observed for all dependent variables of interest. Peak knee extension moment and PFJ reaction force were 26% and 38% lower in the short versus long step length condition. Peak PFJS was 30% lower when running with a short step length versus a long step length. Participants demonstrated a 68% decrease in PFJS-time integral/step and a 23% decrease in total PFJS/mile from the long to short step length condition. This suggests a direct relationship between step length and PFJ loads. Further, the total stress/mile experienced at the PFJ is decrease with a short step length despite the greater number of steps necessary to cover this distance. On average, a 10% decrease in step length (12 cm) shielded the PFJ from over 5000 lbs of force/square inch for every mile run. Advice to decrease step length may reduce PFJS, exacerbation of symptoms, and facilitate continued participation in a patient's preferred mode of exercise.

# Graduate Poster Abstracts (Face-to-Face)

GP46

## **The Association of Knee Extension Power with Chair Rise Performance at Varied Knee Angles,**

Kathryn Vick, John Willson, Leslie Allison, Brittany Greenwell, Ali Omahen, Department of Physical Therapy, East Carolina University, Greenville, NC

**INTRODUCTION:** Peak muscle power may be a predictor of functional performance in older adults. However, isokinetic testing, the gold standard for joint power measurement, is not a convenient, inexpensive, or clinically practical measure to assess lower extremity power in many health care settings. The purpose of this study is to determine if scores from a clinical test, the Five-Times Sit-To-Stand Test (FTSTS) can be made to correlate with and predict knee extensor muscle power measurements obtained from an isokinetic dynamometer.

**Methods:** Healthy, non-injured participants were divided into two groups: young adults (n=41, 24.7 yrs, 172.5 cm, 74.2 kg) and older adults (n=41, 70 yrs, 168.7 cm, 76.8 kg). The FTSTS test was conducted with the knee joint fixed at 60°, 75°, & 90° of knee flexion. Peak knee extension concentric joint power measures were obtained using an isokinetic dynamometer at three velocities: slow (60°/sec), medium (120°/sec), and fast (180°/sec). Within each group, average peak power measures at each of the three velocities were correlated to FTSTS values at each of the three knee flexion angles using Pearson correlation coefficients. In addition, 3 stepwise multiple linear regressions per age group were performed using the average peak power measure from each velocity as the response variable, and age, height, mass, and FTSTS at 60° as the explanatory variables.

**RESULTS:** No significant associations between FTSTS values and power measures in the young adult group were found ( $.08 < r < .25$ ). Further, FTSTS scores were not a significant predictor of peak isokinetic knee joint power in this group. However, among older adults, correlations between FTSTS values and power measures were fair to moderate ( $-.40 < r < -.54$ ,  $p < 0.05$ ) and FTSTS values predicted peak knee extension joint power (adj R<sup>2</sup> = .23,  $p < 0.05$ ). The combination of FTSTS values, height, and weight explained 48-55% of the variability in knee extension joint power among older adults.

**CONCLUSION:** These findings suggest that knee extension joint power measures obtained from an isokinetic dynamometer are associated with FTSTS performance in healthy, older adults but not in healthy, young adults. These results suggest that among older adults, reasonable estimates of isokinetic knee extension joint power may be determined using a combination of field tests and anthropometric data.

GP47

## **The Predictive Validity Of The Sway Sled® As A Measure Of Fall Risk In Community-Dwelling Older Females,**

Dickens, Brittany; Fowler, Brittany; Allison, Leslie; Jones, Noelle; Ross, Courtney, Department of Physical Therapy, East Carolina University, Greenville, NC

**INTRODUCTION:** For older adults, imbalance leads to millions of falls annually, causing serious injury and death. Assessment of the postural limits of stability (LOS) is critical to evaluate balance and fall risk because restricted LOS are an independent risk factor for falls in older adults. LOS is currently measured using either an inaccurate, low cost Multi-directional Reach test or more accurate, high cost computerized forceplate Limits of Stability® test. Faculty and students at East Carolina University Department of Physical Therapy designed a novel device, the Sway Sled® (SS), which attaches to parallel bars to accurately assess postural LOS. A prior student study demonstrated that the SS yields valid and reliable clinical measurement of the LOS in healthy, young and (non-faller) older adults.

**PURPOSE:** The purpose of this current cross-sectional study is to assess the predictive validity of the SS in identifying older adults at risk for recurrent falls.

**METHODS:** Subjects were 20 community-dwelling older females (mean age=70.15 yrs, SD 37.26, range=62-87 yrs). Participants were categorized as fallers (n=8) and non-fallers (n=12) based on self-report of falls in the last 12 months and performance on the Timed Get Up and Go test (TUG). Those with two or more falls or a single fall with injury were fallers. Participants reporting near falls or a single fall without injury but scoring  $\geq 13.5$  sec on the TUG, were classified as fallers. All participants performed 3 trials on the SS with a maximal excursion (ME) of their center of gravity (COG) in each of 4 directions (anterior, posterior, left, and right). The mean for each direction was calculated. A One-way ANOVA was used to calculate statistically significant differences between groups (JMP Pro 10).

**RESULTS:** A statistically significant difference in ME scores between fallers and non-fallers, as measured by the SS, was found in the anterior direction ( $p=0.0427$ ). No significant differences were found in the other 3 directions, however the left direction neared significance ( $p=0.0883$ ).

**CONCLUSION:** The SS successfully distinguishes older female fallers from non-fallers during anterior ME of COG. The current small sample size precludes conclusion regarding predictive validity in the 3 remaining directions. This study is ongoing.

## GP48

**Stuttering Inhibition during the Perception of Infra-red Kinematic Marker Movement**, Daniel Hudock, PhD 1, Lin Sun, MA 2, Skye Lewis, MS 2, Laura Ball, PhD 3, Nick Altieri, PhD 1, Joseph Kalinowski, PhD 2, 1-Department of Communication Sciences and Disorders, Division of Health Sciences, Idaho State University, 2-Department of Communication Sciences and Disorders, College of Allied Health Sciences, East Carolina University, 3-Massachusetts General Hospital Institute of Health Professions

Stuttering is immediately and effectively inhibited as people who stutter produce speech while perceiving a second speaker speaking, or when perceiving their own speech that is presented back to them. Perception of second speech signals reduces stuttering frequency from 40 to 100%. The current study sought to examine stuttering frequency during perception of participants' full-face or kinematic marker movements. Patients and Methods: Eight adult participants who stutter read and memorized then verbally produced phrases as they watched their visual feedback on a monitor. Conditions consisted of 1) baseline, 2) full-face with simultaneous visual feedback (F-SVF), 3) full-face with delayed visual feedback (F-DVF), 4) kinematic markers with simultaneous visual feedback (M-SVF), and 5) kinematic markers with delayed visual feedback (M-DVF). Simultaneous conditions were presented with a 0 millisecond (ms) delay and delay conditions were presented with a 200 ms delay. Prior to starting the experiment, eight kinematic markers were placed proximally to participants' lips. Placements were medial vertically, medial horizontally, and four additional markers to the left and right superior and inferior at midpoints between the vertical and horizontal markers (See figure 3). Full-face conditions were presented with a face wide level of focus. Kinematic marker conditions presented a dynamic visual graphic of the markers (i.e., white dots on a black screen in a two-dimensional space).

Stuttering was significantly reduced under feedback and delay conditions. Stuttering frequency was reduced 45%, 56%, 32% and 58% for F-SVF, F-DVF, M-SVF, and M-DVF respectively. Delayed conditions reduced stuttering to greater extents than feedback conditions. Furthermore, there was no significant main effect for feedback by delay.

Stuttering was inhibited during all experimental conditions, however was reduced to the greatest extents during delayed conditions. Findings that stuttering was inhibited during the perception of visual only speech feedback support prior research results. Furthermore, the finding that stuttering is differentially affected during SVF and DVF supports prior research. Current results in concordance with previous research into stuttering inhibition, suggest that stuttering inhibition occurs under multimodal conditions.

## GP49

**The Effects Of Alzheimer's Disease On Skeletal Muscle's Response To Exercise**, Kristen A. Lattimore, Jessica C. Foster, Shelley Burgess, Alison C. Sloan, Sonja K. Bareiss, Terry E. Jones  
Department of Physical Therapy, East Carolina University, Greenville, NC

Alzheimer's disease (AD) is the main cause of dementia in persons age 65 and older, leading to progressive cognitive decline. It is widely accepted that aerobic exercise improves cognition in AD patients. We have observed that AD transgenic (AD tg) mice do not exercise as well as wild type (WT) mice. The exercise response of skeletal muscle in animals with AD has not been investigated. Glycogen synthase kinase 3-2 (GSK32) plays a role in the formation of the neurofibrillary tangles, a hallmark of AD, in the brain. In addition, the phosphorylated (inactive) form of GSK32 is thought to play a role in skeletal muscle hypertrophy. In the current study we investigated if exercise alters total GSK32 and phosphorylated GSK32 protein content in extensor digitorum longus (EDL) muscle from sedentary and exercise WT and AD tg mice. We hypothesized that total and phosphorylated GSK32 protein content in EDL will be different between WT and AD tg mice. WT and AD tg mice were randomly assigned to sedentary, 1x/week exercise, or 3x/week exercise groups. Exercise sessions were one hour in length for three months. EDL muscles were excised, weighed, and homogenized. The homogenates were used for Western blot analysis probing for total GSK32 and phosphorylated GSK32. Both exercise WT groups showed an increase in mass, while the AD tg exercise groups showed declining mass with increasing exercise frequency relative to AD tg control. Exercise produced an increase in total GSK32 in WT, but not in AD tg mice. Phosphorylated GSK32 was not altered by exercise between groups although the concentration in all three AD tg groups trended toward being slightly lower compared to all three WT groups. The response to exercise between WT and AD tg mice groups is different with respect to muscle mass and total GSK32 content. The pattern of exercise response with respect to phosphorylated GSK32 content is similar in WT and AD tg mice. Our findings suggest that the skeletal muscle of patients with AD may respond to aerobic exercise differently than the skeletal muscle of patients without AD.

# Graduate Poster Abstracts (Face-to-Face)

GP50

## **Lipid oversupply remodels DNA methylation in genes that play vital roles in fatty acid oxidation**

1JM Maples, 1S Park, 1JD Ridings, 2MJ Hubal, 3LA Consit, 1JJ Brault, and 1JA Houmard, 1Dept. of Kinesiology, East Carolina University, Greenville, NC; 2Dept. of Integrative Systems Biology, Children's National Medical Center, Washington D.C.; 3Dept. of Biomedical Sciences, Ohio University, Athens, OH

**PURPOSE:** Consumption of a high-fat diet leads to an increase in fat oxidation. The mechanism by which this occurs is not clear, however, emerging evidence suggests that normal physiologic adaptations to lipid oversupply depend on the coordinated upregulation of broad transcriptional regulators that play vital roles in fatty acid oxidation (FAO) such as the peroxisome proliferator activated receptors (PPARs). Epigenetic modifications, such as DNA methylation, may explain, at least in part, the upregulation of genes in response to a lipid stimulus. The purpose of this study was to determine the molecular response to a heavy lipid load in an environment void of in-vivo hormonal and neural stimuli and thus identify intrinsic transcriptional and/or epigenetic adaptations to a lipid stimulus.

**METHODS:** RNA and DNA was isolated in human skeletal muscle cell cultures (HSkMC) from 9 lean (BMI= 22.8 kg/m<sup>2</sup> 32.2; Age= 23.4yrs 34.6) Caucasian women following a 48hr incubation in 1) lipid (250QM oleate:palmitate) or 2) 5% BSA (control). mRNA content was measured using real-time PCR. DNA was bisulfite converted and methylation was measured using the Illumina HumanMethylation450 BeadChip.

**Results:** Lipid incubation induced a significant upregulation of several broad transcriptional activators involved in FAO including PPAR $\alpha$ , NRF-1, and NRF-2 (p<0.05). PPAR- and NRF-regulated genes including PDK4, COX6C, CS, and CPT1B were also significantly upregulated (p<0.05). In addition the methylation of PPAR $\alpha$  and CPT1B was significantly altered in response to lipid (p<0.05).

**CONCLUSIONS:** The coordination of broad transcriptional activators and their downstream targets was induced in response to lipids. It is likely transient changes in DNA methylation may provide a connection between nutritional factors, like lipid intake, and gene expression as lipid incubation significantly remodeled DNA methylation of genes that play a vital role in fatty acid oxidation.

Funding support provided by NIH Grant AG025205.

GP51

## **Effects of Increased Muscle Strength on Hip and Knee Motion During Stance Phase of Walking in Adolescents Who are Obese**

DeCarlo, Melissa B.; Edwards, Jennifer L.; Rountree, Margaret D.; Carlton, Megan B.; Williams, D. S. Blaise; Gross McMillan, Amy, Department of Physical Therapy, East Carolina University, Greenville, NC

Adolescents who are obese exhibit movement characteristics during gait, placing them at risk for musculoskeletal dysfunction and pain. Strength deficits have been hypothesized to contribute to these gait characteristics. Adolescents who were obese were able to increase their hip abductor and knee extensor muscle strength after 8 weeks of training. The purpose of this study was to determine the effect of increased hip abductor and knee extensor strength on frontal plane hip excursion and sagittal plane knee excursion during stance phase in adolescents who were obese. We hypothesized that, compared to obese peers who did not train, those who completed the training program would exhibit 1) decreased frontal plane hip excursion and 2) increased sagittal plane knee excursion during stance phase of walking. Of the 32 subjects enrolled in this study, data from 18 subjects who were obese (age = 14.5 $\pm$  1.5 yrs [TRNG], 14.4  $\pm$  1.7 yrs [CTRL]; BMI for age/gender > 95%) are included in this study. Subjects were matched by gender, Tanner stage and age, then randomized to either a control (CTRL, n=7) or training (TRNG, n=11) group. The TRNG group performed resistance exercise (hip abductors, hip extensors, knee extensors, PFs) 3x/week for 8 weeks, with resultant significant increases in strength of hip abductors and knee extensors (data submitted separately). An 8 camera Qualisys Motion Analysis System (Qualisys International, Gothenburg, Sweden) was used to measure lower extremity angles during walking before and after training. Data were normalized and averaged across trials for each subject. Frontal plane hip excursion was defined as the difference between maximum hip adduction and hip angle at initial contact (IC). Sagittal plane knee excursion was defined as the difference between maximum knee flexion and knee angle at IC. Paired t tests were used to determine changes in these variables in each group with training. Even though obese adolescents significantly increased strength in hip abductors and knee extensors with training, no significant differences were found in hip and knee excursion variables in either group. To decrease the risk for musculoskeletal dysfunction, greater strength changes, and perhaps specific gait training, may be needed to alter gait pattern, given the stable nature of human gait.

## GP52

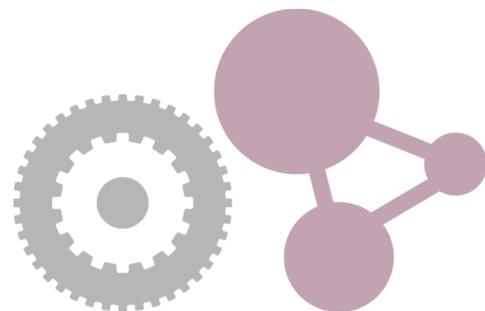
**Psychological and Physiological Effects of a One-Week Mindfulness-Based Intervention**, Summer Anderson, BS, Christyn Dolbier, PhD, Department of Psychology, East Carolina University, Greenville, NC

Introduction: Mindfulness meditation (MM) is a state of active awareness of thoughts, emotions, and bodily sensations without judgment or reactivity. Evidence demonstrates the effectiveness of 8-week Mindfulness-Based Stress Reduction (MBSR) programs. Shorter mindfulness based interventions (MBIs) appear psychologically beneficial, but merit further research in regard to physiological measures. Method: This study examined psychological and physiological effects of a one-week MBI using a within-subjects design. Participants were recruited from Introductory Psychology courses (N=15, M=19 years, majority female and Caucasian, meditation novices). Participants attended two lab sessions with one week in between during which they practiced daily 20-minute CD-led MM. During lab sessions, they underwent 20-minute CD-led MM, and data were collected pre-, during-, and post-MM. Data included state psychological surveys pre and post (relaxation, stress, anxiety, emotion), longer-term psychological surveys pre (stress, anxiety, mindfulness); and HRV via ECG pre-, during- and post [low frequency (LF), LF norm, high frequency (HF), HF norm, LF/HF ratio] during both lab sessions. Repeated measures ANOVAs examined changes over time. Results: After the one-week MBI, dispositional mindfulness and state relaxation significantly increased. Stress and anxiety (state and one-week) significantly decreased. Sympathetic nervous system (SNS) activity significantly increased during MM (LF, LF norm, LF/HF ratio). After one-week MBI, this increase showed a reversal of the upward trend observed before the MBI by decreasing post-MM (LF norm, LF/HF ratio). An opposite pattern emerged for parasympathetic nervous system (PNS) activity, with decreases during-MM that reversed post-MM only after the one-week MBI (HF norm). Conclusions: A one-week MBI provides psychological benefits. SNS increase and PNS decrease may reflect the novelty of this state and its focus on the present (positive or negative). These findings suggest that one week is not long enough to show SNS dampening and PNS heightening indicative of non-reactivity. Future researchers should employ a control group and various MBI lengths to further investigate at what point this occurs.

## GP53

**Skeletal Muscle Mitochondria With Alzheimer's Disease**, Polly S. Martin, Shelley Burgess, Alison C. Sloan, Sonja K. Bareiss, Terry E. Jones, Department of Physical Therapy, East Carolina University, Greenville, N.C

Alzheimer's Disease (AD) is the most widespread neurodegenerative pathology in the elderly population. Along with cognitive symptoms, AD shows decreased strength and activity that may be related to alterations in skeletal muscle structure and function. We have observed that AD transgenic (AD tg) do not exercise as well as wild type (WT) mice. The literature suggests that the alterations in skeletal muscle function in the AD population may be due in part to changes in the mitochondria of skeletal muscles. Additionally, there is evidence that both fast- and slow-twitch muscle fibers are metabolically altered in some disease states. We investigated the content of a metabolic enzyme in extensor digitorum longus (EDL) muscle from control and AD tg mice. EDL was excised, weighed, and homogenized from control and AD tg mice. Homogenates were used for Western blot analysis probing for citrate synthase. The mass of the EDL muscles were not different between groups. The content of citrate synthase was not different between groups. To our knowledge, this is the first research done on a mitochondrial enzyme in skeletal muscle of AD tg mice. Our finding may not be indicative of other mitochondrial enzymes in this muscle or mitochondrial enzymes of other muscles; therefore, we are further investigating enzyme content in another muscle. Further research into this area is warranted since the literature suggests that the decrease in motor function of the AD population is due in part to mitochondrial changes in skeletal muscle.



# Graduate Poster Abstracts (Face-to-Face)

## GP54

### **Effects Of Resistance Training On Lower Extremity Muscle Strength In Adolescents Who Are Obese,**

Edwards, Jennifer; DeCarlo, Melissa; Hodges, Nancy Jo; Gross McMillan, Amy, Department of Physical Therapy, East Carolina University, Greenville, NC

Adolescents who are obese have lower relative strength in hip abductors and ankle plantarflexors (PFs) compared to healthy weight peers. This may contribute to their movement patterns during walking (i.e., collapse of hip into adduction and knee into valgus in stance), which place them at risk for musculoskeletal dysfunction and pain. The study's purpose was to look at the effect of a resistance training program on their muscle strength. We hypothesized after an 8 week training program, adolescents who were obese would show greater increases in lower extremity strength (compared to obese peers who did not train), and maintain gains for 8 weeks following program cessation.

Twenty four subjects who were obese (Age = 14.7+/- 2.0 yrs [TRNG], 14.5+/- 1.7 yrs [CTRL]; BMI for age/gender > 95%) completed the study. Subjects were matched by gender, Tanner stage and age, then randomized to control (CTRL, n=9) or training (TRNG, n=15) group. The TRNG group did resistance exercise (hip abductors, hip extensors, knee extensors, PFs) 3x/week for 8 weeks. Using the HUMAC Norm (Computer Sports Medicine, Stoughton MA), absolute strength of muscle groups was measured before training (PRE) and immediately after training (POST 1), and 8 weeks after training (POST 2). Relative strength was calculated by dividing absolute strength by mass. Paired t tests were used to determine changes groups with training/over time. TRNG group subjects significantly increased relative strength of hip abductors (p=0.004 right, p=0.05 left) and knee extensors (p=0.02 right, p<0.000 left); CTRL subjects significantly increased relative strength of right knee extensors (p=0.04) and left hip extensors (p=0.009). At POST 2, there were no significant differences compared to PRE values. Obese adolescents significantly increased hip abductor and knee extensor muscle strength with training but did not maintain gains 8 weeks after training. Hip extensor and PF muscle groups were difficult to measure and strengthen due to compensatory strategies during measurement and training sessions. The training protocol may have been too conservative: subjects typically rated difficulty < 4 (Somewhat Hard) on Borg's Rating of Perceived Exertion. To increase and maintain strength in lower extremities, adolescents who are obese may benefit from resistance exercise longer than 8 weeks and more aggressive protocols.

## GP55

### **The Influence of Foot Type and Gender on Frontal Plane Motion at the Hip During a Single Leg Landing,**

Bourgeois, E; Bendahmane, H; Kitchens, E; Ross, C; Thompson, J; Jenkins, WL; Willson, J, Movement Science Laboratory, Department of Physical Therapy, East Carolina University, Greenville, NC

Objective: To assess how foot type and gender influence frontal plane hip kinematics during single-leg landing from a jump.

Background: Research has shown that female athletes participating in jumping sports have a 4-6 times greater chance of injuring their anterior cruciate ligament (ACL) than male athletes. Approximately 80% of ACL injuries occur as a result of noncontact mechanisms of injury such as pivoting and landing activities. During this activity, increased hip adduction and internal rotation along with knee valgus and tibial external rotation (medial collapse) typically occur resulting in an increased strain on the ACL and higher risk for injury. The relationship between gender and knee injury has been studied extensively however, other potential risk factors for medial collapse might include hip and foot structure. Methods and Measures: Forty-seven subjects were divided into gender (n=23 males, n=24 females) and foot type (n=25 rigid feet, n=22 mobile feet). Navicular drop test was used to determine foot type (mobile > 10 mm navicular drop; rigid < 4 mm navicular drop). All subjects performed single-leg jump landings on the left lower extremity. Subjects were asked to jump to 75% of their maximum vertical jump height during each trial repetition. An 8 camera Qualysis Motion Analysis system was used to collect biomechanical measures. Two-Way ANOVA analyses were used to determine if frontal plane differences existed within genders and within foot type with respect to hip motion (p < 0.05). Results: At the hip joint, females with mobile feet demonstrated significantly greater total frontal plane hip excursion than females with rigid feet (p < 0.01). Also, the females with mobile feet demonstrated greater total frontal plane hip excursion than males with mobile feet (p < 0.05).

Discussion and Conclusions: Both gender and foot type appear to influence proximal motion of the lower extremity when landing from a forward vertical jump. Females with mobile feet demonstrated greater total frontal plane hip excursion compared to females with rigid feet and males. Consequently females with mobile feet may have greater strain on the ACL during landing activities, putting them at higher risk for ACL injury.

## GP56

**Physicians Manage Patient Cultural Beliefs through Counseling**, Aniqah Shahrier, Janet Malek, PhD, Brody School of Medicine, East Carolina University, Greenville, NC

As studies continue to show that patient beliefs about health impact their health behaviors, physician cultural competency is becoming an increasingly important aspect of patient care. The purpose of this study was to explore the strategies physicians use to manage patient cultural beliefs. A convenience sample of 12 physicians at the International Centre for Diarrhoeal Disease Research, Bangladesh in Dhaka, Bangladesh was interviewed on patient cultural beliefs about diarrheal disease and their responses to those beliefs. Participants reported a variety of cultural beliefs in their patients. They cited lack of education as the biggest barrier to managing the beliefs. Counseling patients to explain the real causes of diarrheal disease and dispel misleading cultural beliefs was believed by the physicians to be the most effective strategy for managing patient cultural beliefs.

## GP57

**The Impact of Return-to-Work Programs**, Michelle Glasgow, East Carolina University, Greenville, NC

According to the United States Department of Labor when an employee is out of work due to illness or injury, it is in everyone's best interest to return him or her to work in some capacity as soon as they are able. This study will review the best Return-To-Work practices based on research model conducted in the state of California by the University of California at Berkeley. The best practices highlighted by the research on return-to-work practices in the state of California will be compared to Workers' Compensation laws and practices in the state of North Carolina to highlight the impact of an effective Return-To-Work program. Although return-to-work programs were traditionally instituted to simply reduce workers' compensation costs, an effective return-to-work program can be beneficial to employers in a variety of ways. In addition to reducing workers' compensation costs, return-to-work programs can help avoid millions of dollars in fines and penalties, retain experienced employees, improve employee morale and productivity, increase competitiveness of a business, and help ensure equal opportunity of employment for persons with disabilities. The manner in which an injured employee returns to work after being injured on the job can have either adverse or beneficial effects to both the employee and the employer. There are injuries that prevent a worker from performing their job in the manner they were able to before the injury. There are disabilities that prevent an injured employee from performing their regular duties all together. However, there are

instances where an injured worker can meet the demands of the job, after being injured, with appropriate modifications. Employers are not always required to retain employees who suffer injuries at the work place. This study will present the possible beneficial impact of return-to-work programs.

## GP58

**Gait Biomechanics Of Healthy Old Adults Do Not Change After Twelve Weeks Of Plantarflexor Strength Training**, Rachel Tatarski<sup>1</sup>, Chantal Beijersbergen<sup>2</sup>, Zachary Domire<sup>1</sup>, Patrick Rider<sup>1</sup>, and Dr. Paul DeVital<sup>1</sup>, <sup>1</sup> College of Health and Human Performance, Department of Kinesiology, East Carolina University, NC, <sup>2</sup> University of Groningen, The Netherlands

Locomotion is an important and inherent part of daily life and is integral in maintaining an independent lifestyle, especially in older adults whose functional capacity has declined. Physiological changes with aging, including loss of muscle mass, strength and power are manifested in walking, notably at the ankle joint. Old adults exhibit decreased power of the plantarflexors and increased power of the hip extensors. This distal to proximal shift in function could be due to plantarflexor weakness, so strengthening the plantarflexors may help reverse the negative physiological effects of aging and help preserve functional capacity in old adults. The purpose of this study is to determine the effect of plantarflexor strength training on gait biomechanics during level walking at a safe maximum speed in healthy old adults. A total of 13 healthy adults between the ages of 65 and 85 participated in this study (6 strengthening, 7 stretching). After baseline tests, the strengthening group performed resistance exercises for gastrocnemius and soleus muscles and the stretching group stretched them three times per week for 12 weeks. All subjects will undergo gait assessments and maximal strength testing at the end of the 12 week training period. Due the small sample sizes, a t-test was used to compare pre versus post-test values within each group. Preliminary results do not show any changes in stride length (strengthening: pre = 1.68 cm, post = 1.61 cm; stretching: pre = 1.65 cm, post = 1.48 cm) or walking velocity (strengthening: pre = 1.88 m/s, post = 1.84 m/s; stretching: pre = 1.77 m/s, post = 1.54 m/s) in either group from pre to post. Additionally, no changes in were detected in ankle torque (strengthening: pre = 9.0 Nm/%BW\*H, post = 8.8 Nm/%BW\*H; stretching: pre = 8.8 Nm/%BW\*H, post = 9.3 Nm/%BW\*H) or ankle power (strengthening: pre = 3.8 W/kg, post = 3.6 W/kg; stretching: pre = 3.4 W/kg, post = 3.6 W/kg) during level walking at a safe maximum speed for either group. Based on the preliminary results, a 12-week plantarflexor strength training program does not appear to affect the gait biomechanics of healthy old adults during walking at a safe maximum speed. However, the study is ongoing and the sample size is expected to increase.

# Graduate Poster Abstracts (Face-to-Face)

## GP59

**Gait Biomechanics Alter Due to Variations of Locomotion Surfaces**, H. Bennett, P. Rider, R. Krupenevich, K. Bumgardner, M. Le Doyen, J Willson, Z. Domire, & P. DeVita, Depts. of Kinesiology and Physical Therapy, East Carolina University, Greenville, NC

Introduction: Evaluating gait biomechanics are essential in both clinical and research analyses of human movement. Advancements in treadmills to become instrumented with built in force plates have allowed for ease in obtaining kinematic and kinetic gait, compared to locomotion overground. However, a review of literature indicates no unanimous conclusion that gait over these two different surfaces are in fact equal. Further research is required to determine how significant the observed variations are to gait biomechanics. Objective: The purpose of this pilot study is to compare walking and running gait biomechanics between overground and instrumented treadmill surfaces in active runners. Methods: Pilot subjects were 1 male and 1 female (aged 22-24), who currently run 15+ miles per week, and were familiar with locomotion on treadmills. 3-D Motion capture and force plate data were collected on both subjects with each subject wearing standard gait testing markers. Both subjects walked and ran overground at 1.5 m/s and 3.35 m/s, respectively. Next, each subject was allowed 3 minutes to acclimate themselves to treadmill walking and running at the same speeds as performed overground followed by collection of kinematic and kinetic data. Inverse dynamics were used to calculate joint moments during the four conditions. Results: Both subjects decreased hip extensor moments, 20.25 Nm and 5.2 Nm, and increased knee extensor moments, 14.4 Nm and 12.46 Nm, walking on the treadmill vs. overground. Subject 1 had increased hip and decreased knee extensor moments, 19.2 Nm and 35.6 Nm respectively, running on the treadmill vs. overground. Subject 2 decreased their hip extensor moments and increased the knee extensor moments, 22.4 Nm and 8.04 Nm respectively, running on the treadmill vs. overground. Both subjects decreased stride length while walking, 0.18 m and 0.17 m, and running, 0.30 m and .18 m, on the treadmill vs. overground.

## GP60

**Post-disaster implications of policy changes to North Carolina mosquito control programs**,

Jonathan Harris, Alice Anderson, and Stephanie Richards, Environmental Health Program, Department of Health Education and Promotion, East Carolina University, Greenville, NC  
Natural disasters such as hurricanes increase mosquito abundance and arbovirus transmission risk. In 2011, Hurricane Irene impacted eastern North Carolina (NC), resulting in flooding that increased mos-

quito populations and hindered recovery efforts. In past years, NC Mosquito Control Programs (MCPs) received state support for arbovirus surveillance. However, recent budget shortfalls have reduced the functionality of NC MCPs. Consequently, many NC counties must rely on the Federal Emergency Management Agency for post-disaster mosquito control. Emergency funding is critical for short-term suppression of potential vector populations; however, continuous funding is needed for arbovirus surveillance. This paper examines mosquito abundance in pre- and post-aerial insecticide spraying regions in Washington and Tyrrell Counties in eastern NC. Mosquitoes were trapped, identified to species, and counted at eight study sites. Traps in spray zones showed significant decreases in mosquito abundance compared to negative control traps. Implications of reactive rather than proactive mosquito control responses are discussed.

## GP61

**Effects of mentor-based exercise on overweight adolescents' physical self-perceptions and aerobic fitness**, Sawyer, M., Carraway, M.E., Andleton, J., Raedeke, T.D., McCammon, M., & Lutes, L., East Carolina University, Greenville, NC

In recent decades the prevalence of obesity has been on the rise. Although the links between obesity and physical health are well known, the relationship between obesity and mental health is complex and misunderstood (Tuthill et al., 2006). Self-perceptions are an important facet of psychological well-being (Blaine et al., 2006). Biddle (2011) found poor self-perceptions to be a predominant mental issue in overweight adolescents. Research also shows a positive relationship between exercise and self-esteem. In addition, epidemiological studies indicate obese youth are less aerobically fit than their normal weight counterparts (Johnson et al, 2000). Although not specific to exercise, mentoring programs have also to have positive effects on adolescent well-being. Our purpose is to evaluate the impact of Project Mentor on the self-perceptions and fitness level of overweight adolescents. Project MENTOR is a mentor-based, exercise intervention designed for overweight adolescents. Adolescents participate in three, mentor-led, vigorous weekly exercise sessions designed to enhance exercise success and enjoyment. The program also involves a lifestyle-coaching through weekly behavioral challenges designed to enhance self-regulatory skills related to physical activity and healthy eating. To date, 28 participants with a mean age of 14 and a baseline BMI of 32 have participated in the mentoring intervention. An additional 12 adolescents were randomly assigned to a wait-list control condition with a mean age of 14

and baseline BMI of 36. In addition to fitness assessments, participants completed a questionnaire that assessed domain specific self-perceptions, physical self-worth, and global self-esteem (Whitehead, 1995; Harter 1988) pre/post intervention. A series of 2 (condition) X 2 (time) repeated measures ANOVA's combined with inspection of effect sizes revealed that participants in the mentoring condition showed improved aerobic fitness ( $d = .41$ ) compared to the control condition, which exhibited minimal change ( $d = .05$ ). In terms of self-perceptions, mentor participants reported improved self-esteem, physical self-worth, and perceived physical condition with the effect sizes being in the moderate to large range (i.e.,  $d = .63$  to  $1.02$ ). Findings support that a mentor-based exercise program has a positive impact on self-perceptions and aerobic fitness.

#### GP62

**Effects of Video Feedback on Football Player's Skill Development.** Charles Addison Harvey Jr. and Dr. Nelson Cooper, 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 youth sports. Intercollegiate 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 skills. The purpose of this report is to present a conceptual foundation for the use of video feedback and its contribution to sport skill learning and development. Two conceptual frameworks will be presented: constructivism and observational learning. Constructivism is a continuous learning process that depends on active participation for optimal results and occurs in four stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation (Davies, 2010). Observational learning is the innate action of learning through observing an action (Horn, Williams, & Scott, 2002). Both of these conceptual frameworks contain fundamentals that illustrate the learning process through video feedback. Both frameworks and recommendations for utilizing video feedback are presented.

#### GP63

**Aromatherapy Rest Period on an Inpatient Cancer Services Unit.** Amy M. Jones RN, College of Nursing, East Carolina University, Greenville, NC

Aromatherapy has been popular for decades in China, however in recent years; there has been more interest in aromatherapy in the United States. Aromatherapy is reported to decrease stress and anxiety as well as pain perception. Lavender was traditionally used as an antiseptic. Today, literature reports lavender being used to help with relaxation and pain management (Kritsidima, Newton & Asimakopoulou, 2009). On inpatient hospital units, noises and interruptions are common and frequent. Lack of sleep and rest can increase patients' blood pressure and contribute to overall morbidity as well as decrease immune function (Parthasarathy & Tobin, 2009). The ability to cope and reason, alertness, wound healing and respiratory functions are all affected by lack of rest or sleep (Hsu, Ryherd, Wayne & Ackerman, 2012). This project focused on oncology patients at a large medical center during the fall of 2012. Over the course of one month, a total of 19 sessions of aromatherapy was administered to patients. With each encounter, the patients were encouraged not to accept phone calls or other disruptions. Family was allowed to remain with the patient as long as they did not speak or make noise. Lavender essential oil was diffused via a cotton ball. Relaxation music was played and lights were dimmed. Patients were left for 30 minutes and at the end of the session a questionnaire was administered. Patients ranged in age from 22-75 with 2 out of the 19 sessions being conducted with male patients. The overall project showed a positive trend towards patients reporting improved mood and decreased pain. Patients reported their pain before and after the intervention. Thirty one percent of encounters reported decreased pain after treatment and eighty five percent of the encounters reported improved overall mood.

Hsu, T., Ryherd, E., Wayne, K.P. & Ackerman, J. (2012). Noise pollution in hospitals: Impact on patients. *Journal of Clinical Outcomes Management*, 19(7), 301-309.

Kritsidima, M., Newton, T. & Asimakopoulou, K. (2009). The effects of lavender scent on dental patient anxiety levels: A cluster randomized-controlled trial. *Community Dentistry and Oral Epidemiology*, 38(1), 83-87. doi: 10.1111/j.1600-0528.2009.00511.x

Parthasarathy, S. & Tobin, M.J. (2009). Sleep in the intensive care unit. *Applied Physiology in Intensive Care Medicine*, 191-200. doi: 10.1007/978-3-642-017

# Graduate Poster Abstracts (Face-to-Face)

## GP64

**The Effect Of Carrying A Load On Patellofemoral Joint Forces In Males And Females During Inclined Walking**, Rebecca Krupenevich, Thomas Mahar, Rachel Tatarski, Patrick Rider, Paul DeVita, Zac Domire, East Carolina University, Greenville, NC

Female soldiers experience increased rates of injury compared to male soldiers (Orr et al. 2011). In particular, females have exhibited a high rate of anterior knee pain (Strowbridge 2002). Identifying the mechanisms that contribute to chronic knee pain could help to decrease injury rates among females in the military. Many previous studies have determined the load amount to be carried as a relative load based on the participant's body weight. In reality, load amounts carried in the military are absolute. They are based on the position or job being performed rather than body mass (U.S. Department of the Army Field Manual 21-18). A comparison of genders based on an absolute load, instead of loads relative to body weight, may help to explain the high rates of injury observed in female soldiers. The purpose of this study was to compare the effects of carrying an absolute load on patellofemoral joint force (PFF) in males and females. We recruited seven members of the ECU Army ROTC (4 males, 3 females) to participate in this preliminary study. Subjects wore standard ROTC boots during testing and a MOLLE rucksack containing 24kg (U.S. Army fighting load) during loaded conditions. Subjects performed several walking trials up a ramp with a 10 degree grade at a standard speed of 1.5m/s. Three load conditions (unloaded, mid-back position, and low-back position) were tested. Kinematic data was captured using an eight camera Qualisys motion tracking system. AMTI forceplates were used to capture force data. Data was analyzed using V3D and combined in a musculoskeletal model to predict patellofemoral joint forces (Messier et al. 2011). Preliminary results show that while both males and females displayed increased patellofemoral joint forces in response to loading, PFF increased more in females than in males. Males increased PFF 165% from the unloaded condition to the low load position and 155% to the mid position. In comparison, females increased PFF 295% from unloaded to low, and 244% to the mid position. It could be postulated that the increase in PFF is due to differences in strength between the males and females that result in maladaptive gait behaviors. Findings from this study may have implications for military strength training or load carriage training programs. Further analysis will relate knee flexion angle and quadriceps force to PFF.

## GP65

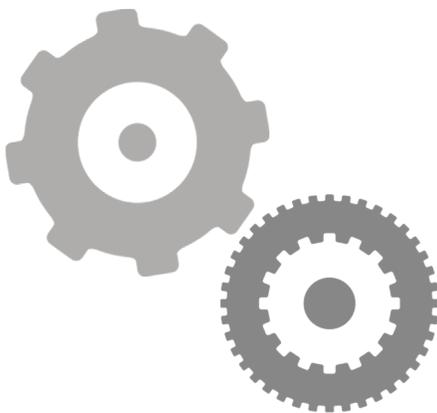
**Applications of Stochastic Processes in Cancer Research**, Kristin Steely, Department of Mathematics, East Carolina University, Greenville, NC

Up to 70% of runners sustain an injury over any one-year period. Rate of impact loading has been implicated in the etiology of many overuse running injuries. Rate of loading may be reduced by adopting a midfoot strike pattern; a pattern common among people who traditionally run barefoot. The Vibram FiveFinger (VF) is a popular minimalistic shoe purported to simulate a barefoot experience. Research testing this claim is scarce and has utilized all male subjects with differing degrees of barefoot running experience. The purpose of this study was to evaluate the immediate effects of minimalistic footwear on rate of loading relative to barefoot running, among female runners. In this study, nineteen healthy female runners with no prior barefoot running experience ran over-ground (3.52-3.92 m/s) while shod in traditional running shoes (TS), the VF, and barefoot (BF). Vertical loading rate and ankle angle at footstrike data were recorded for five foot contacts per condition using 3-D motion analysis and a force platform embedded in the runway. Differences between conditions were evaluated using a repeated measures ANOVA ( $\alpha = 0.05$ ). Our results show that loading rate while running in the VF shoes (121.29 BW/s) was not different than running BF (109.56 BW/s) ( $p = 0.05$ ). However, loading rates in both the VF and BF condition were greater than the TS condition (76.1 BW/s) ( $p = 0.05$ ). Dorsiflexion angle at initial contact was smallest in the BF condition (1.94 deg), followed by VF (4.37 deg) and TS (12.12 deg) ( $p = 0.05$ ). These results suggest that among runners with no previous barefoot running experience, the average immediate response to running with VF or BF may be higher loading rates and smaller ankle angles at initial contact. Higher loading rates may increase an individual's risk for certain running-related overuse injuries. This paper examines mosquito abundance in pre- and post-aerial insecticide spraying regions in Washington and Tyrrell Counties in eastern NC. Mosquitoes were trapped, identified to species, and counted at eight study sites. Traps in spray zones showed significant decreases in mosquito abundance compared to negative control traps. Implications of reactive rather than proactive mosquito control responses are discussed.

## GP66

**The origin and evolution of the C-terminal domain of the largest subunit of RNA Polymerase II**, Chunlin Yang, Brody School of Medicine, East Carolina University, Greenville, NC

The C-terminal domain (CTD) of the largest subunit (RPB1) of DNA-dependent RNA polymerase II is composed of tandemly repeated heptads with the consensus sequence YSPTSPS that are highly conserved across many eukaryotic taxa, including animals, yeasts and green plants. Previous work showed that the CTDs deviate substantially from this tandemly repeated structure in some organisms; however, weak sampling made it difficult to determine whether such disordered sequences represent the CTD's ancestral state, or reflect degeneration from a canonical repetitive structure. Without a clear understanding of the pattern of CTD evolution, mechanistic processes responsible for conservation or degeneration of the domain cannot be determined. Therefore, we undertook the broadest investigation to date of the evolution of the RNAP II CTD across eukaryotic diversity. The analysis indicates that a tandemly repeated CTD heptad structure existed in the ancestors of each major taxon, and that degeneration of this ordered structure is a common feature of CTD evolution. Modifications of the ancestral heptad amplified appear to be associated with an increase in developmental complexity in animals and green plants. The pattern has been taken to an extreme in both fungi and red algae, where the CTD has undergone dramatic to complete degeneration during the transition from unicellular to multicellular forms. Overall, loss and reinvention of various repeats have punctuated CTD evolution, occurring independently and sometimes repeatedly in different groups.



## GP67

**The Migration of Salt Marsh Zonation Across Latitude**, Casey B. Nolan 1,2 and David R. Chalcraft 2,3, 1Coastal Resources Management Ph.D. Program, 2Department of Biology, 3Center for Biodiversity, East Carolina University, Greenville, NC

Plant community composition in salt marshes along the east coast of the United States is remarkably consistent across a broad latitudinal scale. Within any given latitude, however, species differ in their distributions along an elevational gradient. For example, the halophyte *Salicornia maritima* occurs in lower marsh zones and *Spartina patens* occurs in upper marshes. The traditional paradigm is that competitively dominant upland species are restricted from low marsh zones by stress, whereas stress-tolerant species are excluded from the upland by competition. The dominant abiotic stressors that govern this distribution have been widely recognized as hydroperiod, nutrient availability, and soil salinity. Recently, however, *Salicornia maritima* has expanded from low marsh zones into dense stands of competitively superior *Spartina patens* in multiple east coast barrier island salt marshes at southern latitudes (e.g., Assateague Island National Seashore, Maryland) but not northern latitudes (e.g., Fire Island National Seashore, New York). A potential explanation is that differences in environmental regimes between the two latitudes have promoted different local adaptations that predispose southern plant populations to better moderate competitive pressure and expand their distribution. For instance, southern marshes are exposed to longer and warmer growing seasons relative to northern marshes. To test the hypothesis that southern populations of *Salicornia* are better competitors, we will conduct a reciprocal transplant study involving *Salicornia maritima* and *Spartina patens* found in two disjunct populations (New York and North Carolina). Species from the NC population will be grown together in mesocosms and transplanted to the NY site, and individuals from the NY population will be transplanted together to the NC site. Two levels of fertilization and three levels of hydroperiod treatments will be applied in a full-factorial fashion during the 2013 growing season. Results from this study will help to determine whether the local adaptations of conspecific salt marsh species influence their ability to moderate environmental stressors that typically exclude their establishment in the upland boarder.

# Graduate Poster Abstracts (Face-to-Face)

GP68

**Migration patterns of spiny dogfish as inferred from mark-recapture, acoustic, fishery landings, and fishery independent data.** Jennifer L. Cudney 1, Roger A. Rulifson 1,2, 1Institute for Coastal Science and Policy, East Carolina University, Greenville, NC, 2Department of Biology, East Carolina University, Greenville, NC

Spiny dogfish are a small, abundant schooling species of shark that are generally thought to seasonally migrate between the Mid-Atlantic and New England. Federal survey and landings data have primarily been used to infer seasonal migration and movement patterns for federal and interstate management. The goal of this study is to refine understanding of the timing, extent, and seasonality of spiny dogfish that migrate through the mid-Atlantic Bight through the development of a new acoustic tagging program. This approach allows for consideration of individual movements of spiny dogfish; acoustic tags in particular provide a means to track subjects over a multi-year time period across large distances. Acoustic results are corroborated with the analysis of a 15 year mark-recapture program conducted by East Carolina University off the coasts of North Carolina, Massachusetts, and Nova Scotia. 213 spiny dogfish were tagged in two studies between 2009-2010 and 2010-2011 with acoustic tags in North Carolina and Massachusetts. These tags have a battery life of up to three years, and analyses are ongoing as data are provided from partner institutions maintaining acoustic arrays between North Carolina and Maine. Redetection rates of animals acoustically tagged in 2009 and 2010 off the coast of North Carolina were 74 and 87.5 percent respectively; these animals were detected on acoustic receivers deployed by East Carolina University and partner institutions between North Carolina and Maine. Spiny dogfish tagged off the coast of Massachusetts were primarily re-detected in the Gulf of Maine and the northern mid-Atlantic Bight.

GP69

**How far past metamorphosis do the impacts of predators on larvae last?** Scott P. Jones and David R. Chalcraft, Center for Biodiversity, Department of Biology, East Carolina University

Many organisms have the ability to alter their morphology, behavior, or life history in response to environmental cues. For example, the presence of predators can cause tadpoles to alter their morphology in a manner that increases the ability of tadpoles to escape predation. It is unclear, however, whether the morphological changes made by tadpoles in response to predators in their aquatic environment have negative consequences for the individuals in the terrestrial environment after they metamorphose into juveniles. We examined whether predator induced variation in the morphology of tadpoles produced variation in the morphology of metamorphosed individuals, and if so, whether morphological differences persisted, converged or diverged through time. We also examined whether predator induced morphological variation in tadpoles had important consequences on the performance of individuals after they metamorphosed. To achieve these goals 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 morphological differences among these individuals during their larval and terrestrial juvenile stages. We assessed the performance of juveniles by raising them in penned enclosures and measured growth, survival and hopping ability. Larval toads reared with different predators did not differ in their average mass. Toad metamorphs reared with predators were larger than those reared without predators. Metamorphs reared with fish had longer legs than those reared with dragonflies which in turn had longer legs than those reared without predators. After being added to the enclosures, there were no significant differences in number of toads, size, leg length, or jumping ability between toads reared in the three treatments. These data suggest that the consequences of larvae changing their morphology to escape predation disappear shortly after metamorphosis. If the costs of responding to a predator as a tadpole are minimal after metamorphosis, then all frogs placed in a common environment should converge on a common morphology that conveys the best fitness advantage possible. These data need to be interpreted with caution because of the high mortality in the enclosures, which may have prevented the detection of differences due to small sample sizes.

## GP70

**What do you know about water quality? Using Cultural Consensus Analysis to determine the educational value of citizen-based water quality monitoring programs and other environmental-themed groups,**

M. Chad Smith and Roger A. Rulifson, Coastal Resources Management Program, Institute of Coastal Science and Policy, East Carolina University, Greenville, NC

Cultural consensus analysis (CCA) is based off cultural consensus theory, which is comprised of analytical techniques and models that can help identify cultural beliefs and how individuals might be grouped based on these beliefs. To determine if there is a consensus between different cultural groups, a survey of related questions is administered to individuals based on their identified cultural group. Responses are aggregated and the average responses are used to estimate the answers. Individual responses will be tested against the aggregate responses to determine if there is a consensus between the cultural groups. For my proposed research, CCA will be used to determine if individuals of citizen water quality monitoring programs or other environmental-themed groups retain knowledge of water quality as opposed to individuals who are not involved in these programs or groups. Surveys will be distributed to individuals that identify themselves as belonging to one of two groups: (1) water quality monitoring program participant or belonging to an environmental-themed group, or (2) never participated in any water quality monitoring program or environmental-themed group. Surveys will be analyzed using UCINET software to determine if there is consensus between the two groups; multiple dimensional scaling will be used to visually group the survey respondents to one another. No consensus between the two groups will reveal different cultural beliefs between the two groups when it comes to water quality; this can help promote the value of these programs and groups. Consensus between the two groups will reveal no separation of cultural beliefs when it comes to water quality; this should alert monitoring program coordinators and group leaders to improve water quality education.

## GP71

**Are the sea nettles *Chrysaora quinquecirrha* in the Neuse River Estuary sexually reproducing?**

Mahealani Y. Kaneshiro-Pineiro 1, Amanda L. Cornelsen 2, Barryn E. McLaughlin 2, David G. Kimmel 1,2, 1Institute of Coastal Science and Policy, East Carolina University, Greenville, NC, 2Department of Biology, East Carolina University, Greenville, NC,

Jellyfish blooms in coastal environments have been reported to be increasing, leading to societal and economic problems. Many theories exist to explain blooms, including aggregation for the purposes of sexual reproduction. We chose to investigate the potential occurrence of sexual reproduction the sea nettle (*Chrysaora quinquecirrha*). In the Neuse River Estuary (NRE), North Carolina, the annual presence of this species has negative effects on estuarine recreation. A useful and informative method to evaluate sexual reproduction in jellyfish species is to observe gonad maturity via histology. Our study used histology to assess sexual reproduction of NRE sea nettles in 2011. One-hundred sea nettles were randomly sampled from mid-May to mid-July 2011 to observed sex ratio, the presence of brooded larvae, and if the jellyfish had mature gonads. Upon collection, morphological characteristics (bell diameter, color, and oral arm color) of the sea nettles were recorded and gonad samples were preserved in 5% formalin. Histology slides were then created for the gonads of all 100 jellyfish. All slides were analyzed with microscopy and image analysis. We found a sex ratio of 14:13, where females consisted of 52% and males 48%. Of the females, none were sexually mature (egg diameters > 0.07mm) and there were no brooded larvae. There were 5/48 males that showed spawning during the end of May and early June. Our study did not indicate internal fertilization of sea nettle eggs as shown by their small diameters and a lack of larvae. This suggests that either external fertilization is the norm or sexual reproduction is not occurring. As the literature reports these species to be internally fertilized, further analysis is needed, including in vitro fertilization experiments and abundance surveys of planktonic stages of the sea nettle.

# Graduate Poster Abstracts (Face-to-Face)

## GP72

**Shoreline Change Analysis of the Twenty Coastal Counties of North Carolina**, David W. Hawkins, D.R. Corbett, J.P. Walsh, East Carolina University, Greenville, NC

Increased storm activity and rising sea level can adversely affect the North Carolina (NC) shoreline, leaving this region in a vulnerable state. To better manage and prepare for these adverse impacts, a greater understanding of the processes that drive change along the coast is needed. Only recently has a digital database been created that can be used to conduct statistical comparisons between shoreline change in North Carolina and the geomorphologic forces and processes that create change (e.g. slope, fetch, etc.). This ArcGIS database consists of a digitally mapped shoreline of the twenty coastal NC counties. This project is designed to incorporate the digitized data from the estuarine shoreline into a system that can be used by coastal planners and scientists. I will assist in the data analysis and help bridge together the physical processes that cause morphological change along the NC estuarine coastline. I hypothesize that land use changes along the shoreline will alter the rate of shoreline change over time.

The spatial analysis of this digitized shoreline via ArcGIS will allow the identification of specific types of shoreline, shoreline structures and the concentration of these structures per county, different watersheds, and specific areas either prone to erosion or deposition. A combination of methods ranging from time-series spatial analysis, to statistical methods for predicting shoreline changes, will be used in this research. Understanding how these coastal estuarine areas change over time in response to an array of processes, such as extreme storm events, sea level rise, and anthropogenic manipulation, is crucial to being able to properly plan for future development and/or for conservation and preservation purposes of the coast.

## GP73

**Submarine Groundwater Discharge in the Antarctic**, Jared Crenshaw, Reide Corbett, Kimberly Null, Institute of Coastal Science and Policy, Department of Geological Sciences, East Carolina University, Greenville, NC

Submarine groundwater discharge is the total discharge of water across the sediment water interface, and is an important process for nutrient delivery into nearshore environments and across continental margins. Using naturally-occurring radio- and stable isotopes, we are quantifying the amount of submarine groundwater and surface water discharge in coastal environments of the West Antarctic Peninsula and evaluating its contribution to the iron budget of the region. Iron, which is a critical element in photosynthesis, is important to major portions of the Southern Ocean because of its limited availability. In this region, the importance of groundwater to the iron budget, and its role in primary production, have not yet been evaluated. The amount of freshwater delivered to the coastal ocean via submarine groundwater discharge, is being quantified via a geochemical box-model. The model we are using accounts for all potential sources of a suite of naturally occurring radio-tracers that are indicative of groundwater and surface water interactions. Additionally, we are analyzing each sample for dissolved iron concentration in order to quantify that sample's contribution to the regional iron budget. This research will significantly enhance our understanding of the factors that affect primary production in one of Earth's most productive regions.

## GP74

**Effects of Saltwater Intrusion on the Survival of Bald Cypress (*Taxodium distichum*) Forested Wetlands**, Amanda S. Powell and Marcelo Ardón, Department of Biology, East Carolina University, Greenville, NC

Changes in river discharge to coastal areas and sea level rise will increase the frequency of saltwater intrusion into former freshwater forested wetlands. Bald cypress trees are dominant trees in forested coastal wetlands of the coastal plain. This study will combine field observations and laboratory experiments to examine the effects of saltwater intrusion on bald cypress growth at different life stages (seedlings, young trees, and mature trees). We will conduct a regional survey of bald cypress growth using increment tree ring cores from adult trees along a salinity gradient in the Albemarle Sound, North Carolina. We will also examine how saltwater intrusion affects young trees that were planted by comparing height and diameter at breast height (DBH) across a restored wetland. Finally, we will conduct a greenhouse experiment where we will

look at how seedlings survive with different hydrological treatments (drought and saturated) and chemical treatments (control, saltwater, saltwater without sulfate, and sulfate only). Overall, we expect that salinity will decrease growth and survival of baldcypress trees at all life stages. From increment tree ring cores we expect trees located in higher salinities to have smaller average annual growth rates than trees located in areas of less salinity. At the wetland restoration site, trees located in the areas that have experienced saltwater intrusion will have a smaller DBH and height compared to trees located in predominantly freshwater areas. In the greenhouse experiment we expect the seedlings in the control group to have higher biomass and survival compared to the other chemical treatments. Increases in saltwater intrusion and sea level rise could lead to the extinction of plant species that are important for coastal ecosystems and provide habitat and food for wildlife. Therefore, it is important to study how the different wetland species are going to tolerate an increase in salinity and sea level rise. For management practices it is important to understand if the vulnerability of baldcypress to increased salinity changes with life stage.

#### GP75

##### **Maternal Strontium Input of Striped Bass (*Morone saxatilis*) to their Progeny: Determining a Mother's life history from the Progeny**

Brie A Elking and Roger A Rulifson, Department of Biology, ICPS, East Carolina University, Greenville, NC

Striped bass (*Morone saxatilis*) have two main life history strategies: anadromy and residency. Anadromy is when a species lives in saltwater as an adult and spawns in freshwater, while residents stay in freshwater throughout life. It is possible to determine whether or not an individual is anadromous or resident by examining trace elements in the otoliths (ear bones), specifically Strontium, which is directly related to water saltiness. We will take this knowledge a step farther and determine if, by looking at larval otolith strontium levels, the life history of the mother can be determined. Not much is known about the formation of otoliths and the amount of maternal input to the otolith itself. This research will discover how related the progeny and maternal otoliths are and whether there is a concentration of elements in the mother's tissue that would help explain how possible elemental signatures are passed on. It is hypothesized that the kidney and ovary tissue will have a concentration of the same elemental signature as the progeny's otolith and, that due to this, the life history strategy (resident or anadromous) of the mother can be seen in the core of these progeny and the primordium of adult fish. If the progeny

otolith signatures can be traced back to the mother's life history strategy, then we can determine the relative production and survival of progeny from anadromy versus residency.

#### GP76

##### **Major and trace element composition of gahnite as an indicator of rare element granitic pegmatites**

YONTS, Jason<sup>1</sup>, BITNER, Joshua<sup>1</sup>, HEIMANN, Adriana<sup>1</sup>, WISE, Michael A.<sup>2</sup>, RODRIGUES SOARES, Dwight<sup>3</sup>, and MOUSINHO FERREIRA, Ana Cláudia<sup>3</sup>, <sup>1</sup>Department of Geological Sciences, East Carolina University, Greenville, NC, <sup>2</sup>Mineral Sciences, Smithsonian Institution, Washington, D.C., <sup>3</sup>Instituto Federal de Educação, Ciência e Tecnologia da Paraíba, Brazil

Rare metals such as Li, Ta, Be and rare earth elements (REEs) are valuable in electronics, rocket propellants, medicines, and nuclear reactors and are found in granitic pegmatites. The focus of this research is to study the major and trace element chemical composition of gahnite in pegmatites from Maine, Maryland, North Carolina, Brazil, Poland, and Argentina to differentiate rare element pegmatites from rare metal-poor (i.e., barren) pegmatites. Both barren and rare element granitic pegmatites contain the zincian spinel gahnite ( $ZnAl_2O_4$ ), commonly found as an accessory mineral in these rocks. The major and trace element chemical composition of gahnite in rare element granitic pegmatites has not yet been investigated in detail. What is more, to date there are no published trace element data for gahnite in any rock type. I hypothesize that the variations in the chemical composition of gahnite will assist in distinguishing barren pegmatites from rare element granitic pegmatites. Preliminary analysis of the major element composition of gahnite in the investigated pegmatites obtained by electron microprobe analysis suggests a different Zn concentration exist in rare element pegmatites compared to barren granitic pegmatites. A ternary plot in terms of ZnO, FeO, and MgO shows that gahnite in rare element pegmatites display higher Zn values than that in barren pegmatites. A plot of mol (Fe+Mg)/Al versus mol (Zn+Mn)/Al shows distinct regions for gahnite in rare element and barren pegmatites. Higher (Zn+Mn)/Al values appear to be characteristic of gahnite in rare element pegmatites. The next goal is to analyze the trace element composition of gahnite to determine if the trace element data will support the results derived from major element analysis. I propose that analysis of trace elements in gahnite, by LA-ICP-MS, will show trends similar to those seen with major element components. If this hypothesis is supported, gahnite could be used as an exploration guide to find more rare metal deposits.

# Graduate Poster Abstracts (Face-to-Face)

GP77

**Investigation of the stratigraphy and petroleum geology of the Alexander siltstone in the Appalachian foreland basin**, West Virginia, USA, Katie Cummings, Department. of Geological Sciences, East Carolina University, Greenville, NC

Petroleum production from the Alexander siltstone may be better understood by examining the structure of the stratigraphic unit. The Alexander siltstone is located in the foredeep of the Appalachian foreland basin in northern West Virginia. To better understand the structure of the Alexander siltstone, the stratigraphy, distribution of porosity, and petroleum geology of the unit will be investigated. By understanding the structure, the controls on petroleum production as well as any compartmentalization within the stratigraphic unit will be better understood. Although much research has focused on petroleum production within shallower stratigraphic units, inadequate information exists about the structure and petroleum geology of the stratigraphically deeper Alexander siltstone.

To investigate the stratigraphy, distribution of porosity, and petroleum geology of the Alexander siltstone, selected well log data obtained from wells located in northern West Virginia will be analyzed. The selected well log data will be used to construct cross-sections and a variety of maps to interpret the subsurface stratigraphy. By analyzing the well logs, interpretations of unit porosity, compartmentalization, and reservoir characteristics can be made, which will provide a better understanding of petroleum production of the Alexander siltstone.

GP78

**The redox state of the ocean during the formation of 1.69 Ga late Paleoproterozoic Banded Iron Formations**, SERNA, Erica<sup>1</sup>, HEIMANN, Adriana<sup>1</sup>, and SPRY, Paul<sup>2</sup>, <sup>1</sup>Department of Geological Sciences, East Carolina University, Greenville, NC, <sup>2</sup>Department of Geological and Atmospheric Sciences, Iowa State University, Ames, IA

Banded Iron Formations (BIFs) are marine chemical precipitates rich in iron and silicon that formed by hydrothermal activity during the Precambrian. The major and trace element composition of BIFs can be used to decipher the chemistry of Earth's ancient oceans. For example, for the Archean and late Paleoproterozoic, negative Cerium (Ce) anomalies will indicate that the Earth's early ocean was oxidized, while positive Europium (Eu) and Ce anomalies will indicate that the oceans were reduced. Similarly, Eu anomalies will allow us to reconstruct the hydrothermal input and temperature of the fluids at the time of deposition: positive Eu anomalies in the BIFs indicate source hydrothermal fluids with temperatures higher than 250°C. There has been an enormous amount of investigation done on older BIFs, in particular 2.5 Ga BIFs from Australia and South Africa. However, late Paleoproterozoic BIFs have not been studied in detail

and may hold the key to understand the evolution of the Earth's oceans during this time in the Precambrian when BIFs stopped forming.

The main goals of this study are to determine: 1) The redox state of the Precambrian oceans at ~ 1.69 Ga; and 2) The physicochemical conditions of the source fluids that generated the BIFs. In order to reach the goals, petrographic analysis, bulk-rock major and trace element (including rare earth elements) chemical analysis, and scanning electron microscope and electron microprobe analysis of 1.69 Ga BIFs from near Broken Hill, Australia, will be conducted. Chemical analysis will be used to identify the rare earth element anomalies, while electron microprobe analysis will be used to obtain the major element composition of single minerals present in the BIFs. The results of this study will lead us to understand the physicochemical characteristics of the oceans when these BIFs formed. These early Earth conditions may hold the key to the search for life in other planets, like Mars.

GP79

**Estuarine shoreline change along the Outer Banks barrier-island system: Insights from Ocracoke to Nags Head, NC**, Ian Conery<sup>1,3</sup>, JP Walsh<sup>1,2,3</sup>, and DR Corbett<sup>1,2,3</sup>, <sup>1</sup>Department of Geological Sciences, <sup>2</sup>Institute for Coastal Science and Policy, East Carolina University, Greenville, NC, <sup>3</sup>Coastal Studies Institute, Manteo, NC

Natural and anthropogenic forcings induce change of the ocean and estuarine coastline. Rising sea level, storms conditions and human development are specific influences that affect barrier islands and encourage the monitoring of change to our important coastal areas, like the Outer Banks. Much prior work has focused solely on examining oceanfront erosion, while estuarine areas have received less attention, despite their vital role ecologically and as natural buffer against storms. The Albemarle-Pamlico estuarine system, situated behind the Outer Banks, is the second largest estuarine system in the U.S., and experiences is strong waves and wind tides capable of altering the shoreline over short and long-term time scales. In this study, shoreline change rates were calculated for sections of the Outer Banks, NC from Ocracoke Island to Nags Head using a transect-based approach. Shorelines were digitized using aerial photography from 1945 (pre-development), 1955, 1974 and 2006. A software called, Analyzing Moving Boundaries Using R (AMBUR), was employed to calculate annual shoreline change rates. With a mean rate of -2.5 m/yr, the majority of Ocracoke Island showed erosion from 1955 to 2006. Additionally, shoreline change rates can be correlated to shoreline composition and orientation within the estuarine system. Recognizing and understanding historic shoreline change along with the responsible processes is critical for the management of coastal resources and sustainable development.

## GP80

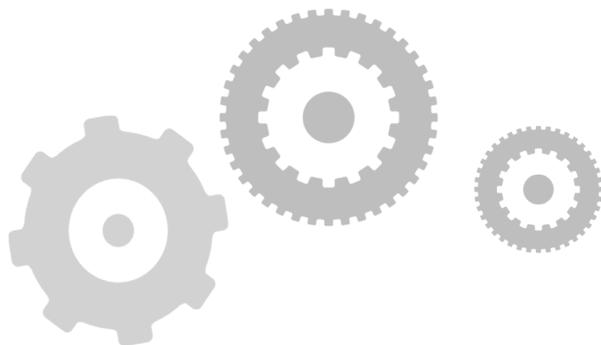
**Using Garnets as a Granitic Pegmatite Classification Tool.** MORETZ, Leatha<sup>1</sup>, HEIMANN, Adriana<sup>1</sup>, BITNER, Joshua<sup>1</sup>, WISE, Michael A.<sup>2</sup>, RODRIGUES SOARES, Dwight<sup>3</sup>, and MOUSINHO FERREIRA, Ana Cláudia<sup>3</sup>, <sup>1</sup>Department of Geological Sciences, East Carolina University, Greenville, NC, <sup>2</sup>Department of Mineral Sciences, Smithsonian Institution, <sup>3</sup>Instituto Federal de Educação, Ciência e Tecnologia da Paraíba (IFPB)

Granitic pegmatites are a rock type often enriched in economically important elements such as lithium and the rare earth elements. Garnets are a common accessory mineral in granitic pegmatites, so it may be possible to use garnet major and trace element chemistry to help classify types of pegmatites and assess lithium enrichment. If garnet chemistry can be used to aid in pegmatite classification, it could give researchers and mining companies a quicker and easier assessment of probable rare element assemblages. We hope to create a compositional classification aide for general classification of pegmatites and for their lithium enrichment, because currently, pegmatite classification is complex and difficult to use. Classification requires detailed knowledge of mineralogy, major and trace element compositions from multiple minerals, and an understanding of the origin of the pegmatite. The major element composition (obtained by electron microprobe analysis) of garnet samples from pegmatites from around the world were graphed. These graphs of different combinations of cations and oxides are then used to visually compare compositions between different types of pegmatites in order to test the hypothesis that garnet can be used as an aide to classify pegmatites. As a second round of investigation, we also plan to analyze the trace element composition of our samples using laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) and use similar graphical methods to look for a compositional distinction of the pegmatite types. The results of both methods will then be compared to verify if garnet compositions can be used to classify pegmatites. If our classification proves valid, it will be a useful tool for mineral exploration and study of pegmatites.

## GP81

**Does the quantity of resources in the environment alter the impact of multiple predators on their prey?** Tyler R. Gelles and David R. Chalcraft, Dept. of Biology and Center for Biodiversity, East Carolina University

Predation is an important biological process affecting prey populations and most prey in nature are exposed to multiple predator species. Much research has revealed that the combined effect of multiple predators on their prey can be substantially different from that which would be expected if the predators operated independently of each other. Some reasons for this discrepancy include interference among predator species and/or anti-predator responses of prey to one predator that alter the effectiveness of the other predator. In systems where one of the predators is an omnivore, an increase in the availability of primary producers via nutrient enrichment could alter the extent to which the combined impact of multiple predators on their prey differs from that which would be expected if predators were assumed to forage independently of each other. We conducted an experiment in artificial ponds to examine this idea. Our experiment manipulated the occurrence of two common pond predators, omnivorous crayfish (*Procambarus acutus*) and carnivorous dragonfly larvae (*Anax* sp.), in environments that varied in the amount of nutrients available to support algal growth. We measured the response of herbivorous tadpoles. Preliminary analyses suggest that the effect of predator manipulations on the growth of tadpoles depended on nutrient availability. We saw an overall trend of tadpoles reaching a greater mass and metamorphosing sooner with increased nutrient availability. There were larger differences in mass and time of metamorphosis in high nutrient ponds, containing a single predator or multiple predator species, than low nutrient ponds. Tadpole survivorship seems to be greater in ponds with omnivorous predators than carnivorous predators. Increasing nutrient availability enhanced the biomass of phytoplankton present but had no effect on periphyton biomass. Our results show that the presence of multiple predators often had unexpected impacts on prey which are different than would be predicted if predators were operating independently.



# Graduate Poster Abstracts (Face-to-Face)

GP82

**The Thermodynamics of Cadmium Binding to Human Cardiac Troponin C: Investigating new Mechanisms of Cadmium Toxicity**, Lindsay Fulcher, East Carolina University, Greenville, NC

Cardiovascular disease encompasses a variety of medical conditions that involve the muscle and vascular system of the heart. Prolonged development of this disease is known to cause heart failure, which is one of the leading causes of death among Americans. The cause for this disease is unclear but it has been linked to obesity, high blood pressure, arteriosclerosis and stress. Scientific data have shown that amino acid mutations present in cardiac muscle protein troponin C (cTnC), and exposure to toxic metals, specifically Cd<sup>2+</sup> and Pb<sup>2+</sup> lead to the development of heart disease. The N-terminal domain of cTnC contains a functional and defunct EF hand loop. Both loops contribute to regulating cardiac muscle contraction but the functional loop does so by binding calcium while the defunct loop does not bind calcium and serves more as a binding site for troponin I (cTnI). Recent crystal structures demonstrated that cadmium can bind to both the functional and defunct loop of cTnC. One can speculate that the presence of cadmium in the protein can disrupt protein function and hence muscle regulation, however, there is not enough information to deduce a mechanism. It is the goal of this research project to study the interaction between cTnC and cadmium in more depth. We plan to utilize isothermal titration calorimetry (ITC) to quantify the thermodynamics of cadmium binding to the protein and compare these data to findings produced by calcium binding to the protein. Through our results we hope to shed light on potential mechanisms of cadmium toxicity and its effects on cardiac function.

GP83

**Assessing the Monophyly of Red Algae and Green Plants Via Conserved Core Informational Genes**, Justin Perry and John W. Stiller, Department of Biology, East Carolina University, Greenville, NC

For well over a century a monophyletic relationship between red algae and green plants has been debated. Many prominent scholars have sought to address this problem, however, a consistent solution has not been found. The question of a monophyletic relationship between red algae and green plants is essential to understanding early eukaryotic evolution, particularly for in depth evaluation of the origin and evolution of eukaryotic photosynthesis, and for understanding these important groups of primary producers. To address the question more rigorously, there is need for a consistent methodology that is minimally affected by phylogenetic artifacts. To circumvent the previous problems seen in compari-

sons of a variety of molecular markers, the first goal of this project is to develop a set of genes spanning the broad range of eukaryotic life that demonstrate conserved evolutionary and functional homology. The set will contain genes that perform highly conserved functions in the cell and therefore are less likely to be influenced by patterns and processes of sequence evolution that are known to produce phylogenetic artifacts. The sequence of each gene will be obtained through a BLAST (Basic Local Alignment Search Tool) search of one of two major bioinformatics databases, NCBI (National Center for Biotechnology Information) or JGI (DOE Joint Genomics Institute). Sequences will be obtained from these databases from 40 organisms that span the eukaryotic tree of life. These sequences will then be aligned using multiple sequence alignment programs and edited by hand before being used for phylogenetic tree-reconstruction. Statistical analyses will be applied to each tree to determine the strength of support for red algae and green plant monophyly. The goal of this project is to provide an approach that is useful, not only for addressing red/green monophyly, but also for generally problematic phylogenies at deep evolutionary levels.

GP84

**Natal Origin of Cape Fear River Striped Bass (*Morone saxatilis*) Inferred Through Otolith Chemistry**, Evan Knight and Roger A. Rulifson, Department of Biology, Institute for Coastal Science and Policy, East Carolina University, Greenville, NC

Since 1980 the Cape Fear River population of Striped Bass (*Morone saxatilis*) has been sustained by stocking using broodstock from the Roanoke River. However, coastwide concerns about mixing populations through stocking that might be genetically adapted to individual river systems have caused a reexamination of this policy. In 2010, The North Carolina Wildlife Resources Commission (NCWRC) began a new stocking program by using Cape Fear River broodstock to stock the Cape Fear River. This program was started to determine if stocking fish of Cape Fear parentage will increase the spawning population of striped bass in the Cape Fear River. We will examine striped bass collected by state agencies from the Cape Fear watershed to assess the success and contribution of stocked hatchery fish in this population. Striped bass will be sampled by fishery independent gillnet and electrofishing surveys (NCDMF, NCWRC) in the Cape Fear. Sacrificed broodstock from the Watha State Fish Hatchery and Edenton National Fish Hatchery will be collected and processed. Biological information will be collected to determine LSI and K factors. Each fish will be measured (FL and TL, mm) and weighed (g). Scales and otoliths will be removed

for ageing and otolith chemistry. Tissue samples will be taken to determine if Cape Fear striped bass are resident or if they migrate to the ocean. Otoliths will be sectioned for age, and then examined by Laser Ablation-Inductively Coupled Plasma Mass Spectroscopy (LA-ICPMS) to determine changes in concentrations of elements that reflect habitats in North Carolina Watersheds. Wandering between watersheds and broodstock origin (wild-spawned or hatchery-spawned) will be assessed using otolith chemistry, and biological results will be compared between wild and hatchery-spawned fish. Results will assist managers in decisions about future stocking efforts for coastal populations.

#### GP85

**Urban Stormwater Wetland Restoration Project: Putting Rainwater Back In Its Place**, Bennett, Andrew<sup>1</sup>, Covi, Michelle<sup>1</sup>, Monroe, Robert<sup>1</sup>, C. Ryan Poythress<sup>2</sup>; <sup>1</sup>Ph.D Program in Coastal Resource Management, <sup>2</sup>Department of Geological Sciences, East Carolina University, Greenville, NC

This project was undertaken as a submission to the US EPA's Campus Rainworks Challenge, a competition designed to engage a multi-disciplinary group of students in assessing stormwater conditions on their campus and designing solutions. East Carolina University's main campus includes 158 buildings on 530 acres, which along with paved surfaces for parking, streets, and sidewalks, covers over 60% of the land that is impervious to rainwater. A high percentage of impervious area within a watershed leads to larger volumes of stormwater being generated, which degrades water quality, potentially harm human health, and pollutes stream habitats. We proposed the construction of two stormwater wetlands on our campus to mitigate the effects of the high percentage of impervious area, to retrofit. Their location would be adjacent to 10th street, replacing a concrete culvert, which we termed Jarvis Creek, and adjacent to the Science and Technology Building in the bowl area. These wetlands were designed based on the NCDENR Stormwater Best Management Practice Manual. Stormwater wetlands mimic the hydrology and processes of natural wetlands, thereby restoring water quality and biological integrity. Stormwater wetlands also slow the flow of water, allowing for flocculation of sediments and heavy metals, and uptake of nutrients such as nitrogen and phosphorous by vegetation. Our team used GIS to assess the current impervious surface conditions and stormwater design methods to estimate change in stormwater runoff rates and pollution as a result of our design. As a regional public university, East Carolina could set an example for stormwater management in the community.

#### GP86

**Habitat Utilization of 2 Separate Stocks of Adult Striped Bass**, Morone saxatilis, in the Inshore and Offshore Waters of North Carolina Inferred through Otolith Microchemistry, Daniel Zurlo<sup>1</sup>, Roger Rulifson<sup>1,2</sup>, <sup>1</sup>Department of Biology, East Carolina University, <sup>2</sup>Institute for Coastal Science and 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 Carolina is greatly influenced by the movement of these potentially intermixing stocks. In this study striped bass from two major management areas in North Carolina, the Albemarle and Roanoke River Management Area and Central/Southern Management Area will be used to analyze stock migration patterns. Length and weight measurements will be taken and livers will be removed to calculate condition factor K and liver-somatic index (LSI). Otolith microchemistry will be used as a proxy for migration patterns as otoliths incorporate trace elemental signatures of the watersheds the fish inhabit (Campana 1999). Otolith microchemistry will be analyzed via LA-ICP-MS. Temporal variation in otolith microchemistry will be compared to available water chemistry data to determine habitat utilization and migratory patterns of adult bass. Otolith data will be compared between stocks to determine migration between them. It is expected that some fish from the Albemarle Sound will exhibit anadromy during their adult lives, while the Central/Southern fish will be largely resident. The results of this research will be significant, especially for the depleted Central/Southern stock, because it will be some of the little data providing accurate watershed use of adult Central/Southern striped bass. It will also help to clearly delineate separate stocks of striped bass in North Carolina, allowing fisheries managers to manage stocks more accurately.

# Graduate Poster Abstracts (Face-to-Face)

GP87

## **2011 Mississippi River Flood Deposition and How it Compares to Other Event Deposits**, David R.

Young<sup>1</sup>, J.P. Walsh<sup>1</sup>, D. Reide Corbett<sup>1</sup>, Siddhartha Mitra<sup>1</sup>, Jessica S. Snyder<sup>2</sup>, Erik Anderson<sup>1</sup>, <sup>1</sup>Department of Geological Sciences and <sup>2</sup>Department of Biology, East Carolina University, Greenville, NC

Floods and storms dramatically increase the sediment load supplied to continental margins, leading to greater and potentially geochemically unique deposition. The 2011 flooding of the Mississippi River provided an opportunity to examine if and how a large flood was received on the seabed along the adjacent continental shelf. This was a geologically significant flood that occurred from May to August, 2011, surpassing historic levels at Vicksburg, MS and necessitating the opening of the Morganza Spillway for the first time in 37 years. For this study, the stratigraphic and geochemical nature of the deposition from this event has been evaluated using multi-cores collected at 68 sites along the Louisiana shelf. To evaluate flood deposition, cores were examined using x-radiography, the particle reactive radioisotope <sup>7</sup>Be ( $t_{1/2}=53$  days), polycyclic aromatic hydrocarbons (PAHs), and grain-size analysis. Inventories of <sup>7</sup>Be from post-flood cores varied across the shelf, reaching up to 7 dpm cm<sup>-2</sup> near the Mississippi River; the highest inventories were 10-15 km away from the river mouth and at depths of 25-75 m. Off-shore of the Atchafalaya River, the highest inventories were farther from the river mouth but closer to the coast, at depths of 5-30 m. Based on maximum <sup>7</sup>Be-penetration, the 2011 flood layer reached up to 9-cm thick at sampled sites. However, other data suggest that the flood layer might be significantly thicker than <sup>7</sup>Be suggests. PAH levels were slightly higher at stations adjacent to the mouth of the Mississippi River (~400 ng g<sup>-1</sup>) when compared to levels at the mouth of the Atchafalaya River (~200 ng g<sup>-1</sup>). These PAH levels were lower than amounts previously quantified on Mississippi River suspended particles and lower than historical levels in the seabed of the Gulf of Mexico. Finally, flood deposit sediments showed an increased percentage of finer particles compared to previously deposited material, but only at a few sites was the flood deposit sedimentologically and stratigraphically distinct. Comparing these characteristics to previous storm/flood deposits will help show the depositional significance from the 2011 Mississippi River flood and how it relates to other global shelf settings. Together, these data can help in the understanding of the event sedimentation and stratigraphic interpretation of this and other river-dominated shelves.

GP88

## **Defining Past Morphodynamic and Paleoenvironmental Conditions Associated with Barrier Island Collapse Events**, Nick Zaremba, David Mallinson,

Eduardo Leorri, Stephen Culver, and Siddhartha Mitra, East Carolina University, Greenville, NC

The Holocene has been punctuated by rapid climatic changes that have impacted coastal North Carolina. Two of these periods occurring at approximately ca. 4100-3700 cal yr BP and 1150-500 cal yr BP (during the medieval warm period) are synchronous with increased marine influence in the Albemarle-Pamlico Estuarine System (APES), which seem to be related to a greater segmentation of the barrier islands. This marine influence is strongly supported by a significant change in the depositional environment as indicated by foraminiferal assemblages. How these segmentation events affected the tidal regime and morphodynamics of the APES is unknown. Increases in either inlet size or barrier island segmentation would likely increase the tidal amplitude and current velocity in Pamlico Sound. However, the relationship between these variables has yet to be determined. The DELFT3D hydrodynamic model can provide insight on how barrier island morphology can alter the tidal amplitude, tidal current velocities, sediment transport and changes in salinity of Pamlico Sound. To constrain the model simulations, paleobathymetries will be created for the segmentation events as well as at 2500 cal yr BP when estuarine conditions prevailed, and 500 cal yr BP, when the Outer Banks were highly segmented. All four of these time periods (4000, 2500, 1000, and 500 cal yr BP) are significant because they represent the Outer Banks under different morphodynamic situations. These paleobathymetries will be created using high-resolution seismic data correlated to core logs, radiocarbon dates and a sea-level curve. The modeled hydrodynamic conditions will also be compared to paleoenvironmental and grain size data to determine the correlation between the model and field data. This will make it possible to assess the accuracy of the DELFT3D hydrodynamic model performance. This research will provide insight into how coastal systems react to barrier island geomorphic change caused by rapid climatic fluctuations.

## GP89

**A record of post-Last Glacial Maximum East Asian Monsoon variability from Sunda Shelf sediments,**

Woodson, Anna Lee<sup>1</sup>, Culver, Stephen J.<sup>1</sup>, Mallinson, David J.<sup>1</sup>, and Leorri, Eduardo<sup>1</sup>, Shazili, Noor A.M.<sup>2</sup>, Vijayan, V.R.<sup>3</sup>, <sup>1</sup>Department of Geological Sciences, East Carolina University, Greenville, NC, <sup>2</sup>Institute of Oceanography, University Malaysia Terengganu, <sup>3</sup>Minerals and Geosciences Department, Perak, Malaysia

Variations in East Asian Monsoon strength and duration affect the climate of much of Southeastern Asia. Late Pleistocene and Holocene monsoon patterns for the region have been reconstructed by applying various geochemical approaches to deep-sea sediment cores from the South China Sea. This will be the first study, however, to provide a detailed, post-Last Glacial Maximum paleoclimate record from the shallow Sunda Shelf in the southern South China Sea. The Sunda Shelf has likely received significant terrestrial sediment input through time, since it lies offshore of major fluvial systems and is marked by numerous paleo-channels. Therefore, the Sunda Shelf may hold a continuous record of late Pleistocene and Holocene paleoclimate. In January of 2013, five sediment cores (ca. 3 to 4 m in length), collected in submarine canyons on the Sunda Shelf north of Bintulu, Sarawak, Malaysia in 2008, were continuously sampled at two centimeter intervals. Sediments in these cores will be analyzed for a number of geochemical proxies for climate change, in an attempt to define variations in the strength of the East Asian Monsoon. Tests of a planktonic species of foraminifera, *Globigerinoides ruber* s.s., will be used to obtain Mg/Ca paleothermometry data, AMS C-14 age estimates, and paleosalinity trends from stable oxygen isotopes. These down-core data, when combined with grain-size and magnetic susceptibility, as well as studies of Ti and Fe abundance in bulk sediments, carried out by other researchers, will provide a comprehensive history of East Asian Monsoon variability since the Last Glacial Maximum. This record, in turn, will provide crucial insight into future climatic changes that may affect agriculture and economics in Southeast Asia.

## GP90

**Thermostatistical Analysis of Financial Markets,**

Frank R. Brown, David W. Pravica and Martin Bier, East Carolina University, Greenville, NC

Over the past several decades physicists have used models and techniques developed in the sciences to analyze the price diffusion behavior of financial markets. These methods include the application of nonextensive thermodynamic statistics, information entropy, and detrended fluctuation analysis. This thesis extends information entropy methods to include the use of binary state variables to character-

ize the changes in price/volume of a stock. Instead of looking at the amount of change, we simply look at the direction of change, thereby creating a series of binary states. These various binary states can either be analyzed individually or combined to create a composite state. Any of these states or combination of states can be analyzed using various techniques from the physical sciences. We apply these concepts to the analysis of volume for the S&P-500 index as well as to the closing prices of a number of stocks. Analysis of the volume state for the S&P 500 index reveals interesting patterns affected by the introduction of weekly options. An analysis of the direction of day-to-day closing price trends reveals that the direction of a price change is a Markov process even though the magnitude of the change has been shown by many, beginning with Benoit Mandelbrot, not to be Gaussian and hence non-Markovian.

## GP91

**Emplacement mechanisms, timing, and flow characteristics of the intrusive sheet network on the southern margin of Mount Hillers, Henry Mountains, southern Utah,** Thornton, E. and Horsman, E., East Carolina University, Greenville, NC

Continental crust, and the magmatism that produces these rocks, is vital to humans. Our understanding of the magmatic processes involved with continental crust construction is incomplete, and warrants further study. The southern margin of Mount Hillers, in the Henry Mountains of southern Utah, displays an intricate network of bedding concordant (sills) and bedding discordant (dikes) igneous sheets intruding uplifted Mesozoic sedimentary strata. Because sills and dikes are the primary means by which magma migrates through the shallow crust, and because spectacular 3-d igneous exposures with no tectonic overprint exist, this is a unique opportunity to better study upper crustal magmatism. The focus of this study is to better understand the emplacement mechanisms, timing, and flow characteristics of these intrusions. I will constrain emplacement history of the intrusions using field observations and supplementary lab work. Most intrusive igneous bodies form from multiple, sequentially emplaced pulses of magma. Evidence of these distinct pulses has been observed in the field: younger, fine-grained dikes cross-cutting older, coarse-grained sills. Several laboratory techniques will be employed to help further constrain emplacement history. Thin section petrography, X-ray fluorescence analysis, and crystal size distribution analysis will all be used to further characterize and quantify independent magma pulses based on textural and geochemical differences. Minerals crystallizing out of melt rotate and align parallel to flow direction, so comparing

# Graduate Poster Abstracts (Face-to-Face)

these mineral fabrics with intrusion geometry will shed light on the movement of this magma. Anisotropy of magnetic susceptibility analysis of cored specimens provides a measure of the alignment of all mineral grains by quantifying how induced magnetization perturbs a known magnetic field. These results show fairly consistent flow paths between dikes and sills, with fabrics generally running parallel to the length of the intrusion. Furthering our knowledge of these shallow crustal magmatic processes has major implications on how continental crust is constructed and may advance our understanding of certain volcanic hazards and earthquakes.

## GP92

**Radio-tracking king rails in northeastern North Carolina.** Jaan R. Kolts and Susan B. McRae, Department of Biology, 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 its 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 dispersal patterns of king rails, we will affix radio-transmitters onto king rails at MacKay Island National Wildlife Refuge in northeastern North Carolina. This is the first study to use radio telemetry on the Atlantic population of king rails. We will capture adult king rails in mist nets, whoosh nets or drop nets using call-back during the breeding season. Non-breeding season captures will be conducted by spotlighting from an airboat. Radio-tracking will be conducted year-round to determine the location and movement patterns of adult king rails, including during the relatively unknown brood-rearing stage. This will contribute vital rates of post-hatching survival. We will measure local habitat characteristics where king rails occur to determine preferences, and quantify home range and breeding territory sizes. Our 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.

## GP93

**Mineralogy and Geochemistry of the Valentines Iron Formation, Eastern Uruguay**, Lancaster, Heather<sup>1</sup>, Heimann, Adriana<sup>1</sup>, and Lateulade, Richard<sup>2</sup>, <sup>1</sup>Department of Geological Sciences, East Carolina University, Greenville, NC, <sup>2</sup>Minera Aratiri, Uruguay

Banded Iron Formations have long been studied in order to better understand the oxygen conditions, whether oxic or anoxic, of early Earth's oceans. Researchers have extensively studied 2.5 billion years old (Ga) BIFs, such as those in the Hamersley Group in Western Australia and the Transvaal Supergroup from South Africa, yet little to no research has been conducted on the BIFs from the Valentines Formation or any other BIFs from Uruguay. The Valentines BIFs are approximately 2.5 billion years old, thus probably representing the same time period in which the majority of the large BIFs from the Hamersley Group and Transvaal Supergroup were deposited. The chemical composition and mineralogy of the Archean-Proterozoic Valentines BIFs is mostly unknown. This results in a lack of information for ocean oxygen levels from that part of the world during the late Archean- early Proterozoic. The goal of this project is to determine the ocean chemistry and physical conditions of the fluids during the formation of the BIFs in that part of the world at ~ 2.5 Ga. The objectives of this project are to: 1) Determine the mineralogy and major element composition of the minerals, and 2) Determine the bulk-rock major and trace element chemical composition. The chemical composition of BIFs records the physicochemical conditions of the oceans during the time of deposition. Europium anomalies in rare earth element plots can be used to determine the temperature of the hydrothermal fluids from which the BIFs formed. Seven cores are available for study, five of which represent the Valentines Iron Formation, while the other two are the volcanic host rocks. Petrographic analysis will be conducted on polished-thin sections and bulk-rock chemical analysis will be obtained from the different varieties of rocks. A Scanning electron microscope will be used to determine the qualitative composition of the minerals. The rock compositions collected from these samples will be compared with those of BIFs from other locations around the world to determine if they are similar to other BIFs of similar age. This study will provide information about whether the oceans were oxic or anoxic, the temperature of the fluids, and the ocean chemistry in this part of the world during the deposition of these BIFs at around 2.5 Ga.

**GP94**

**Translocation of myopodin during differentiation in HT-29 cells**, Kelli Shortt, Melissa Harkins, Jean-Luc Scemama, Margit Schmidt, Joseph Chalovich, East Carolina University, Greenville, NC

Synaptopodin 2, also known as myopodin, is an actin-binding protein. Largely unfolded, synaptopodin 2 possesses the characteristics of a hub protein capable of having multiple binding partners such as myosin, calmodulin, and alpha-actinin. Synaptopodin 2 undergoes rapid polymerization of G-actin in a calcium-calmodulin dependent manner. Since actin polymerization rates are important for the reorganization of the cytoskeleton, synaptopodin 2 may also play a role in cell cycle progression. Association with alpha-actinin also has been found to promote the translocation of synaptopodin 2 from the cytoplasm to the nucleus, where it is thought to be involved with the chromatin-remodeling complex and transcriptional activity. Synaptopodin 2 has also been suggested to act as a tumor suppressor in prostate and bladder cancer where loss of expression by deletion or hypermethylation leads to an increased rate of invasiveness. While synaptopodin 2 has four isoforms generated by alternative splicing from a single gene located on chromosome 4q26, little is known about the function of these individual isoforms. Using a prepared antibody against the C-terminus that recognizes isoform B and the truncated form called myopodin, we observed immunological staining in the nucleus in several cell lines. After further studies with the colon adenocarcinoma cell line, HT-29 and African green monkey kidney cells, CV1, staining was intense in irregular areas within the nucleus as well as at the nuclear periphery of HT-29 cells. A strong synaptopodin 2 staining pattern was observed when cells were stained with a commercial antibody against nucleolin and counterstained with DAPI. To further test the nucleolar localization of synaptopodin 2, Actinomycin D was used to inhibit transcription and the nuclear stain disappeared. When HT-29 cells were forced to differentiate with sodium butyrate, the synaptopodin 2 antibody revealed a re-localization of the protein into the cytoplasm. RT-PCR analysis further showed that HT-29 cells lacked Synaptopodin 2B, but contained the smaller isoform, myopodin.

**GP95**

**Mitotic chromosome phenotypes associated with a panel of Mcm10 mutants in Drosophila**, Ritu Dalia, Michael Reubens and Tim W. Christensen, Department of Biology, East Carolina University, Greenville, NC

Replication of the genome and proper formation, and packaging, of chromatin are processes essential to eukaryotic life. Maintenance of epigenetic chromatin states is essential for faithfully reproducing the transcriptional state of the cell; likewise, replication of DNA with high fidelity is crucial for accurate passage of genetic information from a cell to its progeny. Defects in DNA replication and improper regulation of the chromatin states can result in genome instability which can manifest as disease, or death of the organism. There are a plethora of factors involved in the process of DNA replication in eukaryotes, and recent studies have shed light on one of the factors called mini-chromosome maintenance 10 (Mcm10) as an essential DNA replication factor. First discovered in *S. cerevisiae*, Mcm10 is an abundant nuclear protein that has been implicated in the activation of the Pre-RC, interacts with members of the elongation machinery such as Pol3, and has recently been shown to be required in the formation of heterochromatin in both yeast and *Drosophila*. Previous analysis of two *Drosophila* Mcm10 mutant alleles demonstrated that Mcm10 not only plays a role in DNA replication, but also has a role in heterochromatic silencing and chromosome condensation. To further investigate the roles of Mcm10 we used a collection of over 20 missense mutations generated using a Tilling approach. Mitotic index data generated shows that there is not enough evidence to show a significant mitotic delay in the mutant strains. Interestingly though, varying types of chromosomal phenotypes, such as severe condensation defects, separated sister chromatids, aneuploidy and anaphase bridge defects, were observed in these mutants suggesting that Mcm10 is involved in maintaining the genomic stability. Further evaluation of these mutants will help elucidate the biological functions of this well conserved protein as well as provide information on the domains of the protein required for its different biological functions.

# Graduate Poster Abstracts (Face-to-Face)

GP96

## **Electrochemical Detection of Bioactivated Benzo[a]Pyrene Genotoxicity at TP53 Oligomers,**

Caitlin M. Trumbo and Eli G. Hvastkovs, Department of Chemistry, East Carolina University, Greenville, NC

The overall goal of this project is to develop an electrochemical DNA based sensor to detect genotoxicity (DNA damage) at hotspot sequences. Several factors influence the toxicity of DNA damage including stereochemistry, epigenetics, metabolism, etc. This particular research project focuses on incorporating metabolism into the sensor by utilizing myoglobin (Mb) as a heme-enzyme model to study the genotoxicity of benzo[a]pyrene (BP) metabolites at DNA oligomers from the p53 gene.

GP97

## **Tracing Saltwater Intrusion and its Effects on Local Stands of Atlantic White Cedar at the Preyer Buckridge Coastal Preserve,**

James Pitt<sup>1</sup> and Alex Manda<sup>2</sup>, <sup>1</sup>Department of Geological Sciences, <sup>2</sup>Institute for Coastal Science and Policy, East Carolina University, Greenville, NC

The effects of man-made canals on hydrologic systems have been extensively studied for over a decade. At the Emily and Richardson Preyer Buckridge Coastal Preserve, located in Tyrrell County, North Carolina, saltwater intrusion in the freshwater system increases as a function of man-made canals. This reserve is known to contain the largest continuous stands of Atlantic White Cedar (AWC) in the eastern United States. AWC has been in terminal decline over the past century due to logging and the limited range of suitable environments it can grow in. These trees are commercially important to states along the east coast of the United States. Storm events in this Preserve have occurred that have led to corresponding spikes in sodium and chloride concentrations in canal sites, resulting in unhealthy stands of Atlantic white cedar. A fundamental question regarding the spread of brackish water throughout the reserve is, what is the path that the salt water takes when entering the reserve? This is important to know so that effective remediation methods can be applied. Past studies performed by the USGS have concluded that saltwater was entering from the northern portion of the reserve, but failed to explore the possibility of the salt water traveling from the south through these man-made canals. The results from water level measurements, obtained from piezometers in one of these canals and groundwater measurements from wells placed along both sides of the canal, show that the groundwater/surface water interactions occurring along this canal are primarily that of the groundwater system feeding into the surface water for most of the year. This dynamic is reversed periodically throughout the year corresponding to periods of heavy precipita-

tion. Future work will consist of deploying conductivity and seepage meters throughout a portion of this canal system in order to map the spread of high salinity water during these storm events.

GP98

## **Notes on the total mercury concentration in muscle tissue of longnose gar,** Jillian H. Osborne, Roger A. Rulfison, Department of Biology, East Carolina University

The longnose gar (*Lepisosteus osseus*) is an apex predator that inhabits North Carolina. With interest in the longnose gar as a sport and food fish in recent years, it is necessary to investigate the viability of the species for economic profit, ecological management, and human consumption. The fish is often overlooked as a source of dietary protein, although it is consumed in many areas throughout North America. This study provides a comparison of the total mercury (Hg<sup>2+</sup>) concentrations of the white muscle tissue from 75 individuals captured in various locations in Eastern North Carolina. Mercury concentration in mature females ranged from 0.18 to 1.32 mg/kg total Hg<sup>2+</sup>, and in mature males from .065 to 1.47 mg/kg total Hg<sup>2+</sup>. Concentrations in immature individuals and those of unknown sex ranged from 0.08 to 0.78 mg/kg total Hg<sup>2+</sup>. Concentrations in fish over 600 mm in length are more likely to have concentrations of mercury in their tissues that exceed the recommended maximum for consumption.

GP99

## **Birth Factors in Relation to Sexual Orientation and Views about Sexual Orientation,** Ashley E. Robinson, Department of Social Work, East Carolina University, Greenville, NC

The purpose of this study was to see if there is a relationship among six areas (participants' birth due date, birth order, views about sexual orientation, age, sexual orientation and sex). There is limited to no background research pertaining to birth due date (being born early, on-time or late) in relation to one's sexual orientation or one's view about sexual orientation. There were 994 participants; all were 18 years of age and older. Participants were from different ethnicities, backgrounds, sex, sexual orientations, etc. Participants were asked to fill out a short six-question survey (paper form or online). After gathering data, the data was examined to see if there were relationships/correlations among six areas (birth due date, birth order, views about sexual orientation, age, sexual orientation and sex). After completing the analysis, some correlations/patterns were observed. For both males and females, there is a correlation between birth due date and sexual orientation; birth due date and openness; and birth

order and sexual orientation. There was no statistical significance for birth order and openness. Pertaining to age and sex of participants there was not a large statistical significance (pattern or correlation) regarding openness. Since there is limited to no research in this area, this study could help pave the way for further investigations pertaining to sexual orientation.

#### GP100

**Mexico's Lost Decade: The Peculiar Consequences of the North American Free Trade Agreement,** Maria Esther Hammack, Dr. Mona Russell, Department of History, East Carolina University, Greenville, NC

Mexico is a nation of deep social cleavages and inequalities rooted in differences of race, culture, region, language and economic status. The history of the country reflects these constructions as they have rigidly forged the complexities that have seen Mexico's lengthy struggle for stability, and its search for viable roads toward progress and modernity. The end of the 20th century came riddled with chaos & turmoil that added to Mexico's lengthy social, political and economic battles. In particular, the last decade of the century was clouded by numerous controversial events that left Mexico on the verge of collapse. My presentation/poster will explain the consequences of one of these major events, the ratification of the North American Free Trade Agreement, and will focus on several of the major problems it instigated and the turmoil created in its aftermath. The ratification of the NAFTA was a controversial event that exacerbated the already frail stance of the Mexico's economic, social and political life. Problems arose and derived from policies made effective through the agreement's untimely implementation. These policies often failed to take Mexico's circumstances into consideration but benefited the agendas of the governments in charge. NAFTA was meant to promote international trade and investment, increase employment, improve working conditions, and living standards for the three countries involved: Canada, The United States and Mexico. Instead, NAFTA became the symbolic event that unleashed a powerful and unyielding economic policy upon Mexico; one that marked a decade that challenged and changed the country, its people, and their dynamics beyond the initial agreements' intended economic endeavors. It provoked an economic crisis that hindered the country's progress and any goal for stability for the new century it had previously entertained. Mexico also experienced an increase in political instability (that unleashed rebellions such as the Zapatista uprising), a forceful growth in labor migration north that brought intense illegal immigration ramifications, and a proliferation

in drug trafficking that consequently helped consolidate the power and reach of the Mexican drug cartels. These, as well as several other consequences, framed NAFTA as the policy that turned the last 20th century decade into a decade of great loss for Mexico and its people.

#### GP101

**Lost in Translation? Seasonal Forecasting for North Carolina Tourism Businesses,** Emily Ayscue, Center for Sustainable Tourism, East Carolina University, Greenville, NC

During the process of relaying scientific information to an untrained public audience, true meanings behind such information can sometimes become lost in translation. This could be attributed to factors such as inadequate wording and inability on the part of the reader to understand and interpret certain visualizations. A complex issue such as climate change and its effects on tourism can prove hard to engage in without a careful approach that matches the type of information and style of delivery, to the audience. Such is the challenge faced in the preparation and distribution of a new information piece on climate, weather and tourism, developed for use by tourism businesses in making economic decisions. To better understand the nuances of communication within the discussion of climate change and tourism and the use of climate and weather information in tourism business decision-making, the Center for Sustainable Tourism developed a newsletter to display seasonal forecasts for North Carolina tourism businesses using NOAA's seasonal forecast data. The intent of this newsletter is to effectively display weather information in a simple yet accurate way in order to provide meaning in these forecasts and to present likely seasonal scenarios to help tourism businesses prepare for the upcoming tourist season. Selecting effective terminology and appropriately presenting forecast maps challenged the research team. For instance, does one use precipitation over rain; or which shade of red best indicates higher chances of above normal temperatures; or does one refer to it being cooler than normal rather than colder than normal? Highlighting the difficulties facing the research team in approaching the terminology and cartography of this project seems to track closely the issues that communicators of weather conditions and climate variances face every day. This presentation will report the steps in the development of the newsletter, the challenges faced in selecting terminology and climate and weather maps, and the feedback secured via phone interviews and emailed surveys from the newsletter users regarding the effectiveness of the product. Along with the use of static maps to enhance tourism business understanding of weather and climate change, the potential use of other interactive tools such as Google maps, Google earth, and ESRI will be reported.

# Graduate Poster Abstracts (Face-to-Face)

## GP102

**Operationalizing Student Use-of-Self in Social Work Education.** Tracy Carpenter-Aeby, PhD, LCSW, Victor G. Aeby, PhD, Tamyra Jovel, Jason Radosevich, East Carolina University, Greenville, NC

Social workers in the rural areas of eastern North Carolina have many barriers to handle such as funding, transportation, and a lack of resources. These individuals must therefore have access and be able to use appropriately innovative tools such as use-of-self. This tool can be characterized by the synthesis of life skills, social work skills, and self awareness. First year MSW students (N=189) voluntarily participated in a study which examines the changes in the areas of use-of-self during a Foundations course. Students after the course should show more efficacy in all these areas. The findings indicate that most of the areas involved in use-of-self increased significantly. Rural social work educators can use this model to enhance efficacy in students.

## GP103

**An Analysis of Burial Clusters Within Structure 7 at the Town Creek Site, Montgomery County, North Carolina.** Heidi Rosenwinkel, East Carolina University, Greenville, NC

Studies of Mississippian culture groups have been prevalent in Southeastern archaeological research for hundreds of years. These complex societies existed between 1000 and 1600 AD, dissipating around the time of European contact. Mississippian sites in the Southeast are most often characterized by the presence of a central open plaza encircled by both public and domestic structures, and often an earthen mound. Past scholars have worked to decipher the meaning embedded in the archaeological record at these sites, especially in regard to social stratification. Recent trends, however, have called for more focused interpretation of archaeologically recognizable differences between disparate social groups that are not necessarily indicative of rank. One way this goal may be approached is through mortuary analysis. The interdisciplinary methods of such analyses utilize the deliberate nature of funerary behaviors to reach conclusions about the social characteristics of prehistoric and historic communities unique to each study population. The Town Creek site, just outside of Mt. Gilead, North Carolina, exhibits recognizable Mississippian site patterning. However, it is distinctive in that the structures forming the perimeter of the site were repurposed later in the occupation as discrete cemeteries, each containing between 5 and fifty individuals. In my ongoing research, I examine Structure 7 at Town Creek. The cemetery includes 50 individuals, and is thus the densest of all structures on-site. Through analytical methods performed at other Southeastern Mississippian mortuary sites, Structure 7 is analyzed

as to the chronological sequence of burial activity through the examination of burial depth, superposition of remains, and identification of temporally diagnostic burial inclusions. Once the relative temporal sequence of burial events is established, clusters exhibiting cultural patterning within burial events are sought out, utilizing common indicators of social significance including age, sex, body positioning, body orientation, and the amount and nature of grave goods associated with each individual. Patterns established both temporally and culturally within Structure 7 may assist in future interpretations of the other cemetery structures at Town Creek, with the possibility of further extending any patterns to interpret nearby contemporary Mississippian sites.

## GP104

**Exploring Mental Illness Stigma in the U.S. Army.** Jessica Handloff, Department of Anthropology, East Carolina University, Greenville, NC

The changing nature of American warfare reflects and challenges anthropological understanding of conflict. Previous research focused on cultural knowledge applied by service members and the ethical implications of academic participation in expeditionary warfare. However, the overarching cultural influences behind the unique problems service members face during times of war are largely unexplored. During recent conflicts in which the United States military is engaged, research exposed the high number of conflict veterans suffering from mental health problems. Existing research primarily focuses on the individual psychological processes of those suffering from mental disorders and the perceived barriers to care, the most salient of which is fear of stigmatization (Hoge et al 2004, Ouimette et al 2011). Stigma is a universal cultural practice with exclusive influences behind formation and consequences depending on the individual culture (Yang et al 2006). In order to explore stigma from the unique perspective of U.S. military service members, data were collected during semi-structured interviews with active duty U.S. Army officers and East Carolina University Reserve Officers' Training Corps (ROTC) cadets. Text analysis and narrative analysis of the interview transcripts revealed that army officers demonstrate strong cognitive links between physical fitness and mental health and acute awareness of top-down pressure regarding job performance leading to fear of mental illness affecting accomplishment of duties and tasks. There is a contradictory unwillingness to seek professional treatment while supporting and encouraging others to do so. This poster illustrates these findings regarding childhood experiences, current military value systems, and idioms of distress to gain insight into the formation, perpetuation, and exacerbation of mental illness stigma in the U.S. Army.

## GP105

**A Comparison of the Effects of Different Themed Residential Living-Learning Communities on Alcohol Use, Non-Prescription Amphetamine Use and Sexual Health Risk Behaviors in First-Year College Students,**

Anne Corinne Carroll, Heather Wiles, Taylor Schwab, Lydia Ashton and Christyn Dolbier, Department of Psychology, East Carolina University, Greenville, NC

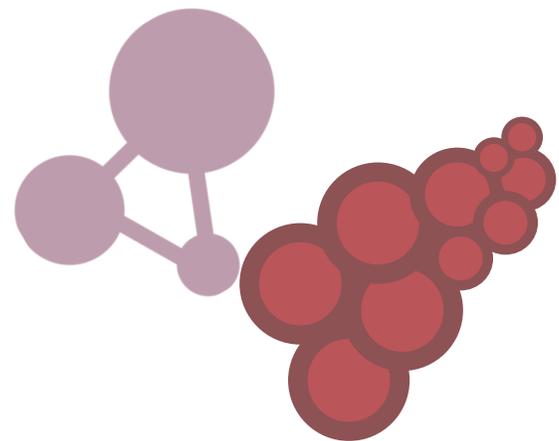
Background: Alcohol and drug use and sexual risk behaviors, and their associated consequences are major problems on college campuses. Living learning communities (LLCs) are becoming common on college campuses but are an unexplored avenue to address these problems. LLCs are first-year residential programs that incorporate themes and build community between faculty/staff and students through learning experiences in and outside the classroom. Several gaps and weaknesses in the LLC literature exist: little examination of their health behavior effects, no comparisons of effects of LLCs with different themes, lack of control or comparison groups, and not addressing selection bias. Purpose: This study is designed to address gaps in the literature and strengthen current research design standards while comparing the health risk behaviors of Wellness LLC, Biology LLC, and non-LLC students. Method: This project utilizes a quasi-experimental 3-group repeated measures design. Data are being collected from experimental (Wellness LLC, n=32), comparison (Biological LLC, n=30), and control (non-LLC, n=100) groups at the beginning, middle, and end of spring 2013 semester. Participants are ECU undergraduates (N=162) at least 18 years of age living on-campus in residence halls. Psychometrically sound surveys assess sexual risk behaviors, and amphetamine and alcohol use. Participants complete surveys on hard copies or online, and are compensated with Pirate Bucks. Analyses will consist of 3 x 3 ANCOVAs to test for differences in outcomes between groups across the semester, while controlling for potential confounds (e.g., sex, parental education, high school health behavior) to help reduce error and isolate LLC effects. Expected Results: Hypothesis 1: The WellLLC group will have the smallest increases in alcohol use, heavy episodic drinking, and alcohol-related consequences over time, followed by the BioLLC group, and then the non-LLC group. Hypothesis 2: The WellLLC group will have the smallest increases in non-prescribed amphetamine use, inappropriate prescribed amphetamine use, and amphetamine-related consequences over time, followed by the BioLLC group, and then the non-LLC group. Hypothesis 3: The WellLLC group will have the smallest increases in risky sexual behavior and sex-related consequences over time, followed by the BioLLC group, and then the non-LLC group.

## GP106

**An exploration of marital status and stress among military couples,**

Meghan H. Lacks, Angela L. Lamson, PhD, LMFT, Andrada Ivanescu, PhD, Mark B. White, PhD, LMFT, & Carmen Russoniello, PhD

There are approximately 1.5 million active duty service members in today's military (Department of Defense [DoD], 2010) and approximately 726,000 (56.4%) of these individuals are married (DoD, 2010). Although the military offers benefits for married personnel, military couples also experience many hardships due to the demands from being in the armed forces (Laser & Stephens, 2011) and the stressors and challenges of military life may leave military members and their spouses more at risk for marital strain. The factors that garner the most attention for disruption and positive outcomes in relationships are the presence and process of deployment, changes in rank, and marital and physiological stress. The present study examines how factors, such as, deployment, rank, and length of time in the service, influence military personnel, their spouse, and their marital status (marital satisfaction, adjustment, and quality). This study took place within a family medicine practice on an Air Force base in the southeastern United States and data was collected from patients and their spouses using self-report measures and biomarkers (e.g., blood pressure and heart rate variability). Correlations and regression analyses were run to examine significant relationships between deployment, rank, length of time in the service, physiological stress and marital satisfaction, adjustment, and quality. Ultimately, the present study attempts to aid evidence based policy to support military couples since the deterioration of marital relationships has the ability to impact the performance of military personnel, which could ultimately have an impact on national security.



# Graduate Poster Abstracts (Face-to-Face)

## GP107

**Recreational factors the affect positive youth development though outcome-based programming**, Brittany Washington, East Carolina University, Greenville, NC

The process and outcomes of youth development continues to be an area of continued research. Sports or recreation-based programs, when designed to achieve youth development outcomes is a unique opportunity and environment for such outcomes. Outcome-based programs may be recognized as an after-school program that increases academic achievement or a recreational sports-based program where youth can advance physically, mentally, emotionally, and socially. Participation in school-extracurricular activities and community youth organizations have been found and to be correlated with high self-esteem, feelings of control over one's life, lower rates of delinquency, higher educational aspirations and achievement (Holland and Andre, 1987; Larson, 1994). An additional framework for designing outcome-based youth development programs is Self-Determination. Self-Determination Theory is an investigation of people's inherent growth tendencies and innate psychological needs that are the basis for their self-motivation and personality integration, as well as for the conditions that foster those positive empirical processes that include autonomy, relatedness, and competence (Ryan and Deci, 2000). The purpose of this presentation is to describe the Self-Determination Theory and define its concepts within the context of recreation and sports programs. Suggestions for including theory to practice will also be presented.

## GP108

**Intergroup Contact, Intercultural Communication Apprehension, and Social Perspective Taking**, S. Austin Cavanaugh, East Carolina University, Greenville, NC

Two psychological factors thought to influence cross-cultural interactions were examined: intercultural communication apprehension and social perspective taking motivation. Participants were students in a course that facilitates cross-cultural interactions. Intercultural communication apprehension and social perspective taking motivation were measured at the beginning and end of the course, along with the Big Five personality traits. Scores on these measures were compared to scores from participants not enrolled in the course. Given previously documented benefits of intergroup contact, a decrease in intercultural communication apprehension and an increase in social perspective taking motivation were expected. Overall, there was no significant difference between groups in terms of how much

intercultural communication apprehension changed,  $X^2(2, 236) = .470, p = .79$ , nor was there a significant between-group difference in change in social perspective taking motivation,  $X^2(2, 242) = 2.50, p = .286$ , thus failing to support initial hypotheses. Two explanations for these results are considered. First, preconditions necessary for intergroup contact to be beneficial may not have been sufficiently met. Second, the factors of interest here may be better understood as psychological traits that are stable over time, instead of states that fluctuate. Post-hoc exploratory analyses were conducted to examine the relationships between intercultural communication apprehension, social perspective taking, and measures of personality traits. Multiple linear regression analysis was used to develop a model for predicting intercultural communication apprehension from neuroticism, extraversion, and openness. This three predictor model was highly significant, accounting for 21% of the variance in intercultural communication apprehension scores,  $F(3, 236) = 21.12, p < .001, R^2 = .21$ . Likewise, a model for predicting social perspective taking motivation from conscientiousness, openness, and agreeableness was highly significant,  $F(3, 239) = 29.38, p < .001, R^2 = .27$ . The results of these analyses suggest that the apprehension experienced at the prospect of communicating with culturally distinct others, along with the motivation to see the world from someone else's perspective, are functions of personality.

## GP109

**Recreation, Planning, and the Rural Community - The relationship between the professions and its effect on rural communities**, Justin Oakes, East Carolina University, Greenville, NC

The planning profession is one which was born out of the response to numerous social, environmental, and health crises that plagued communities. In the professions earliest beginnings, Urban Public Health was a primary focus for planners. Their efforts to control air pollution, keep water clean, handle sewage, and establish public health inspections were all necessary to combat deadly health epidemics caused by environmental health conditions. This response led to the Parks Movement, and the marriage of parks and recreation and planning. Parks, often referred to as the lungs of the city, provide buffers between residential and industrial development, linear linkages and transportation corridors, increase property values, and are factors in decisions about business relocation (Harper, 2009). During this movement, planners such as Fredrick Law Olmsted, who designed New York City's Central Park and oft copied Chicago suburb Riverside, designed park areas in an effort to separate transportation modes,

support active and passive uses, collect water, and promote moral pastimes. Olmsted was also a champion of the need for recreation, believing that the essential recreational need was for rural retreats in the heart of the city (Dahl & Molnar, 2003). The purpose of this poster is to present a brief history of the collaboration of the planning profession and the parks and recreation profession. Additionally, a summary of the current issues pertaining to rural communities that both professions are challenged with addressing will be presented. Recommendations for rural community park planning will be presented.

### GP110

**Factors related to Self-Esteem in Children and Adolescents with Sickle Cell Disease.** Alaina E. Boyle & Cecelia R. Valrie, PhD, Department of Psychology, East Carolina University, Greenville, NC

Sickle cell disease (SCD) is a genetic blood disorder that affects 1 out of every 500 African Americans (Barakat et al., 2002). Individuals with SCD differ in disease severity, with some experiencing many disease-related complications, such as severe pain, delayed puberty, and small stature, and others experiencing fewer complications (Shapiro & Ballas, 1994; Zemel et al., 2007). A psychosocial complication of SCD is that children and adolescents with SCD are more prone to low self-esteem than healthy peers (Brown et al, 1993; Siegel et al, 1990). Low self-esteem in this population has been related to poor disease adaptation (Burlew et al., 2000) and high use of passive coping strategies (Simons et al. 2009). Research on factors predicting self-esteem in children and adolescents with SCD is sparse. Findings from studies of healthy children and adolescents indicate that developmental stage, sex, and physical stature (e.g., height and weight) impact self-esteem. Specifically, research indicates that self-esteem declines from childhood into adolescence (Robins et al., 2001; Trzesniewski et al., 2003) and that adolescent females report lower self-esteem than their male peers (Rosenberg and Simmons, 1975; Eccles et al, 1989). Also, findings indicate that healthy adolescents of shorter stature are more likely to have lowered self-esteem (Apter et al., 1994). Of note, short stature is a common complication of SCD (Jacobs, 2001). The current project is examining the relationship between self-esteem in children and adolescents with SCD and developmental stage, sex, and short stature. We hypothesize that being an adolescent, female, and having shorter stature (as indicated by low height and weight in comparison to age and gender matched norms) will be related to low self-esteem in children and adolescents with SCD. Also, that

developmental stage will moderate the relationship between sex and self-esteem, such that there will be a stronger relationship between being female and low self-esteem for adolescents than for children. Data from the Cooperative Study of Sickle Cell Disease, a longitudinal study of individuals with SCD from 1978 to 1988, will be used to test these hypotheses. Data will be analyzed in the coming months; descriptive statistics on variables of interest and a multiple regression model predicting self-esteem will be calculated.

### GP111

**Making the Transition: Biofeedback with Military Personnel.** Dominique M. Clemmons-James, Department of Addictions and Rehabilitation Studies, East Carolina University

Military personnel are defenders of our nation. However, returning to civilian life poses challenges for service members. For some, there is a disconnect between being deployed and coming home. The intensity of this disconnect is the line between well and ill, and even life and death. It is during this period of transition that mental health concerns surface. Although traditional psychotherapy is effective in civilian cases, biofeedback and neurofeedback are proving more effective with military personnel as a form of cognitive training. The use of these interventions during the transition period has the potential to increase successful re-entry to civilian life. This presentation will (a) provide an overview of factors that make readjustment to civilian life difficult; (b) discuss the treatment needs of individuals with Post-Traumatic Stress disorder; (c) present biofeedback and neurofeedback as cognitive training interventions; and (d) discuss implications and recommendations for counselors and counselor educators.

# Graduate Poster Abstracts (Face-to-Face)

## GP112

**Recycling Behavior Change**, S. JaNell Lewis, East Carolina Health Education and Promotion, East Carolina Recreation and Wellness Center, East Carolina University, Greenville, NC

Recycling is the process of making/manufacturing new products from a product that has already served its original purpose. There is a lot of waste that can be recycled, but people are unaware of their habits. In this study, people are unaware of their habit to not recycle and we want to change that. Recycling is not about the separation of materials but more so about the whole process: collection of old material, creating new material from old, and manufacturing and reproducing (Environmental Protection Agency). According to the "Power of Habits", everyone is a bundle of habits. A habit consists of a cue that triggers a routine, and then a reward is earned. The identified routine for this study that needed changing was individual's habit of depositing recyclables in garbage cans rather than recycling bins. The study was designed to examine if the routine could be altered toward a new recycling behavior. To alter the behavior, a new cue, a poster to encourage recycling was placed on all trash cans within the ECU Recreation Center. Our hypothesis was that the new cue would remind individuals and lead to a change in their routine toward recycling behavior. The posters read, "Feel Good for Doing Good - Recycle" with a picture of a person dropping a bottle in recycle bin. Analysis of pre and post surveys indicated that attitudes were altered and that individuals felt better when they recycled, signifying the signs had an impact. However, the results showed that this cue was not effective in changing the behavior. There was an overall increase of the amount of products being thrown into the recycling bins, but there was not a decrease in the amount of products being thrown into garbage cans. Results suggest signs have an impact but more research is needed to determine effective behavior change methods.

## GP113

**Modern Memories: Religious Differences in Remembering the Battle of Guilford Courthouse**, Zachary Parker, Department of Anthropology, East Carolina University

The way people remember past events is influenced by a wide range of factors. Historical monuments, commemorative parks, and written documents can all play vital roles in shaping how individuals remember the past. I intend to investigate to differences in how local people have, and continue to, construct a particular narrative of the history of Guilford County, including the Revolutionary War battle and the Civil Rights' activism that occurred there. In particular, I

will focus on people's different religious backgrounds as a possible means for explaining variation between certain people's memories. Quakers, Moravians, and Presbyterians all have had a historical presence in the area around Guilford, but the roles that these groups have played varies. How each group is currently remembered may illuminate how theological differences manifest themselves within the memory of the larger culture.

## GP114

**An Exploration of Biopsychosocial and Marital Health in Military Couples Using Heart Rate Variability**, Amelia Muse, Angela Lamson, PhD, LMFT, Andrada Ivanescu, PhD, Mark White, PhD, LMFT, Carmen Russoniello, PhD, East Carolina University

In the United States there are approximately 3.6 million military personnel, over half of which are married (Department of Defense [DOD], 2010). Few researchers have focused on the biological, psychological, and social health of military couples (Lewis, Lamson, & White, 2012) despite the significant presence of military couples in the U.S., and the unique experiences and stressors that military couples are faced with compared to civilian couples (Hogan & Seifert, 2010; Hoge et al., 2008; Mansfield et al., 2010). One way to capture the experience of military couples is to use heart rate variability (HRV), a physiological assessment that measures an individual's stress response and relaxation (Thayer, Åhs, Fredrikson, Sollers III, & Wager, 2012). Heart rate variability captures the amount of distress experienced by an individual because it is a physiological response to biological, psychological, and social stress (Boysen, Lewin, Hecker, Leichter, & Uhlemann, 2007; Tan, Dao, Farmer, Sutherland, & Gevirtz, 2011; Thayer et al., 2012; Smith et al., 2011). The present study focuses on the experience of male military personnel and their female spouses. This project includes literature and analysis of biological factors (BMI, blood pressure, and medical diagnoses), psychological factors (emotional problems, post-traumatic stress symptoms, and level of global distress), social factors (family and practical problems), marital adjustment, and HRV from each partner in the military couple dyad. The significant contribution of this study is the exploration of the individual biopsychosocial health of his (military personnel) and her (spouse) relationship using assessment of physiological stress through the inclusion of heart rate variability. This research provides information and analyses on the types of biopsychosocial stressors affecting military couples and how the nature of biopsychosocial health in military couples affects military marriages. Implications from this research provide data and recommendations to help health professionals and researchers better understand and serve military couples.

## GP115

**An Importance- Contribution Assessment of Leadership Skills among Collegiate Club Sport Participants**, Brittany Hopewell, Nelson Cooper, Deb Jordan, East Carolina University, Greenville, NC

The purpose of this study was to assess college student perceptions of their leadership development skills based on their involvement in collegiate club sports programs at East Carolina University. A previous study invited a random sample of full-time enrolled, on-campus students to complete an online Importance-Contribution survey (Cooper & Jordan, 2011). From this study, a sample of 273 club sport participants was partitioned. The survey contained 23 importance-contribution items designed to assess development of personal leadership skills. The instrument was developed based upon the University's leadership learning outcomes. Students responded to the items using a Likert scale, with 1 equaling not at all and 7 equaling extremely. Gender, age, and semesters of participation were also collected in order to assess group differences. Analysis of Variance was conducted in order to compare importance-contribution scores. Results indicated significant differences between age and semesters of participation ( $p < .05$ ), but not between males and females. The findings may contribute to enhancement of club sport administration practices in order to increase student leadership development.

## GP116

**Lack of education, time, and transportation are the most prevalent barriers to access of preventive care services among the migrant farmworker community in Eastern NC**, William Dalrymple, East Carolina University, Greenville, NC

The migrant farmworker community is an underserved and understudied segment of the population. Health status among members of this community is nearly universally lower than other sub-populations, for many different reasons. Preventive care is one aspect of healthcare that has been shown to be both enormously influential in improving health status and severely lacking among this community. Before improvements can be made, however, the problems need to be more clearly defined. To what extent are preventive care services available to this community? Are they being utilized to their fullest potential? Why or why not? What barriers prevent this community from receiving more standard preventive care? This project sought to answer those questions by conducting a series of recorded interviews with migrant farmworkers (N=34) at various locations in Eastern North Carolina. After analyzing the results, it seemed clear that there are three major issues that prevent migrant

farmworkers in this area from receiving adequate preventive care services. First of all, many of the interviewees did not fully understand the importance of regular physical examinations. Secondly, these people are faced with almost insurmountable time restrictions due to working long hours in the fields. Finally, many of the interviewees reported a lack of transportation available to them. These results strongly imply that a few relatively simple measures could be taken to drastically improve the overall health status of this community. Migrant farmworkers could be supplied with educational materials upon arriving each year that would instruct them on the importance of regular physical exams as well as the locations of various local medical clinics. Additionally, providers could visit many of these camps after hours and with a team of medical students to efficiently eliminate the time and transportation barriers. These easy improvements would help to make the most of the existing healthcare services while also enhancing the health status of the community as a whole.

## GP117

**Certified Safe Logging**, Demetria Powell, Robin Tutor-Marcom, NC Agromedicine Institute, East Carolina University, Greenville, NC

The logging industry is one of the most hazardous industries in the United States. According to the Centers for Disease Control and Prevention in 2010, its fatality rate was over 21 times higher than the overall fatality rate in the US. To address this problem, a Certified Safe Farm model (a proven safety program from agriculture) to logging will be developed and adopted. This model will encourage a safety culture on logging sites through a formal process of certification. The Certified Safe Farm model includes a safety checklist of potential hazards and prevention practices at worksites that is used to determine whether a worksite can be certified as safe. A similar logging safety checklist has been developed in consultation with logging safety experts. The checklist can be used by consultants, insurance companies and independently, by calculating an overall loggers safety percentage score. This score will determine whether a logging worksite can be considered safe and importantly, what worksite improvements need to be made.

# Graduate Poster Abstracts (Face-to-Face)

## GP118

### **Ergonomics Evaluation of a “5-gang” Drill/Tap.**

Ronan McAleenan, East Carolina University,  
Greenville, NC

The purpose of this study is to conduct an ergonomic analysis of a “5-gang” drill/tap in a local industry. The company manufactures parts for oil/gas, subsea, automation and shore power. 28% of the company sales are from electrical connectors. The “5-gang” drill/tap is one of the processes that are included in the manufacture of these electrical connectors. The objective for this analysis is to quantify the level of risk that is associated with the manufacture of this product. This analysis will be completed using a risk assessment tool known as Ergonomic Task Analysis. In order to conduct an accurate task analysis the steps for the manufacture must be analyzed and potential for risk determined. To do this accurately a video recording of an employee that was undertaking the work was taken to perform the Ergonomic Task Analysis. Future proposed studies include analyzing the effectiveness of these implementations to see if they have reduced or eliminated fatigue, discomfort, symptoms or injuries without a decrease of productivity and efficiency.

## GP119

### **Automobile Technician Productivity Improvement using Lean Six Sigma Techniques.**

Telford Locklear,  
College of Technology and Computer Science, East Carolina University, Greenville, NC

This Lean Six Sigma Black Belt project was initiated to help improve technician productivity in a local automotive dealership repair shop. The productivity of automobile repair technicians is an issue for dealership management. Lower technician productivity leads to lower revenues for the dealership, and may lead to a lower customer satisfaction rating. Technician productivity is defined as the ratio of flagged hours to clock hours, expressed as a percentage. Flagged hours are awarded to individual technicians based on the completion of a particular repair. The clock hours are simply the time the technician is on the time clock. The dealership sells new and used cars, and has a repair shop, a quick lube/tire shop, and a body shop. The repair order process in the repair shop is the focus of this project. The DMAIC (Define, Measure, Analyze, Improve, Control) method will be employed to carefully assess the repair order process, determine process capability, analyze process data, and suggest improvements. Once the improvements are verified, procedures will be implemented to control the gains. Lean procedures will also be used to identify and eliminate wasteful processes. The project is expected to result in excess of \$100,000 in annual savings and/or revenue improvements for the local dealership.

# Graduate Oral Presentation Abstracts (Online)

# RCAW

## GDO1

**iPads in Middle School Health Education**, Amy Johnson Stadiem, East Carolina University, Greenville, NC

Students use technology in various ways throughout their lives. This year, the students in my school district have been issued iPads for educational and personal use. By setting up my classes on the iPads and using various applications, I plan to engage more students and teach them how to make healthier decisions. Students in my 8th grade health class will use iPads on a daily basis. They will have access to the most current health information. The class has 23 students enrolled in the health class at Springfield Middle School. The survey instrument used to collect the data is a discovery health end of course test. The data will be collected by March 29th and analyzed by April 12th. It is anticipated that it will help individuals increase their health knowledge and strive for wellness through health and physical activity.

## GDO2

**Teen Pregnancy: A comparison of Educator Curriculum and Making Proud Choices**, Mark Whitman, East Carolina University, Greenville, NC

Studies show the rate of teen pregnancies has been on the decline for many years, but, once these national rates are broken down by race, there is still an enormous discrepancy between the teenage pregnancy rate of White or Caucasian women and Black or Hispanic women. This racial gap may have been influenced by comprehensive health programs that are taught in middle schools. The purpose of this study is to compare educator developed curriculum with an evidence-based curriculum called Making Proud Choices to determine whether the curriculum or presentation of materials have different impacts on the retention of material by the students. This is a participatory action research study comparing two curriculums in two separate racially diverse 7th grade middle school health classes from Chapel Hill, NC. The study involves one class using Educator lesson plans and one class using the Making Proud Choices! curriculum lessons. Forty students will complete and post-test assessment of the common topics from both curriculum and a t-test will be used to compare the means. Data collection will be completed by February 15th, 2013 and analyzed by March 1st, 2013. The results of this study will provide evidence to support the feasibility of quality pedagogy over the need of evidence-based curriculum.

## GDO3

**Teacher instruction: Pretest/posttest analysis of student knowledge**, Matt McDaniel, East Carolina University, Greenville, NC

Tests have long been used to gauge student's knowledge in a certain subject areas. Many testing formats have been developed but the idea remains the same. A test measures to what level a student has learned the material and provides the instructor with feedback. The objective of the proposed study is to investigate how teacher instruction of the health and physical education curriculum has on the impact of student knowledge. Prior research indicates that pre and posttest methods have positive effects on a student's mastery of information. In an investigation to determine if teacher instruction can improve test scores from a pre to posttest, a quantitative study using a one-group pretest-posttest design will be utilized. A quasi-experimental design will be applied to gain insight into teacher instruction of the health and physical education curriculum and the impact on student knowledge. Participants will be selected from an Eastern North Carolina public middle school situated in a low-income area. The study allows participants to complete a pretest on alcohol use, receive instruction, participate in differentiating activities, and follow up by completing a posttest. Descriptive statistics will be applied to determine mean, median, mode and frequency of the pretest and posttest. A t-test will be applied to determine if a difference exists between means. This research proposal aims to investigate the impact of teacher instruction on student knowledge. Teachers, students, parents, and the community will benefit from determining the most effective way to convey health and physical activity information and thus increasing student knowledge.

# Graduate Oral Presentation Abstracts (Online)

## GDO4

**Cumberland County Landfill Six Sigma Implementation**, Brittany Ryan, East Carolina University, Greenville, NC

The Cumberland County Landfill in Fayetteville, North Carolina services approximately 320,000 residents and currently operates four permanent sediment basins in order to collect the sewage runoff from the surrounding landfill. Historically the basins become contaminated and as a result must be drained and excavated. The contaminations of the basins are an environmental and health risk to the surrounding area including the Cape Fear River that the basin water drains. A sediment basin process begins with precipitation where it then flows into a drainage ditch and eventually empties in the basin and the particles in the water settle out. The unique applications of Six Sigma techniques are tailored to this non-manufacturing process through the Define, Measure, Analyze, Improve and Control (DMAIC) methodology.

This Lean Six Sigma Black Belt Certification Project implements Six Sigma, focusing on process improvement, to eliminate non-value added activities such as, excessive water testing, drainage, excavation and wasted man hours. The corporate goal is to reduce the levels of biochemical oxygen demand (BOD) and chemical oxygen demand (COD) by 50% in each sediment basin. In order to accurately measure the metric of BOD and COD levels for this project a vital few equation is defined and the defects per million opportunity (DPMO) is calculated as 24.25 defects per million. In order to reduce the DPMO, data from historical water test results and water flow rates into the basin during precipitation will be statistically analyzed. The improvement phase will consist of three main elements; place flow meter at each stage of the drainage ditch, implant naturally filtering plant life and standardize the sampling process. An SOP along with a control chart will control the elements introduced in the improve phase.

This project utilizes the DMAIC methodology for the implementation of Six Sigma in the sediment basin process and shows an expected cost savings of \$100,000. The paper further identifies issues in the previous process design and suggests a new wetland design for the sediment basin to reduce contamination.

Keywords: sediment basin, DMAIC, Lean Six Sigma, Cumberland County, landfill

## GDO5

**Migration of Legacy applications using NoSQL database**, Pouyan Ghasemi, Department of Computer Science, East Carolina University, Greenville, NC

Legacy application usually refers to a software product that has been used for several years within the organizations and uses an outdated engineering methodology in order to serve the needs of its users. In case of the web technology legacy applications do refer to the applications like FrontPage that webmasters use to publish web content. With the rise of the cloud computing and maturity of content management systems the need for the migration of those legacy applications is inevitable. CMSs (like Drupal, Wordpress, IBM Websphere,...) usually use relational databases to store the data. Though migration of the legacy applications has been always about using the latest technology relational databases like SQL have been around for several years. Most of the SQL based databases do not have the right set of features to scale. Businesses and organizations have suffered from the fact that they cannot easily scale their data centers and in some cases it ended up acquiring more powerful machines and servers.

NoSQL (Not only SQL) is a new term in the industry which refers to the new sets of databases ranged from Key-value store to document store databases. MongoDB which is a document oriented database offers interesting sets of features that in some cases are aligned with the features needed for migration for CMSs and the future required scaling of the database. Since the data in the legacy web applications has been gathered through years of using the legacy application with no forced structure, migrating HTML data to SQL tables does offers its own sets of issues. MongoDB has a schema-less structure that can become useful within the migration process. In our study we analyze and study the migration of the legacy application on the appropriate CMS using NoSQL databases (MongoDB).

## GDO6

**Six Sigma Minimizes the Erosion**, Robert A. Johnson, East Carolina University, Greenville, NC

The objective of this project is to save Power Mulch Systems money by making the operation of a process more efficient. Power Mulch Systems, based out of Smithfield, NC., is a landscaping company that specializes in erosion control. The company uses blower truck technology to install either mulch or compost up to 400 feet away from the truck through a five inch hose.

One of the operations that Power Mulch specializes in is the installation of nylon socks filled with rough grade compost to aid in erosion control. This nylon sock filled with product is placed on the ground to prevent soil runoff. The sock acts as a filter to pre-

vent the soil and sediment runoff caused by heavy rain from reaching waterways and drainage ditches. The process to be improved is the installation of the nylon sock filled with the rough grade compost. The company is currently able to install only 1500 feet of nylon sock on average in a 10 hour workday. The company would like to increase this to 2500 feet of sock on average during a 10 hour workday. For this project I will be using the Six Sigma DMAIC problem solving methodology. The expected saving for the process improvement will be \$3000 per 10 hour workday.

## GD07

**Examining The Online Behavior Of The Visually Impaired,** Julian L.Brinkley, Department of Computer Science, East Carolina University, Greenville, NC

Web accessibility can be generally defined as providing users with disabilities the means to perceive, understand, navigate and interact with the Web. (Henry, 2005) Given that the modern Web is a largely visual medium, one of the more difficult challenges in this regard is facilitating access for the blind and individuals with other significant visual impairments. But as accessibility technologies have improved and awareness has been heightened regarding the issues faced by those with disabilities generally, Web accessibility research involving the visually impaired has changed. Many of the broad and self-evident problems have been, to a degree, solved. Using specialized accessibility technology like refreshable braille displays and widely used text-to-speech software the visually impaired now have some means of accessing the Web. (Fichten, Asuncion, Barile, Ferraro & Wolforth, 2009) But even factoring in these significant advances further work is needed. A number of studies have indicated that the Web is still roughly three times more difficult to use for the visually impaired than for the sighted. (Craven & Brophy, 2003) Moving forward, accessibility research for those with visual impairments will focus less on the general problem of providing some access and more on providing comparable or near-equivalent usability. To further this aim however, different questions regarding the challenges faced by the visually impaired will need to be asked; questions that examine the online behavior of the visually impaired relative to the sighted in an attempt to isolate the more nuanced challenges that they face using current technologies. The answers to these questions may point to more nuanced solutions to what has historically been a more generalized approach to Web accessibility for the visually impaired. Our research, to be presented at Research Creative Achievement Week (RCAW), focuses on answers to these questions with the goal of developing actionable software solutions. The first component of this research consisted of a 46 participant Web-based survey designed to address whether these online be-

havioral differences exist and if so, to what degree. The final component of our research is an as-yet unimplemented study addressing accessibility issues involving popular online social networks specifically.

## GD08

**Optimization Strategies for Cloud / Mobile Interaction,** David Bleicher, East Carolina University, Greenville, NC

In recent years, rapid maturation in underlying technologies has made cloud-based delivery a viable option for increasingly diverse types of applications. The internally-distributed nature of cloud-based platforms lends itself to Service Oriented Architectures (SOA) consisting of multiple, distributed instances of discrete functional components. Web Services (WS) techniques and protocols are now well established for the implementation of systems intended for cloud-based deployment.

Over the same period, consumer and business adoption of networked mobile devices (e.g. smartphones and tablets) has grown exponentially. Entire software categories now exist for which mobile devices are the primary client, and substantial populations rely on mobile devices as a primary computing platform. While the technical capabilities of these devices have also grown rapidly, mobile application development still requires consideration of unique platform constraints.

Among the most frequently cited benefits of SOA/WS are the ease with which new applications may be assembled from existing, diverse sources of data, irrespective of programming languages, platforms, and development technologies. Cloud-deployed systems based on SOA/WS would seem a logical choice for enabling access from mobile devices; one need only allow remote/mobile participation in the system's existing service bus and protocols. This approach is both possible and fairly common. It is also frequently non-performant and difficult to maintain due to the constraints of current mobile devices.

Research indicates an impedance mismatch between prevailing approaches to development in cloud-based services and mobile applications. The rich semantics and flexibility of WS simplifies the former but introduces inefficiencies of network bandwidth consumption and serialization/de-serialization processing requirements. These are problematic when accessed from network/processor constrained mobile devices and carry financial implications as cloud-based infrastructure is routinely priced on cloud-side utilization of these resources. Research has identified techniques to minimize this mismatch within both the distributed system and mobile sides of the equation. Ongoing research will document and quantify the benefits of each technique to support informed consideration for current and future development efforts.

# Graduate Poster Abstracts (Online)

## GDP1

**2011-2012 Grades in Healthful Living**, Susan Buzard, Victor G Aeby, Department of Health Education and Promotion, East Carolina University

Healthful Living is a required course in the state of North Carolina; teachers use multiple methods to assess their students' achievement in this course. The objective of my study is to determine if, we are truly assessing our Healthful Living students' mastery of the North Carolina Standard Course of Study. Due to a lack of information in the literature regarding participation and proficiency and the manner in which the participation impacts the grade we need to know how the students are being graded. This study will examine existing data sets in the form of student grades at Currituck County High School from the 2011-2012 school year. The data has been collected and will be analyzed by March 1, 2013. Based on my observations of collected data it is anticipated that educators have placed more emphasis on items that are not a part of the North Carolina Standard Course of Study and that student grades may not truly reflect their mastery of the standards required.

## GDP2

**The Hidden Value of Art**, Rachel Vieira, East Carolina University, Greenville, NC

In education today, the arts are not perceived as important as other academic subjects. There are concrete benefits that are derived by including the arts in education that are not fully understood. This paper looks at the reasons why the arts must be a part of a comprehensive education today. Ideas such as tacit knowledge to increase understanding, how the state of flow increases self-esteem and how schools actually decrease the benefits of arts are investigated. By fully understanding the role the arts play in learning we can maximize the benefit within the educational system. It is my theory that if the benefit of including art into education were fully understood, the arts would not be an elective course of study but enjoy the same importance as other academic subjects.

## GDP3

**Academic Failure: Coordinated School Health Model**, Brandi Wilson, East Carolina University, Greenville, NC

In 2005, the CDC proclaimed that dropout prevention was a national health concern because education can determine how successful one is in life and the quality of life that one may have. While many families and youth may not consider education a priority, poor health and mental health behaviors may contribute to deficits in education. This study

focused on integrating the Coordinated School Health Program (CSHP) into school health and school-based mental health interventions as mandated by North Carolina Department of Instruction. Specifically, the purpose of this study was to identify the self-reported health and mental health behaviors of a small sample of students (N=5) who attended both Ayden Middle School and the Straightway After-school Program and implement interventions using the CSHP model. Participants were chosen based on referrals from community partners who interacted with the students and deemed them to have potential despite poor academic achievement, negative behavior, and factors that contributed to their risk of academic and personal failure. The mixed method design utilized genograms and Eco maps to enhance understanding of data from the Youth Risk Behavior Survey, Psycho-Socials, Fitness Gram, Grades, and Attendance. Based on the literature, researchers would expect that students may be at-risk for specific health, and mental health issues, low academic achievement; therefore in need of intensive school intervention in order to improve their potential for quality of life and success.

## GDP4

**A comparison of 9th grade student's body mass index, body weight, skin fold measurement and blood pressure**, Adam Hamrick, Department of Health Education and Promotion, East Carolina University, Greenville, NC

Physical inactivity has been deemed a significant, contributing factor to childhood overweight and obesity. In recent years, many school systems removed recess and/or physical education from their curriculum due to growing pressure to increase academic scores and budget cuts. With the vast majority of children's time spent in school, alternative strategies to re-introduce physical activity back into schools are necessary. The objective of the proposed study is to determine if there is a difference between groups (N=100) in 9th grade student's body mass index, body weight, skin fold measurement and blood pressure as a result of a health and physical activity class. The data collection will begin on 2/15 and the succeeding measurements will take place at the 4th week mark (March 1st) and 9th week mark (March 29th). I anticipate that students who are actively involved in daily physical activity will have more improvements in all of these areas of measurement than those students who do not. The results of this study will provide evidence to support the feasibility of an unstructured, moderate to vigorous, health and physical activity in children and provide insight regarding the ideal physical activity intensity and duration necessary to achieve a positive increase in academic performance.

## GDP5

**A Comparison of End-of-Course scores in the Health Sciences Classroom**, Jacqueline O. Watson, Dr. Victor Aeby, Dr. Monica Webb, Department of Health Education and Promotion, East Carolina University, Greenville, NC

The purpose of this study is to determine if there is a difference between means of mid-term health test scores as a result of ten minutes of medical terminology instruction daily in a Health Science class. Though there are several studies in the area of vocabulary retention, no specific studies could be found that include the use of medical terminology in high school students for Post Assessment scores and achievement. Thus the use of teaching strategies and researched based learning techniques will contribute to the literature. This researcher will utilize a simple T-test to determine if there is a difference between groups. This study aims to determine if a difference exists on End-of-Course test scores as a result of ten minutes of medical terminology instruction daily in a Health Science class. Data will be collected by March 20 and analysis will be completed by March 27 for both groups. Based on observation of the collected data it is anticipated that the Health Sciences curriculum will be modified to include daily medical terminology.

## GDP6

**Nutritional Guidance in Pre-Adolescent Female's Food Intake: Teaching Girls to Make Better Food Choices**, Dixie Holden, Dr. Victor Aeby, Department of Health Education and Promotion, East Carolina University, Greenville, NC

The female population of the United States is becoming more obese each year. Pre-adolescent girls in the public school system are getting very little in the way of meaningful nutrition lessons. Brochures have long been an effective way to teach small bits of important information in a short period of time. This study seeks to determine if by using a brochure to teach nutrition, pre-adolescent girls will learn and retain the small bits of vital information much easier than by sitting through lengthy lectures. Many studies of this type have been done with adults and adolescent girls, but none have been done with pre-adolescent females. The data will be collected by February 28, 2013 and analyzed by March 30, 2013. It will utilize a quasi-experimental design and simple t-test to determine if a nutrition education program for pre-adolescent females in the form of a brochure will impact the choice of nutritious foods. A pre- and post-survey were designed to test the student's knowledge of nutrition both before and after reading and studying the brochure. The subjects will be 5th grade female volunteers from a local elementary school physical education class. The qualitative

data collected from the survey will be analyzed as descriptive information and further analyzed to compare means between pre- and posttests. From this study, it is anticipated that 5th grade nutrition education will be modified and girls will make nutritious food choices.

## GDP7

**Does an integrated nutrition education program affect Body Mass Index and knowledge retention of fifth grade students?**, Erika M. Dawson, East Carolina University

Childhood obesity is a growing epidemic in the United States. The CDC reports that in 2011, 17% (or 12.5 million) children in the United States 2 to 19 years old are obese (DNPAO & CDC, 2012). In North Carolina alone, the obesity rate is 13% by the time students reach high school (CDC, 2012). Research has shown that increasing nutritional knowledge along with activity can positively affect Body Mass Index (BMI) over a long period of time. A supplemental nutrition education program integrated within a physical education setting can be an effective way to address childhood obesity and reduce a child's BMI (Schaub & Marian, 2011). The purpose of this participatory action research is to determine if there is a difference in group mean scores of BMI and knowledge. Eighty-three children in fifth grade Physical Education classes Participants were given a pre- and post- test questionnaire which tested their behavior, attitude, and knowledge of nutrition and a pre- and post- BMI analysis. An integrated nutrition education curriculum was provided as the intervention. All participants engaged in Physical Education units involving gymnastics, throwing and catching, basketball skills, cooperative activities, and fitness units. The experimental group had nutritional content included in their instruction. Information dealing with caloric expenditure versus intake, food models showing portion size, My Plate interactive instruction, and information regarding food nutrients was included. The statistical procedures used were paired t Tests to compare the pre- and post- means within each related group for the questionnaire and BMI and independent t Tests to compare the post- test means between the experimental and control groups. All post- test data will be collected by April 18, 2013 and analyzed by April 21, 2013. It is anticipated that the pre-test BMI's will be only slightly altered but that the questionnaire results will improve for the majority of the students in the intervention group. The proposed study explores whether or not the intervention of nutrition education will change the behavior, knowledge and attitudes of the experimental group. In addition, the study will determine whether longevity of intervention improves BMI in children.

# Graduate Poster Abstracts (Online)

## GDP7

**The Effects Of Ankle Mobilizations On Hip Strength**, Zachary Long, Alexander Durland, DPT, Department of Physical Therapy, East Carolina University, Greenville, NC

**INTRODUCTION:** Joint mobilizations have been shown to impact neural feedback, stimulate joint receptors, increase local strength, control pain, increase range of motion, and improve postural control. Previous research suggests strong neural feedback links within the lower extremity. Hip weakness is a suggested contributor to lower extremity injury in females. Ankle injury is associated with hip weakness and delayed onset of hip muscle activation. Similar findings suggest that distal nerve stimulation increases proximal hip abductor EMG activity. It has been seen in clinical observations that performing ankle mobilizations increases hip abduction strength, however, this has not been studied. **METHODS:** 20 healthy college females with no history of ankle sprains in the last 3 years were randomly assigned to receive either grade I (control) or grade III (experimental) ankle mobilizations. Hip abduction strength was measured using a handheld dynamometer and 5 trials of 5 seconds. The study investigator then performed 4 ankle mobilizations each lasting one-minute. Mobilization techniques performed included a distal fibular glide, talocrural rocking, posterior talocrural glide, and a subtalar eversion tilt. Following the mobilizations, participants rested for 15 minutes before their hip abduction strength was remeasured. **RESULTS:** The control group had an average percent change of -0.81 from initial measurement to post-mobilization measurement. The experimental group showed a 7.74% increase in strength following the mobilizations. Analysis of variance demonstrated a significant difference in strength following mobilizations between treatment groups ( $p=0.01$ ). **DISCUSSION:** It can be hypothesized that the increases in strength seen following the grade III joint mobilizations may be due to increased motor recruitment. Previous research has show that joint mobilizations stimulate mechanoreceptors and thus proprioceptive feedback. Given this, the joint mobilizations performed in this study may have stimulated the sural nerve, thus increasing hip abductor motor recruitment as seen in previous studies. With this idea in mind, ankle mobilizations used to provide increased hip strength could serve as a preventative strategy for lower extremity injuries.

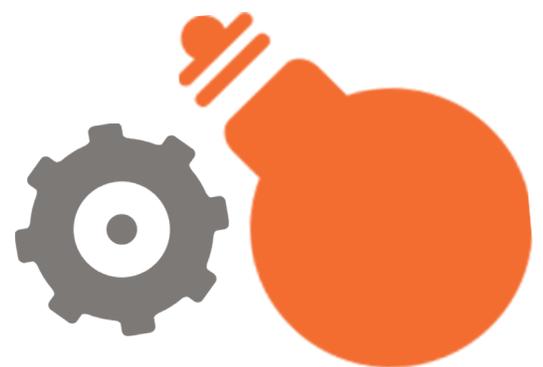
## GDP8

**Current Status of Mosquito Control Programs in North Carolina: The Need for Cost-Effectiveness Analysis**, Supler, Katie L., Richards, Stephanie L., Anderson, Alice, Balanay, Jo Anne G., Environmental Health Program, Department of Health Education and Promotion, East Carolina University, Greenville, NC

Mosquito control in the United States is both technically specialized and labor-intensive with mosquito control programs (MCPs) carrying out services at federal, state, and local levels. The scope of each MCP varies depending on the needs of the region. In the 1970s, the North Carolina (NC) Department of Environment and Natural Resources formed the Public Health Pest Management (PHPM) section to play an active leadership role in training and support for local mosquito control programs across the state. However, PHPM was disbanded in July 2011 due to state budget cuts. Many local MCPs that relied on state funds to carry out mosquito control have also experienced budget cuts. The extent to which recent budget shortfalls have impacted services provided by MCPs is largely unknown. Consequently, the primary objectives of this study are to: 1) assess the current status of MCPs in NC, 2) evaluate the extent to which the operational status of local MCPs affects public health, and 3) evaluate the impacts of losing the PHPM section in NC. This study assesses the current status of mosquito-borne disease surveillance in NC; hence, informing the legislature about potential public health consequences of budget cuts. The implications of our findings to public health risk assessment strategies are discussed.

# **ABSTRACTS: UNDERGRADUATE**

Oral, Poster, & Online Presentations





# Undergraduate Oral Presentation Abstracts (Face-to-Face)

# RCAW

U01

**Molecular Control of Dedifferentiation By RNA-Binding Proteins in *C. elegans* Germ Line**, Austin Brokamp, Quan Nguyen, Udaya Sree Datla, and Myon-Hee Lee, Brody School of Medicine, East Carolina University, Greenville, NC

Cell fate reprogramming manipulates cellular differentiation and allows for its redirection, a process critical for regenerative medicine. One mechanism often inherent to reprogramming is dedifferentiation. In this process, a cell reverts from a differentiated and restricted state to a more undifferentiated and multipotent state. Moreover, tumor-initiating cells (sometimes called cancer stem cells) may arise from the dedifferentiation of more differentiated cell types. Although dedifferentiation has been observed in tissue culture cells and in organisms, the mechanism of dedifferentiation is still poorly understood. Our specific focus is on how differentiated germ cells (spermatocytes) are reprogrammed into undifferentiated cells by RNA-binding proteins. We use the germline of the nematode *Caenorhabditis elegans* (*C. elegans*) as a model system to study the molecular control of dedifferentiation in vivo. Although *C. elegans* are primitive and small, they share many fundamental molecular and cellular regulatory mechanisms as well as biological characteristics with more advanced organisms including humans. We found that PUF (Pumilio and FBF) RNA-binding proteins inhibit dedifferentiation in the *C. elegans* germ line. Moreover, our genetic analysis suggests that dedifferentiation may be programmed at an early stage of germline development lacking PUF genes and aberrant de-repression of PUF targets contribute to dedifferentiation either positively or negatively. Importantly, all regulators we studied are highly conserved. Therefore, our findings may provide insights into the molecular control of dedifferentiation broadly in multiple cellular organisms, including humans.

U02

**The Role of Mitochondrial Biogenesis in Human Mesenchymal Stem Cell Differentiation and Acquisition of a Cardiac Phenotype**, Arun Ajmera<sup>1</sup>, Maria Collins, MS2, Payal V. Pradhan, MS2, Ethan J. Anderson, PhD<sup>3</sup>, Barbara J. Muller-Borer, PhD<sup>2</sup>, 1 Undergraduate Student, Department of Biology and Chemistry, 2 Department of Cardiovascular Sciences, 3 Department of Pharmacology and Toxicology, East Carolina University, Greenville, NC

Background: With an increased understanding of myocardial infarction, human mesenchymal stem cell (hMSC) transplantation therapies have shown promising results as a possible treatment for heart failure. However, transplanted stem cells undergo a significant rate of cell loss within 24 hours after transplantation. Furthermore, little is known about mitochondrial biogenesis for hMSCs transplanted to a cardiac microenvironment, even though mitochondria are vital to cell energy production, cellular differentiation, and cell death. Thus, our purpose was to investigate the role of mitochondrial biogenesis in adult hMSC differentiation and acquisition of a cardiac phenotype. Examining the role of mitochondria in hMSC differentiation is critical for developing more effective cell based therapies for cardiac tissue regeneration. Based on recent experimental evidence and new genomic data, we hypothesized that mitochondrial activity would be enhanced when hMSC differentiation was directed towards a cardiac-like fate.

Methods: In this study, two models to direct hMSC differentiation to a cardiac-like phenotype were evaluated. In the 1st model, hMSCs were treated for 2.5 weeks with a combination of 3 growth factors. We evaluated protein expression of mitochondrial Electron Transport Chain (ETC) complexes with western blot analysis, and analyzed oxidative capacity with mitochondrial O<sub>2</sub> consumption using an Oroboros O<sub>2</sub>K Oxygraph system. In the 2nd model, hMSCs were co-cultured with neonatal rat cardiac myocytes for 48 hours before hMSC isolation. For both models, cardiac and mitochondrial gene expressions were compared in control (monoculture) hMSCs and treated hMSCs with qRT-PCR.

Results: When treated with growth factors, hMSCs showed increased mitochondrial gene expression, increased O<sub>2</sub> consumption, and increased protein expression of mitochondrial ETC complexes associated with cardiac development. Growing hMSCs with cardiac myocytes resulted in increased cardiac and mitochondrial gene expression when compared to control (p<0.05).

Conclusions: These findings suggest that augmentation of mitochondrial gene expression, content, and oxidative capacity is involved in hMSC differentiation towards a cardiac-like fate, and imply that mitochondrial function may be a critical component for enhancing hMSC therapies in cardiac tissue regeneration and repair.

# Undergraduate Oral Presentation Abstracts (Face-to-Face)

## U03

**Role of NKT Cells in fibrosis of the liver**, Edward Sanderlin, East Carolina University, Greenville, NC

Hepatic fibrosis results from a number of chronic liver pathologies including viral infection, autoimmune liver disease, and alcoholic liver disease. Components of the innate and adaptive immune response (Kupffer cells and CD4+ lymphocytes respectively) have been shown to play a role in hepatic fibrosis through production of key pro-fibrogenic mediators such as transforming growth factor beta. NKT cells are a specialized T cell population resident to the liver and have been shown to regulate both Kupffer cell and T cell responses though their function in hepatic fibrosis has not been explored. The purpose of this study was to define the role of NKT cells in a model of liver fibrosis induced by ligation of the common bile duct (BDL). BDL promoted liver fibrosis in wild type (wt) mice in conjunction with increased T cell accumulation, pro-fibrogenic cytokine production, and enhanced matrix remodeling enzyme expression. Mice deficient in NKT cells showed exaggerated tissue injury, T cell accumulation, and inhibition of matrix remodeling enzyme expression. Together, these data suggest that NKT cells protect the liver from BDL-induced tissue injury. Therapies directed at increasing their numbers or function may prove beneficial to prevent chronic tissue injury and fibrogenesis.

## U04

**Differential aging-related changes in Dopamine receptor expression levels (D1, D2, and D3) in the striatum**, Mukund Patel and Stefan Clemens, PhD, Department of Physiology, Brody School of Medicine, East Carolina University, Greenville, NC

Aging is associated with a decrease in motor function and a concomitant increase in muscle stiffness and tone. The striatum plays a critical role in the control of motor function, and it receives strong dopamine (DA) innervation from the substantia nigra. DA actions are mediated by both excitatory D1-like (D1 and D5) and inhibitory D2-like (D2, D3, and D4) receptors, but there is a lack of data on aging-related dopamine receptor expression levels in the striatum. We hypothesize that the observed behavioral aging-related changes are associated with a shift in inhibitory/excitatory dopamine receptor expression in the striatum.

Three groups of wild type mice (C57BL/6) aged 2 months (n=4), 1 year (n=4), and 2 years (n=4) were sacrificed. Striatal tissue was removed from the left hemisphere and Western blots were performed, to detect DA receptors D1, D2, and D3 expression levels (Abcam, D1: ab78021; D2: ab21218, D3: ab42114). DA receptor expression levels were normalized to beta-actin and the respective DA receptor expression in 2-month old animals.

With age, D1 receptor expression increased continuously and significantly over a ~4 fold increase (381.5 +/- 44 %) in the 1 year old and reached a ~5 fold increase (490.5 +/- 42 %) in the 2 year old animals (p<0.001). In contrast, D2 receptor expression did not change with age (1 year: 109.7 +/- 5 %; 2 year: 119.5 +/- 14 %, p=0.833). Similarly, D3 receptor expression showed no change with age (1 year: 143.9 +/- 14 %; 2 year: 120.7 +/- 10 %, p=0.062). Together these data indicate an increase in excitatory striatal DA receptor expression levels with age.

Our data suggest that this net excitatory increase in DA receptor expression may play a role in the decline in motor function with age. It is tempting to speculate that the increase in D1 receptor expression might be a homeostatic compensation for the well established reduction of DA levels with age.

## U05

**Two similar protein synthesis factors (IFE-3 and IFE-1) have very different roles in sperm and oocyte development**, Jacob Subash, Brett D. Keiper, Andrew Friday, Kaitlin Morrison, Department of Molecular Biology and Biochemistry, East Carolina University, Greenville, NC

During germ cell differentiation, embryogenesis and oncogenesis, eIF4E genes are heavily expressed. This translation initiation factor regulates the selection of mRNAs which encode new proteins. The hermaphroditic nematode worm, *Caenorhabditis elegans*, has five genes encoding eIF4E (IFE) factor isoforms. Identifying their specific roles in cell differentiation is part of understanding mRNA translational control during animal development. Furthermore, determining the function of IFEs will aid in comprehending how cancer cells proliferate in humans. IFE-1 and IFE-3 are two isoforms found in the worm that play crucial roles in the development of meiotic germ cells (oocytes and sperm). Dr. Keiper's lab determined that loss of *ife-1* cripples spermatogenesis and, to a lesser extent, oogenesis. Worms lacking IFE-1 have lower fertility compared to wildtype worms. IFE-3 is another essential isoform that is expressed in both germ cells and embryos. Worms lacking the *ife-3* gene generally arrest at the embryonic stage, but ~10% escape that restriction. These IFE-3-deficient worms grow to adulthood, but are infertile because they lack oocytes. My preliminary survey of gonad morphology and immunostaining indicate that all *ife-3* mutant germ cells are converted to sperm. This leads me to hypothesize that IFE-1 and IFE-3 are working in conjunction, but perhaps at different stages, to determine germ cell differentiation. Worms that lack IFE-3 may also be temperature sensitive akin to many other animals that have an ideal temperature for spermatogenesis. Furthermore, RNA interference of IFE-1 in worms that genetically lack IFE-3 shows a new phenotype

in the gonad. The meiotic germ cells do not differentiate properly when both isoforms are not being expressed concurrently; some germ cells attempt to become sperm, while others attempt to become oocytes. The adult gonad of these worms does not resemble an archetypical hermaphrodite or male.

## UO6

**Eastern North Carolina Teachers' Attitudes Toward Using LGBT-Inclusive Literature in Elementary School Classrooms**, Karen Ackiss, Caitlin Law Ryan, East Carolina University, Greenville, NC

Amongst teaching standards created by national professional teaching organizations is one that requires all students and families to be welcomed and affirmed. As schools are typically heterosexist institutions, children who identify as LGBT (lesbian, gay, bisexual, or transgender), or who are children of LGBT parents, often lack a sense of validation. In fact, children who identify as LGBT, or who are gender non-conforming, often suffer a great deal of rejection and face bullying. Research has shown that the strategic use of quality children's literature with LGBT themes or characters can be an asset to the classroom environment. This is particularly important to note considering the research that proves validates the important role literature plays in the development of a child's identity and their growing knowledge of the world at large. While there is research to support the benefits of reading LGBT-inclusive, multicultural children's literature with children, there is none that investigates this topic in Eastern North Carolina. Therefore, my research will answer this question: given research on the benefits of student exposure to texts including LGBT characters, how do current and pre-service elementary school teachers in Eastern North Carolina rate their willingness and ability to use them in their classrooms? Current and pre-service teachers throughout one county in Eastern North Carolina will participate in an online survey that will evaluate their experience with LGBT-inclusive children's literature, their attitudes toward their use in the classroom, and their perceived ability to teach effectively with these texts. The information gleaned from this research will establish baseline data for evaluating the inclusivity of local elementary school curricula for children who are LGBT or have LGBT parents. Such findings will be informative to all teaching professionals as they evaluate the kinds of environments children are exposed to, and the amount of confidence teachers feel with this type of text. The study will also suggest the kinds of additional information or support teachers might need to make their classrooms truly inclusive for all students and their families.

## UO7

**Historical Literature and the 1898 Wilmington Race Riot**, Alyssa Champine, East Carolina University, Greenville, NC

In 2006, the 1898 Wilmington Race Riot Commission published a final report that serves as a historical record of the event and a record of the economic impact on the African American population in Wilmington at the time of the coup. Additionally, the commission mandated that the 1898 Wilmington Race Riot be taught in schools due to its importance in North Carolina's history. However, there is overwhelming evidence that students are not being exposed to this information. My mentor and I have created a teaching module that will provide instructors with a means to deliver instruction on this topic through historical fiction. We chose *MARROW OF TRADITION* by Charles Chesnutt and *CAPE FEAR RISING* by Philip Gerard as the primary focus of the module because of their historical accuracy. Within this teaching module, there are several tools that can be utilized by any teacher to teach about the 1898 Wilmington Race Riot. I have created an interactive timeline that summarizes the events leading up to the coup; a Venn diagram comparing an editorial and a speech that acted as catalysts for the coup; charts comparing characters from *CAPE FEAR RISING* with participants in the coup that were documented in contemporary accounts of it; a chart comparing accounts of casualties and the start of the conflict among eight different sources; and interview questions for Philip Gerard, author of *CAPE FEAR RISING*. The interview questions that I have created can be used in the future for an actual interview with Philip Gerard, perhaps conducted by students, which can then be published in the *NORTH CAROLINA LITERARY REVIEW*.

# Undergraduate Oral Presentation Abstracts (Face-to-Face)

U08

**Righteous Gentiles of the Holocaust**, Sandra Trybus, East Carolina University, Greenville, NC

Righteous Gentiles, or Righteous among the Nations, are non-Jews who risked their lives to save Jews during the Holocaust (A Dictionary of Jewish-Christian Relations 379). Yad Vashem has recognized over twenty-four thousand Righteous Gentiles from myriad countries for their heroic actions. Yad Vashem solely honors Righteous Gentiles who fit certain criteria and did not seek financial gain in exchange for assistance. My present study focuses on Righteous Gentiles from Poland due to the unusual circumstances these individuals encountered during Nazi occupation. This investigation entails several steps.

First, a literature review was conducted on Righteous among the Nations from Poland. Three individuals whose exploits largely impacted the Holocaust were researched extensively. Literature concerning Polish-Jewish relations and World War II was examined to establish an understanding of the historical setting in Poland. The study attempts to diminish the historic viewpoint of Poles as anti-Semites and people who collaborated with the Nazis. Several hypotheses were formulated pertaining to the motives or reasons why Righteous Gentiles were inclined to help the Jews. Next, literature on the reasoning for helping Jews during the Holocaust was analyzed and consistent findings were discovered. In the final step of this study, I would hope that the results from my thesis would be able to be useful to the Yad Vashem database.

U09

**Forgiveness, The Cure for Evil in William Faulkner's 'Sanctuary' and Tim Gautreaux's 'The Missing'**, Rachel Ward, East Carolina University

I will be presenting a paper discussing the role of evil in the novels *Sanctuary* by William Faulkner and *The Missing* by Tim Gautreaux, and the subsequent reactions of the main characters of these novels (Faulkner's Horace Benbow and Gautreaux's Sam Simoneaux). While Faulkner presents a bleaker, more hopeless view of an individual's chance to defeat evil, Gautreaux's story demonstrates a cautious optimism and hopefulness for its protagonist. This is evidenced in the individual journeys of Horace and Sam. Horace Benbow is so shocked by the horror and senseless hatred displayed towards other human beings that he intentionally blinds himself to it, making it clear that he never truly understands that he should be trying to change the prejudice between social classes instead of focusing all his effort into winning a trial that is destined to fail as a result of that same prejudice. Because of his blindness, Benbow loses the trial, his hope and his optimism for the future, essentially becoming another victim. Sam Simoneaux, however, is never unaware of the true origins of the evil he is fighting against. Throughout his journey, he grows to realize that the

only way to fight against evil is to forgive those who have wronged him, thus ending the cycle of hate and vengeance once and for all and allowing him to move forward with his life. This comparison shows that the best way of the two to win against evil is to forgive, thus cutting evil off and keeping it from growing.

U010

**Turning On the Volume: Anthony Minghella's film adaptation of Charles Frazier's *Cold Mountain***, Mizul I. Cobeo, Department of English, East Carolina University, Greenville, NC

Film adaptation is the art of reworking a written text for the screen. The process by its very nature implies a degree of difference if only because the story telling mediums are different. A film adaptation that provides good example of these differences is the adaptation of North Carolina writer Charles Frazier's *Cold Mountain*. This paper looks specifically at the difference between the written scene of Inman's death in the novel, in contrast to its adapted counterpart in the film. What this paper argues is that the notable addition of sound to the scene in the film and the intentional lack of sound in the original text reflect the different agendas between Charles Frazier and Anthony Minghella, who adapted the novel into the film. Both storytellers utilize sound in their scenes, but the quietness of in Frazier's original scene creates a sense of peace and gentle release whereas the addition loud music in Minghella's adaptation creates a sense of tragic loss.

in the gonad. The meiotic germ cells do not differentiate properly when both isoforms are not being expressed concurrently; some germ cells attempt to become sperm, while others attempt to become oocytes. The adult gonad of these worms does not resemble an archetypical hermaphrodite or male.

U011

**LuCIDD Optical Setup**, Dr. Regina DeWitt, Mary E. Taylor East Carolina University

Natural environmental radiation causes charge to become trapped within materials and by bleaching (shining highly focused light) these materials we are able to remove the trapped charge through exposure to light. Optically Stimulated Luminescence (OSL) is the emission of light from an irradiated insulator or semiconductor during exposure to light. When we bleach a sample we are able to read the OSL signal and determine the last time the sample has been in direct sunlight and use that to date the sample. During the measurement a highly focussed laser beam is scanned over the sample. It is a new and valuable method for measuring doses from ionizing radiation. This method can be used with an instrument available in the physics lab at East Carolina University called LuCIDD which is a confo-

cal luminescence instrument under development by Dr. Regina DeWitt and myself. The goal of this undergraduate research is to use LuCIDD and design the best optical setup for the study of OSL signals. The optical setup uses a variety of lasers, lenses and pinholes to find the best alignment combination for optimum laser diameter on sample surfaces.

## U012

**The Theory of General Relativity predicts some results which are in agreement with Non-Relativistic Quantum Mechanics, even though Einstein published the theory 9 years (1916) earlier than Quantum Mechanics was known.** Maneesh Jeyakumar and Dr. Orville Day, Department of Physics, East Carolina University, Greenville, NC

The General Theory of Relativity, a theory about gravity including gravitational waves, was first published by Einstein in 1916. In its conventional applications since then, it predicts that gravitational waves travel at the speed of light. In the region near a black hole some gravitational waves may circle it, influencing the radiation emitted by falling material within that region. Properties of these waves provide experimental tests of General Relativity itself, including the speed of the waves predicted by the theory in a location where gravity is intense, together with two other physical properties: the inherent spin of the quantized particles (gravitons) of which the gravitational waves are composed, and the quantization of the possible frequencies of the waves. These waves circle the black hole just outside the event horizon (beyond which nothing can return to the outside world). The discrete frequencies predicted by the theory concord with predictions of non-relativistic quantum mechanics, a theory originally published in 1925, 9 years later, without any consideration of the properties of gravity. The largest amplitude gravitational waves measured on Earth originate at the supermassive black hole (named Sagittarius A Star Sgr A\*) which is the center of our Milky Way Galaxy. This black hole is sufficiently massive that radiation from its surrounding region outshines the radiation from the region surrounding any one of the millions of smaller black holes which are closer to Earth than Sgr A\*. It is hence easier to measure its properties. We show that the theoretical predictions of General Relativity for radiation from Sgr A\* match nicely experimental Amplitude Modulated Frequencies (AMF) of signals measured at Earth.

## U013

**Delayed self-fertilization in *Triodanis perfoliata*, an annual plant species,** Hetal Patel, East Carolina University, Greenville, NC

Self-fertilization (selfing) allows a plant to reproduce when pollinators may be scarce. In some plants, selfing occurs late in anthesis, allowing opportunities for cross-fertilization before selfing occurs. This mechanism is thought to take place in *Triodanis perfoliata*, a winter annual plant species. In a greenhouse study, research was conducted on *Triodanis perfoliata* to determine the timing of selfing during anthesis within the plant. Additionally, the plants' ability to produce full seed set through selfing was studied. Plants were inspected every day for flower opening. Styles of various ages were collected and stained for self pollen tube growth. The pollen tubes that penetrated the stigma and entered into the style were counted. Mean pollen tube number increased dramatically in styles collected at later stages of anthesis, showing that selfing is delayed.

Seed set was compared after four different treatments were applied to various flowers of each plant. The first two treatments both included hand self-pollination on the first day of the stigma opening; however in one treatment the style was cut off one day later and in the other treatment the style was left intact. In the third and fourth treatments no hand self-pollination was applied; in one treatment the style was cut off early in anthesis and in the other the style remained intact. In the unpollinated treatments, seed set was higher in flowers with uncut styles. The lower seed production within the cut style treatment indicated that selfing is somewhat delayed. Furthermore, seed set in the cut and uncut styles in pollinated treatments were equivalent, indicating that the removal of the style only prevented delayed selfing. The uncut pollinated treatment produced a higher seed set than the uncut unpollinated treatment, which showed that selfing alone does not produce full seed set. Taken together, our results confirm that selfing occurring late in anthesis contributes substantially to reproduction in *Triodanis perfoliata* but is not as effective as both self- and cross-fertilization.

# Undergraduate Oral Presentation Abstracts (Face-to-Face)

U014

**On the validity of the northern fog-basking beetle (*Onymacris unguicularis schulzeae*): molecular phylogenetics complement previous morphological assessment of this Namib Desert endemic,**

Rachel Plollard<sup>1</sup>, Trip Lamb<sup>1</sup>, and Jason E. Bond<sup>2</sup>,  
<sup>1</sup>Department of Biology, East Carolina University, Greenville, NC, <sup>2</sup>Auburn University Museum of Natural History, Auburn University, Auburn, AL

Darkling beetles (family Tenebrionidae) are dominant ecological forms in the dune fields of Africa's Namib Desert. One of the more intensely studied species, the fog basking beetle (*Onymacris unguicularis*), has been subject to much ecological and behavioral research. Northern populations isolated from other populations by approximately 300 km have been described as a separate subspecies, *O. u. schulzeae*, based on minor morphological variation. However, whether, or to what degree, *O. u. schulzeae* is genetically distinct from the southern subspecies (*O. u. unguicularis*) has not been determined. To address this question, we generated DNA sequence data for two mitochondrial genes from populations across the beetle's geographic range. We observed limited population genetic divergence within subspecies but substantial divergence between subspecies. Moreover, phylogenetic analysis identified two well-supported groups corresponding precisely with the northern and southern subspecies. These genetic data, in conjunction with additional morphological analysis, support the validity of *O. u. schulzeae* and suggest that this subspecies may warrant full specific status.

U015

**Proposed origin of black mats found at the Younger Dryas boundary,** Abigail 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.

U016

**Dietary Patterns of Female Hispanic Immigrants,** Kimberly Opsal, East Carolina University, Greenville, NC

When individuals immigrate to the United States, their dietary patterns often change because of lack of access to foods common to their culture. This forces immigrant populations to adapt new food habits that are potentially detrimental to their health (e.g., promote obesity, diabetes, hypertension). This qualitative study analyzed the food experience themes of young adult Hispanic female immigrants. We hypothesized that current diet habits, in comparison to those from their home country, are less healthy (e.g., more processed, higher fat and sugar content). From December 2012 to February 2013, two audio taped interviews were conducted in the homes of Hispanic female participants of Women, Infants, and Children at Wake County Northern Regional Center of Health and Human Services. All participants had immigrated within the past 10 years, and were between 20 to 40 years of age. Descriptions of the dietary changes, and their impact on the family, were explored during the initial home interview. During this initial visit, each participant was provided a digital camera and instructed to take 10 pictures of food experiences in their home. A qualitative inquiry about the pictures taken occurred during the second home interview. The audio-recorded interviews were translated (from Spanish to English) and transcribed verbatim by the primary researcher. Phenomenology is the Theoretical Tradition that we are using to assess themes about dietary changes that resulted from immigration.

## U017

**Police Integrity: The promotion of ethical behavior and elimination of the abuse of power from police officers.** Dany Hernandez, East Carolina University, Greenville, NC

Being a police officer comes with an outstanding amount of responsibility. In order to carry out their duties, police officers are given a great deal of power over the people that they have sworn to protect. With more command and authority than the average citizen, police officers are faced with moral and ethical dilemmas on a daily basis. Integrity is crucial if a police force is to function effectively and to successfully navigate towards a common goal. From federal law enforcement to town or city agencies, integrity violations or some other form of corruption is a possibility that could potentially fragment the force. Further, no matter the degree of corruption, any case of police deviance will affect the public image of law enforcement. Citizens tolerate the police clearly having more authority over them because the people trust those officers to not abuse their power and use it to effectively do their job.

This research analyzes how specific abuses of power have affected departments and their surrounding communities. It also examines the effectiveness of approaches departments have taken towards preventing unethical behavior. Although tackling corruption, police deviance, and other integrity violations is a very difficult and ongoing task, it is imperative to do so in order to strengthen the force and its impact on society. Promoting ethical behavior and overall integrity within police departments not only contributes to a positive public image, but also reduces future abuses of power.

## U018

**Sea-level Rise Literacy and Perceived Risk in Eastern North Carolina,** Alyssa Randall, Department of Geography, East Carolina University, Greenville, NC & The NC Space Grant

Sea-level rise is an emerging environmental transformation to which Eastern North Carolina is highly vulnerable. The Albemarle and Pamlico Sound region has already been identified as one of the top three most threatened areas from sea-level rise in the United States. While a great deal of research has been done on global climate change and sea-level rise, less research has investigated how people understand the phenomenon and perceive its potential effects. Yet, an understanding of residents' awareness and understanding of environmental transformations such as sea-level rise is critical to formulating effective education, policy, and mitigation plans. This study proposes to investigate sea-level rise literacy and perception of risk among coastal and inland residents of Eastern North Carolina through surveying residents and teachers in four locales in eastern North Carolina:

Nags Head, Wilmington, Greenville/ Pitt County, and Duplin County. The specific objectives of the survey are 1) to compare inland and coastal residents' views on public policy and mitigation efforts and 2) to analyze how factors such as age, gender, education, occupation, income, and residency influence sea-level rise literacy and risk perception 3) to compare teachers' understanding and perception of sea-level rise to that of the general public. Using a convenience sampling method, approximately 200 surveys will be distributed to residents across the four locales. Science teachers in grades k-12 will be surveyed via the environmental education listserv through the National Science Teachers Association. Data will be analyzed using IBM SPSS statistics software to correlate responses with demographic data. It is intended that the findings from this research can then be used to design k-12 education programs that aim to raise awareness about sea-level rise and also to assist policy makers and town planners in formulating mitigation plans for the future.

## U019

**FoodMASTER Science Curriculum Increases 4th Graders Multidisciplinary Science Knowledge,** Caitlin Collins<sup>1</sup>; Virginia Carraway-Stage, MS, RD, LDN<sup>1</sup>; Jana Hovland, MS, RD<sup>2</sup>, Sebastian Diaz, PhD<sup>3</sup>, Melani Duffrin, PhD, RD, LDN<sup>1</sup>; 1 Department of Nutrition Science, East Carolina University, Greenville, NC, 2 Department of Dietetics, Marshall University, Huntington, WV, 3 Diaz Consulting, Morgantown, WV

The Food, Math, and Science Teaching Enhancement Resource (FoodMASTER)(FM) Initiative is a compilation of programs aimed at using food as a tool to teach mathematics and science. Previous studies have shown that students experiencing the FM curriculum were very excited about the activities, became increasingly interested in the subject matter of food, and were able to conduct scientific observation. The purpose of this study was to assess the effectiveness of the integrated hands-on, food-based science curriculum on 4th grade students' multidisciplinary science knowledge. During the 2009-2010 school year, FM researchers implemented a hands-on, food-based intermediate curriculum in eighteen 4th grade classrooms in Ohio (n=9) and North Carolina (n=9). Students completed a researcher-developed science knowledge instrument, consisting of 13 multiple choice questions administered pre- and post-test. Only subjects with pre- and post-test scores were entered into the sample (Intervention n=343; Control n=237). No significant differences were observed between groups at pre-test. At post-test, the intervention group scored (9.9532.00) significantly higher (p=.000) than the control group (8.8432.37). These findings suggest the FM intermediate curriculum is more effective than a standard science curriculum in increasing students' multidisciplinary science knowledge.

# Undergraduate Oral Presentation Abstracts (Face-to-Face)

## UO20

**There Is No Planet B: The Most Frequently Used Green Initiative Practices of North Carolina Bed and Breakfasts**, Mary Stuart Sanderson, Alleah Crawford, East Carolina University

A bed and breakfast (B&B) is a house or small lodge where someone can rent a room for a fee that includes breakfast (Bed and Breakfast, 2012). The United States B&B industry is worth approximately \$3.4 billion, with roughly 17,000 operating inns (Professional Association of Innkeeper International, 2010). According to Tsai (2008), green inns are B&Bs that use eco-friendly operation methods, while protecting their business environment, to provide consumers with green living areas, products, and/or services. DeFranco and Weatherspoon (1996) found three key categories that B&Bs should add to their list of green practices: energy, solid waste, and water. Some individual examples of green initiatives for the B&B industry are full washer/dryer laundry loads, reusable utensils rather than disposable, paper reduction practices, and the purchase of green cleaning products (DeFranco & Weatherspoon, 1996). Studies found that the execution of green initiatives is more common in large hotel chains, and that businesses like B&Bs are lagging behind (Van Haastert & De Grosbois, 2010). According to Van Haastert and De Grosbois (2010), there are three key barriers in the adoption of sustainable practices in smaller inns: budgetary constraints, lack of knowledge, and conflict with consumer outlook and expectations. In order to better understand the adoption of green practices within the B&B industry, this study seeks to investigate the most frequently used green initiatives among North Carolina B&Bs. Quantitative data related to the use of green practices was collected via an electronic survey. The survey asked participants if they performed specific green initiatives, as well as how well they performed these practices. A sum of 215 North Carolina B&Bs were surveyed for this study. The response rate of this research study was 33%, which means 71 surveys were completed out of the 215 that were given. Of the 71 responses, 58% of them were complete and valid for analysis. Data has been collected and analyses are currently being completed. Means will be calculated so that a list of most frequently used B&B green initiatives can be generated.

## UO21

**Effects of Implicit Theory of Personality and Big 5 Personality on Responses to Biased Statements during Intercultural Communication**, Michelle Collins, Marion Eppler, PhD, Department of Psychology, East Carolina University

My senior thesis tests Dweck's (2000) theory that beliefs about personality influence reactions to stereotyped information. People with a fixed view believe that personality is a stable trait and behavior is consistent. They are likely to endorse stereotypes and make quick global judgments about character (Levy, et al., 2001). In contrast, people with a malleable view believe that personality is changeable and behavior adapts to different situations. They rely less on stereotypes and are flexible in their interpretations of others' behavior (Molden & Dweck, 2006), and they are likely to confront prejudice in a positive, educational manner (Rattan & Dweck, 2010). The purpose of my experiment is to apply this theory to intercultural interactions. More specifically, I am comparing how fixed versus malleable views of personality influence cross-cultural communication when stereotyped comments are made.

My study began last fall (2012) and is ongoing this semester (spring 2013). Participants complete Dweck's (2000) measure of beliefs about personality and a Big Five Inventory (John & Soto, 2008) to examine relationships between actual personality and beliefs about personality. Then they are experimentally oriented towards a malleable or fixed view of personality by reading scientific reports endorsing one or the other (see Chiu, Hong, & Dweck, 1997 and Rattan & Dweck, 2010 for similar interventions). Next, participants engage in an intercultural communication task where they converse with an international partner (confederate) via computer chat. After several minutes of discussion, the international partner makes a biased comment about Americans. After answering a few final questions, the experiment ends with a careful, scripted debriefing. Outcome measures include participants' responses to the biased statement during chat and their ratings of the partner on global characteristics such as friendliness.

My hypotheses are that participants with a fixed view of personality will ignore the biased comment during conversation, avoid future interactions with the partner, and evaluate the partner negatively. Participants with a malleable view will confront the biased comment positively, be motivated to continue the interaction, and evaluate the partner positively. These findings may have implications for improving intercultural interactions.

# Undergraduate Poster Abstracts (Face-to-Face)

# RCAW

UP1

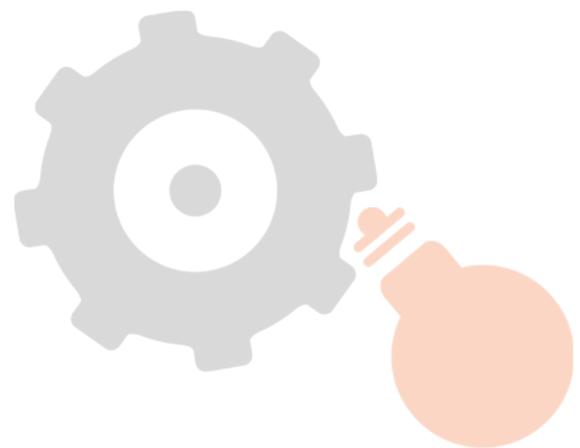
**Epigenetic Effect of Paternal Diet and Exercise on Offspring Activity Level**, M. P. Parker<sup>1</sup>, A. Ajmera<sup>1</sup>, M. Koury<sup>1</sup>, M. Jeyakumar<sup>1</sup>, O. Williams<sup>1</sup>, E. Pak<sup>1</sup>, D. Walters<sup>1</sup>, D. Neurfer<sup>1-2</sup>, and A.K. Murashov<sup>1</sup>, <sup>1</sup>Department of Physiology, <sup>2</sup>Institute for Diabetes and Obesity, East Carolina University, Greenville, NC

Transgenerational epigenetic alterations have shown to play roles in metabolic disorders such as obesity and diabetes. However, epigenetic effects on associated behavioral patterns are far less studied. We investigated the effects of diet and exercise on behavior via total motor activity and tested the hypothesis that fathers subjected to chronic exercise will produce offspring that express higher levels of motor activity while fathers subjected to a high fat-diet will produce offspring that express lower levels of motor activity. Variation in activity was measured by studying total XT+YT and Z movement of C57BL/6J mice placed in metabolic cages for 5 day periods at 4 weeks, 10 weeks, and 16 weeks of age. Fathers were split into three groups: 10% fat diet control group (CF, n=5), 60% fat diet experimental group (FF, n=6), and chronic exercise experimental group (EF, n=5). Offspring were split via their parental grouping (CF n=13, EF n=12, and FF n=7), and then randomly divided into 10% fat diet group (n=17) and 60% fat diet group (n=16). Comparison between F1 offspring groups revealed that only EF mice expressed a significant increase in total activity from CF mice at 4 weeks ( $P < 0.05$ ). No other significant differences between groups were found at any time point; however, the established pattern could lead to further research using wheels within metabolic cages to allow for more accurate measurement. Differences in activity between groups based on parental heritability decreased over time while differences between groups based on diet increased. Differences between CF and EF decreased by 50% from 4 weeks of age to 16, while differences between 10% fat diet mice and 60% fat diet mice increased by 350% over the same time period. At 4 weeks, EF mice exhibited 136% total activity of CF mice while at 16 weeks this was reduced to 116%. At 4 weeks, 60% fat mice demonstrated 94% the activity level of 10% control mice, while at 12 weeks the number was reduced to 80%. This research suggests that epigenetic modifications initiated by diet and exercise can cause non-genetic transgenerational effects on behavior and that modifications can be reversed by alterations in diet and exercise.

UP2

**Inhibition of Vascular Smooth Muscle Growth by the Soluble Guanylyl Cyclase Activator BAY 60-2770**, Danielle N. Martin, Shaquria P. Adderley, Chintamani N. Joshi, William Durante and David A. Tulis, East Carolina University, Greenville, NC

Abnormal proliferation and migration of vascular smooth muscle cells (VSMCs) are key components of pathologic vessel growth and efforts aimed at their reduction are clinically essential. Cyclic nucleotide signaling has long been studied for its growth-mitigating properties, and in the current study we hypothesized that the novel soluble guanylyl cyclase activator BAY 60-2770 (BAY) inhibits proliferation and migration of rat primary VSMCs through PKA and PKG. BAY significantly reduced cell numbers in concentration-dependent fashion after 72 h (0.1-10 QM) and S-phase cell numbers (~40%) after 16 h with no effects on cell viability. Interestingly, BAY caused nominal reduction (~20%) in cell migration after 16 h. Mechanistically, BAY significantly induced cGMP in concentration- and time-dependent fashion without apparent effects on cAMP. In-Cell Western analysis showed that BAY significantly increased phosphorylation of vasodilator-stimulated phosphoprotein (VASP) at Ser157 and Ser239, respective indicators of PKA and PKG signaling. Lastly, BAY doubled PKG activity without observable effects on PKA activity. These data suggest that BAY has capacity to inhibit VSMC proliferation through cGMP/PKG/VASP signaling. This work was supported by NHLBI grants HL59976 and HL81720 and by an ECU Undergraduate Research and Creative Activity Award.



# Undergraduate Poster Abstracts (Face-to-Face)

## UP3

### **Characterization of the specific interaction between HTLV-1 encoded protein HBZ and DNA helicase RecQL5**

Astor Ankney, Isabelle Lemason, Department of Microbiology and Immunology, Brody School of Medicine, East Carolina University, Greenville, NC

Adult T-cell leukemia/lymphoma (ATLL) is an aggressive form of cancer caused by the retrovirus HTLV-1. HBZ is one of the viral proteins implicated in the oncogenesis in ATLL. The purpose of this research is to understand at the molecular level how HBZ participates in the transformation process. Previously, our laboratory has shown that two LXXLL motifs in the activation domain (AD) of HBZ bind with high affinity to the KIX domain of cellular co-activators p300 and CBP, disrupting access to that domain by other transcription factors and therefore modulating transcription. Interestingly, one of the proteins that our laboratory found to interact with HBZ is the DNA helicase RecQL5. RecQL5 is involved in DNA replication and DNA repair and contains a KIX-like domain important for protein interaction and RecQL5 functions. Our hypothesis is that there is a direct interaction between the LXXLL motifs of HBZ and the KIX domain of RecQL5. This interaction could disrupt the activities of RecQL5, initiating genome instability in the infected cells and potentially be important for ATLL development. To this point, I have cloned the KIX domain of RecQL5 into the pGEX-2T bacterial expression plasmid using polymerase chain reaction. The plasmid has been transformed into pLysS competent cells to produce the KIX domain of RecQL5 in fusion with glutathione S-transferase (GST) protein. The next step is to affinity purify the fusion protein using glutathione-agarose beads. We will then perform GST-pull down assays using HBZ-AD added to the GST-KIX protein to determine whether HBZ-AD interacts with RecQL5-KIX domain. If a direct interaction is found, we will determine whether HBZ influences factors binding to RecQL5-KIX domain and affect RecQL5 function. If the result is negative, we will examine the possibility that another domain of HBZ or RecQL5 is involved, or that an intermediate protein is moderating the interaction.

## UP4

### **Impacts of nicotine on the nAChRs and selected microRNA in *Caenorhabditis elegans***

Joseph Ryan Polli and Xiaoping Pan, East Carolina University, Greenville, NC

Nicotine is one of the most abused substances. Nicotine targets nicotinic acetylcholine receptors (nAChRs), stimulates the mesolimbic dopamine system, and leads to addiction. This project's purpose is to decipher the microRNA regulation of

nAChRs in response to nicotine exposure using the model organism *Caenorhabditis elegans* (*C.elegans*). MicroRNAs are conserved, non-coding small RNAs which have emerged as a master regulator for gene expressions. However, nicotine-induced microRNA regulation of nAChR gene clusters remains unknown. The *C. elegans* genome encodes 28 nAChR genes that are highly conserved across species including humans. *C. elegans* also exhibit similar behavioral patterns as humans when exposed to nicotine. We hypothesize that nicotine exposure induces aberrant expressions of microRNAs that target nAChRs genes and regulate addiction behaviors. Preliminary data has successfully characterized addiction behavioral patterns following chronic low micromolar range nicotine exposures, including stimulation, withdrawal, and tolerance. This project will support further research on microRNAs regulation of nAChR genes implicated in addiction behaviors. *C. elegans* were treated with control, 6.17 M, 19.5 M and 61.7 M of nicotine for 24-hours where RNA was then extracted. Primers were designed and the expressions of the 28 nAChR genes were measured using the quantitative Real-time PCR. We then identified conserved miRNAs that potentially target the nAChRs using target prediction algorithms. The selected miRNA were then analyzed using a stem-loop real-time PCR procedure. This project will provide novel insights into molecular mechanisms of nicotine addiction; identified miRNAs would serve as therapeutic targets for addiction

## UP5

### **Investigating metal oxide nanoparticles toxicity and mobility in aqueous environment: impacts of pH and temperature**

Tommy Zhang, Yanqiong Zhang, Aparna Satsangi, and Xiaoping Pan, East Carolina University, Greenville, NC

One important aspect to study the toxicity induced by manufactured nanoparticles (NPs) is the characterization of NPs in the dosing solution, including particle size, size distribution, composition, surface area and reactivity. Characterizing the physiochemical properties of NPs is critical to understand basic mechanisms underlying the interaction of NPs and biological matters, such as what property mainly determine the toxicity? The knowledge will enable the prediction and evaluation of toxicity of different NPs where toxicological data is insufficient. In this study, we investigate the effects of pH and temperature on the aggregation and agglomeration of metal oxide nanoparticles ZnO, TiO<sub>2</sub>, and CuO. The NPs size, distribution, and zeta potential were tested under different pH and temperature ranges. We also use *Caenorhabditis elegans* (*C.elegans*) as an animal mode to assay the toxicological effects of different NPs. The survival, growth, and reproduction effects were investigated. Results indicate sig-

nificant higher mortality and reproduction inhibition were induced by CuO and ZnO than TiO<sub>2</sub> NPs. In molecular level, we also dosed *C. elegans* L4 larvae for 24 hours to test the expression of egg-laying and oxidative stress related genes. Results showed CuO NP causes growth retardation and brood-size reduction in *C. elegans*. The gene expression of some egg-laying or stress related genes, such as *acr-8*, *egl-19*, *egl-46*, *old-1* were also affected by CuO NPs.

#### UP6

**Translational control during neonatal male germ cell development**, Evelyn P. Kaye<sup>1</sup>, Jonathan T. Busada<sup>1</sup>, Vesna A. Chappell<sup>1</sup>, Brett D. Keiper<sup>2</sup>, and Christopher B. Geyer<sup>1</sup>, <sup>1</sup>Departments of Anatomy and Cell Biology and <sup>2</sup>Biochemistry and Molecular Biology, Brody School of Medicine, East Carolina University, Greenville, NC

Transition of quiescent gonocytes to proliferating spermatogonia in the neonatal mouse testis initiates the first wave of spermatogenesis at 3-4 days postpartum (dpp). Despite doubling of the germ cell population during this developmental transition, mRNAs encoding only ~50 genes increase e2-fold. We used a genome-wide approach to determine whether changes in translation efficiency might also regulate gene expression. Whole testis extracts were fractionated on polyribosome profile gradients to resolve cytoplasmic translating and non-translating mRNA complexes. Total RNA and protein were isolated from whole testis and gradient fractions for qRT-PCR and western analysis, respectively. We found that ~3,000 unique mRNAs became e2-fold enriched in polyribosomes during this transition without significant changes in their abundance. We found that accompanying protein levels for a subset of these genes increased, as predicted. Our data support the concept that, in the neonatal testis, mRNA utilization is an important determinant of the proteome. In addition, we have identified a large group of genes whose future study will identify previously unappreciated pathways and cellular processes involved in neonatal germ cell development.

#### UP7

**Combination of Dendritic Cell Therapy with Conventional Chemoradiation Therapy Improves Survival for Rectal Cancer in a Murine Model**, Walker JN<sup>1</sup>, Kachare SD<sup>2</sup>, Cayer JC<sup>2</sup>, Carver FM<sup>2</sup>, Englert ZP<sup>2</sup>, Verbanac KM<sup>2</sup>, Zervos EE<sup>2</sup>, Vohra NA<sup>2</sup>, <sup>1</sup>East Carolina University, Greenville, NC, <sup>2</sup>Department of Surgery, Brody School of Medicine, East Carolina University, Greenville, NC

The goal of neoadjuvant therapy in rectal cancer is to downstage or preferably eradicate the tumor prior to resection. Achieving complete pathologic response (CPR) using neoadjuvant chemoradiation is associated with improved overall and disease free survival. The aim of this study was to achieve improved complete pathologic response rates and survival by combining intra-tumoral injection of dendritic cells with conventional therapy. A syngeneic rectal cancer cell line (CT26) was subcutaneously injected into the thigh of immunocompetent Balb/c mice. Mice either received no treatment, conventional chemoradiation (CXRT) (5-fluorouracil + XRT) for 3 weeks, or CXRT plus tumor-lysate pulsed dendritic cells (CXRT/DC). Specific anti-CT26 cytotoxic T cell (CTL) activity was determined using standard chromium release assay. Flow cytometry for immune cell subsets was performed on cells isolated from spleens and tumors. Animals in the control group showed predictable uninhibited growth and all were euthanized due to tumor size. CXRT animals showed improved survival but none achieved complete response. Thirty three percent of the animals in CXRT/DC group exhibited CPR. Median survival for the control, CXRT, and CXRT/DC treated animals was 24, 46.5, 67 days, ( $p < 0.0001$ ). Splenocytes from CXRT/DC treated mice exhibited higher specific anti-CT26 CTL activity (28%) when compared to CXRT (17%), untreated control (11%) and naïve mice (<1%). Flow cytometry demonstrated an increase in regulatory T cells (Tregs), macrophages, granulocytic myeloid derived suppressor cells (MDSCs) and monocytic MDSCs in tumor bearing animals, ( $p < 0.05$ ). Dendritic cell activity stimulates anti-tumor CTL responses, but may also decrease MDSC and Treg mediated immunosuppression. Addition of dendritic cells to conventional chemoradiation therapy for rectal cancer increases complete pathologic response and thereby survival via immune modulation. Further analysis will allow subset comparisons between treatment groups.

# Undergraduate Poster Abstracts (Face-to-Face)

UP8

**Genetic analysis of pollen color, number and viability in two subspecies of *Triodanis* and their hybrids**, Joshua Thigpen, East Carolina University, Greenville, NC

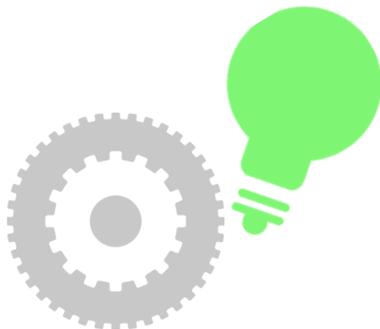
Speciation occurs when two separate species diverge from a common ancestor. The mating of these species often results in partially sterile hybrids that produce a reduced number of viable gametes. *Triodanis perfoliata* is an annual plant that has diverged into two subspecies: subsp. *biflora* and subsp. *perfoliata*. There are obvious phenotypic differences between the subspecies of *Triodanis*, including differences in pollen color and pollen production. We investigated pollen color and number in order to determine how many genes control the variation in these traits among the subspecies. We studied parental plants of each subspecies as well F1 and F2 generations. For pollen color determination, we collected samples from each plant and used some of the samples to create a reference to accurately score the other samples by eye. To quantify pollen production, we collected anthers of each plant, stained the pollen with aniline blue, and viewed it under a microscope using a hemacytometer. We then used a biometric method of comparing the variances between the F1 and F2 generations. If there is more variance shown by the F2 generation, then there are a small number of genes controlling the phenotypic trait. According to our results, approximately two genes control pollen color due to the increased variance in the F2 generation. In contrast, results for pollen production indicated that several genes control the difference between the subspecies. We also compared the amount of non-viable pollen produced by the parent subspecies, F1 and F2 generations and found that hybrids have somewhat increased sterility. This study contributes to an ongoing investigation of reproductive isolation between two diverging plant subspecies.

UP9

**The Effect of Lithium Chloride Combined With a Mineral Mix in a Rat Model of Mania**,

Cara E. Carr, Zachary A. Cormier, Helen L. Williams, Partha S. Nagchowdhuri, Brian A. McMillen, East Carolina University, Greenville, NC

The purpose of this experiment is to investigate whether the effects of lithium chloride (LiCl) are enhanced by the addition of a mineral mix supplement, EMPower Plus, to reduce hyperactivity in a rat model of mania. The hypothesis is that the LiCl and mineral mix combination will produce a significant decrease in hyperactivity. Bipolar disorder is a very prevalent disease in today's society. The treatment of bipolar patients with LiCl produces high levels of toxicity in these patients. If the results prove significant, considerably less LiCl could be prescribed with the same amount of efficacy. This will produce a significant decrease in toxicity, which will result in a decrease in negative side-effects. This study uses the flower pot technique to produce hyperactivity by Rapid Eye Movement (REM) sleep deprivation for three days. Twenty mmol/kg or 60 mmol/kg LiCl, 20% mineral mix, 20 mmol/kg LiCl plus 20% mineral mix, or vehicle are administered orally for fourteen days and again during the three days of flower pot REM sleep deprivation. Body weight, food, and fluids are measured daily. On day 17, rats are video-recorded and the SMARTJr program by Panlab Harvard Apparatus is used to measure distance travelled. Immediately after recording, the rats are killed, brains removed, and the striatum and prefrontal cortex detached for HPLC analysis of dopamine and its metabolite, DOPAC. The results show a significant increase in distance travelled by sleep-deprived rats versus controls. Also, the rats that received 60 mmol/kg LiCl are different from the controls. For HPLC analysis, the only difference found is that the dopamine levels in the striatum of the 60 mmol/kg LiCl are significantly higher than the 20 LiCl plus 20% mineral mix. The hypothesis is proven incorrect with the mineral mix concentration used for this study. It is possible that additional trials with different concentrations may be necessary for significance within the groups.



## UP10

**The Human T-cell Leukaemia Virus type 1 (HTLV-1) encoded protein, HBZ, stabilizes and up regulates the c-Jun protein and gene**, Martin Pearce, Isabelle Lemasson, Nicholas Polakowski, Department of Microbiology and Immunology, Brody School of Medicine, East Carolina University, Greenville, NC

HTLV-1 is a human retrovirus known to cause adult T-cell leukaemia (ATL) characterized by uncontrolled proliferation of CD4(+) T-cells. Among the HTLV-1 genes the basic leucine zipper (HBZ) gene is the only one transcribed as an anti-sense transcript from the 3' long terminal repeat of the provirus. HBZ has been shown to be expressed in all ATL cases whereas other virally encoded genes are not always expressed. Therefore HBZ is believed to be important for pathogenesis of ATL. HBZ is a nuclear protein with a C-terminal leucine zipper (ZIP) domain. The ZIP domain is known to interact with several cellular bZIP proteins such as c-Jun and JunB. c-Jun is an oncogenic transcription factor that plays an important role in cellular proliferation, transformation and differentiation. c-Jun forms a heterodimer with c-Fos to form activating protein 1 (AP-1) transcription factor, which enables AP-1 to bind its DNA sequence. One previous study showed that HBZ inhibited c-Jun binding to the DNA. Another study showed that HBZ promoted proteolytic degradation of c-Jun. There are two forms of the HBZ protein, spliced (Sp1) and unspliced (US), which differ by a few amino acids at the N terminus. The unspliced form of HBZ was shown to cause degradation of c-Jun; however, the spliced form was not characterized. We wanted to investigate the effects of HBZ Sp1 on c-Jun levels in the cell. We demonstrated using western blotting that when HBZ Sp1 was present the c-Jun levels were increased. HBZ Sp1 was also shown to increase levels of ectopically expressed c-Jun, suggesting that HBZ stabilizes c-Jun. In contrast to the previous report, HBZ US was also seen to stabilize c-Jun. We therefore hypothesize that c-Jun is degraded after it activates transcription to turn off gene expression. This post transcriptional degradation mechanism which turns off particular genes, has been studied with a similar transcription factor, c-myc. We predict that the binding of HBZ to c-Jun prevents AP-1 formation and therefore prevents c-Jun degradation which leads to its increased levels inside the cell. In addition to these findings, we have shown using real-time PCR that HBZ increases c-Jun transcription, therefore HBZ could be stabilising the c-Jun protein and up regulating the c-Jun gene. We are currently working on the exact mechanism of which HBZ causes these effects.

## UP11

**Changes in foot strike pattern and running mechanics following accommodation to minimalistic footwear**, Jennifer Warren, LILG, John Willson, PT, Ph.D., Department of Physical Therapy, East Carolina University, Greenville, NC

**Objective:** Minimalistic footwear has garnered widespread interest in the running community based largely on the premise that the footwear may reduce certain running-related injury risk factors through adaptations in running mechanics and foot strike pattern. The purpose of this study is to examine adaptations in running mechanics among runners who typically run in conventional cushioned heel running shoes as they transition to minimalistic footwear.

**Methods:** Nineteen female runners with a rear foot strike (RFS) pattern who train in traditional running shoes with a cushioned heel were recruited for this prospective observational study. Participants trained for 20 minutes, three times per week, for two weeks using minimalistic footwear. Three-dimensional lower extremity running mechanics were analyzed before and after this two week accommodation period. **Main outcome measurements:** Changes in foot strike pattern preference, hip and knee joint kinematics at initial contact, step length, stance time, peak ankle joint moment and joint work, and vertical ground reaction force loading rate were evaluated over time. **Results:** The majority of participants demonstrated a RFS pattern while running in minimalistic footwear at each visit. No change in foot strike pattern was noted over time ( $P = 0.25$ ). Runners demonstrating a RFS pattern experienced a vertical loading rate that was 331% greater than those who converted to a non-RFS pattern during the accommodation period. Knee flexion angle at initial contact increased  $3.8^\circ$  ( $p < 0.01$ ), but ankle and hip flexion angle at initial contact were similar between visits. No changes in ankle joint kinetics or running temporal-spatial parameters were observed.

**Conclusions:** Limited and inconsistent natural adaptations to minimalistic footwear were observed. The majority of traditionally shod runners utilized a RFS pattern while running in minimalistic footwear and maintained this pattern over time despite significantly higher vertical loading rates. This greater loading may have detrimental effects over time.

# Undergraduate Poster Abstracts (Face-to-Face)

UP12

**Does volitional consumption of ethanol by the mHEP rat produce tolerance?**, Shelby N. Barry, Sydney L. Hendricks, Helen L. Williams, Brian A. McMullen, East Carolina University, Greenville, NC

Alcoholism is a prevalent disease in the United States with a 10% lifetime risk. The Myers high ethanol preferring (mHEP) rat is used as an animal model of alcoholism. The mHEP rats have been selectively bred to volitionally consume copious amounts of ethanol. The project will test if drinking pharmacological amounts of ethanol provides a tolerance to acute doses of ethanol, as evidenced by reduced effects of ethanol on motor incoordination or hypothermia. The project will also determine if ethanol provides cross-tolerance to the hypnotic effect of pentobarbital, a barbiturate, along with a tolerance to a decrease in body temperature. Pentobarbital is used as a central nervous system depressant. The hypothesis is that after drinking ethanol for 2-3 weeks rats will be tolerant to acute doses of ethanol or a barbiturate drug. Rats from the F35 generation will be placed in individual suspended stainless steel cages for the 10-day step-up screening process of 3-30% ethanol in tap water. The preferred drinking concentration is then found (concentration that results in approximately 50% ethanol solution, 50% water consumed), and the rats will be trained to walk on the Med Associates Inc. rotorod, a rat treadmill. The preferred concentration will be given for 2-3 weeks and the rats must demonstrate the ability to walk for 180 seconds three consecutive days before testing. Criteria for walking on the rotorod on the test day is 60 seconds, then the baseline rectal temperature will be taken, and an acute dose of either 2.0 g/kg ethanol or 15 mg/kg pentobarbital will be injected intraperitoneally into the rats. Then the rats will be tested for walking on the rotorod, plus have their rectal temperature read at 15 minutes, 45 minutes, and 60 minutes. A control group of rats will go through the step-up process and will be treated the same as the experimental group, but will only receive water after the step-up procedure.

UP13

**Effects of the Viral A35 Protein on MHC Class II Protein Trafficking**, Corey Boles, Gwen Jones, Rachel Roper, Department of Microbiology and Immunology, Brody School of Medicine, Department of Biology, East Carolina University, Greenville, NC

Our lab studies the mechanisms of poxvirus virulence. Dr. Roper identified a viral gene/protein (A35R) that interferes with antigen presentation, the seminal event that begins an immune response. This gene increases virulence in mice 1000 fold, and it interferes with how the Major Histocompatibility Complex Class II (MHC Class II) on antigen-present-

ing cells functions in presenting antigens to T lymphocytes. However, the mechanism by which A35 interferes with MHC Class II is unknown. My project investigates whether the A35 affects MHC Class II protein recirculation, the process whereby MHC Class II molecules move from the surface of the cell to internal vesicles and then return to the cell surface to display foreign antigen bound to MHC Class II. We infect cells with either the wild type virus or the A35 deletion mutant virus for several hours, then we incubate with an unlabeled antibody that covers MHC Class II molecules on the cell surface. We allow the cells to incubate at 37 C during which time the MHC molecules circulate. Then we change the cells to 4 C with azide to "freeze" the proteins from moving and incubate with a labeled anti MHC Class II antibody which detects the new MHC molecules that have moved to the surface (the MHC that is bound to the unlabeled antibody is covered and hidden from detection). Thus, this process will identify the quantity of new MHC that move onto the cell surface. Our preliminary data show that the A35 protein interferes with the movement of the new MHC molecules to the cell surface.

UP14

**A Pilot Study of Foot Stiffness in Barefoot and Traditionally Shod Runners**, Erica A. Bell, Jamie E. Hibbert, Patrick M. Rider, Paul DeVita, Zachary J. Domire, East Carolina University, Greenville, NC

Running is a very popular form of exercise, but is associated with a large number of overuse injuries, such as shin splints, plantar fasciitis, and stress fractures. Over recent years there has been a rising trend in barefoot running, in which runners run barefoot or in minimalist shoes instead of traditional running shoes. There is a heated debate going on in the world of biomechanics as to the benefit of running with barefoot/minimalistic shoes versus traditional running shoes. Marketing claims suggest that running barefoot or in minimalist shoes prompts runners to shorten their strides and encourages a forefoot or mid-foot striking pattern, which is believed to strengthen foot structures and thereby reduce injury. The emphasis of increasing foot strength is placed mainly on the plantar fascia. Traditional running shoes rely on cushioning to disperse force. In barefoot running, the plantar fascia, due to arch deflection during loading, is thought to disperse forces more evenly. Due to the increased use of the plantar fascia, it should become stiffer, which in turn will strengthen the foot, and possibly reduce impact transmission injuries. In hopes of validating the claims of barefoot running with scientific evidence, and potentially providing insight on changes that can be made to the modern running shoe to reduce injury, this study will seek to

compare the differences in stiffness of the plantar fascia in barefoot runners and traditionally shod runners using ultrasound elastography. In addition, the flexor hallicus brevis muscle, its tendon, and the heel pad will also be examined for stiffness. It is hypothesized that an increased stiffness will be seen in the plantar fascia of barefoot runners when compared to controls (traditionally shod runners). Preliminary data supports this hypothesis. In a pilot comparison between a male barefoot runner and a traditionally shod male runner, an increased stiffness is seen in all four structures in the barefoot runner. More subjects will be recruited to further investigate this hypothesis and support this conclusion.

#### UP15

**Regulation of Germline Stem Cells via PUF proteins & Regulation of de-differentiation via HIF-1 proteins**, Quan Nguyen<sup>1</sup>, Austin Brokamp<sup>1</sup>, Udaya Sree Datla<sup>2</sup>, Myon-Hee Lee<sup>3</sup>

<sup>1</sup>Department of Biology, East Carolina University, <sup>2</sup>Department of Biomedical Sciences, East Carolina University, <sup>3</sup>Department of Oncology and Hematology, Brody School of Medicine, East Carolina University, Greenville, NC

Cell fate reprogramming manipulates cellular differentiation and allows its direction, a process critical for regenerative medicine. One mechanism often inherent to reprogramming is de-differentiation. Using *C. elegans* as a model system, we recently reported that PUF (PUF-8 and FBF) proteins are required to inhibit de-differentiation. Here we focus on how genetic and environmental factors regulate de-differentiation at the molecular and cellular levels. In this study, we identified LIP-1 (MPK-1/ERK phosphatase) a potential PUF target using bioinformatics, genetics, biochemistry, and cell biology tools. In addition, we found that hypoxia normally inhibit the initiation of de-differentiation. All regulators we found in *C. elegans* are broadly conserved. Therefore, we suggest that similar molecular circuitry may control de-differentiation in other organisms, including humans.

#### UP16

**NigD lipoproteins encoded by BF638R\_1335, O588 and O743 aid in the protection of *Bacteroides fragilis* against prolonged oxidative stress**, Samantha Palethorpe, Ivan Ndamukong, Anita Parker and Jeffrey C. Smith, East Carolina University, Greenville, NC

*Bacteroides fragilis* is a gram negative obligate anaerobe which is part of the normal human microbiota. Due to its highly aerotolerant nature *B. fragilis* is also one of the most commonly isolated bacterial strains from intra-abdominal abscesses; a condition which costs the US approx. \$500 million each year. Colonic perforations (due to surgical procedures, trauma etc.) allow *B. fragilis* to escape from an anaerobic environment to the aerobic peritoneal cavity. The immune system attempts to wall off the infection by forming an abscess, thus creating a perfect anaerobic environment for *B. fragilis* to proliferate. *B. fragilis* has a Prolonged Oxidative Stress (POST) response system that allows it to overcome the transition to an aerobic environment. The extracytoplasmic function sigma factor, EcfO, is one of many regulators which responds to oxygen stress and an EcfO mutant has a defect in survival after exposure to oxidative stress. EcfO is responsible for inducing a number of genes involved in the POST response. Three members of the EcfO regulon are BF638R\_1335, O588 and O743 which code novel lipoproteins bearing homology to the NigD family, each of which has a secretion signal sequence. These are induced 29, 112 and 18 fold respectively in *B. fragilis* upon controlled expression of EcfO, which suggests that they are involved in protecting *Bacteroides* against oxidative stress. The original NigD homologue was identified in the *Prevotella nigrescens* encoding locus, located adjacent to the bacteriocin-encoding gene, NigC. NigD is suggested to be an immunity protein to the bacteriocin *nigrescens*. The gene BF638R\_0501 has significant homology to NigC which suggests that BF638R\_0501, 1335, O588 and O743 may all interact in the same way to protect *B. fragilis* during prolonged oxidative stress. His-tagged complemented mutants were used to perform cellular localization and interaction assays to identify the role of these genes during the POST response. Identification of these upregulated genes aids in the understanding of how *B. fragilis* is able to survive in aerobic conditions during the formation of intra-abdominal abscesses.

# Undergraduate Poster Abstracts (Face-to-Face)

UP17

**The Effects of A35R on Lymphocyte Subpopulations in Mouse Lung**, Shayna Mooney, Gwen Jones, Rachel Roper, Department of Microbiology and Immunology, Brody School of Medicine, 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. Initial data showed increased recruitment and/or proliferation of cell populations in response to vaccinia infection, and the A35R gene slightly perturbed populations of B220+ cells (activated B and T cells), macrophages, dendritic cells, and granulocytes. Further repeats of the experiment will be required to look at the kinetics of the immune cell responses and to confirm findings in order to better understand A35R immunosuppression.

UP18

**Cardiovascular risk factors relating to alcohol consumption in students at East Carolina University**, Hannah Woolard, Brittany Brown, Hsiao Lai, MD, East Carolina University, Greenville, NC

**Objectives:** Describe the demographics of drinkers/nondrinkers, gender, and ethnicity at East Carolina University. Analyze the relationship of alcohol use and other cardiovascular risk factors. Analyze alcohol consumption and its relationship to other high risk behaviors.

**Background:** Although difficult to define, most scientists agree that binge drinking may be described as four or more drinks per occasion for a woman and five or more drinks per occasion for a man. Young adults, ages 15-24, are at highest risk to participate in binge drinking, especially college athletes, fraternity and sorority members. Long time abuse can result in chronic injury to the liver, lungs, and throat; tumors of lung and throat; as well as, in-

creased risk of heart disease, heart attack, or stroke. Along with these health problems come impaired judgment, resulting in risky behaviors such as drinking and driving, unplanned/unprotected sex, and violence.

**Methods:** During summer 2010 and fall 2011, undergraduate students at East Carolina University participated in a cardiovascular screening. As part of this screening, physical measurements such as height, weight, blood pressure, and heart rate were taken. A survey that evaluated the students' overall health, physical activity, eating habits (including salt, dairy, meat, and fat intake), smoking, and alcohol consumption was also completed.

**Results:** 19.1% of the screened population of undergraduate students at ECU admitted to drinking at least six alcoholic beverages a week. Out of these: 57.0% were male, 43.0% were female; 94.9% white; 2.5% black; 1.3% Hispanic; 1.3% other ethnicity. The average BMI for drinkers was 22.9 versus 24.0 in nondrinkers, and 45.6% were physically active (participating in at least 20 minutes of exercise a day). Of the drinkers, 40.5% were smokers while only 10.8% of the nondrinkers were smokers. 5.1% of drinkers had high blood pressure, 8% high cholesterol, and 15.2% gained 10 or more pounds.

**Conclusions:** In this study undergraduates who participate in drinking did not have greater risk factors associated with cardiovascular disease, aside from smoking. Although risk factors may not be currently present, healthy behaviors and disease prevention should be continued because it is known that over-time significant alcohol consumption contributes to cardiovascular risk.

UP19

**Comparison Of Hip Worn And Wrist Worn Activity Monitors For Assessment Of Physical Activity**,

Thomas F. Mahar and Matthew T. Mahar, East Carolina University, Greenville, NC

Accelerometers worn at the hip are used to assess physical activity, but lack of compliance with the measurement protocol can limit such studies.

**PURPOSE:** The purpose of this study was to examine the agreement between wrist worn and hip worn accelerometers on various physical activity outcome variables. **METHODS:** Sixty-four participants (mean age 21.3  $\pm$  2.4 yrs; mean BMI 24.7  $\pm$  4.6 kg/m<sup>2</sup>) wore two ActiGraph GT3X+ accelerometers (on hip and wrist) for two consecutive days. Participants exercised on a treadmill at two speeds to allow comparison of accelerometer output during walking and running. Participants also reported their preferences regarding hip and wrist worn activity monitors. **RESULTS:** Activity counts for axis 1 and the vector magnitude were significantly higher for wrist worn than for hip worn monitors ( $p < .05$ ), although monitor output was significantly correlated

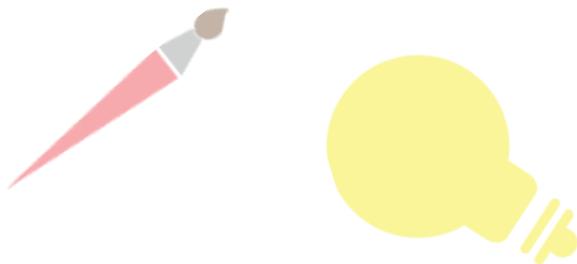
between the wrist and hip ( $r = .74$ ) during both treadmill and free living physical activity. Regression analysis to develop a cut-off score for wrist worn monitors comparable to established cut-off scores for hip worn monitors resulted in large errors. More participants felt the wrist worn monitor compared to the hip worn monitor was comfortable to wear when sleeping (65% vs. 52%) and easy to wear while exercising (94% vs. 67%). CONCLUSIONS: Activity counts from wrist worn monitors are moderately correlated to counts from hip worn monitors, but large standard deviations during both treadmill exercise and free living physical activity make it difficult to equate output from the two sites. Compliance may be improved with wrist worn monitors because participants report greater comfort and ease of wear than for hip worn monitors.

#### UP20

##### **Fast Food Consumption and Weight Change Among College Students, Based on Culinary Knowledge**

Lisa Bacon, Julie Barthel, Kimberly Kruse, Dr. Kimberly Heidal, PhD RD, Department of Nutrition Science, College of Human Ecology, East Carolina University, Greenville, NC

Fast food consumption and weight gain among the United States population is of growing concern as obesity rates climb. National nutritional data indicate the majority of young adults, ages 18-24, consume diets excessive in fat. This study examined the relationship between cooking ability, fast food consumption and weight gain in college students. A validated college life survey, approved by the East Carolina University Institutional Review Board, was administered to a convenience sample of 314 college students. Pearson product correlations and frequencies were calculated using SPSS version 20. No correlation was found between the ability to cook from scratch and fast food consumption or weight gain in college students. The statistical evidence suggests that convenience exerts a stronger influence over a student's dietary food choices, as opposed to culinary knowledge.



#### UP21

##### **Satisfaction among Patients and Families in a Pediatric Healthy Weight Treatment Center**

Kristen Everett<sup>1</sup>, Dr. David Collier<sup>2</sup>, Yancey Crawford<sup>2</sup>, 1 East Carolina University, 2 Brody School of Medicine, East Carolina University, Greenville, NC

As the prevalence of childhood obesity rises, it is becoming increasingly important for pediatricians to implement effective clinical interventions to treat obese children. The American Medical Association expert committee recommends a multi-disciplinary approach to treat childhood obesity which includes behavior and nutrition counseling, as well as motivational interviewing to promote change in the child's health behavior and improve weight outcomes (Barlow, 2007). Despite current clinical efforts and interventions to treat childhood obesity, attrition rates are high among the patients and families who are able to access such care (Skelton, 2012). A few studies hypothesize that failure to meet the family's expectations or dissatisfaction with the program result in high attrition rates. In general, patients demonstrate high rates of satisfaction with obesity treatment programs yet attrition rates remain high. Reasons for high attrition rates vary, however the connection between patient and family satisfaction and attrition rates has been seldom studied. This project aims to explore patient satisfaction themes and the implications patient satisfaction has for positive weight outcomes. This inconclusive outcome may be partially due to lack of specificity or sensitivity in satisfaction measuring tools as well as the fact that most surveyed patients are those who attend the appointments. This study in particular will review the satisfaction of patients and their families at the ECU Pediatric Healthy Weight Research and Treatment Center of Greenville, NC. Results obtained to date with the existing patient satisfaction instrument will be reviewed and discussed. A revised patient satisfaction measuring instrument will then be developed and implemented in efforts to better assess patient satisfaction and obtain actionable responses which allow for more effective treatment. A new process for collecting additional patient satisfaction data at a later (4 month) time point will be created and preliminary results from the new surveys will be presented and discussed. Further studies will be required to illustrate the connection between patient satisfaction and attrition rates and the effects on weight outcomes. This proposed study attempts to contribute to the existing research and provide a framework for future evaluation of pediatric obese patients' satisfaction.

# Undergraduate Poster Abstracts (Face-to-Face)

## UP22

**The Effects Of Exercise On Skeletal Muscle In Alzheimer's Disease**, Mary A. Greyard, Shelley Burgess, Alison C. Sloan, Sonja K. Bareiss, Terry E. Jones, Department of Physical Therapy, East Carolina University, Greenville, NC

The most common form of dementia, Alzheimer's disease (AD) is known for its ability to cause memory loss as well as changes in thinking and behavior. Previous studies have described that endurance exercise is related to improved cognitive function in humans with dementia and AD. We observed that AD transgenic (AD tg) mice had difficulty exercising compared to wild type (WT) mice. This suggests that there may be motor control problems with AD that might impact skeletal muscle or the disease has a direct impact skeletal muscle. Additionally, the literature reports that muscular strength is lower in AD patients. We hypothesized that mass, cross-sectional area, and/or fiber type in the EDL muscle will show differences in AD tg mice compared to WT mice. WT and AD tg mice were assigned to one of three different groups: sedentary, endurance exercise one time per week, and endurance exercised three times per week. EDL muscle was excised and weighed. Skeletal muscle was sectioned and will be analyzed for cross-sectional area and fiber type. We found that the mass of the EDL from AD tg mice was 58% ( $p = 0.039$ ) of the EDL mass from the WT mice when exercised three times per week. The AD mice that exercised three times per week had 24% less EDL mass in comparison to sedentary AD mice. The loss of mass in EDL skeletal muscle of AD tg mice suggests that chronic endurance exercise may result in atrophy, an undesirable outcome. We will report cross-sectional area measurements which will determine if skeletal muscle fibers have atrophied.

## UP23

**Effects of Exercise on Blood Biomarker Profiles in a Triple-Transgenic Mouse Model of Alzheimer's Disease**, Morgan Haskins<sup>1</sup>, Heather Lauth<sup>1</sup>, Alison Sloan<sup>1</sup>, Morgan M. Pearce<sup>1</sup>, Tuan D. Tran<sup>2</sup>, Terry E. Jones<sup>1</sup>, and Sonja K. Bareiss<sup>1</sup>, <sup>1</sup>Department of Physical Therapy, East Carolina University, <sup>2</sup>Department of Psychology, East Carolina University, Greenville, NC

Exercise has been shown to protect against cognitive decline and Alzheimer's disease (AD) progression. Despite the wealth of epidemiological evidence of this therapeutic approach, the dose of exercise required to protect against AD has not been determined. Recent studies show that the pathological processes leading to AD cause characteristic alterations in blood signaling inflammatory proteins

that are associated with the progression of AD. The purpose of this study was to determine the impact of increasing dosages of exercise on AD plasma signaling protein profiles, and correlate these findings with changes in cognitive (behavioral) function. Triple transgenic AD mice (3xTg) bearing the PS1-M146V, APP-Swe, and tauP301L mutations and non-transgenic mice were assigned to one of the following groups: sedentary controls, one time per week, or three times per week forced wheel running. All exercise groups received 12 weeks of exercise at a moderate intensity of 8.0 m/min for 60 minutes. Blood was drawn at the start (3 months) and end of the exercise intervention. At 6 months of age, animals underwent cognitive behavioral (Morris Water Maze) testing. Blood was analyzed using the Meso Scale Discovery System testing for the following analytes: monocyte chemoattractant protein-1 (MCP-1), tumor necrosis factor-alpha (TNF-3), and regulated and normal T cell expressed and secreted (RANTES). Preliminary results have shown positive dose-dependent changes in cognitive (behavioral) analysis with wheel run mice compared to their sedentary counterparts. Correlation of these dose-dependent exercise effects are being assessed against the AD blood biomarker profiles to encourage innovative techniques for AD detection and monitoring.

## UP24

**GSK-3-Beta Activation as a Means to Reduce Maladaptive Neuronal Sprouting Associated with Spinal Cord Injury Pain**, Angela Korleski<sup>1</sup>, Renae Estes SPT<sup>1</sup>, Liz Dugan, Ph.D.<sup>1</sup>, Kori L. Brewer Ph.D.<sup>2</sup>, Sonja K. Bareiss Ph.D, PT<sup>1</sup>, <sup>1</sup>Department of Physical Therapy, East Carolina University, <sup>2</sup>Department of Emergency Medicine, East Carolina University, Greenville, NC

Neuropathic pain is a significant consequence that follows spinal cord injury (SCI). Maladaptive sensory neuronal sprouting is gaining recognition for its role in contributing to the development of post SCI pain syndromes. We previously demonstrated that SCI pain is associated with sensory neuronal sprouting and inhibition of glycogen synthase kinase-3 beta (GSK-3B), a key regulator of neuronal growth. The purpose of this study was to investigate if pharmaceutical activation of GSK-3B can attenuate abnormal sensory growth responses following SCI. Long-Evans rats underwent excitotoxic SCI via an injection of quisqualic acid (SCI) or an equal amount of saline (sham). Immediately following the SCI or sham operation a flexible catheter was inserted subdurally to deliver either a GSK-3B activator (LY294002) or vehicle (veh) to the level of the lesion once per day. Animals were divided into the following groups: sham/veh (n=5), SCI/veh (n=5), or SCI/LY (n=5). Three and six days after

SCI, dorsal root ganglia (DRG) at and ipsilateral to the injury were harvested, dissociated, and cultured for 20 hours. Cells were stained with a neuronal specific antibody (B-tubulin III) and analyzed for soma size as well as length of neuronal sprouts. SCI rats showed a significant ( $p < 0.05$ ) increase in the percent of sprouting neurons and length of sprouts (41.9%, 160.7  $\pm$  15.5 Qm) versus sham animals (34.9%, 90.4  $\pm$  13.0 Qm). Treatment with LY for 3 days significantly decreased ( $p < 0.05$ ) both the percent of neurons sprouting (20.5%) and the length of neurites (66.9  $\pm$  7.5 Qm) compared to SCI animals. Treatment with LY for 6 days also significantly ( $p < 0.0001$ ) decreased the percent of neurons sprouting from 48.0% to 19.6% as well as decreasing neurite length ( $p < 0.05$ ) from 294.2  $\pm$  20.6 Qm following SCI to 101.6  $\pm$  20.8 Qm. We show that SCI results in enhanced DRG neuronal sprouting and that intrathecal delivery of a GSK-3B activator reduced DRG sprouting to non-injured levels, suggesting that GSK-3B may be a potential therapeutic target to prevent maladaptive sprouting associated with SCI pain.

#### UP25

**An Examination of Cigarette Smokers and Dietary Habits**, Julie Barthel, East Carolina University, Greenville, NC

Many people continue to smoke cigarettes regardless of the warnings and penalties. Cigarette smoking has been shown to have an adverse effect on dietary intakes. The purpose of this study was to examine the dietary habits of college students who smoke cigarettes. A validated college life survey, approved by the East Carolina University Institutional Review Board, was administered to a convenience sample of students at ECU. Forty-two (42) students reported smoking cigarettes. T-tests and frequencies were calculated using SPSS version 20. Although previous studies have reported a reduction in fruit and vegetable consumption in cigarette smokers, the participants in this study met the recommendations for fruits and vegetables. Strong evidence was found suggesting cigarette smokers had a higher prevalence of obesity, alcohol use and depression than non-smokers. These factors have been shown to have an adverse affect on health and dietary intake. The study supported the importance of continued efforts to reduce cigarette smoking among college students and to promote basic healthy life-long practices and behaviors.

#### UP26

**Evaluation of metabolic risk factors in lean ECU undergraduate students**, Maidah Atta, Brittany Brown, Hsiao L. Lai, MD, Department of Nephrology & Hypertension, East Carolina University, Greenville, NC

**Objective:** Assess the type and prevalence of risk factors in lean vs. obese and overweight individuals. **Background:** Although diabetic risk is higher for overweight and obese individuals, certain lean individuals may also be susceptible to diabetic risk. Often this is associated with FH of diabetes or inherited disorders of insulin or carbohydrate metabolism. Metabolic syndrome describes the presence of a spectrum of traditional risk factors for type 2 diabetes and may also increase the risk of diabetic emergence or progression in susceptible lean individuals.

**Methods:** Cardiovascular risk assessment was conducted in 526 ECU undergraduate students over the summer 2010 and fall 2011. Metabolic syndrome is defined as the presence of 2 out of 3 of the following cardio metabolic risk factors: obesity, physical inactivity, cholesterol abnormality, high blood glucose levels. We examined the prevalence of these risk factors in lean individuals with and without family history of heart disease.

**Results:** Students with risk due to the presence of family history of heart disease represented 8.56% lean individuals and 10.20% overweight students. Thirteen percent of lean students were physically inactive compared to 4.83% of overweight students. The total cholesterol of overweight undergrads was 13% while 8% of lean individuals. Overweight and lean students had equal prevalence of high blood-glucose levels (9.4% versus 9%). The presence of a single metabolic risk factor was equivalent in obese and overweight students (37%) compared to lean participants (35%). Nine percent of lean individuals and only 5.5% of overweight individuals had two or more risk factors.

**Conclusions:** This study found that lean undergraduates have equivalent to higher prevalence of metabolic risk factors compared to overweight students. Lean students have a higher trend toward physical inactivity. Contrary to expectations, lean students had equal rather than lower prevalence of elevated blood-glucose compared to the overweight population. Lean students also had higher prevalence of multiple risk factors compared to overweight and obese students. This study demonstrates a need for metabolic risk assessment and emphasis of risk reduction in undergraduate students whether lean or obese.

# Undergraduate Poster Abstracts (Face-to-Face)

UP27

**Exploring the Use of Social Media for Health Education in a Rural High School Population**, Ashley N. Minton, East Carolina University, College of Nursing

Adolescence is a time of transition that involves increasing independence and acquiring positive self-care habits to be continued through adulthood. Yet, adolescents are less likely than young children and young adults to seek preventive health services. A literature review on the health education needs of adolescents identified health literacy and utilization of health services as major health needs. Researchers have identified many barriers experienced by adolescents that prevent adolescents from receiving needed health services. These barriers include, lack of trust in health care providers to maintain patient privacy and confidentiality, negative experiences with health care providers, long clinic wait times and inadequate transportation. School based health centers have been identified as an important resource for addressing some of these barriers particularly in poor, rural areas. Research also suggests that social media including websites, cell phone applications and text messaging services can successfully augment the health care adolescents receive and increase adolescent health education. This project intends to evaluate the health education needs of high school students in a school based health center in rural eastern North Carolina and determine the benefit of social media as an important method of increasing adolescent health education. The project hypothesis is that adolescents will have an interest in social media resources that confidentially answer health questions and the use of social media resources will be beneficial in meeting adolescent health education needs.

UP28

**Improving Health Literacy Among Latino Mothers in Duplin County**, Emily O'Farrell, College of Nursing, East Carolina University

Health literacy means understanding health promotion and disease prevention information. In public health, each health care encounter is an opportunity to enhance health literacy among clients, families, and communities. It is especially important for parents of young children to have basic health literacy in order to accommodate optimal health and wellness for their children. Hispanic parents are a population group particularly at risk for barriers in access to care and utilization of health services. Research demonstrates that a lack of health literacy serves to complicate preexisting barriers to health care especially among newly arrived immigrant Hispanic groups. Hispanic children are commonly subjected to respiratory infections for which they require parents' competence of the signs, symptoms, and appropriate responses. Health literacy with regard to

respiratory illness for these families are of particular concern to health professionals. The Duplin County Health Department (DCHD) in eastern North Carolina serves a growing Hispanic population. Public health providers have identified this need of health literacy in regard to childhood respiratory infections among Hispanic parents. This Senior Honors Project will 1) identify current methods of health promotion related to respiratory infections, 2) assure the health literacy of these methods, and 3) provide demonstration and return demonstration of appropriate use of a thermometer in relation to respiratory infections. This project will also contact various medical equipment companies for donated thermometers. This project will identify an algorithm for parents of when and whom to contact at the DCHD for appropriate health services related to respiratory infections. This project aims to improve access to care and utilization of health services by Hispanic parents. I will work with bilingual staff members of the DCHD in order to ensure an appropriate translation and accuracy of information. I hypothesize that these health promotion efforts will provide Hispanic parents with an understanding of the implications and importance of the use of a thermometer and appropriate steps to follow for optimal child health care.

UP29

**Controlled burning and Eastern bluebird reproductive success at the West Research Campus, East Carolina University**, Taylor G. Abernethy, Rachel J. Smith, and Susan B. McRae, Department of Biology, East Carolina University, Greenville, NC

The Eastern bluebird (*Sialia sialis*) is a popular songbird species found all across eastern North America from Florida to the maritime provinces of Canada. Controlled burning is used to reduce overgrowth and recreate the effects of natural brush fires in the southeast, restoring disturbed habitats such as this one to longleaf pine savannah. As part of a long-term study of this species at ECU's West Research Campus, we looked at the effect of a controlled burn on Eastern bluebird reproductive success. Approximately one quarter of the site was burned in late winter 2012, during the non-breeding season. At the conclusion of the burn, 32 nest boxes were replaced, 8 in the burned areas and 24 in the unburned areas. All nests were checked at least three times per week to monitor nest building, clutch initiation, clutch size, hatch date, hatching and fledging success. Bluebirds are multiple-brooded, and pairs produced between 1-3 successful broods between late March and July. All chicks were measured and banded. We will compare reproductive success of pairs breeding in the burned and unburned areas of the site by a variety of parameters (clutch size, hatching success, fledging success) to determine the impact of this form

of land management on the bluebird population. Further research will address specific factors that may contribute enhanced reproductive success in this species.

### UP30

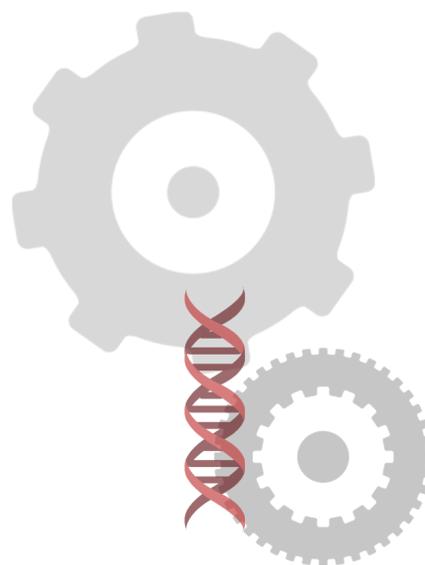
**Biofilms as a Physiological Response to pH Stress in Extreme Alkaliphiles**, Megan Shaia, Katrina Twing, and Quan Ngyugen, East Carolina University, Greenville, NC

Surface-associated microbial communities, or biofilms, are the mode-of-life for microorganisms in most natural environments. They have been shown to play crucial roles in resistance to various environmental stresses such as toxic chemicals, oxygen, and antibiotics. Several strains of alkaliphilic Hydrogenophaga were obtained from these extreme ultrabasic ecosystems (pH>11) associated with the serpentinization of deep Earth rocks. These cultures were observed to form dense layers of polysaccharides, particularly when grown at high pH on solid agar media. Similarly, when analyzing cell abundance from rock cores taken from an actively serpentinizing ecosystem in California, it was found that the further underground a sample was taken (and presumably closest to the highest pH fluids), the higher cells densities were detected on the solid materials. Cell counts were around 1.60E+6 cells per milliliter towards the surface of the core, while 1.73E+7 cells per milliliter near the bottom. To date, it is unknown how these microbes handle high pH stress, as high pH can impact the functioning of the proton motive force across the cell membrane and stability of RNA. Based upon these observations, it is hypothesized that biofilms play an important part in maintaining homeostasis of microbial communities at elevated pH values. I am testing this hypothesis using a representative strain of Hydrogenophaga isolated from a serpentinizing habitat that grows between pH 7 and 10. The cultures are being grown on glass coupons in a flow cell device under a low, constant flow rate of liquid media. Since the device holds four channels, two channels will flow pH 8 media while the other two pH 10. Afterwards, the biofilms will be imaged and their architecture quantified using confocal epifluorescence microscopy. Factors to be measured include biofilm thickness and cell-to-cell distances using geospatial techniques, and pH within intact biofilms using pH sensitive fluorescent dyes. These studies will not only provide insights into microbial adaptations to high pH serpentinizing ecosystems, it will also help develop new approaches to characterize biofilm eco-physiology.

### UP31

**Investigating Saltwater Intrusion in the southern Albemarle Estuarine System, North Carolina**, Jessica Kegel<sup>1</sup> and Alex K. Manda<sup>2</sup>, <sup>1</sup>Department of Geological Sciences, East Carolina University, <sup>2</sup>Institute for Coastal Science and Policy, East Carolina University, Greenville, NC

The purpose of this study is to determine the source of saltwater intrusion occurring in the southern Albemarle Estuarine System of eastern North Carolina. The hypothesis that the source of the elevated salinity levels in the southern Albemarle Estuarine system is from the south will be tested. To test this hypothesis, salinity measurements were collected from the Alligator River and the Alligator-Pungo Canal adjacent to the Emily and Richardson Preyer Buckridge Coastal Reserve. The data were collected with a handheld meter at ~10 sites, during four trips taken in the Fall of 2012. The results indicate that salinities are low in northern Alligator River (ranging from 4 to 8 ppt) and relatively higher in the southern segments of the Alligator-Pungo Canal (ranging from 12 to 15 ppt). These results suggest that the source of the saltwater intrusion is south of the Alligator-Pungo Canal, possibly the Pamlico Sound. This study is important because it improves our understanding of the mechanisms that control salt water intrusion in the coastal wetland systems. These wetland systems, such as those in the Emily and Richardson Preyer Buckridge Coastal Reserve, are home to rare and protected species of trees and animals that may be sensitive to elevated salinity levels.



# Undergraduate Poster Abstracts (Face-to-Face)

UP32

**Settlement Patterns and Success Rates in Eastern Bluebirds**, Rachel J. Smith and Susan B. McRae, East Carolina University, Greenville, NC

Nest cavities are a limiting factor for Eastern bluebird reproduction. Nest boxes have helped increase bluebird populations that have previously declined across the species range due to competition for nest sites by invasive species. Bluebird nesting and settlement behavior has been monitored at ECU's West Research Campus for the last three breeding seasons. We set-up 32 nest boxes, purpose-built to exclude larger cavity nesters and fitted with predator baffles. We studied settlement patterns of past breeders and their adult offspring to help understand bluebird dispersal and population dynamics. In addition to nest site selection and timing of breeding we measured clutch sizes, hatching success and fledging success of hatched chicks. Since 2011, chicks and breeding adults have been banded with permanent numbered metal bands. Adults were given unique plastic color band combinations to allow subsequent individual identification from a distance. This identification system makes it possible to non-invasively track the nesting locations of individual birds for more than one season. This study specifically explores the patterns of resettlement of earlier breeders and recruits (particularly those hatched on-site that returned as breeders), and compares their success rates. Of 22 breeding female bluebirds banded in 2011, 7 (38%) returned to breed in 2012. Of those returning females, 6 settled in the same box occupied the previous year. Of 16 male bluebirds banded in 2011, 7 (46%) returned to breed in 2012. Of those returning males, 4 settled in the same box occupied the previous year. Recruits of both sexes (4 females, 3 males) also returned as breeders. We will test the hypothesis that nest box fidelity is related to individuals' previous breeding success.

UP33

**Developing a Panel of Microsatellite Markers for Common Moorhen (*Gallinula chloropus*) as a Research Tool for Population Studies**, Matthew T. Edwards, Susan B. McRae, East Carolina University, Greenville, NC

The common moorhen (*Gallinula chloropus*) sometimes exhibits a rare behavior called conspecific brood parasitism, a female laying an egg in the nest of a neighbor, manipulating this host' to raise its offspring and relieving itself of the encumbrance of parental investment. In some populations, hosts reject these parasitic eggs rather than incubate them. Expression of both behaviors may be affected by genetic relatedness between neighbors. We are testing this in two distinct populations of common

moorhen. Our hypothesis is based on kin selection theory and posits that hosts have less to lose by rearing the young of relatives. We expect that the population with higher rates of brood parasitism and host rejection will exhibit lower levels of genetic relatedness among neighbors than the other. With DNA samples for both populations, our goal is to develop a panel of microsatellite markers as a tool to assess genetic relatedness; such a panel has never previously been produced for the common moorhen. Markers developed for related species were screened in order to develop an optimized marker set. Of 50 primer pairs tested, 30 amplified a product in the common moorhen. PCR products are being tested for variability using the Fragment Analysis module on a DNA sequencer. We are subselecting only those markers found to have e4 variable alleles when amplified in the common moorhen for our relatedness analyses. The markers will be used to genotype members of each population to generate pairwise relatedness estimates among individuals. These data will then be used to determine whether there is an effect of relatedness on brood parasitism.

UP34

**Non-Reducing sugars as cryopreservatives**, Morgan Barker, James Parker, Chad Day, East Carolina University, Greenville, NC

Trehalose (a non-reducing sugar) has been shown to protect platelets during freezing, a process known as cryopreservation. Unfortunately, the mechanism of protection is not well understood. The objective of this work project is to gain insight into the interactions between cryopreservatives and model membranes. The study will also investigate sucralose, a chemical analogue of trehalose, as a potential cryopreservative. We hypothesize that the cryopreservatives interact strongly with the lipid headgroup and have designed a series of experiments to investigate this. The cryopreservation properties of both sugars interacting with model membranes will be investigated using infrared spectroscopy (IR) and differential scanning calorimetry (DSC).

## UP35

**Behavioral Correlates of a Masculinized Trait in Female Threespine Stickleback: Does Social Complexity Matter?**, Benjamin Woodall, Lengxob Yong, and Jeffrey McKinnon, Department of Biology, East Carolina University

Threespine stickleback fish (*Gasterosteus aculeatus*) have been an important model system for elucidating mechanisms underlying morphological and color pattern evolution. Male sticklebacks are well studied for the red nuptial coloration on their throats, which is often associated with aggression and territoriality. In some populations, male-typical red coloration is also common in females. Such a masculinized trait in females may play a role in intrasexual competition. Indeed, a population that includes the red females has been shown to be overall socially dominant to a nearby population that lacks females with this coloration. However, in within-population tests, red-throated females were not more aggressive and dominant than dull-throated females, during previous experiments involving dyadic interactions. Nevertheless, the possibility has remained open that in complex social settings patterns of aggression and dominance could differ. In the present study we tested the hypothesis that females with red-throats are more aggressive/dominant in a complex social context involving several fish including both males and females. After creating replicated mixed sex social groups including both dull and red females, we conducted three 1hr behavioral observations. We used reflectance spectrophotometry to evaluate female throats for differences in red chroma, and subsequently the relationship between red chroma and behavioral aggression. Initial analyses suggest that red-throated females are not overall more aggressive, relative to dull females, in a complex social context, suggesting that the masculinized female trait may play a limited role in intrasexual competition. However, red-throated females did tend to bite and lunge significantly more during the first observation. In subsequent observations dull females exhibited increasing biting and lunging, but they were not statistically different from that of red-throated females. Males also became more engaged as observations proceeded, and displayed aggressive behaviors that may have affected the social dynamics. Investigations of sex-specific interactions between red throat females and background fish, males and females, are ongoing and may elucidate the relative importance of the masculinized trait.

## UP36

**Tectonic Evolution of the Contentnea Creek pluton Wilson, North Carolina**, Richard Burns and Eric Horsman, Department of Geological Sciences, East Carolina University

Paleozoic granitic rocks make up a large portion of the continental crust in the piedmont region of North Carolina, but many exposed igneous rocks remain poorly studied. The Contentnea Creek igneous intrusion, of Paleozoic age, is an elliptical granitic body within the Eastern Slate Belt in southern Wilson County, North Carolina. The Contentnea Creek pluton is a coarse-grained biotite granite containing megacrysts of alkali feldspars up to 4 cm in length. There are few outcrops of the pluton, an intrusive igneous body that has been crystallized beneath the Earth's crust, as coastal plain sediments cover most of it. Little mineralogical variation exists throughout the Contentnea Creek pluton. However, at thin section scale localized deformation is found in deformed mineralization and micro-breccias. This deformation is only found on the western part of the pluton, which also borders the Paleozoic-age Hollister Fault zone. To further test whether the western portion of the intrusion experienced tectonic deformation, I am examining rock samples at outcrop scale, hand sample scale, and thin section scale particularly in the western part of the pluton. Shape preferred orientation analysis will be used on slabbed samples to quantify alignment of mineral grains stretched by tectonic deformation throughout the intrusion. X-ray fluorescence spectrometry will provide geochemical data of mineral abundance throughout the pluton, which can be compared to various other igneous intrusions in the region. I hypothesize the Contentnea Creek pluton will share many mineralogical similarities with plutons in the surrounding area and the deformation found in the pluton will be localized to the western part of the pluton providing evidence the Hollister Fault zone was active during emplacement. This project is important in providing information on poorly studied plutons and understanding how continental crust was formed in the eastern United States.

# Undergraduate Poster Abstracts (Face-to-Face)

UP37

## **Biometric analysis of morphological traits differentiating two subspecies of *Triodanis*** Sandra Trybus,

Jonathan Caban, East Carolina University, Greenville, NC

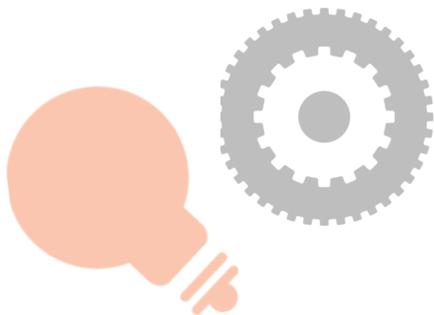
The amount of genetic differences required for one species to diverge into two separate lineages is variable and often a point of controversy in the scientific community. *Triodanis perfoliata*, a weedy annual plant species native to Pitt County, NC, has diverged into two subspecies, *perfoliata* and *biflora*. The subspecies can be differentiated based on the prevalence of cleistogamy, the production of permanently closed self-fertilizing flowers, and several morphological traits. Subsp. *biflora* allocates a greater amount of its energy towards the production of cleistogamous (CL) flowers, while subsp. *perfoliata* produces mainly open or chasmogamous (CH) flowers and very few cleistogamous flowers. Subspecies are distinguished by the location of the pore on fruit capsules and floral bract shape. The purpose of this study is to determine how many genes control each diagnostic trait. We used a biometric approach to estimate gene number. A slight increase in phenotypic variance between the F1 and F2 generations is indicative of a multi-gene response whereas a large increase in variance suggests a small number of loci. Utilizing dissecting scopes and digital calipers, morphological data on leaf/bract measurements and fruit pore position were collected from parental, F1, and F2 plants grown in a greenhouse. Graphical analysis of variance suggests many loci of small effect contribute to the expression of these traits. Further analysis of subsp. *perfoliata* and *biflora* genetic architecture may lead to a change in taxonomic classification for these subspecies.

UP38

## **Determining the accuracy of a single-beam SONAR devices' ability to measure the abundance of submerged aquatic vegetation**, Audrey Pleva, Dr.

Joseph Luczkovich, Department of Biology, Institute for Coastal Science and Policy, East Carolina University, Greenville, NC

Sea grass or submerged aquatic vegetation (SAV) has been established as the base of the aquatic food web and provides habitats for commercially and recreationally important fishes (grouper, sea trout, and flounder) and invertebrates (blue crab, scallops, and shrimp.) However, worldwide declines of sea grass have been noticed and these same trends have been seen throughout North Carolina estuaries. When sea grass declines, fish habitats are lost and there is higher mortality within the population. The loss of SAV can occur due to dredging, boat traffic, and algal blooms caused by excess nutrient runoff. In order to do a rapid assessment of the change in SAV cover, the state of NC funded an Albemarle-Pamlico National Estuarine Partnership (APNEP) team, including ECU members, to create a boat-based monitoring protocol of SAV using SONAR and underwater video. These boat-based techniques were necessary because the previously used digital aerial photography method underestimated SAV percent cover living in turbid and deep areas that could not be seen in aerial shots. The present study tested the boat-based protocol developed by the APNEP team, while aerial photography was being taken in Sept 2012, to verify the presence of SAV in the Currituck Sound of North Carolina. Using a BioSonics DTX echo sounder with a 420-kHz, 6-deg single-beam transducer, sea grass percent cover was recorded along 60, 900-m long shore-normal transects, spaced 25m apart, within a 1500m x 900m sampling site. After SONAR transects were run, the BioSonics EcoSav2 software was used to determine SAV presence and depth every 3m. By using a cokriging procedure in ArcMap GIS software with SAV percent cover and depth as predictors of SAV presence or absence, a prediction map of SAV presence was created. The accuracy of the SONAR technique was verified against SAV presence as seen on a high resolution, low-light underwater video camera (Sartek, model #SDC-MSS) at one hundred randomly selected points along the same SONAR transects. By comparing the presence and absence of SAV predicted by the cokriging algorithm and the presence and absence of SAV in the videos, an accuracy percentage for the SONAR technique was determined. There was a 77% total agreement between the BioSonics SONAR and the video check-points. Our SAV cover map will soon be compared with the APNEP digital aerial photography.



## UP39

**East Coast Vs. West Coast Typhoons in the Philippines**, Mark Nissenbaum, Department of Geography, East Carolina University, Greenville, NC

The Philippines is located in the northwestern Pacific between Guam and Vietnam. The climate of the Philippines is noteworthy for its monsoonal, seasonal, and tropical weather patterns. Tropical cyclones can form during any time of the year in the northwestern Pacific, and generally impact the east coast of the Philippines under the influence of a strong subtropical ridge during the summer months. Less common are west coast typhoon impacts that trace their origins to the South China Sea. The goal of this project is to establish a tropical cyclone climatology for west coast impacting typhoons in the Philippines based on historical data records. The project will begin with the development of a database for west coast landfalling typhoons. NCEP, the National Center for Environmental Prediction, provides free global weather data extending back to 1948 that can be interpreted in a program called GrADS (Grid Analysis and Display System). GrADS will be used to recreate the synoptic steering flow present during the time of these west coast landfalling typhoons. A comparison will be made between the conditions present during west coast and east coast landfalls in order to gain a greater understanding of Philippine tropical cyclone climatology in addition to the seasonal variation of typhoon landfalls.

## UP40

**Synthesis of Potentially Biologically Active Compounds via Oxidative Cyclizations**, Alex Simmons, Brian Love, Department of Chemistry, East Carolina University, Greenville, NC

The group's current focus is to investigate controlling product mixtures for ceric ammonium nitrate (CAN)-based oxidations. The focus of this project is cyclic diquinones; expanding upon previous group work. Diquinones often have biological activity, and several diquinone derivatives in particular can be used as anticancer agents. The purpose is to develop a simple and rapid way to create cyclic diquinone derivatives starting from 2,5-dimethoxybenzyl alcohol derivatives. The anticipation is the synthetic scheme could be practical in larger scale pharmaceutical industry.

The hypothesis is diaryl ethanes and dibenzyl ethers will react with CAN to produce the anticipated diquinones. To go about testing the hypothesis, compounds with relatively simple structures (no alternative functional groups or carbon chains) will

be prepared. Currently, we have been successful in synthesizing several simplistic starting materials and derivatives are being pursued.

Previous work showed that synthesis of the required diaryl ethanes, was not trivial. Though we had moderate success using one set of conditions, we plan to investigate other methods of preparing these starting materials. A successful method was developed for making dibenzyl ethers, which produces products of higher yield and purity compared to literature references.

To continue testing of the hypothesis, a simple dibenzyl ether was combined with CAN, in an attempt to oxidize the compound to a cyclic diquinone. The initial reaction failed to give the desired product, but a mixture of several compounds. The mixture of compounds is currently being analyzed and separated. We plan investigating other available routes to form cyclic diquinones as a major product. Once appropriate conditions are found to achieve the desired cyclization, they will be applied to a variety of different substrates.

The next step in the project is to continue examining the scope of the reaction and addressing the limitations of the current method. This would include pursuing various solvents for CAN cyclizations, and creation of derivatives of the dibenzyl ether for cyclizations. We currently are looking into simplified one-step ways to create the desired

## UP41

**Evaluation of the use of electrospray ionization mass spectrometry (ESI-ToF) as an online detector for Gel permeation chromatography characterization of synthetic polymers**, Jocelyn Francis, East Carolina University, Greenville, NC

My project is to evaluate the use of electrospray ionization mass spectrometry (ESI-ToF) as an online detector for Gel permeation chromatography characterization of synthetic polymers. The use of recently developed additives which eliminate multiple charging dramatically simplifying resulting mass spectra provides a departure from convention and holds the potential to dramatically increase applications of GPC-ESI-ToF-MS in detailed analysis of polymer distributions. Historically, multiple charging has been an obstacle for all but the lowest mass of polymer samples. Online Multi-Angles Light Scattering detection will be employed in parallel for comparison.

# Undergraduate Poster Abstracts (Face-to-Face)

UP42

## **Mineralogical Record of the Change in Direction of the Brazil Current and the Fate Amazon-derived Sediments during Periods of North Hemisphere Glaciation**

Katie Erb and Catherine A. Rigsby, Department of Geological Sciences, East Carolina University, Greenville, NC

Peaks in the Ti/Ca ratios in sediment from a core taken on the continental shelf east of the Amazon River signal abrupt, large amplitude, increases in precipitation and runoff on the adjacent continent. The timing of these peaks corresponds with the timing of North Atlantic (NA) cold periods of the last glacial, the Heinrich events, and Dansgaard-Oeschger stadials. Increases in precipitation are corroborated by the stable isotopic record of speleothems from the Nordeste of Brazil. Mg/Ca and  $\delta\text{-O-18}$  of planktonic foraminifers from our cores supports studies that link a colder high-latitude NA with a cooler northern tropical Atlantic, a warmer southern tropical Atlantic, a southward migration of the ITCZ, and increased precipitation and runoff in the Nordeste. These changes have been ascribed to a decrease in or shutdown of the Atlantic meridional overturning circulation (AMOC). The North Brazil Current (NBC), co-located with the sediment cores, is both the major global pathway by which heat is advected from the Southern to the Northern Hemisphere and the major source of the near-surface return AMOC flow. Today, the NBC flows northward along Brazil's eastern margin and controls the pathway of Amazon-derived sediment. We hypothesized that the shutdown of the AMOC signaled by the Ti/Ca peaks in our cores brought about cessation or reversal of the NBC, thus an east or south-eastward shift of Amazon sediment discharge. If so, instead of being sourced by rivers of Northeastern Brazil, the Ti/Ca peaks may have had an Amazon source. This shift of source should be recorded in the sediment mineralogy. X-ray diffraction (XRD) analysis on samples of high and low Ti/Ca revealed no difference in the mineralogy. These samples are also indistinguishable in C and N content, C and N stable isotopic ratios, and Sr isotopic ratios. However, they are also indistinguishable from Amazon-derived sediments from a different core. Thus, the hypothesis is neither supported nor negated and more detailed provenance analysis (e.g., Nd isotope analysis, U/Pb of detrital zircon, pollen analysis) is needed to determine whether or not NBC transport was reversed during North Atlantic cold periods. This question is significant because some of the most recent GCM simulations for the next IPCC report indicate that a complete shutdown of AMOC is in our climate future.

UP43

## **Synaptopodin-2 Isoform A Expression in Human Colon Adenocarcinoma Cells**

Chase Stocks<sup>1</sup> and Kelli Shortt<sup>1</sup>, Jean-Luc Scemama<sup>2</sup>, Margit Schmidt<sup>2</sup>, <sup>1</sup> East Carolina University, <sup>2</sup> Biology Department, East Carolina University, Greenville, NC

Synaptopodin-2 is an actin-binding protein commonly found in brain, kidney, and skeletal muscle tissues in mammals. It binds to and causes rapid polymerization of G-actin, a protein that is essential in many cell functions. Synaptopodin-2 can also associate with a number of other proteins, such as myosin, calmodulin and alpha-actinin. Association with alpha-actinin promotes the translocation of synaptopodin-2 from the cytoplasm to the nucleus, where it is involved with the chromatin-remodeling complex and therefore transcriptional activity. Four isoforms of synaptopodin-2 are known to exist: isoform A, B, C, and myopodin. These isoforms are believed to be the products of alternative-splicing. Recent studies have shown that myopodin can act as a tumor suppressor gene as it is frequently deleted in invasive prostate cancers and silenced by hypermethylation in bladder cancer. My research goal was to observe the effects of Synaptopodin-2 isoform A over-expression in HT29 human colon adenocarcinoma cells and to analyze its location in the cells in both undifferentiated and differentiated states. My hypothesis stated that synaptopodin-2 isoform A would show differential expression in HT29 cells upon differentiation. First, HT29 cells were transfected with a plasmid vector in which synaptopodin-2 isoform A cDNA had been cloned in frame with a green fluorescent protein (GFP) gene. Two different transfection techniques were tested: electroporation and a liposome-based chemical reagent. The results were quantified in terms of the efficiency of transfection and the location of the fused protein in the transfected cells was analyzed using a confocal microscope. After over-expression, the synaptopodin-2 isoform A-GFP fusion protein was found localized mainly in the cytoplasm of HT29 cells. Future research will be done to study the localization of synaptopodin-2 isoform A after HT29 cell differentiation.

UP44

## **Mapping of the maize mutant, indeterminate floral apex1**

Richard Ullberg, George Young, Kristi Walters, and Beth Thompson, East Carolina University, Greenville, NC

Maize is an important crop plant. Maize has two inflorescences, the tassel and the ear. The female inflorescence, the ear, produces kernels used for both food and the production of the alternative fuel ethanol. In the Thompson lab we are interested in identifying genes important for inflorescence development. Indeterminate floral apex1 (ifa1), is a recessive

sive mutant that affects inflorescence development, causing meristems in the inflorescence to be less determinate than normal. The goal of this research is to determine what gene is mutated in *ifa1* mutants and responsible for the *ifa1* mutant phenotype. To identify the *ifa1* mutant, we are using a map based cloning approach. Previous mapping places the *ifa1* mutation on chromosome one, within 3 cM of marker *umc76*. We are using two mapping populations generated by crossing *ifa1* homozygotes to A632 and W22 inbreds and selfing the progeny. Our total mapping population consists of ~110 plants. Using recombinant chromosomes we have narrowed down the region containing the *ifa1* mutant to an interval between markers IDP 4205 and BNLG 1007. This region spans ~1.4 cM and just under three megabase pairs. We are currently testing new markers for polymorphisms and screening for additional plants with recombinant chromosomes in order to further narrow down the interval.

#### UP45

**Water We Eating? Developing a Nutrition Science Activity for a Water Quality Awareness Summer Camp Experience.** Kimberly Kruse, Caitlin Collins, Melani W. Duffrin, PhD, RD, LDN, East Carolina University, Greenville, NC

Upstream-Downstream Connection is a 1 week summer camp focused on the investigation of water availability, importance, and quality. Water We Eating?, a component of the summer camp, is a one hour lesson designed to engage children in the discovery of the water content of food, recognition of fruits and vegetables (FV) as excellent sources of water, and establishing the importance of water within the human body. A total of 84 participants, ranging from 5th to 8th grade, actively investigated the water content of produce using various FV and a juicer. Throughout the activity, students recorded observations, measured fluids, and formulated water needs of the human body. Participants demonstrated the acquisition of new scientific terminology and the ability to engage in scientific inquiry. The activity was well-received by the students as evident in the enthusiasm to operate the juicer, taste-test evaluations, and willingness to participate. The simple design and use of household equipment and recycled bottles offers a wider opportunity of implementation in various settings. Water We Eating? exhibits the potential of assisting educators in forging connections between academic programs in health, nutrition, math, and science.

#### UP46

**A Comparative Study of Infant Chimpanzee Behavior in Captivity: Asheboro, NC,** Adam Johnson<sup>1</sup>, Dr. Richard Bergl<sup>2</sup>, and Dr. Linda Wolfe<sup>1</sup>, <sup>1</sup>Department of Anthropology, East Carolina University, Greenville, NC, <sup>2</sup>Curator of Conservation and Research, NC Zoo

Chimpanzees, a species of ape, are native to central and western Africa. Chimpanzees have been studied in detail beginning with Jane Goodall beginning in 1960. The North Carolina Zoological Park contributes to The Species Survival Plan (SSP). This program improves the care and facilitates the breeding of endangered animals in captivity. The study being proposed allows me the opportunity to study a varied community of chimpanzees and contribute to the SSP. My study should prepare me for future research as I am currently learning how to document primate behavior and can apply the primate behavior course to studying and conserving primate species. There are three infants at age 1, Ebi, Genie, and Gigi, and a young female, Nori, age 2.5. Chimpanzee infants vary in behavior greatly based on individual personality (Clark 1977). Chimpanzee rearing and subsequent weaning begins at different times and by different means depending on the personalities of the mother and infant (Clark 1977). The three individuals, Ebi, Genie, and Gigi, are being cared for by their mother which contrasts with Nori, who was hand reared. During the 8 week observational period I will be studying the behavior variation in the infant chimpanzees. I will develop an ethogram to better document and analyze gathered data. I am interested in rearing and weaning, and the everyday activities associated with it. Data will be recorded on the duration, time, location, and the reactions from infant and mother on an Activity Data Sheet.

# Undergraduate Poster Abstracts (Face-to-Face)

UP47

## **Are There Really Rules and Expectations in Talking Relationships? Gender Differences in Relationship Formation among Young Adults,**

Katy A. Wester,  
Anne E. Phoenix, East Carolina University,  
Greenville, NC

According to Knapp's relationship development model, individuals go through several stages as they form relationships (Avtgis, Anderson, & West, 2009). These stages include initiating, experimenting, and intensifying. Recently, young adults have been engaging in a new relationship forming activity referred to as talking, prior to committing to a relationship. Many young adults go through this stage before formally entering a relationship, but little research has been conducted about talking relationships. Though the expectations and actions about actual committed relationships have been studied, ideas about what happens and what is expected in a talking relationship have not been formally defined. In previous dating studies, males and females have been found to have different expectations in regards to their dating behaviors (Knox & Wilson, 1981). Our current research, explores the gender differences between college-aged males and females and the opinions of what they think is appropriate when in the talking phase of a relationship. An online survey was conducted of 183 individuals' ages 18-26, 79 males and 104 females mostly from universities in Eastern North Carolina. Data was statistically analyzed and it was found that males and females varied significantly in regards to sexual behaviors and activities. Males indicated it was more appropriate to engage in sexual intercourse, oral sex, sexting, and have multiple talking partners at one time. Females reported significant differences in regards to being in a talking relationship-particularly it was ok to be excited and have butterflies around the person they were talking to. Our findings seem to indicate that males are oriented towards the sexual side of a relationship and females are oriented towards the emotional side of a relationship. These findings are important for those who educate and work directly with young adults because it indicates the different values of males and females when in a talking relationship.

UP48

**Assessment on the Necessity of Sustainability Education,** Kelsey Wenzel, Courtney Leffelman, East Carolina University, Greenville, NC

One of the most instrumental aspects of improving sustainability anywhere is having a group of people who feel motivated to do it. Motivation stems from knowledge and awareness. We will conduct an electronic survey on "sustainability literacy" of students at East Carolina University including general facts about sustainability as well as student's knowledge

of efforts the University has already made. We will compile these responses to determine the severity of the need for sustainability education on campus. Based on these results we will develop a plan of action to address these needs. Additionally, we will work toward meeting the requirements of the STARS framework from the Association of the Advancement of Sustainability in Higher Education. We will address the areas the campus succeeds at, as well as note the standards we do not meet. This will be a continuous process over time, resulting in East Carolina University eventually becoming a STARS certified campus.

UP49

## **The Effects of Self-Deprecating Humor on Candidate Approval when Appearing on Late-night Comedy and Soft News Programs,** Jeffrey Coleman, East Carolina University, Greenville, NC

It seems that today, more than ever, people have the opportunity to choose from a plethora of television channels and programs. Unlike in the past when there may have only been three or four stations to choose from, now a television provider may offer hundreds of choices. If a viewer is watching a station that does not appeal to him or her, a simple click of the remote could provide many other options. The world of social media and online videos has also exploded rather recently. Facebook, Twitter and YouTube have connected people like never before. With these new technological advances political candidates have new opportunities, and arguably new obstacles, in their pursuit for the American vote.

In order to appeal to a wide variety of voters, candidates may choose to appear on many different types of television programs during the election campaign. With the vast number of television programs available, they are no longer restricted to hard news programs on stations like CNN, MSNBC, FOX or ABC. As compared to only a few decades ago, there are an immense number of soft news programs available (Baum 2002). Now candidates can appear on entertainment centered programs such as The Daily Show with Jon Stewart, or Oprah. By doing this they may be able to reach out to different types of voters. Yet appearing on these soft news programs may not only benefit candidates by allowing them to get their name out there, it may also have another unintended, but potentially positive effect. By being on soft news programs, largely centered on entertaining their audiences, candidates may humanize themselves and may even increase their likeability and approval among viewers (Baum 2005). Whether or not candidate appearances on soft news help to improve their approval rating may be an important question for not only political scientists and students, but also for presidential cam-

paigns themselves. An important hypothesis which would like to present during Research and Creative Achievement Week is that appearing on late-night television programs will improve a candidate's favorability among audience members. An ongoing analysis will explore the change, or lack thereof, in the likeability of candidates before and after seeing him or her on a late-night comedy or soft news program.

#### UP50

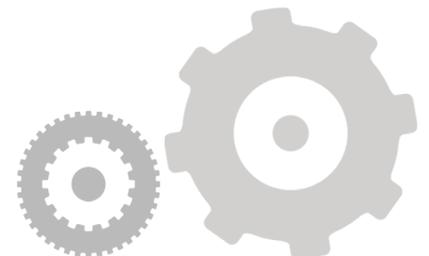
**Comparison of Mental Health Between First-Year College Students Residing in Living Learning Communities and Traditional On-Campus Housing,** Heather Wiles, Anne Carroll, Nicole Corrieri, Laura Lama, Christyn Dolbier, East Carolina University, Greenville, NC

Introduction: Mental health issues such as stress, anxiety and depression increase during college. Living Learning Communities (LLCs) have become more common on college campuses and are an unexplored avenue for addressing these problems. LLCs are residential programs building faculty-staff-student community through themed learning in and outside the classroom. LLC research focuses on academic outcomes, with scarce attention to mental health effects or LLC comparisons. Purpose: This study's purpose is to compare the mental health and academic performance of Biology LLC, Wellness LLC, and non-LLC students. The results of the study will address gaps in the literature regarding mental health effects of LLCs, and as well as comparative effects of differently themed LLCs on mental health and academic performance. Method: The project employs a quasi-experimental design with three groups: first-year students in Biology LLC (n=30), Wellness LLC (n=30), and living on-campus but not an LLC (n=60). Recruitment strategies include residence hall flyers, meetings and manned stations, and LLC distribution list emails. Psychometrically sound surveys assess retention and stress, depressive, and anxiety symptoms. Participants will authorize the Registrar to provide GPA data. Surveys will be administered in-person and online at the beginning, middle, and end of the spring semester to examine outcome trajectories across the semester. Participants will be compensated with Pirate Bucks. Expected Results: Hypothesis 1: Wellness LLC participants will have the smallest increases in stress, anxiety and depressive symptoms across the semester, followed by non-LLC participants, with Biology LLC participants having the greatest increases due to its highly competitive nature. Hypothesis 2: Biology LLC participants will have the highest GPA and retention rates at the end of the semester, followed by Wellness LLC participants, with non-LLC participants having the lowest.

#### UP51

**Mediating Effects between Perceived Self-Esteem, Self-control, and Health Risk,** Juliann Stalls and Derrick Wirtz, East Carolina University, Greenville, NC

The effect of self-esteem and self-control on health outcomes has been the subject of recent inquiry (Orth, Robins, & Widaman, 2012; Baumeister & Tierney, 2011). Interestingly, in our most recent research on the link between self-esteem, self-control, and health outcomes, we consistently found that individuals with high self-esteem were perceived to have lower overall health risk compared to those with high self-control. The purpose of the current research was to build upon our understanding of the perceived link between self-esteem and better health outcomes by exploring the mechanisms by which these concepts are linked (i.e., mediations). In our study, participants saw one of four different surveys of fictitious people with varying levels of self-esteem and self-control. Participants then evaluated the health risk and health behavior of targets through a questionnaire. For example, in the questionnaire we asked about the likelihood of the fictitious person having heart disease and about the likelihood that the fictitious person was a smoker. Additionally, we counterbalanced question order in our study to determine if this impacted responses. The purpose of this research is to determine if American college students perceive links between self-esteem, self-control, and health outcomes due to their associating self-esteem and self-control with certain health behaviors.



# Undergraduate Poster Abstracts (Face-to-Face)

UP52

**FoodMASTER Summer Science Camp Experience Impacts Participants' Attitudes Towards Nutrition and Cooking**, Sarah Sykes<sup>1</sup>; Jacquie DeChabert-Rios, PhD<sup>2</sup>; David Rivera, PhD<sup>2</sup>; Beth Wall-Bassett, PhD, RD, LDN<sup>1</sup>; Virginia Carraway-Stage, ABD, RD, LDN<sup>1</sup>; Melani Duffrin, PhD, RD, LDN<sup>1</sup>, 1 Department of Nutrition Science-East Carolina University, 2 Department of Hospitality Management-East Carolina University, Greenville, NC

Upstream-Downstream Connection (UDC) is a 1 week summer camp offered to Boys and Girls Clubs of Pitt County North Carolina. The camp focuses on outdoor activities that investigate the science of water quality. The strong interest and engagement in the gardening and foods component of the camp, led camp Directors to seek out new opportunities for campers. In the summer of 2012, FoodMASTER Summer Science Camp (FMSSC) joined UDC to offer a 1 week extension to the UDC campers. The FMSSC offered 27.5 instructional hours over a 5 day period focused solely on the science of food, cooking, nutrition, and gardening. The purpose of this study was to compare the attitudes of the UDC + FMSSC campers (n=27) to a group of UDC only campers (n=37). Researcher developed surveys were administered to both groups after attending the camps. Attitude items focused on science, cooking, nutrition, mathematics, gardening, and educational goals. Descriptive statistics and t-test were conducted using SPSS 20.0. Significance levels were set at  $p < .05$ . Results indicated a significant difference on five attitude item scores in the areas of cooking and nutrition. Findings demonstrated FMSSC had a positive impact on campers' attitudes towards nutrition and cooking. Camps focusing solely on the science of cooking, food, nutrition and gardening can serve to impact students' attitudes towards the subject matter, increasing interest and efficacy. Future studies assessing campers' attitudes pre-test, post-test and six months out as well as longitudinal tracking of repeat campers are warranted.

UP53

**Are we just TALKING or are we actually DATING?: Examining the transition from talking relationships to committed, dating relationships among young adults**, Ashley P. Johnson, Shaniqua T. Wood, Department of Child Development and Family Relations, East Carolina University, Greenville, NC

According to Knapp's relationship development model, individuals go through several stages as they form relationships (Avtgis, Anderson, & West, 2009), including initiating, experimenting, and intensifying. Young adults today are engaging in a new relationship forming activity referred to as talking, prior to committing to a relationship. Considering Knapp's model, talking likely fits in the first few stages of his theory of relationship development. Current research provides knowledge on stages of dating and

relationship formation, but addresses little on the phenomenon of talking. Although familiar to the younger generation, talking has not been scientifically defined/studied in previous relationship literature. In previous dating studies, males and females have been found to have different expectations in regards to their dating behaviors (Knox & Wilson, 1981). To examine the phenomenon of talking and its association with the dating process, we used the following research questions. What activity or event leads people to move from being in a talking relationship to being in a more serious dating, committed relationship? Secondly, does gender and religiosity affect young adult attitudes toward the transition from talking to dating? Online data was collected from young adults in Eastern North Carolina. Seventy-nine males and 103 females responded to questions regarding talking and what signifies the transition from talking to an exclusive/committed relationship. After ranking the importance of different activities/events, the event with the highest mean ranking included having a relationship-defining conversation about agreeing to only see each other. In contrast, starting a sexual relationship received the lowest mean ranking. Females, compared to males, and religious individuals, compared to non-religious individuals, significantly indicated that having a relationship-defining conversation about only seeing each other signified the transition from talking to a committed relationship. Males, more than females, significantly reported that inviting your partner to be in a more committed relationship marked this transition. Surprisingly, there was no significant difference for sexual activity as an indicator of the transition from talking to a committed relationship amongst all participants regardless of religiosity or gender.

UP54

**Personality, Aggression, and Hockey**, Dr. Mark Bowler and Andrew Theado, East Carolina University, Greenville, NC

As done by Winter et al, (1998), the explicit self-perceptions of an individual's traits serve as a channel for the behavioral expressions of implicit motives. Subsequently, Frost et al. (2007) proposed that self-ascriptions of aggressions would interact with implicit aggressiveness to channel the expression of aggressive behavior. The present study sought to retest a model of proposed relationships among the explicit (self-aware) and implicit (unconscious) personalities and aggressive behavior. Specifically, the Conditional Reasoning Tests of Aggression (CRT-A) was used to measure the implicit aspects of personality (James et al, 2005) along with a traditional self-report measure of anger/hostility. Data was collected from adult league ice hockey players who completed both measures with differential penalties serving as indicators of aggressive behavior.

## UP55

**Long-Term Effects of Brief Intercultural Interactions Via Videoconferencing.** Taylor Gulley, Marion Eppler, PhD, Department of Psychology, East Carolina University, Greenville, NC

Allport (1954) proposed that intergroup contact reduces intergroup prejudice, but only if certain conditions are met for optimal contact groups have equal status, common goals, no intergroup competition, and contact is sanctioned by authorities. Hundreds of studies support Allport's theory, but a recent meta-analysis (Pettigrew, Tropp, Wagner, & Christ, 2011) found that although these conditions facilitate reduction in prejudice, they are not all necessary. Three ways that contact reduces prejudice include increasing knowledge about the outgroup, reducing anxiety about interacting with the outgroup, and increasing empathy and perspective taking (Pettigrew & Tropp, 2008). Cross-group friendships are particularly important for reducing anxiety and increasing empathy, particularly if they involve self-disclosure (Davies, Tropp, Aron, Pettigrew, & Wright, 2011). The purpose of my study is to examine the effects of intercultural contact on ethnocentrism. People high in ethnocentrism use the values and behaviors of their ingroup as the standard for judging other groups, and they tend to evaluate the outgroup negatively with hostile, stereotyped assumptions (Neuliep, 2002). I am surveying alumni of ECU's Global Understanding classes to see if intercultural contacts made in a course taken 1-5 years previously are maintained over time, and whether these friendships had any long-term impact. In the Global Understanding courses, ECU students typically met with two or three countries, spending roughly five class sessions engaged in real-time videoconference discussion alternating with computer chat. Students were also encouraged to exchange email correspondence with international partners. Does this brief intercultural experience in a classroom setting produce any of the benefits envisioned by Allport's theory? Also, does it influence interest in international news, motivation to study languages, and travel abroad experiences? Participants filled out measures of these variables when they initially took the course, and their responses as students will be compared to their responses as alumni. I am also examining the quality of their friendships. My hypotheses are that simply participating in the course is not sufficient, but that significant effects will only be seen when students established deeper relationships with one or more international partners.

## UP56

**Integrated Food-Based Science Curriculum Increases Fourth Graders Math Knowledge.** Callan Hoerdemann<sup>1</sup>, Ashley Roseno<sup>1</sup>, Virginia Carraway-Stage, MS, RD, LDN<sup>1</sup>, Jana Hovland, MS, RD<sup>2</sup>, Sebastian Diaz, PhD<sup>3</sup>, Melani Duffrin, PhD, RD, LDN<sup>1</sup>, <sup>1</sup> Department of Nutrition Science, East Carolina University, Greenville, NC, <sup>2</sup> Department of Dietetics, Marshall University, <sup>3</sup> Diaz Consulting, Morgantown, WV

Research shows increasing mathematics knowledge in primary education settings can have long-term benefits in everyday life. Addressing numeracy skills in elementary education is particularly important for developing foundational knowledge to improve understanding mathematics and science in the context of healthy living. The Food, Math, and Science Teaching Enhancement Resource (FoodMASTER) Initiative is a compilation of programs aimed at using food as a tool to teach mathematics and science. The purpose of this study was to assess the effectiveness of the integrated hands-on, food-based science curriculum on 4th grade students mathematics skills. During the 2009-2010 school year, FoodMASTER researchers implemented a hands-on, food-based intermediate curriculum in eighteen 4th grade classrooms in Ohio (n=9) and North Carolina (n=9). Students completed a researcher-developed mathematics knowledge instrument, consisting of 20 multiple choice questions administered pre- and post-test. Only subjects with pre- and post-test scores were entered into the sample (Intervention n=288; Control n=194). No significant differences were observed between groups at pre-test. At post-test, the intervention group scored (16.6333.42) significantly higher (p=.000) than the control group (15.0134.04). These findings suggest the FoodMASTER intermediate curriculum is more effective than a standard science curriculum at increasing students mathematics knowledge.

# Undergraduate Poster Abstracts (Face-to-Face)

UP57

## **Utilizing a Single-Session Medication Adherence Intervention to Improve Disease Management Among African American Women with Diabetes,**

1. Williamson, S., 1. Quinn, K., 1. Dinatale, E. 2. Vines, L., 2. Hambidge, B., 3. Littlewood, K., 1. Lutes, L., 2.4. Cummings, D. , 1. Psychology Department, East Carolina University, 2. Center for Health Disparities, East Carolina University, 3. School of Social Work, East Carolina University, 4. Department of Family Medicine, Brody School of Medicine, East Carolina University, Greenville, NC

Approximately 26 million Americans currently have diabetes and another 79 million suffer from pre-diabetes. Diabetes increases the risk for heart disease, stroke, hypertension, and early mortality and disproportionately impacts African American women. While medications have been shown to be key in disease management, up to 64% of patients are considered medically non-adherent. Thus, treatment programs should specifically target medication adherence behaviors. The purpose of the present study will be to identify and provide treatment to participants who are non-adherent with current medications in the EMPOWER study, a program for rural African American women with diabetes. Using the Morisky Medication Adherence Scale, participants with poor adherence will be identified among the 200 EMPOWER participants and provided with a single phone-based non-adherence intervention utilizing motivational interviewing techniques. Post-intervention assessment will determine whether this session impacted medication adherence at 12 months. It is hypothesized that the single session medication adherence coaching session will improve participant's medication adherence and be related to improved HbA1c levels. The baseline data and intervention outline will be presented.

UP58

## **An Examination of Women's Roles and Status in the Aztec Empire,** Alexandra Terry, East Carolina University, Greenville, NC

This poster draws upon a literature review and archival research to outline the roles women played in Aztec domestic and public spheres and to examine how these roles were regarded and valued in the society. These data indicate that women played important roles in the Aztec household and were highly valued as mothers. Women also occupied specialty occupational roles as midwives, priestesses and artisans in the public sector. While many scholars such as Nash (1978) have argued that despite these roles, Aztec society was still patriarchal; our conclusion is that women's roles are better theorized as complementary to those of men within an overarching religious ideology that emphasized the importance of the male/female duality in the spiritual realm.

UP59

## **What does talking really mean to young adults? Perceptions of talking behaviors in today's relationship formation,** Ayrien F. Davis, Jana Daves,

Child Development and Family Relations, East Carolina University, Greenville, NC

Knapp's (1978) relationship development model defines the stages of relationship formation and dissolution (Avtgis, Anderson, & West, 2009). The first three steps Knapp identifies in the development of a relationship are initiating, experimenting, and intensifying, in which a new aspect of relationship development, talking, may be found. Knapp's relationship interaction stages were used to initially frame the styles of talking used in the present study. Today, one of the challenges when examining the relationship development process is to determine where and how talking can be classified in a relationship. Scholarly articles were reviewed concerning relationships, different stages and theories concerning relationship formation. In order to better understand talking relationships, a survey instrument was constructed which included 37 statements about possible behaviors young adults would deem appropriate when talking to a person. These statements included a 5-point Likert scale with the range of 1=strongly disagree, to 5=strongly agree. A total of 184 individuals, 104 females and 79 males, between the ages of 18 to 26 completed the online survey. The statements were then categorized into eight different styles of talking. The eight styles included: Casual Conversation Talking, Spending Time Together Talking, Flirty Talking, Physical/Sexual Talking, Physical Non-Sexual Talking, Sharing/Disclosing Talking, Publicly Talking, and Monogamous Talking. After ranking the mean scores of the statements and placing them into their designated styles, the style with the highest composite mean was Flirty Talking ( $m = 4.183$ ). The statement behaviors included within this style were playful non-committal touching, teasing, eye contact, and enjoying each other's company. The style category with the lowest overall composite mean was physical/sexual talking ( $m = 2.622$ ). This style's statement behaviors included having sexual intercourse, oral sex, and sexting. When examining and ranking all 37 statements together, having conversations with the person they are talking to ranked the highest among young adults ( $m = 4.5$ ) and was classified as a behavior within the Casual Conversation Talking. The lowest ranked response was talking to other people while currently in a talking relationship ( $m = 2.11$ ), which was categorized under Monogamous Talking.

## UP60

**The Mindful Motherhood for Pregnant Women Project**, Kristen Williams, Summer Anderson, Aiesha Draughton, Christyn Dolbier, Department of Psychology, East Carolina University, Greenville, NC

Introduction: Mindfulness is a state of active awareness of thoughts, emotions, and bodily sensations in the present moment without judgment or reactivity. Mindfulness-based interventions (MBIs) reduce stress and provide other psychological and physiological benefits. Prenatal stress negatively relates to maternal-fetal health. MBI integration into prenatal care settings may be beneficial during pregnancy. A standardized MBI tailored for pregnant women, Mindful Motherhood Training (MMT), has shown promise in a pilot study, however, limited psychological and no biological or health data were collected. Purpose: This project's purpose is to: 1) identify ways to enhance MMT recruitment, retention, and adherence through focus groups with pregnant women; and 2) examine MMT feasibility and effectiveness in pregnant women with greater stress due to having Diabetes Mellitus (DM). Methods: In phase 1, pregnant women (n=24) will be recruited from the Brody School of Medicine (BSOM) maternity clinic. Three 8-participant focus groups will be conducted, with open-ended questions about MMT participation willingness and obstacles. MMT implementation strategies will be developed using themes from content analysis of focus group data. Phase 2 will employ an experimental research design with random assignment to treatment group (TG) receiving MMT or usual care group (UCG). Women 12-26 weeks gestation with DM (n=48) will be recruited from the BSOM maternity clinic. Psychological, biological, and health data will be obtained via psychometrically sound surveys and medical chart abstraction pre- and post-intervention, and at 1-month follow-up. MMT includes one 2-hour 12-person group session per week for 8 weeks. Sessions contain education, mindfulness exercises, and discussion. Participants receive the Mindful Motherhood book, workbooks, and audio guided exercises for home practice. MMT feasibility will be evaluated by examining recruitment and retention data. Effectiveness will be examined using repeated measures ANOVAs to compare psychological, biological, and health variables between the TG and UCG across the three time points. Expected Results: Compared to the UCG, the TG will show greater decreases in stress, anxiety, depression, and HbA1c (long-term blood sugar marker); and increases in coping, self-efficacy, prenatal care, and DM regimen adherence.

## UP61

**Carryover Effects of Emotions on Persuasive Messages**, Monique Heath, Department of Psychology, East Carolina University, Greenville, NC

Among the many studies that document carryover effects of emotions, none have examined the impact on perceptions of political candidates. According to Lerner and Keltner's (2000, 2001) Appraisal Tendency Framework, emotions are extracted from our evaluations of events that cause specific reactions in different people, thus our evaluation of a situation causes an emotional response. Psychologists have used the appraisal tendency framework as a basis for predicting the influence of emotion on judgment. The primary question addressed by this research is: How does one emotional experience influence the next and the judgments that follow? In an attempt to shed new light on the answer to this question, the current work will test hypotheses drawn from the appraisal tendency framework and the emotional blunting hypothesis. A carryover effect of emotions on persuasive messages will be introduced by exposing participants to an emotionally provocative film clip immediately followed by a political ad that appeals to a specific emotion. Immediately afterward, participants will be asked to evaluate the political candidate that they saw in the ad. If the appraisal tendency framework is supported then ads that are paired with emotionally similar film clips will be more effective. If the emotional blunting hypothesis is supported then ads that are paired with clips of opposite emotional valence will be less effective.



# Undergraduate Poster Abstracts (Face-to-Face)

UP62

**Aztec Music Education Before and After The Spanish Conquest**, Stormy De Lucia, East Carolina University, Greenville, NC

This poster presents data from historical and archival research on the musical practices and the music education system in traditional Aztec society to explore how these were transformed by the Spanish conquest. I hypothesize that similarities in musical styles and musical interest in general allowed the Spanish to penetrate Aztec society more easily while also enabling the Aztecs to transform Spanish musical forms in order to preserve elements of their traditional culture. Aztec music was taught in Calmecac schools for upper class children and Tepochcalli schools for children of commoners (De Couve, Lucia Frega, & Dal Pino 1997). Music education was highly valued for its association with religious rituals and status in the social hierarchy. Traditional Aztec instrumentation included an assortment of percussion, such as skin drums, and woodwinds, such as bone or wooden flutes (Booth 1966). All of these instruments were used in coordination with singing and dancing to honor gods in religious festivals and rituals. A main goal of Aztec musical education was to teach pupils divine songs using a codex, to be sung during religious practices (De Couve, Lucia Frega, & Dal Pino 1997). After the Spanish conquest, music became a vital point of connection between the two cultures. Spanish missionaries began to instruct Aztec children in European styles of music and introduced new instruments (Aguilar, Lumsden, & Ramsey 2002). Aztec adults connected with the hierarchy found in the Catholic church through involvement as musicians and choral members. In this way, Aztecs were able to transfer praise songs originally for their gods, and direct them towards the Christian god (Aguilar, Lumsden, & Ramsey 2002).

UP63

**Is there a link between “green” certification and job attainment in today’s competitive market?**, Matthew Dickerson, East Carolina University, Greenville, NC

My interest lies in how sustainability initiatives affect the future of the construction industry. A comprehensive literature review will provide an understanding of current and historical trends for green building and established organizations. Of particular note, there are specific certification options for industry professionals within these various organizations. Further the Associated Schools of Construction, American Council for Construction Education, and the Advisory Board for the Department of Construction Management at East Carolina University address the need for continued enhance-

ment of undergraduate professional skills. A survey approach will offer insight on the use of green building techniques and importance of attaining certification by construction companies. This information will help facilitate growth and opportunities for U.S. Green Building Council student chapter at East Carolina University. The chapter has met regularly on campus to study and review exams for Leadership in Energy and Environmental Design certification. This has shown that there is a positive outcome for students who obtained their certification and received internships accordingly. My endeavor aims to prove a direct relationship between certification and job opportunities thus strengthening the student organizations actions.

UP64

**Lyman filament extruder**, Plastibot Printers, Brad Raynor, Matt McCotter, East Carolina University, Greenville, NC

We will be working with the Plastibot company that is based in Raleigh NC. Plastibot is a company that is here to help spread the knowledge of 3D printers and how useful they can be in our lives. (Plastibot, 2012) Working with these machines is a growing hobby as well as in industry. The purpose of our project will be to better his output and productivity by implementing a filament recycling machine that will take already made parts and turn them into new usable filament. With this he could make a better profit by recycling old parts that did not work and making new filament for the use of himself and his clients. With the use of this, less money will need to be spent on new plastic for the printers and will be introducing lean manufacturing techniques. The initial plans for a machine like this are being taken from the Lyman Filament extruder, an open source design of a filament extruder that gives free will to modify and change as one wish. (Lyman, 2012) Also through our association with the school, we hope to bring at least one workshop of Plastibot’s, to be taught by my Capstone group, Brad Raynor and Matt McCotter, to ECU to teach other students about how to build their own 3D printers. For anyone who hopes to enter into a design field, having made their own 3D printer would look really good on a resume and because of how fast this technology is growing, it could end up giving more people a cutting edge in the future.

## UP65

**Value of AutoCAD in Manufacturing Industry as compared to New Technology Standards**, J. Blake Crowder 1, 2, 1East Carolina University, Greenville, NC, 2AAR Cargo Systems Goldsboro, NC

The study in which I will be performing is to assess the value of creating and updating Computer Aided Design drawings in both AutoCAD and Catia software packages. I have learned through an internship at AAR that in many industries, especially the manufacturing industry, Catia has become the standard for CAD software. As a student in the Industrial Engineering Technologies program, I have developed advanced skills in the AutoCAD program, yet I have never been introduced the Catia software. I am hoping through this internship to develop skills in the software, as AutoCAD is slowly becoming the old way of doing things. I hope the findings from my research will help ECU to maybe consider incorporating more advanced programs, as the Industrial world seems to be adopting these new technologies as the standard.

Through initial research at AAR, I have discovered that Catia is a better alternative to AutoCAD in the fact that it exponentially more precise and accurate. Catia, unlike the Autodesk programs, has the ability to be programmed directly into the machinery on the Production floor. This eliminates the need for operators to program part design into each machine before each step which removes unnecessary time and effort from the production process. This new technology is being adopted into many different applications in the Industrial world, and comparing and contrasting the application compatibility against that of AutoCAD should show that it is becoming the way of the past. I hope ECU can use this information to better prepare the students of Engineering, Design, and Industrial Technology programs, and give them the opportunity to work with design software of the future.

## UP66

**Spool Mold Design**, Will Garren, East Carolina University, Greenville, NC

Currently the present spool thickness for the VOY-20 instrument transformer results in a PD reading that currently does not meet standards set by customers and the Canadian Standards Association (CSA). There is currently no mold or products in house that meet the new specifications. The new design will encompass an increase in spool thickness, flange and an increase lip length. Also, other design considerations include lengthening the spacing between the flanges providing more room between high voltage windings and thus decreasing potential discharge between high and low windings. Whether or not the design modifications are successful will be evident based on PD testing. The estimate for the spool thickness comes from a trend-line created based on PD results from units of various voltage classes.

## UP67

**Effects of Lost Worktime In a Manufacturing Facility**, Shane Siver1, 2, 1 East Carolina University, Greenville, NC, 2 Keihin Carolina System Technology

There are many factors that contribute to the success of a manufacturing facility. The concentration of most Industrial Engineers is the overall efficiency of a production line and how the amount of lost work time affects the efficiency. A key factor to efficiency is the cycle time of the various processes and machines throughout the production line. Cycle time is the average time between completion of successive units in a repetitive process. Another key factor to the efficiency is machine downtime. Downtime is the time from the first equipment breakdown to full running production. Downtime in a manufacturing process is usually caused by a machine that has broken or that is not able to perform up to its full potential. We will be conducting time studies and investigating the cycle times of various machines at Keihin Carolina System Technology, making sure that these machines are working to their full potential to ensure their process is flowing at an optimum level. We will also investigate the causes of machine downtime, and how we can eliminate some problems that are causing these machines to break. We will also investigate how we can speed up the repair process in order to decrease downtime there as well.

# Undergraduate Poster Abstracts (Face-to-Face)

UP68

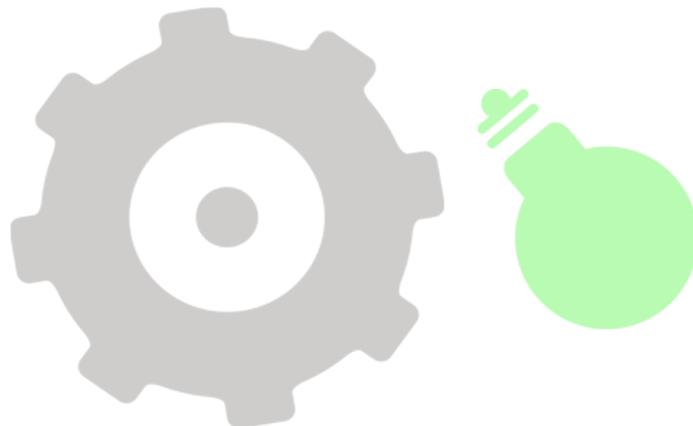
**Re-Design Of Core-Winding Area Layout For The Gct Area Of Abb**, Masato Nagakane, East Carolina University, Greenville, NC

This project presents a comprehensive look at the issues involved in increasing production and capacity by redesigning the layout of operating lines within the core-winding area of the generator current transformer division of ABB. This current project has been underway for the last four months. It includes a re-design of the crane and hoist system; re-design of the conveyor line layout, and ergonomic improvements on the existing core-winding machines and shielding stations. ABB provides utility, industrial and commercial customers with safe, reliable and smart technologies for the distribution of electricity. The extensive global offering includes distribution automation products, switching, limiting, measuring and sensing devices, switch-gear, modular substation packages and related services. Pinetops began operations as a Westinghouse Electric plant in 1978. It became a joint venture with both ABB and Westinghouse in 1989, and was acquired solely by ABB in 1990. The Pinetops plant is considered by ABB as its "World-wide Center of Excellence" for instrument transformers. The generator current transformer are specializes in a variety of highly customizable products, thus requiring a highly responsive and flexible layout. This project will address both of these issues. The proposed layout must be robust, able to meet future needs without additional equipment or re-design. Long-term goals are to increase capacity and double the productivity. The plant layout design will offer potential improvement by trying to optimize quality, promoting effective use of the people, equipment and space and increasing production.

UP69

**Mitsubishi Industrial Robot**, Mohammed T. Abdo, East Carolina University, Greenville, NC

Industrial Engineering Technology (IET). The Mitsubishi Industrial Robot was purchased by the Industrial department at East Carolina University for learning and educational purposes only. This unique Mitsubishi robot provides a visual example of how robots in the manufacturing fields are used, programmed, and maintained. Learning how to use and program the robot is of course, part of the lesson as well. The issue with this robot is that while a student was learning how to use this machine, a clamp (of two) from the hand of the robot, broke, while picking up an object. The little metal gripper that is assembled within the hand of the robot cannot be re-ordered by the Mitsubishi manufacture, by itself. The whole robotic hand must be replaced instead of the clamp itself. This causes an issue for the department, because, if the hand were to be ordered, it would cost the University's department, \$2,200. This is why I was selected by Bruce Peterson, Lead Lab Supervisor. I am familiar with the robot as well as Solid Works 2011. I plan on drawing and fabricating the exact part of the clamp while using the same exact dimensioning to re-create the clamp. After the drawing is completed, I then will have the help of Mr. Andrew Wilson, who will help me with the fabrication of this project, that will be printed on the Z-printer for a 3-D model at the University. Once we find out that the model is the correct size and dimension, Mr. Wilson will continue with assisting and supervision of milling out the clamp on the milling machine.



# Undergraduate Poster Abstracts (Online)

# RCAW

## UDP1\*

**Real time bioluminescent monitoring of circadian clock gene expression**, Khoa Do, Ming Cai, Ben Kassahun, Steve Nunns, Bin Zhou, Jian Ding, Department of Physiology, Brody School of Medicine, East Carolina University

Circadian rhythms are physiological functions that manifest a 24-hour period, including sleep-wake cycle, metabolism, body temperature, sensory acuity, motor coordination, cognitive performance, hormone and neurotransmitter synthesis and release, receptor regulation, second messenger levels, serum and intracellular enzyme activity, cell division, gene expression, and even susceptibility to diseases, drugs, toxins, and radiation.

The circadian rhythm in mammals is regulated by the central circadian clock in the suprachiasmatic nucleus (SCN) of the hypothalamus. The SCN receives direct input from the retina known as the retinal hypothalamic tract (RHT), which is responsible for light entrainment of circadian rhythm. The RHT originates from a special set of retinal ganglion cells that contain melanopsin. The SCN projects to the adjacent hypothalamic neuroendocrine nuclei to keep the circadian rhythm of the organism in synchrony with the environmental light dark cycle and to synchronize the circadian rhythm of peripheral organs to each other.

At the molecular level, circadian rhythms are generated by the oscillatory expression of a large family of circadian clock genes through the transcriptional and translational feedback loop (TTFL). We are breeding an unique type of transgenic mice where the circadian clock gene period-2 (mPer2) is coupled to the fire fly luciferase (luc:per2). The bioluminescent signal generated by luciferase in the presence of luciferin. The level of bioluminescent signal reflects the gene expression of mPer2, which enables us to monitor circadian clock gene expression in real time in live tissue.

Bioluminescent recording is achieved with the use of the lumicycle instrument equipped with a cool-CCD camera to record and analyze the bioluminescent image with special computer software. The mouse SCN brain slice is sectioned with the vibroslicer. The SCN slice is viable in vitro for up to a week at 37°C. In addition to the SCN, tissues from peripheral organs, including the liver, spleen, lungs, and heart, also generate circadian rhythm of mPer2 gene expression, reflected with bioluminescent.

*\*Will be presenting face-to-face in Undergraduate Biomedical Sciences Category*

## UDP2

**Litholink stone risks in a pediatric nephrology practice in Eastern North Carolina**, Axita C. PateLL and Hsiao L. Lai, MD2, 1East Carolina University Honors College, 2 Division of Nephrology & Hypertension, Department of Internal Medicine and Pediatrics, East Carolina University, Greenville, NC

Although the incidence of kidney stones is much less in pediatrics the incidence of pediatric stone disease is rising. Earlier age of onset of first kidney stone is associated with a higher recurrence rate. Identification of specific risk factors in at risk patients can guide treatment to reduce stone formation and recurrence and to avoid potential renal damage. Litholink is a lab that specifically analyzes 24 hour urine collections for stone risk factors. 143 Litholink collections were obtained over a 2-year period from February 2009 to February 2012 from 99 unique pediatric patients with clinical indications for high stone risk. Analysis of Litholink data was correlated with clinical data on patient demographics. Stone risk factors were analyzed with regards to BMI, gender and race. The average age of patients was 10 3 4 years, with 53% female, 66% White, 15% Black, 16% Hispanic, and 2% Other races. Out of 143 collections 75.5% met volume adequacy criteria. Low urine volume and elevated sodium to potassium ratio were found in >50% of all patients regardless of BMI. Low urinary citrate was seen in 74.3% of females and 55.2% in males. Underweight patients were more likely to have high supersaturation of calcium oxalate (SSCaOx), high 24 hr urinary oxalate levels (24Ox) and low 24 hr citrate (24Cit) levels. OB and OW patients had higher prevalence (15.4 vs 9.3 and 7%) of elevated supersaturation of uric acid (SSUA), particularly OB males and low urinary magnesium (24Mg) compared to lean or underweight patients. OB and OW males had more elevation of SSCaOx, with opposite trend in females. The reverse pattern was observed for 24Mg in males versus females. Hispanic females had higher prevalence of hypocitraturia (61.3 vs 19.4%), but in general Hispanic patients had low supersaturation rates of calcium oxalate, calcium phosphate and uric acid. Hypomagnesuria was also less in Hispanic patients (3.2 vs 15.8 and 16.8%) compared to Blacks and Whites. Low urine volume and high dietary salt intake were highly prevalent in this population of patients. A high proportion (46%) of patients had BMI risk. Surprisingly in this group UW patients had equivalent to higher risk prevalence than OB and OW patients. Low urinary citrate levels were prevalent in all patients, but more so in female patients. Analysis of risks reveals differing trends based on gender, race and BMI.

# Undergraduate Poster Abstracts (Online)

## UDP3

**A Water Consumption Audit of Selected ECU Dormitories**, Ryan Knapp, Imran Syed, Cameron Lallathin, Kris Abshire, Department of Technology Systems, College of Technology & Computer Science, East Carolina University, Greenville, NC

A water usage audit is being conducted to identify ways in which ECU can reduce its consumption of water. The study will be limited to water consumption in Fleming, Cotton, and Clement dorms. A physical count of the number of sinks, showers, and toilets, and other fixtures will be conducted. Low flow and the non-low flow fixtures will be identified. Once the data for faucets, showers, toilets, and other plumbing fixtures have been collected, how much water is being used without the upgrades of low-flow fixtures will be calculated. Then the quantity of water that can be saved with the use of low-flow fixtures will be calculated. The underlying outcome of this work is to lower the water usage, one building at a time on the campus starting with the least efficient. From this audit ECU will request changes to the aerators, which will be a good investment long term. The audit will gather data to be used by other facilities in hopes to reduce their consumption.

## UDP4

**Solar Panel Installation on ECU Warehouse Campus**, Scott Michael Barber, Lucas Gaido, Department of Technology, East Carolina University, Greenville, NC

In an effort to become more sustainable, operationally, East Carolina University has been pursuing numerous money savings initiatives. In addition, some of the initiatives will reduce ECU's impact on the environment while maintaining the social dimensions of sustainability. In line with this goal, Aaron Johnson, who has central receiving and warehouse responsibility, would like to install solar panels on the university-owned warehouses to provide power for the warehouse district and to demonstrate the feasibility of taking advantage of solar energy at ECU. Solar panels, devices that convert the energy of light directly into electricity, would provide renewable energy with no impact on the environment and provide financial savings. In order to determine if this is an achievable alternative to current electrical power sources, this project determines the initial costs and payback period for installing solar panels on these buildings. We then produce an estimate on the reduced impact on the environment as a result of installing solar panels, based on the amount of energy produced. After conducting an assessment on the current effectiveness and technology of solar panels, we analyze the data we have for the energy use of these buildings, and make an accurate proposal for the installation of solar panels for the warehouses. This project researches and addresses the many factors that affect the effectiveness of solar panels on East Carolina University's warehouses, and determines if this is an alternative worth pursuing. The primary factor analyzed is the financial savings brought to the institution, including the buyback period, estimated life expectancy of the solar panels, and potential government incentives. Next, our research determines the change in environmental impacts that will result from the installation of solar panels. As a summary of this research, we then present various options for the installation of solar panels on the warehouse campus at East Carolina University.

## UDP5

**Insect Succession on Pig Carcasses in Eastern North Carolina**, Banks V.M., Richards S.L., Anderson A., Department of Health Education and Promotion, East Carolina University, Greenville, NC

The relationship between insect succession and carcass decomposition is a factor in determining the post-mortem interval (PMI), the period of time after death. Aspects of decomposition are used in forensic investigations to determine time of death and whether the carcass was relocated. Patterns in species occurrence and abundance can be found during the PMI. It is important to obtain data from different geographic regions and habitats as this information can be used in forensic studies and criminal investigations. Region-specific documentation of insects of forensic importance can facilitate estimation of the PMI. The current study evaluates seasonal (summer, fall, winter, spring) effects on the PMI in relation to insect succession. The summer and fall observation periods have been completed. The winter and spring components of this experiment are in progress. Insects were collected from carcasses on a daily basis for an approximately three week period during each season. Soft bodied insects were preserved in vials containing 70% ethanol and other insects were pinned prior to identification to species. More than 600 insects were collected during the summer and fall experiments. Data on species composition and abundance with regard to the PMI are presented. Insects in Order Diptera were most abundant during the initial fresh stage of decomposition. Species diversity increased as the PMI progressed (i.e. bloated, active decay, advanced decay, remains stages). Patterns of insect succession will be analyzed within each season and between seasons.

## UDP6

**The Benefit of Energy Efficient Lighting**, William Pate, Zachary Wait, Department of Technology Systems, College of Technology and Computer Science, East Carolina University, Greenville, NC

Some buildings on the East Carolina University campus make effective use of energy efficient lighting systems using automatic lighting controls, energy efficient bulbs, and other energy efficient devices in hallways, classrooms, and various common areas. Other buildings have not yet made the transition to this method of energy conservation and are causing the university to expend resources that could be used in different areas. The purpose of this project is to determine which buildings electrical systems, main focus being lighting, need to be retrofitted to decrease lighting costs. To determine which buildings are the best candidates for this retrofit, we will analyze power usage of buildings with and without energy efficient lighting systems, as well as the physical elements in each building. First, we will research to find which buildings presently have energy efficient lighting. We will do a physical audit of each of the buildings in our project's scope. To do this audit, we will walk through each building taking inventory of what types of bulbs each building currently has installed as well as whether it has automatic occupancy sensors. We will also walk through these buildings during off hours to determine which lights are being left on without anyone being around. Second, we will look at recent, existing, electricity usage bills from the university records. Third, we will figure out how much of the usage actually goes to the lighting as opposed to outlets, computers, or other electrical sources. We will then compare the two, upgraded energy efficient system and outdated inefficient system, determining how much savings can be achieved by using an energy efficient lighting system. After conducting this study, we will provide the administrators with options for cutting operating costs of campus buildings, the initial cost of these options, and the rate of return these options are expected to have.

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Muse, Amelia	41	124	Sawyer, Megan	37	102	Wiles, Heather	49	163
Nagakane, Masato	50	170	Schenck, Graham	36	95	Wilkinson, Daniel	35	85
Nguyen, Quan	46	149	Schofield, Erin	36	91	Williams, Kristen	49	167
Nissenbaum, Mark	48	159	Serna, Erica	38	110	Williamson, Sarah	49	166
Nolan, Casey	38	105	Shahbazi, Ali	33	70	Wilson, Brandi	43	130
Nukunya, Kate	35	88	Shahrier, Aniq	37	101	Wilson, David	33	72
Oakes, Justin	40	122	Shaia, Megan	48	155	Wingate, Garrett	36	91
O'Farrell, Emily	47	154	Shortt, Kelli	39	117	Woerner, Brittany	36	90
Opsal, Kimberly	45	140	Simmons, Alexander	48	159	Woodall, Benjamin	48	157
Osborne, Jillian	39	118	Siver, Shane	50	169	Woodson, Anna	39	115
Palethorpe, Samantha	46	149	Smith, Michael	38	107	Woolard, Hannah	47	150
Parker, Matthew	46	143	Smith, Rachel	48	156	Wright, Diana	34	76
Parker, Zachary	32	68	Soliman, Eman	30	54	Yang, Chunlin	38	105
Parker, Zachary	41	124	Spencer, Michelle	36	94	Yerke, Aaron	35	89
Pate, William	51	173	Stadiem, Amy	42	127	Yonts, Jason	38	109
Patel, Axita	51	136	Stalls, Juliann	49	163	Young, David	39	114
Patel, Hetal	45	139	Starov, Oleksii	33	70	Younge, Erin	33	72
Patel, Mukund	44	171	Steely, Kristin	37	104	Zaremba, Nicholas	39	114
Pearce, Martin	46	147	Stewart, Emily	31	64	Zhang, Tommy	46	144
Pelletier, Christopher	35	87	Stocks, Chase	48	160	Zurlo, Daniel	39	113
Penumarti, Anusha	35	84	Stone, Joshua	34	81			
Perry, Cathy	33	73	Subash, Jacob	44	136			
Perry, Justin	39	112	Sullivan, Brittany	32	70			



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The RCAW committee would like to thank all of those who participated and attended.

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