COME TO LIFE

10TH ANNUAL
RESEARCH & CREATIVE ACHIEVEMENT WEEK

APRIL 4 – 8 2016
MENDENHALL STUDENT CENTER

East Carolina University

#RCAW2016 • @ECUGRADSCHOOL • ECU.EDU/GRAD

Research & Creative Achievement Week 2016

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

We would also like to recognize Doctoral of Physics student Taylor Dement, for his development and management of the abstract book.

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March 2016

We are pleased to invite you to participate in the East Carolina University Research and Creative Achievement Week (RCAW). The week of April 4-8, 2016, has been set aside to highlight the extraordinary accomplishments of our students in research and creative activities. It is the hope of the organizing committee that you will attend, as much as your time allows, to see and hear what our students have achieved. Also, we hope that you will strongly encourage your students to attend. The event is sponsored by a partnership of these entities: Division of Academic Affairs, Division of Health Sciences, Brody Graduate Student Association, Graduate and Professional Student Senate, Office of Undergraduate Research, Office of Postdoctoral Affairs, Graduate School, and the Division of Research, Economic Development, and Engagement.

Research and Creative Achievement Week is a showcase of graduate and undergraduate student research and creative activities that are taking place here at ECU. There will be over 360 student presentations, an impressive number that reflects the continuing growth of research and creative activities at ECU in a variety of fields and disciplines. Graduate student oral and poster presentations and the Postdoctoral Scholar poster presentations will take place on Monday, April 4. Undergraduate student oral and poster presentations will take place on Wednesday, April 6. In addition, we have online presentations for both undergraduate and graduate students.

As part of our continuing emphasis on student and student-faculty collaborative work, the Intersection of Arts and Sciences event will take place on Tuesday, April 5, as well as the International Scholars Symposium. The Honors College Research Showcase and Reception, along with the College of Education Faculty and Student Research Showcase, will be on Wednesday afternoon. The entire week is capped off with the announcement of the student and postdoctoral RCAW award winners, Graduate Faculty Mentor Award winners, Thesis and Dissertation Award winners, and other award winners at noon on Friday, April 8.

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

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

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

Ronald L. Mitchelson Phyllis N. Horns Michael R. Van Scott

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Division of Academic Affairs

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Planning Committee

Tom McConnell: The Graduate School, RCAW Chair

Mary Farwell: Assistant Vice Chancellor, Interim, Division of Reearch, Economic Development, and Engagement, Director of Undergraduate Research, RCAW Co-Chair

Bob Chin: Technology Systems, College of Engineering and Technology

Taylor Dement: Biomedical Physics Student, Thomas Harriot College of Arts and Sciences

Paul DeVita: Kinesiology, College of Health and Human Performance

Christyn Dolbier: Psychology, Thomas Harriot College of Arts and Sciences

Nehad Elsawaf: Economics, Thomas Harriot College of Arts and Sciences

Rich Franklin: Microbiology & Immunology, Brody School of Medicine

Derrick Isler: The Graduate School

Julie Johnson: Nutrition Science Student, College of Allied Health

Jennifer Jones: President, Graduate & Professional Student Senate; Coastal Resources Management, Thomas Harriot College of Arts and Sciences

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

Marquerite Latham: The Graduate School

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

Alexander W. Prunka: Political Science Student, The Honors College

Alan Skirnick: English Student, Thomas Harriot College of Arts and Sciences

Virginia Stage: Nutrition Science, College of Human Ecology

Anastasia Weeks: President, Brody Graduate Student Association; Microbiology and Immunology, Brody School of Medicine

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

Technical Committee

Wendy Creasey

Charles Elton

Laurie Godwin

Derrick Isler

Mike Myles

Matthew Powell

Ginny Sconiers

John Southworth

Research Week Daily Schedule

Monday

APRIL FOURTH

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

- Oral sessions in MSC Great Rooms (GR1, GR2, GR3)
- Graduate Posters in MSC Social Room
- Graduate Posters in MSC Room 221
- Graduate Posters in MSC Room Gallery

10:15 am – 12:15 pm | Postdoctoral Scholar Posters | Social Room

Tuesday

APRIL FIFTH

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

9:00 am – 12:00 pm | Intersection of Arts and Sciences | MSC Room 244

2:30 pm – 6:00 pm | International Scholars Symposium | MSC Room 244

Wednesday

APRIL SIXTH

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

- Oral Sessions | MSC Great Rooms (GR1, GR3)
- Undergraduate Posters | MSC Social Room
- Undergraduate Posters | MSC 221
- Undergraduate Posters | MSC Gallery

2:00 pm – 3:30 pm | Honors College Research Showcase and Reception | MSC Great Room 2

4:00 pm – 6:00 pm | College of Education- Faculty and Student Research Showcase | MSC Room 244

Thursday

APRIL SEVENTH

Undergraduate Posters | Posters must be taken down by noon

Friday

APRIL EIGHTH

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

- RCAW Awards
- Thesis/Dissertation Awards
- ECU Distinguished Graduate Faculty Mentor Awards
- Carol F. Volkman Awards
- Coastal Scholars Award

Lectures & Symposia

Intersection of Arts and Sciences

International Scholars Symposium

Honors College Research Poster Showcase and Reception

College of Education Faculty and Student Research Showcase

Global Issues Virtual Conference

Intersection: Arts@Science

HOSTED BY THE COLLEGE OF FINE ARTS AND COMMUNICATION

Date: Tuesday, April 5, 2016
Time: 9:00 AM – 11:00 AM
Location: MSC 244

WELCOME TO THE INTERSECTION: We know that art, in and of itself, has intrinsic value. Perhaps Intersection: Arts @ Science illuminates scientific research in the service of art, unveils creative activity that inspires scientific breakthrough, or showcases novel solutions found through cross-disciplinary partnerships. Our purpose is to celebrate collaboration, recognize interdisciplinary initiatives and investigate the arts as they inspire innovation in the sciences.

9:00 Art + Science = Wonder
Dr. Tim Christensen (Biology)

9:10 The Relation of Theories of Art to Research in the Social Sciences
Dr. George Bailey (Philosophy)

9:20 Greco-Roman Paganism in the Architectural Culture in the Southern Levant During the Roman Empire
Mia Willis (Classics)

9:30 Exploring the Eye: Using Eye-tracking Microscopes in Art and Design
Dr. Cynthia Bickley-Green, Rachel Hanna Clark and Nicole Allen (Art Education)

9:40 Groupthink: How the Intersection of Art & Science Provide for a Better Community
Roderick Hall (Political Science)

9:50 Night Ritual
Visiting Instructor Kristina Smith (Photography)

10:00 Student Produced Theatre Projects: A Vital Aspect of the Collegiate Theatre Experience
Mathew Johnson and Brandon Fillette (School of Theatre and Dance, Honors College) URCA awardees

10:10 Escher and Da Vinci: Bringing Order to a Chaotic World
Dr. Punam Madhok (School of Art and Design)

10:20 The Intersection of Arts and Science
Lee Hoff (Mathematics, Psychology, Honors College)

10:30 Video Games: Virtual Worlds Require Real Art and Science
Josh Peery (Visual Learning Clinic)

10:40 Theatrical Global Connections: Storytelling for the World's Children
Dylan Ritch (School of Theatre and Dance), URCA Awardee

10:50 Research and Production of The Crane Wife: Asian Theatre's Effect on the Western World
Sarah Howard (School of Theatre and Dance), URCA Awardee

Presenter order and times subject to change. No talk lasts longer than 10 minutes.

INTERNATIONAL SCHOLARS' SYMPOSIUM-2016

PROGRAM

2:45-3:00

Opening Remarks: Dr. Nehad Elsawaf : International Scholar Symposium Chair and Organizer.

Session 1:

Session Chair- Dr. Nehad Elsawaf

3:00-3:20

3D Printer Selection Engine, Ranjeet Agarwala and Robert A. Chin, Department of Technology Systems, College of Engineering and Technology, Daniel Zuberbier, Mark Sanders, Joyner Library, East Carolina University, Greenville, NC, 27858

3:20-3:40

Exploring Family Heritage in an Undergraduate Course on Families and Cultural Diversity:A Step toward Developing Cultural Competence. Priti P. Desai, Bernice A. Dodor and Elizabeth E. Carroll, Department of Human Development and Family Science, College of Health and Human Performance, East Carolina University, Greenville, NC, 27858

3:40-4:00

Developing a Research-Based Curriculum Model to Promote Science Processing Skills in Early Childhood Classrooms, Chia-Jung Yeh, Sheresa Blanchard, Department of Human Development and Family Science, College of Health and Human Performance, East Carolina University, Greenville, NC, 27858 and Ajay Singh ,Department of Early Childhood & Elementary Education, College of Education and Human Services, Murray State University, Murray, KY, 42071

4:00 PM-4:20 PM
BREAK

Session 2:

Session Chair Dr. Nehad Elsawaf

4:20- 4:40

High Energy Planetary Ball MillingTechnique for Soft Ferrimagnetic Glass Ceramics Nano Particles Production, Nehal A. Erfan and Barbara Muller J-Borer, Department of Engineering, College of Engineering and Technology, East Carolina University, Greenville, NC, 27858

4:40-5:00

Comparison of Retention in Care Outcomes for HIV-infected Patients Who Reengaged in Care through State Bridge Counselors vs. Those Who Reengaged through Other Efforts, Nada Fadul, Sarah Willis, Diane Campbell, Aimee Wilkin, Jenna Donovan, Abigail Boyer, Amy Heine, Lawanda Todd, Anna LeViere, Evelyn Byrd Quinlivan, Departement of Infectious Disease, Brody School of Medicine, East Carolina University, Greenville, NC, 27858

5:00-5:20

Are State Educational Expenditures Equalizing?, Aygül Anavatan, John A. Bishop and Lester A. Zeager, Department of Economics, College of Arts and Science, East Carolina University, Greenville, NC, 27858

5:20-5:30

Concluding remarks- Dr. Nehad Elsawaf

Honors College Research Poster Showcase and Reception Schedule of Events

In collaboration with East Carolina University's 10th Annual Research and Creative Achievement Week

Date: Wednesday, April 6
Time: Throughout day with reception from 2:00-3:30 PM
Location: Mendenhall Great Rooms

Honors College students will be presenting their research and/or creative activity throughout the day on Wednesday, April 6. All presentations will take place within Mendenhall Student Center. Please see below for the list of all Honors College students and their respective presentation details.

The Honors College research reception will take place from 2:00-3:30 PM in the Great Rooms. Please join us as we recognize our students and mentors for their achievements. Refreshments provided.

Presenters

MSC Social Room

UP75: Sydney Howard
UP77: Kimberly Miskow
UP81: Elizabeth Radack
UP82: Morgan Pullium
UP83: Mikayla Paluzzi
UP84: Victoria Reynolds
UP87: Kathryn Donato
UP89: Stephanie Griffin
UP91: Aaron Parker
UP 92: Denay Hayden
UP93: Selena Hamilton
UP94: Anna Howell
UP95: Amanda Beeler
UP97: Swapna Sahiti Marella
UP99: Kristen Fulcher
UP100: Allison Yeager
UP102: Mallory Byrum
UP103: Dennis Wilson
UP104: Joanna Paul, Kelly Forbis, and Jackie Curtis
UP105: Kelli Soos
UP106: Emma Renfrow
UP107: Carried Beard
UP109: Avery Barr
UP110: Meghan Boop
UP111: Erin Traister
UP112: Lillie Malpass
UP113: Heather Wolford
UP114: Hannah Woolard
UP115: Kate McPherson
UP117: Jared Ingle
UP118: Jacylin Ticatic
UP120: Taylor Locklear
UP121: Halbert Campbell
UP122: Thomas Phinizy
UP129: William Thaxton
UP133: Emily Bolger
UP136: Heinz Dinter
UP137: Joseph Paul
UP 138: Christopher Pridgen

MSC 221

UP4: Shivam Patel
UP5: Nadiya Yerich
UP6: Robyn Alston
UP10: Stephanie Sanders
UP11: Ashley Warren
UP15: Leela Goel
UP17: Emma Shirley
UP18: Mikayla Bellardini
UP19: Radhika Kothadia
UP20: Zoe Hinton
UP23: Aenia Amin
UP25: Andrew Reid
UP27: Jake Francisco
UP28: Amy Dorszynski
UP33: Landon Moody

MSC Great Rooms

UO8: Ivy Culver
UO9: Erika Dietrick
UO10: Spencer Jackson
UO12: Sarah Judy
UO15: Morgan Sherlor
UO16: Daniel Franch
UO17: Kathryn Medinas
UO18. William Sokolovic
UO19. Raleigh Little
UO21. Samantha Dawson
UO26: Victoria Eaton
UO27: Samuel Roebuck
UO29: Sarah Lisson
UO31: Anna Lawrence
UO32: Tyler Moore

MSC Gallery

UP45: Carolina Abashian
UP47: Mark Nabell
UP49: Ryan Clancy
UP51: Alexander Prunka
UP52: Erin Mahoney
UP54: Megan Woodlief
UP56: Camryn Keeter
UP60: Brianna Knox
UP61: Ryan Carter-Stanley
UP63: Morgan Harvey
UP67: Savannah Welborn
UP72: Holden Jones

College of Education Faculty and Student Research Showcase

Invited Lecturers

Lecturer	Presentation
Daniel Dickerson	*The Examination of a Pullout STEM Program for Urban Upper Elementary Students*
Matthew Militello	*Preparing School Leaders to Work with and in Community*

Invited Roundtable Presenters

Roundtable Presenter	Presentation
Allison Crowe	*Stigma From Professional Helpers Toward Survivors of Intimate Partner Violence*
Melissa E. Hudson	*Teaching Early Numeracy Skills Using Single Switch Voice-Output Devices to Students with Severe Multiple Disabilities*
Martin Reardon	*A Double Standard and Dubious Ethics in Determining Quality Teaching*
Christopher J. Rivera	*Using a Multicomponent Multimedia Shared Story Intervention with an iPad® to Teach Content Picture Vocabulary to Students with Developmental Disabilities*
Caitlin Ryan	*Discussing Princess Boys and Pregnant Men: Teaching About Gender Diversity and Transgender Experiences Within an Elementary School Curriculum*
Sharon Schleigh	*Analysis of Individual Test Of Astronomy Standards (TOAST) Item Responses*

Student Presenters

Student Presenter	Presentation
Jenny Hodgin	*Analyzing the implication of iPad use in the classroom on student achievement.*
Erica Conti	*Time of Day and Assessments*
Mary Key	*Does constructed response instruction have an effect on the ability of students to express their comprehension of a text?*
Amanda Tomlin	*A Study of Fourth Grade Students' Focus and Engagement during Independent Reading After Participating in Physically Active Brain Breaks*
Mary Key	*Does constructed response instruction have an effect on the ability of students to express their comprehension of a text?*
Lauren Warner	*The Effects of Peer Tutoring on First Graders' Reading Achievement*
Amber Mirise	*Ability Grouping in the Mathematics Classroom*
Ashley Stanton	*Comprehension Strategies and Native Language Discussion in the Classroom*
Suzanne Averitt	*Raising Student Achievement Using a Mutli-Tiered System of Support*
Faison Powers	*"I Read it, You Should Read it Too!": Increasing Students Motivation to Read Through Book Talks, Book Choice, and Book Recommendations*

Together Creating a Global Community

Global Issues Virtual Conference

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

The Global Issues Conference will facilitate student-centered discussions with students around the world on topics that impact young people and their futures across the globe.

Sessions

- Gender
- Migration
- Race and Ethnicity
- Education
- Language
- Health

Come Join Us!

April 4-8, 2016
Virtual Conference

For more information email
gpeglobalissues@ecu.edu

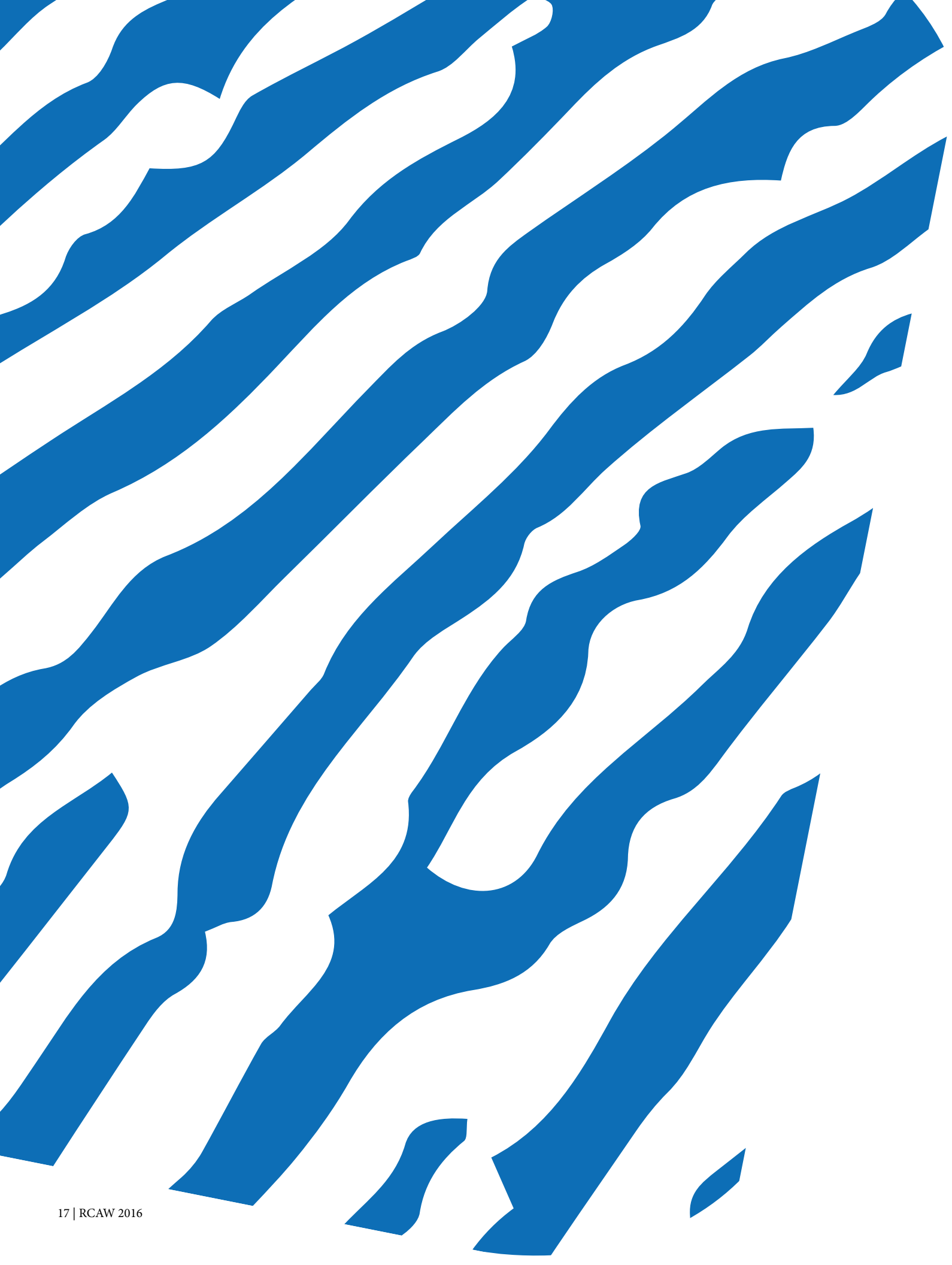
East Carolina University

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

Please Join the Conversation. Times and Dates TBA

Państwowa Wyższa Szkoła Zawodowa im. Stanisława Pigonia w Krośnie

Global Partners in Education



Mentor List

A special thank you to all the mentors that encouraged and worked with students for Research and Creative Achievement Week 2016

Ables, Elizabeth Tweedie
Agarwala, Ranjeet
Anderson, Ethan J
Ardon-Sayao, Marcelo
Avenarius, Christine Benita
Averett, Paige
Aziz, Shahnaz
Babatunde, Oyinlola Toyin
Baker, Michael Drew
Balakrishnan, Christopher
Balanay, Jo Anne Goot
Banks, William Paul
Bareiss, Sonja Karin
Batts, David Lee
Baugh, Eboni Jacanne
Bean, Eban Zachary
Becker, Craig M
Behm, Michael G
Bova, Kenneth Paul
Brewer, Kori Louise
Burns, Colin Sanderson
Carawan, Lena W
Carpenter-Aeby, Tracy
Castles, Ricky Thomas
Cellucci, Anthony J
Chalcraft, David R
Chalovich, Joseph M
Chen, Runying
Chen, Yan-Hua
Chin, Robert A
Choi, Jungmin
Christensen, Timothy W
Clemens, Stefan
Cooper, Nelson Lee
Covey, Burrell Montz
Danell, Allison S
Daneri, Juan Jose
Daniel, Isaac Randolph
Das, Bhibha Mayee
Das, Kanchan K
DeVita, Paul
DeWitt, Jamie C
DeWitt, Regina
Dolbier, Christyn
Domire, Zachary J
Donica, Denise
Drake, John Richard
DuBose, Katrina D
Eagle, John Scott
Eamon, Thomas Floyd
Edwards, Robert
Eppler, Marion A
Ewen, Charles R
Fafulas, Stephen
Ferreira, Rosana Nieto
Fogarty, Elizabeth
Frank, Amy R
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Lunsford, Philip J
Luo, Huabin
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Massey, Brian
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May, Linda Elizabeth
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McClung, Joseph Matthew
McConnell, Ann C
McCoy, Krista Ann-Marie
McKinnon, Jeffrey
McKinnon, Jennifer Faith
McMillen, Brian A
McRae, Susan B
Meardon, Stacey Augusta
Mendez, Lucia I
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Miller, Richard
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Mitra, Siddhartha
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Pan, Xiaoping
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Perry, Jamie L
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Quick, Linda Ann
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Reyes, Enrique
Richards, Stephanie Lynn
Richman, Alice Rose
Rider, Patrick Michael
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Robidoux, Jacques
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Rudel, David James
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Russoniello, Carmen Vincent
Ryan, Caitlin Law
Ryan, Teresa Jean
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Shaikh, Saame Raza
Silver, David W
Smith, David L
Soderstrom, Kennth M
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Spuches, Anne M
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Thompson, Brittany Myles Wright
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Torres, Essie Talina
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Valrie, Cecelia R
Van Dross, Rukiyah
Verbanac, Kathryn
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Vilkomir, Sergiy
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Vohra, Nasreen A
Walcott, Christy
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Webb, Monica Cecilia
Wells, Angela Franks
Wheeler, Michael D
Willson, John David
Willy, Richard William
Witczak, Carol
Wright, Heather Harris
Wubneh, Mulatu
Yang, Li
Yang, Yu
Yao, Jianchu
Zeng, Xiaoming

Graduate Oral Presentations

MSC Great Room 1 | Biomedical Sciences **8:30 am — 3:15 pm**

GO1	8:30-8:45	Human T-cell Leukemia Virus basic leucine zipper factor (HBZ) hijacks small Maf transcription factors to alter cellular transcription, Amanda Rushing
GO2	8:45-9:00	Diminished force production and mitochondrial respiration are strain dependent myopathies of ischemic muscle regeneration, Cameron Schmidt
GO3	9:00-9:15	The soluble guanylyl cyclase activator BAY 60-2770 inhibits arterial smooth muscle cell migration in protein kinase G/VASP-dependent manner, Andrew Holt
GO4	9:15-9:30	Morphology of the Levator Veli Palatini Muscle in Cleft Palate Using Magnetic Resonance Imaging, Katelyn Kotlarek
GO5	9:30-9:45	Regulation of the Macrophage in the Reversal of Hepatic Fibrosis, Sherri Moore
GO6	9:45-10:00	Absence of the Proton Sensor GPR4 Reduces Intestinal Inflammation in a Mouse Model of Inflammatory Bowel Disease, Edward Sanderlin
GO7	10:00-10:15	Differential Characterization of J-series Prostaglandins as Pro-Apoptotic Products of Cancer Cell Metabolism, Robert Kobet
	10:15-10:30	BREAK
GO8	10:30-10:45	CaMKKα is A Positive Regulator of the Pentose Phosphate Pathway in Mouse Skeletal Muscle, Jeremie Ferey
GO9	10:45-11:00	Determination of novel flagellar proteins that are critical for the distinctive morphology and motility of Borrelia burgdorferi, Kihwan Moon
GO10	11:00-11:15	Defining the Role of the C-Terminal Region of Troponin T by Analysis of a Series of Truncation Mutants, Dylan Johnson
GO11	11:15-11:30	EphrinA1-Fc reduces apoptosis of ischemic HL-1 cardiomyocytes via attenuation of exosome biogenesis in vitro, Kyle Takayama
GO12	11:30-11:45	Investigating the Pro-metastatic Niche in Metastatic Murine Models of Triple Negative Breast Cancer, Kassondra Balestrieri
GO13	11:45-12:00	Structural Characterization and Mutagenicity of the Aflatoxin B2a-Amino Acid Adduct as a Potential Detoxification Product, Blake Rushing
GO14	12:00-12:15	GPR4 Stimulated ATF3 Expression by Acidosis Is a Negative Regulator of Inflammation in Human Umbilical Vein Endothelial Cells (HUVECs), Elizabeth Krewson

Graduate Oral Presentations

MSC Great Room 1 | Biomedical Sciences 8:30 am — 3:15 pm

GO15 1:30-1:45 Fatty Acid-mediated Mitochondrial Dysfunction: Differential Effects Among Individuals, Jared Shine

GO16 1:45-2:00 RNA Wars: The Modifications Awaken, Nathaniel Fry

GO17 2:00-2:15 Spermatogonia in the neonatal mouse testis differ in their sensitivity to retinoic acid (RA), Ellen Velte

GO18 2:15-2:30 The 'Mechanistic Target of Rapamycin' (mTOR) is Required for Spermatogonial Differentiation in the Mouse, Nicholas Serra

GO19 2:30-2:45 The Vaccinia virus protein O1 enhances virulence and inhibits antigen presentation, Anastasia Weeks

GO20 2:45-3:00 Acute high fat diet exposure in skeletal muscle-specific estrogen receptor-α knockout mice leads to increased adiposity in males and glucose intolerance in females, Melissa Mae Inigo

GO21 3:00-3:15 Structural Investigation of Pathogenic Transthyretin Amyloids using Solid-State NMR, Anvesh Dasari

MSC Great Room 2 | Fine Arts 8:30 am — 3:15 pm

GO22 8:30-8:45 *Seeking Safety in a Dark Land*, Abir Mohsen

GO23 8:45-9:00 Contrapuntal Influences and Developments in the Keyboard Music of György Ligeti, Sarah Hemminger

GO24 9:00-9:15 "Identity Overload", Alexandra Ingle

GO25 9:15-9:30 Fresh Tracks, Joseph Mannino

GO26 9:30-9:45 Clyde Jamison Basilus III and "Bootleg" Basilus: An Assessment of Time Traveling Bandits, Addison Brown

GO27 9:45-10:00 Fly in the Ointment, Hosanna Rubio

GO28 10:00-10:15 Finding Where I Belong, Sarah Lazure

10:15-10:30 BREAK

Graduate Oral Presentations

MSC Great Room 2 | Fine Arts **8:30 am — 3:15 pm**

GO29	10:30-10:45	Methods of Scientific Application in Ceramic Studio Practice and Atmospheric Firing, Rachel Clark
GO30	10:45-11:00	Contamination: The pharmacist as primary mental health care provider, Brian Culbertson
GO31	11:00-11:15	Cover the Girl, Katya Harris
GO32	11:15-11:30	Structure, Revealed, Nadia Massoud
GO33	11:30-11:45	6102 Creative process : ssecorp evitaerC 2016, Brett Beasley
GO34	11:45-12:00	Racism, Sexism, and White Privilege, Andrew Wells
GO35	12:00-12:15	Modernism's Influence on Arvo Pärt's Tintinnabuli Style, Emerson Voss
	12:15-1:30	BREAK
GO36	1:30-1:45	Life Casting - The Plaster Bandage Method, Jessica Bradsher
GO37	1:45-2:00	Broken Bodies: The German Porcelain Doll Industry and Adornment, Kayla Staigvil
GO38	2:00-2:15	Distant Transmissions, Christine Zuercher
GO39	2:15-2:30	Intimate Vision: Late 18th Century Eye Miniatures, Barbara McFayden
GO40	2:30-2:45	Musical Irony in the Weimar Republic, Rebecca Kim
GO41	2:45-3:00	Art, Gypsum, and You!, Brendan Mims
GO42	3:00-3:15	Exploring Surrealism in Figurative Sculpture, Chris Morgan

Graduate Oral Presentations

MSC Great Room 3 | Social Sciences — 8:15 am — 10:15 am

GO43	8:15-8:30	Testing a Model of the Development of PTSD Following Childbirth Resulting in Admission to the Neonatal Intensive Care Unit, Meghan Sharp
GO44	8:30-8:45	Examining Drug Trafficking as Supplemental Income among Hispanic Immigrants: A cultural perspective, Amber Francis
GO45	8:45-9:00	Entheseal Changes as a Reflection of Activity Patterns at 1st Century BC/AD Petra, Tara Stanko
GO46	9:00-9:15	Stereotyping and Spectrums: An Analysis of Homosexual Language and Hierarchies in Alex Sanchez's *Rainbow Boys,* Justin Littlefield
GO47	9:15-9:30	Implicit Theories of Intelligence and Difference-Education as an Intervention for First-Generation Students, Dayna Rodriguez
GO48	9:30-9:45	From test to testimony: Resiliency after TBI Diagnosis, Quanisha Davis
GO49	9:45-10:00	Consequences of Rape as Predictors of Sexual Assault Resistance Self-Efficacy, Melissa Decker
GO50	10:00-10:15	Impact of alcohol sale regulation on drug abuse - a secondary analysis of national data sets, James Woodward
	10:15-10:30	BREAK

MSC Great Room 3 | Natural Sciences — 10:30 am — 12:45 pm

GO51	10:30-10:45	Resource availability patterns in nontarget impacts of a biocontrol weevil, Erin Fegley
GO52	10:45-11:00	Fear, Competition, and Time: The interaction of predation, competition, and phenology on treefrog morphology and life-history, Scott Jones
GO53	11:00-11:15	Improving The Cytotoxicity Of The Anti-Cancer Agent Anandamide: Structural Modification To Prevent Enzymatic Degradation, Andrew Morris
GO54	11:15-11:30	Social Status-Dependent Molecular Regulation of Dopaminergic Pathways in Zebrafish Brain, Thomas Miller
GO55	11:30-11:45	Climate Change and the Sea Breeze in the North Carolina Coast, Nicholas Luchetti

Graduate Oral Presentations

MSC Great Room 3 | Natural Sciences 10:30 am — 12:45 pm

GO56	11:45-12:00	Unintended impacts and management of a biological control weevil on a rare Great Lakes dune thistle, Jaclyn Inkster
GO57	12:00-12:15	Quantifying the Thermodynamics that Define Cadmium Mimicry: A Comparison to Cadmium, Rachel Johnson
GO58	12:15-12:30	Case Studies of the Impacts of Climate Change on Precipitation Organization in the SE US, Mark Nissenbaum
GO59	12:30-12:45	Response of the soil and rhizosphere microbiome to long-term fertilization, Regina Ann Bledsoe

MSC Great Room 3 | Education 1:45 pm — 2:45 pm

GO60	1:45-2:00	Teacher Perceptions of Multilevel Policies and the Influence on Nutrition Education in North Carolina Head Start Preschools, Amanda Peterson
GO61	2:00-2:15	Evaluation of Nutrition Knowledge in Eighth-Grade Students in Eastern North Carolina (NC) Based on NC Healthy Living Standards, Caroline Hodges
GO62	2:15-2:30	A Study of Fourth Grade Students' Focus and Engagement during Independent Reading After Participating in Physically Active Brain Breaks, Amanda Tomlin
GO63	2:30-2:45	Comparing the Learning Effects Between Pecha Kucha and PowerPoint Presentations in Occupational Safety Training, Stacy Freeman
	2:45-3:00	BREAK

MSC Great Room 3 | Engineering/Technology 3:00 pm — 4:00 pm

GO64	3:00-3:15	"Is There An App for That: Baby Boomers Adoption of Smartphone Healthcare Apps", Annie Patrick
GO65	3:15-3:30	Fluid Contact Angle Assessment to Evaluate Wetting of Dental Materials, Rana Abdelsalam
GO66	3:30-3:45	Practical Testing Approaches for University Portal Applications: A Case Study, Mary Moore
GO67	3:45-4:00	A Unified View of Big Data Testing, Nam Thai

Graduate Poster Presentations

MSC 221 | Humanities 8:15 am — 10:15 am

GP1 The Pamlico Pirates: An Investigation of the North Carolina Pirates thourgh Historical and Archaeological Methods, Allyson Ropp

GP2 Public Health on the Somerset Plantation, Jay Menees

GP3 Financial Exploitation of the Elderly: An Exploration of the Professional Literature, Jacqueline Vaughn-Heath

GP4 A 3D photogrammetric survey of a Florida Reef Light, Michael Letzring

GP5 The Power of Porcelain: Authority and Landscape in Early Modern Cyprus, Justin Mann

MSC 221 | Natural Sciences 8:15 am — 10:15 am

GP6 Input and Transport of Terrestrial Dissolved Organic Matter in the Tar-Pamlico Estuary, NC USA, Christopher Buonassissi

GP7 Green Extraction of Medicinal Herbs with Subcritical Water, Ninad Doctor

GP8 Evaluation of Selection Criteria for Whole Body Human Computational Phantoms for Use in Radiotherapy Research, Christopher Pelletier

GP9 Statewide Offshore Sand Sources for Beach Nourishment and Dynamics of the Beach-Dune System along a Human-modified Coast, Northern Outer Banks, NC, Ian Conery

GP10 Microbial community structure and functional diversity shifts along a freshwater-saltwater gradient, Henry Raab

GP11 Modeling Sterically-Congested Dimerization in the Rhodium-Catalyzed Hydroacylation of Formylstyrene: The Need for a Dispersion Functional, Thomas Shoopman

GP12 Best Management Practices: The Intersection of Flap Gate Function and Fish Passage, Allison Stewart

GP13 Determination of NC Southern Flounder Offshore Spawning Migration & Habitat Through Active Acoustic Telemetry, Tyler Peacock

Graduate Poster Presentations

MSC 221| Natural Sciences **10:15 am — 12:15 pm**

GP14 Comparing the current interglacial to the last: Foraminiferal assemblages from the Sunda Shelf, northeastern peninsular Malaysia, Bailey Donovan

GP15 Major- and trace-element composition of garnet as an indicator of rare-element mineralization in pegmatites, Nicholas Mitchell

GP16 Defining the Origin of an Anomalous Sand Ridge Field in Pamilico Sound, NC, USA, Brian Querry

GP17 Spatial and Temporal Variability of Nitrogen in Groundwater Beneath Three Large Onsite Wastewater Treatment Systems in Eastern North Carolina, Samantha Haskett

GP18 Holocene Paleoenvironmental Reconstruction of the Sunda Shelf, off Northeastern Peninsular Malaysia, Emily Harrison

GP19 Evaluation of Barrier Sprays for Mosquito Control in Eastern North Carolina, Joshua Volkan

GP20 Genome Editing in *Camelina Sativa*: Herbicide Resistance and Oil Composition, Aimee Malzahn

GP21 The origin of chert and its potential effect on porosity and permeability in the Onondaga Limestone in New Jersey, Kelsey McGee

GP22 Actuarial Science, Thomas Allen

MSC 221| Natural Sciences **12:30 pm — 2:30 pm**

GP23 Iron isotope fractionation in the Skaergaard intrusion, Greenland: implications for magmatic differentiation and planetary formation, Alex Hammerstrom

GP24 Stratigraphic and structural controls on gas production of the Upper Devonian Gordon sandstone located along the Catskill shoreline complex in southern West Virginia, Jonathan Noles

GP25 Reducing Stormwater Runoff and Nutrient Inputs in Lower White Oak River Watershed, Ryan Bond

GP26 High Resolution Nitrogen Transformation Monitoring in Tree Box Filters in Durham and Goldsboro, North Carolina, Max Robinson

GP27 Characterizing Coastal Subenvironments With Modern Foraminiferal Assemblages In Bogue Banks, North Carolina, Nina Shmorhun

GP28 Hickory Shad: A Valuable, yet Poorly Understood Recreational Species, Ryan MacKenzie

GP29 The Identification and Quantification of Oxygenated Polycyclic Aromatic Hydrocarbons in Biochar Leachates by Molecular Analytical Methods, Stephanie Webb

Graduate Poster Presentations

MSC 221| Natural Sciences cont. 12:30 pm — 2:30 pm

GP30 Evaluating Fe Isotope Fractionation in the Sakergaard Intrusion through Bulk-rock Fe isotope analysis, Tiffany Cummings

GP31 A study of Wimble Shoals: Geologic history, dynamics, and influence on sediment tranport, Ryan Gibbons

GP32 Identifying spatial and temporal variability of beach properties on Pea Island, Outer Banks, North Carolina, USA, Brian Gallagher

MSC Gallery | Social Sciences 8:15 am — 10:15 am

GP33 From Workaholism to Burnout: The Effect of Psychological Capital, Fiona Moyer

GP34 A Comparison Study of ADHD in Relation to Substance Use and Depression among a College Student Sample, Kirk Mochrie

GP35 Do you get by with a little help from your friends: Psychophysiological arousal differences when discussing romantic disagreement with friends versus partners, Daniel Blocker

GP36 Social Justice Issues in Subsistence Fishing in Coastal North Carolina, Elizabeth Brown-Pickren

GP37 A Socioeconomic Perspective of Resource User Compliance in Fisheries, Christina Wiegand

GP38 Communicating Weather Information through Social Media-rology: An Assessment of the National Weather Service's Social Media Content and Account Analytics, Minh Phan

GP39 Percieved Role Management and Parent Self-Efficacy, Carrie Bumgarner

GP40 Written in Stone: Headstone Material Change in North Carolina, Simon Goldstone

GP41 *Factors that Influence Older Women's Long-Term Care Decisions*, Lindsay Cortright

GP42 Brunswick Town Wharf Construction Analysis, Stephanie Byrd

GP43 Workaholism and Aggressive Behavior: The Potential Moderating Effect of Perfectionism, Sarah Wellman

GP44 Change and Continuity at the Coast: A social network analysis of adaptation in Dare County, North Carolina, James Fulks

GP45 *A Spatial Analysis of Bounded Cemeteries at the Town Creek Site (AD 1150-1400) in the Southern Piedmont, NC*, Paige Ford

Graduate Poster Presentations

MSC Gallery| Social Sciences 10:15 am — 12:15 pm

GP46 Effectiveness of Visual Supports in the Home for Preschool Age Children with Autism: Implementation of Modified TEACCH Methodology, Velez, Laura

GP47 The Endless Pursuit for Self-Validation through Attainment: An Examination of Self-Esteem as a Moderator in the Relationship between Workaholism and Work Stress, Shannon Zamary

GP48 Teacher Perceptions of Kindergarten Readiness Regarding Social and Emotional Factors, Kelsey Zary

GP49 There is Always More I Could Say: Older Lesbian Responses to an Open Ended Question, Brittany Bullock

GP50 Comparing Methodologies for Documenting Commingled and Fragmentary Human Remains: A Case Study From Petra, Emily Sussman

GP51 Parental Visitation of Infants in a Neonatal Intensive Care Unit and Special Care Nursery: Barriers, Reasons, and Facilitators, Andrew Taylor

GP52 Generational Dyslexia: Adolescents with Dyslexia Being Raised by Parents with Dyslexia, Ayrien Davis

MSC Gallery| Social Sciences 12:30 pm — 2:30 pm

GP53 "I Read it, You Should Read it Too!" Increasing Students' Motivation to Read Through Book Talks, Book Choice, and Book Recommendations, Faison Powers

GP54 *An Analysis of a Stone Artifact Cache from the Shelor Site in Montgomery County North Carolina,* Lori Gross

GP55 Rhetorical Analysis of the 2015 Chapel Hill Shootings: Media Portrayals of Victimized Muslims in Western Media, Roxanne Becker

GP56 Psychological Toughness, Grit, Physical Fitness, and Physical Activity in ROTC and Non-ROTC Students, Elena Cortright

GP57 A Social Norming Advocacy Campaign to Reduce High-Risk Drinking Among the East Carolina Student Population: Less Drinking, More Thinking, Walter Ryan

GP58 Tuscarora as Trade Middlemen Between Colonists and Interior Piedmont Tribes of North Carolina, Amy Dubis

GP59 Intermediate Teacher Perceptions After Implementation of a Hands-on, Integrative Food-based Curriculum, Mindy Bower

Graduate Poster Presentations

MSC Social Room | Biomedical Sciences **8:15 am — 10:15 am**

GP60 N-3 polyunsaturated fatty acids incorporate into cardiolipin of cardiac mitochondria in obesity accompanied by increased levels of complex I and V, Elizabeth Sullivan

GP61 GLUT4 is not necessary for overload-induced glucose uptake in mouse skeletal muscle, Shawna McMillin

GP62 Mitochondrial uncoupling-independent increase in muscle respiration likely mediates anti-obesogenic phenotype of phosphatidylethanolamine methyltransferase null mice, Anthony Verkerke

GP63 Volumetric Breast Density, Breast Cancer Subtypes and Race, Hitesh Shivalingappa

GP64 Novel Prostamide, 15-Deoxy-$\Delta^{12,14}$ Prostamide J_2, Displays Anti-Melanoma Activity In Vitro And In Vivo**,** Daniel Ladin

GP65 Acyl chain remodeling has a strong influence on the mixing behavior of cardiolipin in model mitochondrial membranes, Edward Pennington

GP66 Thermal pain withdrawal reflexes in MEIS1 knockout mice, a possible animal model for Restless Legs Syndrome (RLS), Samantha Meneely

GP67 Manipulation of glutamatergic neurons in the arcuate nucleus of the mouse hypothalamus is sufficient to alter metabolic regulation, Brenton, Laing

GP68 Determination of optical parameters of turbid samples through Monte Carlo simulations**,** Stephen Mutisya

GP69 T cell death-associated gene 8 (TDAG8) stimulates negative selection and acts as a tumor suppressor in hematologic malignancies, Calvin Justus

GP70 Reactive byproducts of catecholamine metabolism and lipid peroxidation disrupt oxidative phosphorylation efficiency in cardiac mitochondria**,** Margaret Ann Nelson

GP71 Deletion of LPCAT3 Promotes Enhanced Insulin Signaling in Skeletal Muscle, Patrick Ferrara

GP72 Phosphatidylethanolamine N-methyltransferase is required for respiratory uncoupling in brown adipose tissue, Jordan Johnson

GP73 Characterization of *ftz-f1* in *Drosophila* oogenesis, Amelia Helms

GP74 Thc Treatment During Adulthood Reduces Persistent Effects Of Chronic Mild Stress On Zebra Finch Song Behavior, Tessa Holland

GP75 WITHDRAWN

Graduate Poster Presentations

MSC Social Room | Biomedical Sciences 10:15 am — 12:15 pm

GP76 Simulation study of diffraction Imaging for single cell assay with realistic optical cell model, Eric King

GP77 Identifying Low Frequency Intracellular Calcium Signals: An Image Processing Application, Jadesola Olaoye

GP78 Poly(ethylene Oxide)/β-Lactoglobulin Nanofibers: Chemical Crosslinking Assessment for Applications in Tissue Engineering, Daniel Vargas

GP79 *Hrb27C* is required for *Drosophila* female germline stem cell maintenance, Danielle Finger

GP80 An evidence based update on dysphagia in individuals with Parkinson's disease, Leigh Pfeiffer

GP81 Characterizing the role of *Cul-5* in follicle encapsulation during *Drosophila* oogenesis, Victoria Hardy

GP82 Use of Electroencephalographic Technology to Correlate Brain Activity and Blood Glucose Levels, Bryce Cranwell

GP83 Using MRI to investigate the superior pharyngeal constrictor muscle among racial groups, Ashley Ritter

GP84 Plasma Norepinephrine and Dopamine Levels are Independent Predictors of Risk for Atrial Fibrillation following Cardiac Surgery, Cherese Beatty

GP85 Social status-dependent modulation of dopamine of an identified brain circuit, Katie Clements

GP86 Study of Metabolic and Hypothalamic Neuronal Changes in 3xTg Alzheimer Mice Model with an Early Exercise Treatment, Khoa Do

MSC Social Room| Human Health 12:30 pm — 2:30 pm

GP87 Examining Unequal Enrollment and Use of Patient Portal, Jimmy Lee

GP88 The Relationships Between Physical Capacity And Biomechanical Plasticity With Age During Level And Incline Walking, Daniel Kuhman

GP89 County Health Rankings in North Carolina: A comparison between 2010 and 2015, Alexandria Baker

GP90 The Optimal Age CPR Education Can Be Implemented in School Curriculum: A Systematic Review, Larrin Stewart

Graduate Poster Presentations

MSC Social Room | Human Health cont. **12:30 pm — 2:30 pm**

GP91 Lean Six Sigma Project: Improving Referral to Listing Time for Kidney Transplant Candidates, Sarah Yuhas

GP92 Effect of public health structure on public health expenditures: Evidence from North Carolina, Julia Land

GP93 Assessing Barriers to Parental Involvement in Care of Infants and How Parental Involvement Affects Infant Self-Regulation Skills in a Neonatal Intensive Care Unit and a Special Care Nursery, Aaron Russell

GP94 The Nurses' Physical Activity Study: Caring for You so You can Care for Others, Brianna Clemmons

GP95 Exposure to Heat Stress, Ultraviolet Radiation and Other Occupational Health Hazards Among Groundskeepers at East Carolina University, Nicole Beck

GP96 Design and Development of an Android Application for Edema Measurement, Jiabin Want

GP97 Changes in the Velopharyngeal Anatomy and Physiology following the Remediation of the Posterior Nasal Fricative: A single subject case study, Evans Caison

GP98 A Phenomenological Exploration of the Rewards and Challenges of Non-Profit Animal Care Work, Sierra Fountain

GP99 Effect of Local Public Health Agencies' Structure on Effectiveness in Reducing Adult Tobacco Use, Vijaya Sarvepalli

GP100 Gaze Control in Collegiate Players During the Hitting Phase of Softball, Alexandra Fieldhouse

GP101 Minority farmers' needs, access and knowledge of Vocational Rehabilitation Services: evidence from Minority Farmworkers in Eastern North Carolina, Marissa Citarelli

GP102 Comparison of parent and child rankings of fruit and vegetable liking to assess parent accuracy as proxy reporters, Carrie Downing

GP103 Effects of public health structure on chlamydia incidence: Evidence from North Carolina, Abigail Terkeltoub

GP104 Movement Variability of Lower Extremity Mechanics in Post-Meniscectomy Runners, Marie Morrissette

GP105 Pre-Season Ultrasound Elastography Of The Ucl In Baseball Pitchers, Christopher Curran

Graduate Online Presentations

Online Presentations | General

GON1 Quantitative Analysis of CD4+ and CD8* T Cell Structures and Morphology based Classification, Marion Greene

GON2 Using Six Sigma DMAIC to Optimize Heat Setting Process for Paint Roller Nap Cover Fabrics, David Kurgatt

GON3 Reducing Call Transfer Time Using Lean Six Sigma, Travis Dodson

Postdoctoral Scholar Presentations

MSC Social Room | General **10:15 am — 12:15 pm**

PD1 Phosphatidylserine decarboxylase regulates skeletal muscle respiration by its action on Complex II, Timothy Heden

PD2 Voluntary exercise training improves hypothalamic function via suppression of apoptosis induced by high fat diet in mice, Tomoko Matsubara

PD3 Targeted Overexpression of Mitochondrial Catalase Protects Against Ischemic Myopathy in High Fat Fed Mice, Terence Ryan

PD4 Shared neural substrates of species recognition between parental and parasitic songbirds, Matthew Louder

PD5 Chemotaxis response regulatory proteins CheY1, CheY2, and CheY3 function distinctively in *Borrelia burgdorferi*, Hui Xu

PD6 CaMKKα signaling increases GLUT4 translocation to the plasma membrane in skeletal muscle, Patrick Davis

PD7 Docosahexaenoic acid improves the decrement in antibody production associated with murine obesity upon influenza infection through the production of CD138+ cells, William Guesdon

PD8 Synthetic Plant Transcription Factors: TAL Effector Activators or Repressors (TALEAR), Levi Lowder

PD9 Role of PUF-8/Pumilio and CSR-1/Argonaute in Cell Fate Decision of Caenorhabditis elegans Germline, Dong Suk Yoon

Undergraduate Oral Presentations

MSC Great Room 1 | Engineering/Technology 8:30 am — 10:30 am

UO1	8:30-8:45	Smoothing Package Labeling and Scanning with Universal Leaf, Joseph Stepusin
UO2	8:45-9:00	Design for Low-Profile Electric Telescopic Pass-thru Ratcheting Wrench, James Powell
UO3	9:00-9:15	*Dedicated Virtual Test Environment for Collegiate Cyber Defense Competition*, Nicolas Brey
UO4	9:15-9:30	Bioprocess Design for Production of Human Granulocyte-Macrophage Colony Stimulating Factor/ Neuroantigen Fusion Protein, Ashleigh Levine
UO5	9:30-9:45	A comparison of finite element simulation, analytic prediction and experimental measurements of mode shapes in a center driven square plate with free-free boundary conditions, Mikaela Howell
UO6	9:45-10:00	Three Dimensional Atmospheric Property Measurement System to Support Modeling of Acoustic Propagation in the Littoral Environment, Melissa Hall
UO7	10:00-10:15	Design and Adaptation of a LabVIEW Controlled Scanning Laser Doppler Vibrometer, Matthew Bogard
	10:15-10:30	BREAK

MSC Great Room 1 | Natural Sciences 10:30 am — 11:45 am

UO8	10:30-10:45	The Effects of Calcium Content in Soils on the Federally Endangered Thalictrum cooleyi of North Carolina Pocosins and Pine Savannas, Ivy Culver
UO9	10:45-11:00	Seed bank potential and temperature as a germination requirement of *Thalictrum cooleyi*, Erika Dietrick
UO10	11:00-11:15	Suppression of claudin-7 enhances human lung cancer cell survival, Spencer Jackson
UO11	11:15-11:30	The Morphological Characteristics of Step-pool Systems in Tropical and Non-Tropical Environments, Elisa Alfonso
UO12	11:30-11:45	The Effects of Coal Ash Pond Runoff on pH and Microbial Respiration in River Sediments, Sarah Judy

Undergraduate Oral Presentations

MSC Great Room 1 | Humanities — 1:30 pm — 2:45 pm

UO13	1:30-1:45	Understanding Justice Through the Myth of Perses: Reflections on Hesiod's *Works and Days*, Hannah Forde-Smith
UO14	1:45-2:00	Is Fast Food Really the Culprit? A Fight against Obesity, Trenton Clayton
UO15	2:00-2:15	The Influence of Parental Involvement on Student Learning when Language and Cultural Barriers for Parents of ESL Students Exist, Morgan Shelor
UO16	2:15-2:30	Reimagining Home: 'Heimat' and Identity in Friederike Unger's 'Bekenntnisse einer schönen Seele' (1806), Daniel Franch
UO17	2:30-2:45	From Equality to Exclusion: Women's Roles in the Early Christian Church, Kathryn Medinas

MSC Great Room 3 | Social Sciences — 8:15 am — 10:30 am

UO18	8:15-8:30	The Organizer's Handbook: A Framework for Effective Societal Change, William Sokolovic
UO19	8:30-8:45	The Impact of Client and Auditor Gender on Auditors' Judgements: a Replication and Extension, Raleigh Little
UO20	8:45-9:00	Hobby Lobby: A Case of Values in Corporate America, Llora Harris
UO21	9:00-9:15	The Objectivity of Accountants' Judgments: A Replication and Extension, Samantha Dawson
UO22	9:15-9:30	How do study abroad experiences impact students: A first hand account, Katelyn Craft
UO23	9:30-9:45	The University of North Carolina at Chapel Hill Academic Scandal, Jessica Willard
UO24	9:45-10:00	The True Believers of Islam, Cayla Rodney
UO25	10:00-10:15	Abercrombie & Fitch Case Study, Ellen Lee
	10:15-10:30	BREAK

Undergraduate Oral Presentations

MSC Great Room 3 | Social Sciences **10:30 am — 12:30 pm**

UO26	**10:30-10:45**	Rape Culture in American Society – What Factors Influence Citizens' Opinions toward Rape Victims in the United States?, Victoria Eaton
UO27	**10:45-11:00**	Examining Motivational Factors that Influence the Likelihood of Fraud, Samuel Roebuck
UO28	**11:00-11:15**	Audience Inequality in Sport: Track and Field vs. Popular Sports, Pol Solanellas
UO29	**11:15-11:30**	Development of a Meal Creation Tool to Assess Knowledge and Preference among Preschool Children, Sarah Lisson
UO30	**11:30-11:45**	Student Co-teaching in a Postsecondary Foreign Language Classroom, Paige Vaughan
UO31	**11:45-12:00**	Morphosyntactic variation of subject pronoun expression in an emerging dialect of Spanish in eastern North Carolina, Anna Lawrence
UO32	**12:00-12:15**	"There is no longer Jew or Greek, there is no longer slave or free": The Civil Rights Movement and the Methodist Church in North Carolina, Tyler Moore
UO33	**12:15-12:30**	Uptown Greenville Master Plan: Abstract and Statement of Purpose, Zachary Pate

Undergraduate Poster Presentations

MSC 221 | Biomedical Sciences 8:15 am — 10:15 am

UP1 The Connection between Microglia and ΔFosB in Nicotine- Induced Sensitization to Drugs of Abuse, Kristen Lane

UP2 The Transgenerational Effects of High-Fat and High-Sugar Diets and Exercise on the Development of Drosophila First and Second Generation Offspring, Michelle Pike

UP3 Altered regulation of E2f1 in Drosophila germline stem cells, Taylor Hinnant

UP4 BAY 41-2272 attenuates arterial smooth muscle cell migration in Smad3-dependent manner, Shivam Patel

UP5 The Involvement of the Protein Phosphatase Inhibitor PPP1R2 in Primary Cilia Formation, Nadiya Yerich

UP6 Early nicotine exposure altered larval neuromuscular function and adult germline apoptosis via miRNA-dependent mechanisms, Robyn Alston

UP7 The effects of acute exercise on POMC neuron activity levels in the arcuate nucleus of the hypothalamus, Wyatt Bunner

UP8 Effect of spinal cord injury on dopamine receptor expression and morphine responsiveness, Nzita Lutete

UP9 Synthesis and Characterization of Novel Naphthalimide Fluorophores as Candidates for Drug Conjugation, Jordan Stanley

UP10 HTLV-1 basic leucine zipper factor directly interacts with small Maf transcription factors, Stephanie Sanders

UP11 Effect of Achilles tendon moment arm on knee joint contact forces, Ashley Warren

UP12 Targeting GSK-3b to Prevent At- and Below-Level Pain Following Spinal Cord Injury, Emma Lattner

UP13 Diet-induced obesity reduced aortic smooth muscle contractions via nitric oxide signaling in pregnant rats, Asya Butner

UP14 SH3PX1 is required for follicle encapsulation in the Drosophila ovary, Jasmine Hughes

UP15 Developing a Musculoskeletal Model of Landing, Leela Goel

UP16 Cognitive performance during a gait retraining program to address running mechanics associated with tibial stress injuries, Samantha Niland

Undergraduate Poster Presentations

MSC 221 | Biomedical Sciences **10:15 am — 12:15 pm**

UP17 The role of intracellular metabolic regulators in metabolic reprogramming and inflammatory responses in macrophages, Emma Shirley

UP18 Use of MRI in assessing structural and functional aspects of the velopharyngeal mechanism: evolution, current trends, and future directions, Mikayla Bellardini

UP19 Determining the role of the Early Gene at 23 in *Drosophila melanogaster* oogenesis, Radhika Kothadia

UP20 Can Early Life Exposure to Lead Impact Synaptic Loss in a Transgenic Rodent Model with a Predisposition to Alzheimer's Disease?, Zoe Hinton

UP21 High glucose in the major pelvic ganglion increases sympathetic neurons, decreases parasympathetic and nitrergic neurons, and promotes apoptosis, Anthony Gatto

UP22 Novel Role for Scavanger Receptor-BI in Ozone Induced Lung Injury, Michael Yaeger

UP23 The Role of Prenatal Hormone Exposure on Neurobehavioral Alterations in a Rat Model of Autism Spectrum Disorders

UP24 Analysis of the Molecular Morphology of Mouse Heart by MALDI-TOF/MALDI-IMS, Justin Parks

UP25 Determination of $Gd_3N@C_{80}(OH)_{20}$ interaction with Fe^{2+}, Andrew Reid

UP26 Improved Oosporein Synthesis, Joel Glotfelty

UP27 Novel migration assay using cultured internal pudendal artery smooth muscle cells: New methods to study vascular erectile dysfunction, Jake Francisco

UP28 Exploring Alternative Strategies for the Synthesis of 15d-PGJ_2-EA: Diversification of Synthetic Routes to A Potent Anti-Cancer Agent, Amy Dorszynski

UP29 Mcm10 is required for proper oogenesis and early embryogenesis in Drosophila Melanogaster, Lucas Hopkins

UP30 HTLV-1 encoded protein HBZ inhibits the transcriptional activity of the cellular factor GATA-4, Stephanie Nguyen

UP31 Evidence for a Role of Aurora A Kinase in Spermiogenesis, Brian Elgart

Undergraduate Poster Presentations

MSC 221 | Engineering **12:30 pm — 2:30 pm**

UP32 Linimar Forgings Carolina-Future State Plant Layout (Process Flow Improvement), James Huza

UP33 Assembly and validation of impedance tube measurement system and design of custom 3D printed impedance calibration standards, Landon Moody

UP34 Flander's Manufacturing Abstract, Brandalyn Watts

UP35 The Advantages and Disadvantages of LEED Design & Certification, Suzannah Turner

UP36 Flander's Improvement Project, Zachary Cleghorn

UP37 Raspberry Pi vs. Arduino Uno: Synchronizing Acoustic Measurements Over Large Distances, William Miller

UP38 Microcontroller-based Synchronization of Long-distance Acoustic Measurements, Alan Fader

UP39 Improvement Plan for End-Line Product Storage, Wesley Capar

UP40 Identifying a Range of Materials to be used as Tactile Evaluation Standards, Keely Mckinley

UP41 Carbon-Hydrogen Bonds and Transition Metal Catalysis, Nicholas Garcia

UP42 Analyzation and Improvments of Sun Energy 1, Reuben Holtzman

UP43 MV & ODP Pack area layout (current layout, time study, potential new layout, time improvement), Ethan Gwynn

UP44 Tempo Trainer, Antonio Jones

Undergraduate Poster Presentations

MSC Gallery | Social Sciences 8:15 am — 10:15 am

UP45 Semantic Knowledge Use in Different Discourse Types, Caroline Abashian

UP46 Writing apprehension and its relationship to self-efficacy in undergraduate nutrition and dietetic students, Alyssa Lowin

UP47 Social Factors Impacting Exercise Behavior, Mark Nabell

UP48 Fair Enough: Farmer-Led Councils and Adopting Best Management Practices, Yanira Campos

UP49 Convergence Skills as Demanded by Newspaper Employers and Taught by University Journalism Programs, Ryan Clancy

UP50 Koru Mindfulness and Meditation to Address College Student Stress, Ellie Kim

UP51 Practice Oriented Teaching in Professional Writing, Alexander Prunka

UP52 Sex & Social Media Apps, Erin Mahoney

MSC Gallery | Social Sciences 10:15 am — 12:15 pm

UP53 The Effect of Mud Plume Generation During Escape on the Dynamics of Social Interactions of Crayfish (*procambarus clarkii*), Allison Everett

UP54 "Emotional Intelligence Comparison of Hospitality and COB Undergraduate Students", Megan Woodlief

UP55 Osteoporosis Knowledge Among College Students: A Comparison between Non-Athletes and Athletes, Shannon Posthumus

UP56 Small Firm Marketing Strategies Targeting East Carolina University Students, Camryn Keeter

UP57 Women in Leadership, Rachel Edwards

UP58 The Relationship Between Activity Plan Context and Children's Physical Activity Within an After-School Program, Kayla Maness

UP59 Preschool Childrens' Familiarity with "Healthy" and "Sometimes" Foods: Influence of Parent-Reported Prior Exposure, Shannon Bolyard

UP60 Effects of Emotional Symptoms on Pain and Social Functioning in Youth with Sickle Cell Disease, Briana Knox

UP61 An Analysis of Dietary Habits of Young Adults Seeking Weight Loss and the Feasibility of a Modified Monitoring System Using Mobile Technology in Young Adults, Ryan Carter-Stanley

UP62 Examining Proposed Models of Mindfulness Mechanisms, James May

Undergraduate Poster Presentations

MSC Gallery | Social Sciences cont. 10:15 am — 12:15 pm

UP63 Entrepreneurship in a Niche Service Market: Developing a Business Model for a Dog Training Enterprise, Morgan Harvey

UP64 Vocabulary Development in Bilingual Children: Why We Assess Differently, Kristen Boretti

UP65 The Relationship Between Leadership Interaction and Children's Physical Activity Within an After-School Program Context, Kelsey Newsom

UP66 Should Post Traumatic Stress Disorder be labeled as a disorder?, Gregory Taunton

UP67 Faith-Based Youth Programs And Resiliency Development: An Exploratory Study, Savannah Welborn

MSC Gallery | Technology and Computer Sciences 12:30 pm — 2:30 pm

UP68 Portable Brew Pod, Joshua Stevens

UP69 Improving Efficiency of Body Shop Distribution Center, Jarrad Sims

UP70 Pre-serialization Labeler Camera, Michael Beavans

UP71 An Innovative Ski Speed Regulator, Brian Pridgen

UP72 Open-source Analytics: A Bibliometric Literature Review, Holden Jones

UP73 Elimination product waste, and implement more efficent recycling method, Brian Greene

UP74 An Innovative Ratchet Wrench, Richard Davis

Undergraduate Poster Presentations

MSC Social Room | Human Health **8:15 am — 10:15 am**

UP75 A Program Evaluation of Asthma Management in an Elementary School, Sydney Howard

UP76 Cancer care provider's perspectives on medication adherence for cancer patients on oral chemotherapeutic agents (OCAs): A preliminary qualitative assessment, Paige Field

UP77 Understanding Infant Feeding Practices Among Underserved Mothers: A Program Evaluation, Kimberly Miskow

UP78 Assessment of Occupational Exposure of Animal Facility Personnel to Mouse Urinary Aeroallergens, Emily Bethea

UP79 Physical Activity Barriers in Adolescents, Akaya Cheatham

UP80 Effects of Income Level on Food Behaviors and Nutrient Intake Among 3-5 Year Old Children, Karsyn Tall

UP81 Examining the Musculus Uvulae Using MRI, Elizabeth Radack

UP82 Best Practices for Stroke Prevention and Rehabilitation in Eastern North Carolina, Morgan Pullium

UP83 Development of a Deployable HRV Asessment and Training System, Mikayla Paluzzi

UP84 Interval Training Effects on Bone and Joint Loads, Victoria Reynolds

UP85 Association between Physical Activity and Dietary Patterns in Children and Adolescents ages 6-15: Research Brief, Fawziah Hammad

UP86 Enhancing the self efficacy of cancer patients to cope with cancer related stress, Peace Nwanguma

UP87 Asthma Management in Elementary Schools: A Comparison of Usual Versus Best Practice, Kathryn Donato

UP88 Understanding baseline cancer medication adherence and health literacy among cancer of patients in the Eastern North Carolina Region, Cheyenna Francis

UP89 The Binaural Advantage for Speech Recongition in Noise Ability, Stephanie Griffin

UP90 United States Children/Adolescents (3-15 Years) Fall Below the Recommendations For Water Intake, Kristina Bandy

Undergraduate Poster Presentations

MSC Social Room | Human Health **10:15 am — 12:15 pm**

UP91 Effects of an Acute Bout of Early Morning Exercise on Cognitive Function in Adolescent Athletes, Aaron Parker

UP92 Effects of Adapted Tricycles on Quality of Life, Activities, and Participation in Children with Special Needs, Denay Hayden

UP93 Assessment and Prevention of Children at Risk of Abuse or Neglect, Selena Hamilton

UP94 A Comparison of Usual to Best Practices in Cardiac Rehabilitation Education, Anna Howell

UP95 The relationship between different foot sensations and balance performance during sensory organization test, Amanda Beeler

UP96 Changes in the Level of Velopharyngeal Closure from Birth through Five Years, Haley Dinice

UP97 A comprehensive study of the positive and negative effects of folic acid on embryonic and adult life, Swapna Sahiti Marella

UP98 Cross Sectional Changes in Vocal Tract Volume from School Age through Adolescence, Kelly Hauhuth

UP99 Macronutrient Intake of Pregnant Exercisers and Non-Exercisers, Kristen Fulcher

UP100 Discourse Analysis of Adults with Anomic and Broca's Aphasia, Allison Yeager

UP101 Impact of Extracellular Matrix on Macrophage Polarization, Kelsey Cossio

UP102 Managing Pediatric Chronic Illness in the School Setting: A Program Evaluation, Mallory Byrum

UP103 Post-activation Potentiation: Increasing Power Production in the Block Power Clean, Dennis Wilson

UP104 Sleep and Online TV Media, Joanna Paul

UP105 Impact of a Parental Modeling Physical Activity Intervention on Childhood Physical Activity and Obesity Levels, Kelli Soos

UP106 Breath Alcohol Concentration and Driving: The BrAC and Confidence of Drivers After Drinking in Downtown Greenville, Emma Renfrow

UP107 The Effectiveness of the Alere iScreen© Urine Adulteration Test Strip at Detecting Four Common Urine Adulterants, Carrie Beard

UP108 A Qualitative Evaluation of Pitt County Breast Wellness Initiative Program, Gabriella Burnett

UP109 Accuracy of the SenseWear Pro Armband During Acute Bouts of Bone Loading, Avery Barr

Undergraduate Poster Presentations

MSC Social Room | Human Health 10:15 am — 12:15 pm

UP110 Exploring Factors Influencing Childhood Immunization Rates: A Program Evaluation, Meghan Boop

UP111 At the Grave We Make Our Song, Erin Traister

UP112 La calidad de salud por los ojos de jovenes, Natalie Malpass

UP113 The Impact of Community Health Agencies on the Prevention of Breast Cancer in Underserved Populations, Heather Wolford

MSC Social Room | Natural Sciences 12:30 pm — 2:30 pm

UP114 Regiospecific acylation of cycloplatinated complexes. Scope, limitation, and mechanism, Hannah Woolard

UP115 Palladium Catalyzed C-C Coupling Reaction from a Computational Quantum Mechanical Perspective, Kate Mcpherson

UP116 Effects of Saltwater Intrusion on Chlorophyll a Concentrations in North Carolina Coastal Wetlands, Eva Gallardo

UP117 Identification and characterization of natural modifiers of miRNA-regulated pathways in maize, Jared Ingle

UP118 Enantiomeric Excess Determination for Primary Amines, Jacylin Ticatic

UP119 A Pedigree Approach Tracing the Inheritance of White Egg Coloration in Eastern Bluebird (*Sialia sialis*), Gabriella Villalon

UP120 Sequencing and comparative analysis of the mitochondrial cytochrome b gene in the Marion Uplands Florida Sand Skink, Taylor Locklear

UP121 Elucidating the mechanisms of Nickel as an animal mutagen, Halbert Campbell

UP122 The Effects of Benzoic Acid on Fat Metabolism in *C. elegans,* Thomas Phinizy

UP123 Non-target effects of Glyphosate on growth and microbiome diversity of common pea *Pisum sativum*, Morgan Beamon

UP124 Correlates of Red Throat and Spine Coloration Within and Between Sexes in the Threespine Stickleback, Haley Overman

Undergraduate Poster Presentations

MSC Social Room | Natural Sciences **12:30 pm — 2:30 pm**

UP125 Genetic Analysis of miR319-regulated TCPs in Maize Development, Jessica Wilson

UP126 Spatiotemporal Patterns in the Fish Assemblage of the Pamlico River Estuary, Andrew Valmassoi

UP127 The origin of the eukayrotic tree-of-life based on mitochondrial RNA polymerases, Alistair Arthur

UP128 Map-cloning of the gene respsonsible fot the *Pt1* mutation on chromosome 6 of the maize plant, Anastasia Amoiroglou

UP129 Temporal and Spatial Gradients in phytoplankton pigments in the Tar-Pamlico River estuary, William Thaxton

UP130 Salinity Impacts on freshwater aquatic communities, James Wilkinson

UP131 Opticially Stimulated Luminescence to Detect Absorbed Radiation by Humans, Matthew Waguespack

UP132 An investigation into the Binding Properties of Cd^{2+} to model EF-hand Protein Loops: A comparison to Ca^{2+}, Melinda Plyler

UP133 Computational and Quantum Mechanical Analysis of Catalytic Organometallic Reactions, Emily Bolger

UP134 Are Spiny Dogfish (*Squalus acanthias*) Capable of Consuming Prey Larger than Gape Size?, Kailyn Corriher

UP135 Environmental Factors Contributing to the Development of Above-Anvil Cirrus Plumes, Joel McAuliffe

UP136 MCM10 Genetic Screen on *Drosophila melanogaster*, Heinz Dinter

UP137 Orthogonal Cas9 for Plant Genome Editing, Joseph Paul

UP138 Luminescence Properties of Halite as a Surrogate for Martian Regolith, Christopher Pridgen

Undergraduate Online Presentations

Online Presentations | General

UON1 Rooftop Gardens and Solar Energy, Tyler Wilson

UON2 The Future of Our Children's Health, Miranda Gooch

UON3 Exploring the Power of Solar Energy Through The Development of Solar Charging Stations, Sandy Jalal

UON4 Solar Students, Lukas Zanota

UON5 Building Massing and Orientation in the Passive Design Process, Nathan Mazzuca

UON6 Sustainable and Solar Design, Michael Jones

UON7 Product Placement Strategy in Film: Understanding and Implementing the Process to Increase Brand Awareness, Adriana Gomez-Weston

Abstracts | Graduate Oral Presentations

GO1

Human T-cell Leukemia Virus basic leucine zipper factor (HBZ) hijacks small Maf transcription factors to alter cellular transcription

Amanda W. Rushing[1], Stephanie V. Sanders[2], Kimson Hoang [1], Nicholas Polakowski[1], and Isabelle Lemasson[1]

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[2]Department of Biology, East Carolina University, Greenville, NC, US

Human T-cell Leukemia Virus type I (HTLV-1) is the causative agent of Adult T-cell Leukemia (ATL), a malignancy of infected CD4+ T-cells. This bloodborne pathogen infects an estimated 20 million people worldwide. While most remain asymptomatic, yet infectious carriers, some develop ATL after decades of low viral activity. Despite the use of chemotherapeutics and anti-retrovirals, patients succumb to the disease in mere months. Since an appropriate model animal for ATL has yet to be established, the study of viral alteration of the cell's normal processes is necessary to understand ATL development. Interestingly, in 60% of ATL patients, only a single viral protein is expressed: HTLV-1 Basic Leucine Zipper factor (HBZ). It has been proposed that HBZ likely plays a vital role in the development of the malignant state. While HBZ has been demonstrated to promote cancerous phenotypes like cellular proliferation and migration, it has also been shown to modulate the functions of several cellular transcriptional regulators. In addition to interacting with members of the ATF/CREB and AP-1 families, we report that HBZ interacts with the small Maf basic leucine zipper (bZIP) transcription factors (MafF, MafG, and MafK). Though the full functions of the seemingly redundant small Mafs remain a mystery, they are shown to be essential regulators of the antioxidant stress response and embryogenesis. While small Maf homodimers are recruited to genomic Maf Responsive Elements (MAREs) to repress transcription, heterodimerization with other bZIP transcription factors such as the Cap n' Collar (CNC) protein Nrf2 result in transactivation. Furthermore, small Mafs are shown to be essential for the recruitment of CNC proteins to their regulatory sequences. Here, we show that HBZ also dimerizes with small Mafs and is recruited to MAREs. We hypothesize that these complexes will alter cellular gene expression in such a way that contributes to the development of ATL.

GO2

Diminished force production and mitochondrial respiration are strain dependent myopathies of ischemic muscle regeneration

Cameron A. Schmidt[1,2], Terence E. Ryan[1,2], Chien-Te Lin[1,2], Tom D. Green[1,2], Jeffrey J. Brault[3], Espen E. Spangenburg[1,2], & Joseph M. McClung[1,2]

Department of [1]Physiology, [2]Diabetes and Obesity Institute, Brody School of Medicine, [3]Department of Kinesiology, East Carolina University, Greenville, NC

Reduced skeletal muscle mitochondrial function may be a contributing mechanism to the myopathy and activity based limitations that typically plague peripheral arterial disease (PAD) patients. We hypothesized that mitochondrial dysfunction, myofiber atrophy, and contractile deficits are inherently determined by the genetic background of regenerating ischemic mouse skeletal muscle, similar to how patient genetics affect the distribution of disease severity with clinical PAD.

Genetically ischemia protected (C57BL/6) and susceptible (BALB/c) mice underwent either unilateral subacute hindlimb ischemia (SLI) or myotoxic injury (CTX) for 28 days. Limbs were monitored for blood flow and tissue oxygen saturation (SO2) and tissue was collected for histology, muscle contractile force, gene expression, mitochondrial content and respiratory function.

Despite similar tissue SO2 and recovery of mitochondrial content between strains, BALB/c mice suffer persistent ischemic myofiber atrophy (55.3% of C57BL/6), muscle contractile deficits (~25% of C57BL/6 across multiple stimulation frequencies), and reduced mitochondrial respiratory capacity as assessed in isolated muscle mitochondria (58.3% of C57BL/6 at SLI d7, 59.1% of C57BL/6 at SLI d28 across multiple conditions) and permeabilized myofibers (38.9% of C57BL/6 at SLI d7, 76.2% of C57BL/6 at SLI d28 across multiple conditions). SLI also resulted in greater intramuscular lipid accumulation in BALB/c mice (1335% increase from control limb, d28). Non-ischemic CTX injury revealed similar recovery of myofiber area, contractile force, and mitochondrial respiratory capacity between strains but also resulted in greater intramuscular lipid accumulation in BALB/c mice (335% increase from control limb, d28).

Ischemia susceptible BALB/c mice suffer persistent muscle atrophy, impaired muscle function, and mitochondrial respiratory deficits during SLI. Interestingly, parental strain susceptibility to myopathy appears specific to regenerative insults including an ischemic component. Our findings indicate that the functional deficits that plague PAD patients, particularly those with critical limb ischemia (CLI), include mitochondrial respiratory deficits genetically inherent to the regenerating muscle myofibers.

GO3

The soluble guanylyl cyclase activator BAY 60-2770 inhibits arterial smooth muscle cell migration in protein kinase G/VASP-dependent manner

Mr. Andrew Holt, Mentor: Dr. David Tulis

Coronary artery disease (CAD) accounts for over half of all cardiovascular disease-related deaths. Uncontrolled arterial smooth muscle (ASM) cell migration is a major component of CAD and efforts aimed at attenuating its progression are clinically essential. Cyclic nucleotide signaling has long been studied for its growth-mitigating properties in the setting of CAD and other vascular disorders. Soluble guanylyl cyclase (sGC) synthesizes cyclic guanosine monophosphate (cGMP) and maintains vascular homeostasis predominantly through protein kinase signaling. In the current study we hypothesized that the novel, heme-independent sGC activator BAY 60-2770 (BAY) inhibits ASM cell migration through phosphorylation of the protein kinase G (PKG) target and actin-binding vasodilator-stimulated phosphoprotein (VASP). Using a rat model of arterial growth, BAY significantly reduced neointima formation and luminal narrowing compared to vehicle-treated controls. Using rat and human coronary ASM cells BAY significantly attenuated cell migration, reduced G:F actin, and increased PKG activity and phosphorylated VASP at Ser239 (pVASP.S239) compared to controls. Using site-directed mutagenesis, VASP-overexpressing cells with/without VASP.S239 phosphorylation-resistance showed significantly reduced cell migration compared to naïve controls; however, in these mutants BAY failed to markedly affect cell migration yet PKG activity was elevated compared to naïve cells. In turn, pharmacologic PKG blockade in the presence of BAY fully reversed the inhibitory effect of BAY alone on migration. These findings show BAY has capacity to inhibit ASM cell migration through cGMP/PKG/VASP signaling yet through mechanisms independent of pVASP.S239 and implicate BAY as a potential pharmacotherapeutic agent against aberrant ASM growth disorders such as CAD.

GO4

Morphology of the Levator Veli Palatini Muscle in Cleft Palate Using Magnetic Resonance Imaging

Katelyn J. Kotlarek, Jamie L. Perry

Department of Communication Sciences and Disorders, East Carolina University

A cleft palate is a congenital defect that results in a hole in the roof of the mouth. Children typically undergo surgery between 6-12 months of age to close the cleft in the palate and create proper muscle function for elevation and retraction of the soft palate against back of the throat (posterior pharyngeal wall) during speech. The primary muscle responsible for elevation of the velum is the levator veli palatini (LVP) muscle. Currently, magnetic resonance imaging (MRI) is the only technology that enables three-dimensional analysis of muscle in living individuals.

Previous research has shown differences in the anatomy and physiology of the velopharyngeal (VP) mechanism in individuals with cleft palate compared to those with normal anatomy, including shorter LVP length and thickness, decreased distance between LVP origin points, more acute angles of LVP origin, and interruption of midline muscle tissue. Nyswonger et. al (in preparation) analyzed linear measures of the LVP in adults with cleft palate as compared to adults with normal anatomy using MRI, which found no significant difference between groups. These results contradict the current research base from studies utilizing histology, radiology, and nasopharyngoscopy. The purpose of this study is to examine the differences in LVP morphology between adults with and without cleft palate. Morphology of the LVP, including measures of diameter, circumference, and volume, will be analyzed using MRI as described by Perry, Kuehn, and Sutton (2013). Implications for surgical technique and patient-specific intervention will be discussed.

GO5

Regulation of the Macrophage in the Reversal of Hepatic Fibrosis

Sherri M Moore[1], Ian N Hines[2], Michael D Wheeler[2]

[1]IDPBS, Brody school of Medicine

[2]Department of Nutrition Science, Allied Health

Chronic injury to the liver induced by various etiologies (e.g. viral infection, alcohol consumption, toxin exposure) is known to progress fibrosis or liver scarring, a process that results from an imbalance of collagen deposition and collagen degradation. Macrophages are essential in both the progression and regression of liver fibrosis by participating in a cascade of events including the activation of hepatic stellate cells and regulation of cytokine/chemokine production. The diverse milieu within the liver directs multiple populations of macrophages to several distinct phenotypes broadly including a pro-inflammatory and anti-inflammatory state. Moreover, recent evidence highlights the potential of a newly identified macrophage population to be directly involved in scar resolution through the production of matrix remodeling enzymes (e.g. matrix metalloproteases;

MMPs). The central hypothesis is that Dicer regulates the development of restorative macrophages that facilitate the resolution of hepatic fibrosis. Using the standard carbon tetrachloride (CCl4) exposure model of liver fibrosis, liver was harvested at 1 and 5 days after the last dose of CCl4. qPCR of collagen gene expression from the in vivo model showed in both wild-type and MacDicer knockouts, a steady decrease after 1 and 5 days post CCl4 however the histology showed sustained collagen staining in the knockouts where there was evidence of resolution in the control. Furthermore, TIMP1 and TIMP2 (Tissue inhibitors of MMPs) protein expression was increased in the knockouts and MMP gene expression levels were significantly blunted in the knockouts supporting the idea that MMPs facilitate collagen breakdown and aid in resolution of fibrosis and more importantly, suggesting Dicer plays an intimate role in the development of macrophage differentiation. Furthermore, select Dicer-dependant transcripts have been identified by miRNA-mRNA associations to be involved in the role of the restorative macrophage. In conclusion, these experiments suggest a role of the restorative macrophage in the resolution of fibrosis. Moreover, the expression of Dicer seems to be important for the restorative phenotype.

GO6

Absence of the Proton Sensor GPR4 Reduces Intestinal Inflammation in a Mouse Model of Inflammatory Bowel Disease

Edward J. Sanderlin[1], Kvin Lertpiriyapong[2], Nancy R. Leffler[1], Qi Cai[3], Heng Hong[3], Vasu Bakthavatchalu[4], James G. Fox[4], Joani Zary Oswald[5], Calvin R. Justus[1], Elizabeth A. Krewson[5], Dorcas O'Rourke[2], Li V. Yang[1,5]

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GPR4 is a pH-sensing G protein coupled receptor that can be activated by extracellular acidosis, which is the accumulation of extracellular hydrogen ions, through protonation of several histidine residues on the extracellular domains. Recent studies showed that activation of GPR4 by acidosis increased expression of numerous inflammatory and stress response genes in vascular endothelial cells (ECs) and increased adhesion of leukocytes to ECs which is necessary for leukocyte extravasation during an inflammatory response. Tissue acidosis is a hallmark for inflamed tissues and can commonly exist in the colon mucosa of patients with inflammatory bowel disease (IBD). We examined the role of GPR4 in the governance of intestinal inflammation using a dextran sulfate sodium (DSS)- induced mouse colitis model. Wild-type and GPR4-deficient mice were treated with 3% DSS suspended in drinking water for 7 consecutive days for the induction of acute colitis. Clinical parameters commonly associated with IBD, such as weight loss and fecal blood content, were assessed daily. GPR4-deficient mice showed less severity of disease when compared to wild-type mice. Clinical parameters such as fecal score, body weight loss, colon shortening, and mesenteric lymph node expansion of GPR4-deficient mice were less severe than wild-type mice. Histopathological analysis confirmed GPR4-null mice had less inflammation, leukocyte infiltration, edema, and isolated lymphoid follicle development compared to wild-type. Additionally, inflammatory molecule expression including E-selectin, ICAM-1, VCAM-1, COX-2, and CXCL2 are reduced in whole colon tissues from GPR4-deficient mice. Collectively, these results suggest GPR4 deficiency reduces intestinal inflammation in the DSS-induced IBD mouse model and that GPR4 inhibitors could be a promising therapeutic in treatment of IBD.

GO7

Differential Characterization of J-series Prostaglandins as Pro-Apoptotic Products of Cancer Cell Metabolism

Robert A. Kobet, Daniel Ladin, Colin S. Burns, Rukiyah Van Dross-Andereson, & Allison S. Danell

Cancer is the second leading cause of death in the United States, claiming more than half a million lives every year in the United States alone. Over the past three decades, more individuals have been diagnosed with cancers of the skin than all other cancer types combined, making them of particular concern as cases rise with increasing UV light exposure. The most common type of skin cancer is non-melanoma skin cancer (NMSC). Recently a number of studies have explored endoplasmic reticulum (ER) stress-apoptosis induced by J-series prostaglandins and prostamides in tumorigenic cells overexpressing the enzyme cyclooxygenase-2 (COX-2). The agents catalyzing this process have been identified as 15-deoxy$\Delta^{12,14}PGJ_2$-EA and the isomers PGJ_2-EA and $\Delta^{12}PGJ_2$-EA as the end products of this pathway using liquid chromatography-tandem mass spectrometry (LC-MS/MS). Mass spectrometry has been

shown to be an ideal method for analyzing diverse functional lipids such as prostaglandins. However, mechanistic factors leading to specific product ions of such molecules are largely unexplored. The present work aims to identify and differentiate PGJ_2 and $\Delta^{12}PGJ_2$ based on the position of the double bond. The identification of distinct product ions for isomeric lipids may allow for future identification of novel bioactive lipids and exploration of their specific roles in biological systems.

GO8

CaMKKα is A Positive Regulator of the Pentose Phosphate Pathway in Mouse Skeletal Muscle

Jeremie L.A. Ferey[1-4], Denise Schmidt[1-4], Joshua Ferey[1-4], Brandon Smith[1], Anthony R. Means[6,] and Carol A. Witczak[1-4]

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Ca^{2+}/calmodulin-dependent protein kinase kinase α (CaMKKα) is a Ca^{2+}-activated, serine/threonine kinase implicated in the regulation of skeletal muscle glucose metabolism and growth. Recent work has shown that expression of constitutively active CaMKKα (CA-CaMKKα) in mouse muscle for 2 weeks increases glucose uptake (~100%) and muscle mass (~15%), suggesting that the glucose may be fueling the energetic and/or biosynthetic demands of growth. The pentose phosphate pathway (PPP) is a metabolic pathway that links glucose to growth-dependent processes, by utilizing glucose to produce pentose monosaccharides for DNA/RNA synthesis. To date, no studies have examined whether CaMKKα regulates the PPP. The purpose of this study was to determine if chronic activation of CaMKKα signaling stimulates the PPP in muscle, and if so, whether muscle-specific deletion of CaMKKα would prevent muscle growth and PPP flux. To determine if activation of CaMKKα signaling stimulates the PPP, contralateral muscles were transfected with plasmid containing empty vector or CA-CaMKKα for 2 weeks. PPP activation was assessed by measuring PPP metabolites and total muscle RNA content. CA-CaMKKα expression significantly increased PPP metabolites [e.g. sedoheptulose-7-phosphate (115%), ribulose (57%), ribose (48%)], and RNA levels (~34%), demonstrating that CA-CaMKKα is sufficient to stimulate the PPP. To determine if CaMKKα is necessary for muscle PPP activation and growth, unilateral tenotomy was performed on muscle-specific CaMKKα knockout mice to induce plantaris muscle hypertrophy. After 1 week, muscle PPP flux was assessed by measuring [6-^{3}H]-glucose incorporation into RNA. Our preliminary results show that in wild-type/control mice, tenotomy increased muscle mass (~28%), RNA levels (~80%), and PPP flux (~400%), whereas in muscle-specific CaMKKα knockout mice tenotomy increased muscle mass (~23%), RNA levels (~67%), and PPP flux (~310%). Collectively, these data suggest that CaMKKα is a novel regulator of glucose flux via the pentose phosphate pathway in skeletal muscle.

GO9

Determination of novel flagellar proteins that are critical for the distinctive morphology and motility of Borrelia burgdorferi

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Lyme disease is the most prevalent vector-borne disease in the United States which is caused by the spirochete *Borrelia burgdorferi*. This spirochete is a motile bacterium, and motility, which provided by its periplasmic flagella, was reported to be critical for the pathogenic life cycle of the spirochete. Unlike externally flagellated bacteria, *Borrelia burgdorferi* possesses periplasmic flagella that contain a unique structural component called the collar. This spirochete-specific novel component is located in the periplasmic space and is linked to the major component of the flagella. The collar structure is hypothesized to be critical for flagellar assembly as well as for providing proper rigidity and flexibility of flagella within the periplasmic space during rotation. However, nothing is known about the proteins encoding the collar or their function in any spirochete. To identify the collar proteins, we employed various compelling approaches, and found only *flbB* to be important for motility and collar assembly. Because of its colossal structure, we predict that the collar is comprised of multiple proteins. However, FlbB is a small protein which is unlikely to form the large collar structure. To identify additional collar proteins, we performed bioinformatics using a*Treponema pallidum* protein-protein interaction map developed between known and unknown flagellar proteins and found several proteins to be potential candidates for the collar

structure. Subsequent analyses indicate that only *bb0236* is involved in collar structure assembly. Using various comprehensive methodologies that use cutting-edge tools, we discovered for the first time that these collar proteins are crucial for orientation of periplasmic flagella, motility, and assembly of the motor structures. Because collar is a spirochete-specific structure, the knowledge obtained in these studies can be directly applied to understand the structure and function of flagellar motors of other medically significant spirochetes including the syphilis-causing *Treponema pallidum*which cannot yet be cultivated *in vitro* for molecular analysis. Because the collar is essential for motility, and motility for host infection and bacterial transmission, these studies can also lead to applications in structure-based drug design to disrupt motor assembly, therefore blocking the *Borrelia burgdorferi* dissemination, and preventing the spread of Lyme as well as other spirochete-borne diseases.

GO10

Defining the Role of the C-Terminal Region of Troponin T by Analysis of a Series of Truncation Mutants

Dylan J. Johnson, Joseph M. Chalovich, William C. Angus

Familial hypertrophic cardiomyopathy and other cardiovascular diseases result from mutations of any of the contractile proteins. Some particularly serious disorders are associated with mutations within the actin binding regulatory complex of proteins that includes tropomyosin (Tm), troponin I (TnI), troponin C (TnC), and troponin T (TnT). Mutations within TnT are the most common largely because of the number of natural mutations that occur in that subunit. Our laboratory has studied several mutations of tropomyosin, TnC, TnI and TnT. In most cases, these mutations change the operation of the 3-way switch that controls movement.

Actin-tropomyosin-troponin exists in three structural states. The B state is inactive as is the intermediate C state. The M state is the only active state. In the absence of Ca^{2+}, the switch is mostly in the B state. In the presence of Ca^{2+} and high concentrations of myosin, the switch is in the active M state. In the presence of Ca^{2+} and normal low concentrations of myosin there is an equilibrium among the B, C and M states. If this equilibrium is altered the heart will not function properly and cardiomyopathy will result.

A particularly interesting mutation is Δ14-TnT. That mutant is missing the last fourteen residues of its C-terminus. The Δ14-TnT mutation leads to hypertrophic cardiomyopathy and early sudden death. Our laboratory found that incorporation of this mutant TnT into the regulatory complex stabilizes the active M state of actin in the presence of Ca^{2+}. Furthermore, that same mutation eliminates the inactive B state at low Ca^{2+} concentrations. This suggests the last fourteen residues of the C-terminus of TnT are essential in maintaining the active state and the inactive state of the thin filament. This function had not previously been attributed to TnT. My goal is to identify the key residues of TnT that are responsible for normal state distribution. This information will allow us to identify possible mechanisms of action of TnT and would facilitate the design of treatments of myopathies.

We prepared truncation mutants of TnT that included Δ4, Δ6, Δ8, Δ10 and Δ14. We utilized two stopped flow kinetic assays and an ATPase assay to determine the effect of these deletions on the state distributions. Each assay supported the idea that successive deletions resulted in further diminished function. We conclude that all of the fourteen residues of the TnT C-terminus contribute to a similar extent to the function.

GO11

EphrinA1-Fc reduces apoptosis of ischemic HL-1 cardiomyocytes via attenuation of exosome biogenesis in vitro

Kyle M Takayama, MS, Justin Parks, Uma Sharma, Jitka Virag, PhD

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

In the year 2016, an estimated 635,000 Americans will experience an acute myocardial infarction (MI), a rate that can be scaled to one event every 43 seconds. During MI, occlusion of the coronary artery attenuates perfusion to a significant portion of the left ventricle and induces both necrosis and apoptosis of cardiomyocytes, which lack the mitotic capability to regenerate the injured tissue. The adaptive response to this cellular insufficiency includes the formation of scar tissue and dilatation of the left ventricle, which compromises contractility and compliance of the chamber and ultimately leads to a progressive loss of function and an increased risk of heart failure. In an effort to develop a novel treatment for preventing the loss of cardiomyocytes and defending post-MI cardiac function, our lab has demonstrated that intramyocardial injection of recombinant ephrinA1-Fc (EA1) markedly reduces necrosis, fibrosis, and left ventricular dilatation in murine models of MI. However, the mechanism responsible for the cardioprotective capability of ephrinA1-Fc has yet to be identified. Recently, there has been an explosion of research describing the process of exosome biogenesis and release, and the unique capacity of these actively secreted vesicles for initiating a variety of homeostatic

and adaptive responses via paracrine signaling. Interestingly, treatments that parallel the ischemic condition such as nutrient deprivation and hypoxia significantly augment the release of exosomes from cardiomyocytes. Given the capacity of ephrinA1, constitutively expressed in healthy cardiomyocytes, to bind to and activate a range of erythropoietin-producing hepatocellular carcinoma (Eph) receptors and trigger associated signaling cascades, we hypothesize that delivery of EA1 will attenuate the release of exosomes by HL-1 cardiomyocytes, thereby reducing the pro-apoptotic effect of these vesicles in an vitro model of ischemia. To this end, exosomes will be isolated via differential centrifugation of conditioned media and quantified using an acetylcholinesterase activity assay. Cell viability will be assessed via MTT and apoptosis will be quantified by TUNEL to correlate changes in exosome secretion with cell survival. We expect to find an association between apoptosis and the rate of exosome secretion in ischemic HL-1 cells, an increase in apoptotic cells upon addition of exosome isolates, and a mitigation of these effects by pretreatment with EA1.

GO12

Investigating the Pro-metastatic Niche in Metastatic Murine Models of Triple Negative Breast Cancer

Kassondra Balestrieri, H. Keith Pittman, Mohamed Ramez, Nasreen Vohra, Kathryn Verbanac

Department of Surgery, Brody School of Medicine

Triple Negative Breast Cancer (TNBC) lacks expression of estrogen and progesterone receptors, has reduced expression of HER2 and lacks effective therapies. TNBC has a high rate of metastasis and mortality. The purpose of this study was to evaluate the pro-metastatic niche in reliable metastatic murine models of TNBC. We selected two murine TNBC based on published gene expression studies which demonstrated molecular profiles that mirrored human breast tumor subtypes. The 2225L murine tumor has similar gene expression patterns to human tumors of the basal-like TNBC phenotype. Here we investigated 2225LM, a highly metastatic variant we previously generated through selective serial passaging in vivo. We also studied an LDEV-free variant of the T11 murine tumor, which is representative of the human claudin-low TNBC phenotype. In both models, tumors were implanted in the sc flank of syngeneic naïve Balb/c female mice. In select studies, tumors were resected at approximately 600-800 mm^3 (mean day 21 post-implant) to promote the growth of seeded metastases; lung metastases were evident in 90% mice. Prior to the development of frank metastases (12-30 days post-2225L implant), lung analysis by ELISA showed a steady increase in the neutrophil chemoattractant KC and the pro-tumor M2/N2 chemokine marker MCP-1. Analysis of lungs with visible 2225LM metastases detected increased levels of KC (27 fold) and MCP-1 (23 fold), when compared to naïve mice. These chemokines were not elevated at non-metastatic sites (i.e. kidney). Immune cell subsets infiltrating the primary tumors were assessed using flow cytometry. $CD11b^+$ $Ly6G^-$ and $CD11b^+$ $Ly6G^+$ cells comprised the majority of tumor-infiltrating immune cells and both subsets were more prevalent in 2225LM than T11. Infiltrating lymphoid ($CD3^+$) cells were a minor component of both tumors. In preliminary studies to quantify lung-infiltrating immune cells, levels of $CD11b^+$ $Ly6G^+$ cells were similar in 2225LM (~17%) and T11 (~20%) metastatic lungs compared to controls (~12-17%). To conclude, myeloid derived cells do not appear to be increasing in tumor-bearing mice, however there are substantial increases in pro-tumor inflammatory chemokines at metastatic sites that may be associated with different phenotypic and functional myeloid cell subsets. Both tumor cell lines are reliable metastatic models of TNBC and will be used to further characterize the inflammatory microenvironment of the pro-metastatic niche.

GO13

Structural Characterization and Mutagenicity of the Aflatoxin B_{2a}-Amino Acid Adduct as a Potential Detoxification Product

Blake R. Rushing, Mustafa I. Selim

AFB_1 is a class 1 carcinogen and is a common food contaminant worldwide. Also, it is a major cause of the development of hepatocellular carcinoma (HCC), making dietary exposure to this toxin very concerning . Current strategies to reduce AFB_1exposure are limited and as a result, many people are exposed to this toxin. Current detoxification strategies use harmful chemicals, additives that interfere with nutrient absorption, or they require large, expensive equipment to employ, limiting their usefulness as a realistic application. Additionally, these strategies are ineffective due to incomplete removal or the transformation products are still toxic themselves. Our study aims to develop a new chemical treatment process that can be used to modify AFB_1 into a non-carcinogenic form using benign reagents that are commonly found in human diets. Our strategy targets a particular site of the AFB_1 molecule, the 8,9-double bond, which is responsible for exerting its carcinogenic effect . This process requires modifying AFB_1 into a known less carcinogenic metabolite AFB_{2a}. Although less carcinogenic, AFB_{2a} is known to be very reactive and can spontaneously bind to proteins and amino acids. We have shown that the AFB_{2a}-amino acid adduct can be formed spontaneously in a benign treatment process that can be easily carried out by the average consumer. Furthermore, liquid chromatography-mass spectrometry data have suggested

that the established structure of the AFB_{2a}-amino acid adduct is incorrect, allowing us to predict a new array of properties of this molecule. The aflatoxin B_{2a}-arginine adduct has been specifically selected as our primary detoxification product due to its favorable chemical and physical properties for detoxification and excretion from living organisms. Testing in simulated digestive tract fluids have shown our adduct to be stable under changing pHs in physiological conditions, ensuring the adduct would not readily reverse into its original, carcinogenic state. Additionally, Ames' test results show that AFB_{2a}-arginine shows no mutagenicity at 200 times the concentration of AFB_1. We propose the AFB_{2a}-amino acid/protein adduct itself is a stable and non-carcinogenic form of aflatoxin and that it can be formed prior to consumption with our novel treatment process. If developed, this process would give countries around the world a valuable option for detoxifying contaminated foods, reducing exposure to AFB1 and reducing the incidence of HCC worldwide.

GO14

GPR4 Stimulated ATF3 Expression by Acidosis Is a Negative Regulator of Inflammation in Human Umbilical Vein Endothelial Cells (HUVECs)

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An acidic microenvironment is a characteristic hallmark of many cancers and pathological conditions. This condition can be due to glycolysis which results from insufficient vasculature unable to supply oxygen and effectively removing metabolic byproducts. How an acidic microenvironment specifically modifies the blood vessel and its encompassing endothelial cells (ECs) is not clearly defined. Proton-sensing G-protein coupled receptor 4 (GPR4) is highly expressed in ECs and is activated by protonation of histidine residues. In a recent transcriptome analysis, the ER-stress related gene, Activating Transcription Factor-3 (ATF3) was identified as significantly upregulated in HUVECs expressing endogenous level of GPR4 and further increased in GPR4 overexpressing HUVECs (HUVEC/GPR4) in response to acidosis. ATF3 is a member of the ATF/cyclic-adenosine monophosphate response element binding (CREB) family of bZip transcription factors and is an adaptive-response gene induced by a variety of signals including cytokines, physiological stress, and apoptosis. We stably transduced HUVECs with an expression vector that overexpresses ATF3 in HUVECs (HUVEC/ATF3) or a control vector (HUVEC/Vector). We have identified ATF3 as being a negative regulator of VCAM-1, E-Selectin, IL-8 and CXCL2, which are known inflammatory genes, at the mRNA level. Previously, we have identified the nuclear factor kappa-light-chain-enhancer of activated B cells (NFκB) pathway as an imperative factor for acidosis/GPR4-induced inflammatory gene expression. When HUVEC/GPR4 cells were cultured under acidic condition with NFκB inhibitors, inflammatory (VCAM-1, ICAM-1) response was attenuated in a dose-dependent manner. This novel finding identifies that in ECs, GPR4 stimulates ATF3 expression in response to acidosis and that ATF3 negatively regulates inflammation. In contrast, NFκB positively regulates acidosis/GPR4-mediated inflammation. These results demonstrate an interesting relationship between acidosis induced GPR4 activation, ATF3, NFκB, and inflammation which all have significant implications in a variety of pathosis.

GO15

Fatty Acid-mediated Mitochondrial Dysfunction: Differential Effects Among Individuals

Jared M Shine

Chronic positive energy imbalance, the consequence of a hypercaloric diet, is suggested to cause mitochondrial crisis and loss in metabolic health. This caloric abundance can lead to weight gain and eventually overweight/obese individuals. These individuals are at high risk of developing insulin resistance and potentially the metabolic syndrome. However, not all overweight/obese individuals become insulin resistant, which is a phenomenon of great interest to this lab.

While adipose tissue has been assumed to be resistant to FA-toxicity, results from our lab suggest that sustained FA overload in preadipocytes leads to an increase in reactive oxygen species that, in turn, cause delayed NAD(H) depletion-dependent mitochondrial permeability transition (mPT), ATP depletion, and cell death. This may be clinically relevant because reduced preadipocyte number and differentiation capacities, as well as the production of proinflammatory mediators by preadipocytes, are correlated metabolic abnormalities that define the metabolic syndrome.

As a result of increased FA from the diet, acetyl CoA levels become elevated within cells, which can lead to enzymatic or non-enzymatic acetylation of various proteins. These post-translational modifications can alter protein activity and cellular functioning, and may lead to mPT. SIRT3, a protein deacetylator of the sirtuin family, is responsible for deacetylation within the mitochondria of preadipocytes, and research suggests its activity is reduced after a high fat diet.

We hypothesize high FA treatment increases mitochondrial acetylation whilst limiting SIRT3 deacetylation. Furthermore, this increase in acetylation, along with diminished ATP synthase binding of the anti-apoptotic protein Bcl-xL, ultimately leads to FA-induced cell death. We obtained adipose tissue from patients undergoing coronary artery bypass graft (CABG) surgery, and isolated preadipocytes, from which we cultured for further experiments. Cell death experiments via flow cytometry showed that, indeed, individuals do vary in their response to high FA treatment. We then further looked at individual differences in FA-induced mPT via flow cytometry, as well as the effect of FA exposure on mitochondrial acetylation via Western blotting, and Bcl-xL binding to the ATP synthase via immunoprecipitation. These findings may allow for potential therapeutic targets in the management/prevention of the diseases among the metabolic syndrome.

GO16

RNA Wars: The Modifications Awaken

Nathaniel Joel Fry

Nucleotide modifications in RNA are important for the regulation of gene expression in cells. A change in one of these modifications, N^6 methyladenosine (m6A), has been shown to have major effects on translation and post-transcriptional processes. For example, it is known that mRNAs containing the N^6 methyladenosine modification are targeted for degradation. These changes in RNA modifications can occur quickly, and may be necessary in order to adapt to rapidly changing microenvironments which can be caused by sudden onset disease states including heart attack and stroke. Defects of these modifications in messenger RNA (mRNA) or ribosomal RNA (rRNA) could cause problems in rapid cell response mechanisms, embryonic development, or tumor growth. Understanding the mechanisms behind RNA methylation may unlock ways to reverse disease states and lessen side effects from those diseases.

Recently our lab has discovered that cells incubated in hypoxic conditions (low oxygen) have decreased m6A levels in rRNA compared to cells incubated in normal oxygen levels. Because hypoxia is known to play a role in tumor growth and angiogenesis, as well as heart disease and stroke, we are investigating why and how m6A levels are decreased. Investigations are underway to identify the site of rRNA modification, as well as the enzymes responsible. Currently, we are investigating a known m6A mRNA demethylase, ALKBH5. Although this demethylase has not yet been shown to alter m6A levels in rRNA, we have found that ALKBH5 RNA and protein increases in hypoxic conditions. Therefore, it is possible that ALKBH5 may be causing the hypoxic decrease in m6A rRNA levels. As such, ALKBH5 represents a potential therapeutic target for symptoms and diseases involving the m6A modification in rRNA.

GO17

Spermatogonia in the neonatal mouse testis differ in their sensitivity to retinoic acid (RA)

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Spermatogenesis begins in the neonatal mouse testis with the transition of a seemingly homogenous population of quiescent prospermatogonia into mitotically active spermatogonia. Emerging evidence reveals that this initial population of spermatogonia in the neonatal mouse testis is heterogeneous and contains stem, progenitor, and differentiating spermatogonia. The progeny of these foundational SSCs will provide a consistent source of gametes throughout the adult male reproductive lifespan. In contrast, the first progenitor spermatogonia differentiate in the neonatal testis in response to retinoic acid (RA) to enter meiosis and ultimately become spermatozoa during the 'first wave of spermatogenesis'. We recently made the exciting discovery that neonatal male germ cells (prospermatogonia at postnatal (P) day 1 and spermatogonia at P5-6) differ in their responsiveness to RA both *in vivo* and *in vitro*. This implies that the ability to respond to RA is a driving factor regulating this critical cell fate decision, about which we know very little. We hypothesize that the RA-insensitive subset of prospermatogonia remains undifferentiated to become the foundational pool of SSCs. In wild-type mice at P1, 0% of prospermatogonia have activated the RA-inducible gene 'stimulated by retinoic acid gene 8' (*Stra8*), indicating that they have not yet been exposed to RA. By P5-6, ~50% of spermatogonia have become STRA8+. However, the addition of exogenous RA reveals that the majority of germ cells (60-70% at P1 and ~85% at P5-6) can respond to RA both *in vitro* and *in vivo*, which reveals the existence of molecular controls to protect a subset of germ cells from RA exposure. Our current focus is on the identification of these controls, and our preliminary data and results from the literature implicate differential RA catabolism. We are employing pharmacological approaches to inhibit the action of the CYP26 enzymes (which catabolize RA in the testis) *in vitro*, and found that their inhibition increased the percentage of STRA8+ germ cells to a similar extent

as RA at P5-6. Therefore, we conclude that RA catabolism plays a significant role in protecting male germ cells from RA exposure in the neonatal testis, and future experiments will explore whether this protection is provided by germ cells or somatic cells, and whether it is critical for formation of the foundational SSC pool. This project was supported by a grant from the NIH/NICHD (HD072552) to C.B.G.

GO18

The 'Mechanistic Target of Rapamycin' (mTOR) is Required for Spermatogonial Differentiation in the Mouse

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Adult male germ cells originate from a small population of spermatogonial stem cells (SSCs). SSCs undergo asymmetric cell division maintain to their population and give rise to transit amplifying progenitor spermatogonia. These progenitor cells proliferate before differentiating in response to retinoic acid (RA) to enter meiosis. SSC self-renewal and progenitor differentiation must be coordinated for normal spermatogenesis. Dysregulation of these processes can lead to loss of the germ line or formation of testicular tumors. Much work has been done to define the mechanisms underlying SSC establishment and maintenance, but almost nothing is known about the mechanisms controlling differentiation. To fill this gap in knowledge, our laboratory has focused on defining the events downstream of RA signaling that direct spermatogonial differentiation. We found that RA activates the PI3/AKT signaling pathway in order to upregulate the translation of proteins required for spermatogonial differentiation (KIT, SOHLH1, SOHLH2). PI3K/AKT signaling often converges on the mechanistic target of rapamycin (mTOR), a master regulatory kinase that regulates a variety of cellular processes including translation. We first inhibited mTOR activity *in vivo* with rapamycin and found that it blocked spermatogonial differentiation. Also, RA-induced translation of KIT, SOHLH1, and SOHLH2 mRNAs did not occur under rapamycin treatment. Since this phenotype resulted from global inhibition of mTOR, we created conditional germ cell mTOR knockout mice to investigate the germ cell-autonomous role of mTOR in spermatogonial differentiation. We used Cre-Lox technology to ablate mTOR in fetal prospermatogonia. The germ cell KO mice born were phenotypically normal. Testes from adult KO mice were smaller than littermate controls, and there were no sperm in the cauda epididymis. Histological and immunostaining analyses revealed that spermatogonia were still present in the testis, but none expressed the differentiation marker KIT. Taken together, these results reveal that mTOR is dispensable for the maintenance of the undifferentiated spermatogonial population, but is required for spermatogonial differentiation. Future work to fully characterize this KO model will explore molecular events downstream of mTOR that are required for differentiation, and our results will provide a deeper understanding of spermatogonial differentiation and mTOR's role in germ cell biology. NIH/NICHD (HD072552) to C.B.G.

GO19

The Vaccinia virus protein O1 enhances virulence and inhibits antigen presentation

Anastasia C. Weeks, Gwendolyn B. Jones, Rachel L. Roper

Poxviruses cause a number of mammalian diseases, and several poxviruses are emerging as human pathogens worldwide. Smallpox was successfully eradicated from nature by the Vaccinia virus (VACV) vaccine, and VACV is currently used successfully as a vector in recombinant vaccines that target diseases such as HIV, malaria and cancer. However, VACV retains significant virulence in mammals and is unsafe for approximately 25% of the US population. In order to understand poxvirus pathogenesis and improve vaccines, our lab is investigating poxvirus virulence genes.

Previously, we have demonstrated that the VACV O1L gene (O1 protein) promotes virulence by suppressing anti-VACV antibody production. The initial step in the production of anti-viral antibody is the presentation of antigenic peptides (viral proteins) within MHC class II by antigen presenting cells (i.e. dendritic cells, macrophages, and B lymphocytes) to cognate T lymphocytes. Importantly, it has been show that VACV virulence genes (e.g. A35) that inhibit antigen presentation also reduce antibody production. Thus, we are interested in determining whether O1 suppression of the anti-viral response begins early – at the antigen presentation stage. We examined whether O1 affects MHC class II antigen presentation by splenocytes to T lymphocytes. We used the 2D2-FIG transgenic mouse system, wherein all T cell receptors are specific for the antigen myelin oligodendrocyte glycoprotein (MOG). We showed that the presence of O1 during VACV infection significantly reduced the production of IL-2, a measure of antigen presentation. Preliminary studies also suggest that O1 is not glycosylated, but may be detected on the surface of adherent splenocytes (likely APC). Determining where O1 activity occurs (i.e. within a specific cell type, or at a specific locale) is informative for

understanding the mechanism whereby O1 reduces antigen-presentation-induced IL-2 production and is currently under further investigation.

GO20

Acute high fat diet exposure in skeletal muscle-specific estrogen receptor-α knockout mice leads to increased adiposity in males and glucose intolerance in females

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Reductions in circulating estrogen exposure lead to alterations in skeletal muscle function and metabolism; however, it is unclear whether these modifications are the result of either a direct or indirect effect of estrogen on skeletal muscle. **PURPOSE:** The objective of this study was to determine if the expression of estrogen receptor alpha (ERα) in skeletal muscle is necessary for preventing metabolic dysfunction in adult mice that are fed an acute high fat diet. **METHODS:** To assess the *in vivo* role of ERα specifically in skeletal muscle, we generated an inducible skeletal muscle-specific ERα knockout (ERαKO^{sm}) mouse model. At 10 weeks of age, ERα ablation was induced in the animals. Mice were exposed to either a standard chow or high fat diet for 1 week. Four groups of mice from both males and females were used: 1) wild type-standard chow diet (WT-CD), 2) wild type-high fat diet (WT-HFD), 3) ERαKO^{sm}-standard chow diet (ERαKO^{sm}-CD), and 4) ERαKO^{sm}-high fat diet (ERαKO^{sm}-HFD). Mice were exposed to a glucose tolerance test, and intramuscular fat accumulation was determined in isolated single muscle fibers. **RESULTS:** Induction of flox-mediated recombination resulted in the reduction of ERα in all skeletal muscles tested without affecting expression of ERα in any non-muscle tissues. Exposing WT and ERαKO^{sm} mice to a 1-week high fat diet (HFD, 45% kcal from fat) resulted in ERαKO^{sm}-HFD male mice exhibiting greater body mass and visceral fat mass compared to all the other groups. On the other hand, no statistical differences in body mass and visceral fat mass were observed between groups in the female mice. Adult females fed a HFD exhibited glucose intolerance, which was exacerbated in the HFD-fed ERαKO^{sm} mice. In contrast, male HFD-fed WT and ERαKO^{sm} mice did not exhibit signs of glucose intolerance. Intramuscular fat accumulation was similar in all groups among male and female ERαKO^{sm} and WT mice. **CONCLUSION:** These data indicate that the ERαKO^{sm} has relatively similar anatomical and metabolic characteristics with age-matched WT. However, acute high fat diet exposure resulted in greater adiposity in male ERαKO^{sm} mice and impaired whole body glucose dynamics in female ERαKO^{sm}mice compared to age-matched WT mice. Future directions include exposing the ERαKO^{sm} to a chronic high fat diet to determine stress susceptibility of the model. Supported in part by ADA Basic Science Award (1-15-BS-170) (EES).

GO21

Structural Investigation of Pathogenic Transthyretin Amyloids using Solid-State NMR

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Transthyretin (TTR) is a homotetrameric protein with 127 amino acid residues in each monomer and is rich in β-sheet structure in which eight β-strands are arranged in a β-sandwich consisting of two β-sheets (strands CBEF and DAGH).[i] TTR is a transporter of thyroxine and retinol in serum and cerebrospinal fluid. Misfolding/unfolding of this TTR to form beta sheet rich amyloid is associated with numerous amyloid diseases. More than 100 mutations in the TTR gene have been found to cause transthyretin amyloidosis in which wild type (WT) TTR is responsible for senile systemic amyloidosis and some of the pathogenic mutants are known to cause TTR amyloid neuropathy and TTR cardiac amyloidosis.[ii] Considerable native-like structures were observed in the aggregation prone-states generated by local and/or global unfolding of natively folded proteins.[iii] Solid state NMR was employed to investigate whether the native structures are preserved in amyloid. Previous studies have indicated the formation of distinct amyloids at lower pH values 4.4 and 2.4. These two forms were further characterized by imaging and spectroscopic techniques. Our solid-state NMR results have shown that β-sheets (strands CBEF and DAGH) were maintained during amyloid formation. However, at pH 4.4, in the mutant (V30M) form of TTR a part of the D and A strands appeared to be disrupted. Additionally, in the AB loop, certain residues were appeared be distorted in the amyloid. The other regions of β-sheets are currently being investigated. Structural characterization of soluble amyloidogenic oligomers and their

cytotoxic properties will be discussed.
[i] Blake, C. C.; Geisow, M. J.; Oatley, S. J.; Rerat, B.; Rerat, C. *J. Mol. Biol.* **1978***, 121*, 339.
[ii] http://ghr.nlm.nih.gov/gene/TTR. **2015**.
[iii] Chiti, F.; Dobson, C. M. *Nat. Chem. Biol.* **2009***, 5*, 15.

GO22

Seeking Safety in a Dark Land

Abir Bashir Mohsen

The Lorax(Dr. Seuss), Beautiful Ooops (Barney Saltzberg),and Have you filled a Bucket Today? (Carol McCloud) are books that explore adult issues through narratives for children. Similarly, I create artwork that uses narrative and fantasy to examine issues such as the concept of a safe sanctuary, fear and loss, that arise from living in Gaza as a child. My work relates to my childhood experience with war and my family's and relative's experiences as they continue to live under those conditions.

GO23

Contrapuntal Influences and Developments in the Keyboard Music of György Ligeti

Sarah Hemminger

The purpose of my research is to connect sixteenth and eighteenth century contrapuntal practices to twentieth century compositions. An examination of the development of these musical devices will be conducted through analysis of a selection of piano compositions written by György Ligeti (1923-2006). My research is divided into three main parts. The first is an exploration of common contrapuntal devices used and developed from approximately 1550 to 1750, to include examples from contemporary music literature (Giovanni Pierluigi de Palestrina (1525-1594) and J.S. Bach (1685-1750) will serve as the culmination of sixteenth and eighteenth century counterpoint respectively.) The second part of my research examines a variety of contrapuntal techniques developed by György Ligeti following World War II. Though separated by a few centuries, my research will show clear commonalities between the older techniques of Palestrina and Bach to Ligeti's modern devices. The primary element of the third part is an analysis of selected piano works written by Ligeti between 1968 and 1985, focusing on the previously examined contrapuntal techniques. Also discussed will be the overarching implications and suggestions of the analysis as they apply to the historical transmission of music, specifically as a means of examining the evolution of musical elements over several centuries.

GO24

Identity Overload

Alexandra Ingle

Today is my sixteenth birthday, but my parents completely forgot. "I can't believe I gave my panties to a geek" (Sixteen Candles). I'm a loner in high school…an art geek who wears paint covered overalls (She's All That), and "I believe my love can do anything" with Noah (The Notebook). Noah was drafted for war, and I was told he did not survive. I fell in love with his best friend, Danny. Danny is going to be a father, but Noah is still alive (Pearl Harbor). We celebrated Noah's return from the war and went on a ship to America. It crashed and sank. I said "I would never let go," but I let go (Titanic).

Wait…that isn't me. Who am I?

I am exposed to and often seek out standards, roles, and characters as guides to pass as normal in society. However, I have lost my own sense of self within the process. Before I completed elementary school I was aware of the expectations placed on me by the film industry. In particular, I understood myself in regards to female characters in romantic movies. As part of American culture I see gender roles, models of beauty, and behavior as a set of norms to abide by, often discouraging a positive sense of individualism. Having obeyed society's version of the feminine, I am now disappointed with how I view myself, and question my actions and emotions as healthy responses. I create narratives and characters to critique society's version of self.

GO25

Fresh Tracks

Joseph Matthew Mannino

My life and my upbringing has inspired me to make work about the hunting experience. This body of work shows the positives of hunting; the familial bonds, the connection to nature that it provides, and it comments on the social and historical impact of hunting.

I am creating this body of work for the same reasons I hunt: for the connection to my environment and my food, for the adoration of being outside, for the bonds made with family and friends, and for the need to get away from a disconnected existence. I hunt because I love wildlife and have a vested interest in the conservation of wildlife and wild places, and to be a participant in the raw, unforgiving truth of life.

These images are a first person account made to shift the culturally preconceived perception of hunters. We are not

separate from nature but deeply connected to land, animal, and sustenance.

GO26

Clyde Jamison Basilus III and “”Bootleg”” Basilus: An Assessment of Time Traveling Bandits

Addison Jarvis Brown and Gregory Allen Banks

The year 1903 saw several notable events in human history: William Randal Cremer is awarded the Nobel Peace Prize, Jack London publishes “Call of the Wild”, the Ford Model A begins production, the Wright Brothers take flight, and Edwin S. Porter’s “The Great Train Robbery” makes its mark on cinema history. An exclusion from the aforementioned list is the legend of two particular outlaws – Clyde Jamison Basilus III and “Bootleg” Basilus. Perhaps there have been several criminals to escape (if only for a while) before justice is served but none other have accomplished this task by the means of time travel. Is it all lore? Join us in this presentation to distinguish fact from fiction.

GO27

Fly in the Ointment

Hosanna Rose Rubio

“The idea of death, the fear of it, haunts the human animal like nothing else; it is a mainspring of human activity—activity designed largely to avoid the fatality of death, to overcome it by denying in some way that it is the final destiny for man.”

-Ernest Becker

“Then I commend mirth, because a man hath no better thing under the sun, than to eat, and to drink, and to be merry.”

-Ecclesiastes 8:15 (Origin of “”Eat, drink, and be merry, for tomorrow we die.””)

As the child of fundamentalist evangelical Christians, I was told from a very young age not to fear death, but to welcome it. “This isn’t our true life,” my mother would often say, her face aglow with religious fervor, her eyes turned heavenward, “Our true life comes after death.”

The question of what happens after we die is one that has consumed mankind throughout history, fueled by the inherent conflict in the desire to live and the terrifying realization that death is unavoidable. To manage this fear, we turn to culture and belief systems to explain the significance of life and death by providing them with meaning.

There have been many different attitudes towards death throughout history, each a reflection of the cultural values of that time and place. By examining how these values manifest themselves at different periods, I aim to draw connections to how we deal with mortality in modern society.

GO28

Finding Where I Belong

Sarah K. Lazure

In 2016, women photographers are still enticed by making work that promotes the stereotypical feminine archetypes and reinforces the male gaze by showcasing women as the Virgin Mother or Whore. For decades contemporary women photographers have been using their self-portraits to break free of the societal pressures including sexual orientation, family issues and mental disorders. Where are the portraits of the everyday woman not wrought with conflict.

Through self-portraiture, we become representational figures in our works. Photography is reality and fiction, all at the same time. The photographs I make of myself are not representational of a specific truth but a creation of an experience I want to express. I create images, full of disguising layers and texture, to make an outward record of how I feel internally. I am exploring what it means to be me, to be a woman and to be an artist - without engaging in the use of female archetypes. While these ideas drive the creation of each image, the viewer can connect without knowing those personal details. I develop communication between the image and the viewer as I transform the original photograph into a multi-layered conversation.

GO29

Methods of Scientific Application in Ceramic Studio Practice and Atmospheric Firing

Rachel Hanna Clark

“Art is born of the observation and investigation of nature” (Marcus Tullius Cicero)

Science and art have always seemed unlikely bedfellows. Where science addresses nature, art expresses the divine. It seems that science and art were destined to inhabit different planes, when in fact the two are inextricably linked. I use the scientific method of inquiry to explore ceramic practice, borrowing ideas and

aesthetics from nature to enhance my own work. I am influenced by the way time and energy form the world around me. Through manipulation of ceramic material, these ideas can be expressed in the artistic process.

I am exploring the science behind the process and methods involved in firing ceramic material. I fire primarily in salt, soda, and/or wood kilns where introduced material, vaporizes inside the atmosphere of the kiln and creates the glazed surfaces. Within this firing process, my investigation also delves into the use of the refractory material known as wadding, implemented both as a necessary and aesthetic device. I use wadding to explore the introduction of non-ceramic material, such as metal oxides. Ultimately, the unassuming wadding becomes a tool to introduce color, flame pattern, and aesthetic devise.

GO30

Contamination: The pharmacist as primary mental health care provider

Brian James Culbertson

The United States' approach to treating mental illness is problematic and directly connected to many tragic events plaguing our communities over the past decade(s). My current research is focused on the U.S. mental health care system and its history of perpetual mistreatment of patients, misdiagnosis, and in contemporary times, the standard use of prescription drugs as a primary means of treatment in the "outpatient" mental health care system. Between the 1950's and 1980's asylums were slowly shuttered across the United States in favor of using pharmaceutical drugs as the primary means of treatment for mental illness. Most psychotropic drugs despite a laundry list of side affects that are far more frightening than the ailments they claim to treat have become the standard means of treatment. While psychotropic drugs do help many participants of the outpatient system function normally in their day-to-day lives, there are still many people in which these drugs escalate instability that in many cases leads to violent outburst. I mix prescription drugs with traditional photographic chemistry to create images that reflect the contamination and instability endured by the individuals taking the drugs.

GO31

Cover the Girl

Katya Harris

Since the 1960s, Feminist art has morphed considerably to include many types of discrimination that spill beyond the male/female gender binary. Feminist artists have become increasingly effective at using humor, popular culture, and text as a mechanisms to subvert the ideological cultural environment that (still) treats women as second-class citizens. Inspired by the actions and routines of my day-to-day life, such as participating in social media, wearing make-up, and paying attention to fashion, I question how these daily actions and routines may actually perpetuate negative views of women. Selfies, for example, have been raised as a feminist battle cry of female autonomy and confidence, yet they are still labeled as the narcisstic preoccupation of vapid women. My current body of work, entitled "Cover the Girl," takes a humorous approach to explore the dissonance that I, as a woman, experience in wanting to combat the discrimination faced by women, yet feeling complicit in that very discrimination. I combine portraits of women, elements from popular culture and mass media, and iconic symbols of femininity to satirize the social standards and expectations that perpetuate stereotypes of women. Through a process of image making that relies on having conversations with the subjects of my images, and directly references to these catalogued conversation, I seek to create an open and welcoming dialogue about prejudicial attitudes against women by first becoming aware of what role I play in these issues.

GO32

Structure, Revealed

Nadia Hisham Massoud

The forces of erosion and weathering, acting upon on natural surfaces, can produce alluring sculptural forms. From the faces of cliffs, to tree trunks, down to the smallest fragments of shells; wind and water transform these materials, yielding rich visual vocabularies. These structures, revealed by the withstanding of exterior forces, provide the point of departure for my current work.

While the field of metal design offers many techniques analogous to erosion and weathering, the simulation of natural processes is not my primary concern. Instead, my exploration has focused on form. Experimenting with a wide range of format, media, and technique, my aim is to capture the essential vitality and resilience that radiates from these enduring natural structures.

GO33

6102 Creative process : ssecorp evitaerC 2016

Brett Beasley

Creative activity is achieved through process. Art making allows for these checkpoint accomplishments to be acknowledged.

From wet clay to glaze fired sculpture, the chemical composition has been altered; glaze has sintered, chemical water has been removed and inorganic material burned out. Using a video recording device during my artistic activity enables me to review the development of an artwork. Additionally, this video is a historical signifier of a phase of material manipulation that a participant can view at installation. Taking photographs as documentation of the fired ceramic objects will also aid in the timeline comprehension. A sculpture atop a white pedestal, within the walls of a gallery space, is considered to be a temporal accumulation of all previous actions upon the material.

However, this state of being only exists within the confines of understanding process and procedure. I now pulverize the sculpture, sieve it and reincorporate these raw materials to create another ceramic sculpture. The cyclical nature of this project will inform my research of materiality, time and process.

GO34

Racism, Sexism, and White Privilege

Andrew Ross Wells

For decades, artists have been using combinations of text and image as a means to discuss issues such as race, gender roles and social class. As a white male, it can be difficult to find ways to discuss these issues. I have been conducting interviews and having in depth conversations with close friends to try and understand their experiences of marginalization, gender and/or inequality, etc. My current body of work, explores and documents that dialogue through large scale portraits of and text provided by each person. These pieces are created as a collaboration and are intended to document what I have learned and what they perceive to be the effects of ideologies on their lives.

GO35

Modernism's Influence on Arvo Pärt's Tintinnabuli Style

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In western society much of the first half of the twentieth century centered on Modernism. Estonian composer, Arvo Pärt, experienced the innovation, devastation, and eventual disillusionment that characterized this period while developing his immense talent in what was at the time a Soviet bloc country. Modernist musical ideals of innovation and experimentation weighed heavy on Pärt throughout his early compositional years. By the late 1960s Part felt these ideals had suffocated his compositional voice, and he entered into years of compositional silence and musical meditation. In 1975 Pärt emerged from this reticence with an outpouring of works in his Tintinnabuli style—*Fur Alina* being his first. Pärt's *Passio* is the zenith of this unique style though polarizing in musical scholarship. Pärt's style has been castigated as "being built from the same few basic cells" and as sounding "remarkably consistent from beginning to end". These critiques stem from an aged modernist viewpoint. Pärt's style holds significant musical value and is best understood in a postmodern context.

GO36

Life Casting - The Plaster Bandage Method

Jessica Marie Bradsher

This presentation introduces a technique known to some visual artists and costumers as Life Casting. Specifically, I will discuss a method that utilizes industrial plaster bandages. The history of this form of creation is extensive, but evidence shows that live models were used for this practice commonly in the second half of the 19th Century. In the present day, visual artists can use it to make an exact impression of the human body. It is inherently unique to capture an individual at a certain moment in time for display within the artistic vision of the creator. The current process of plaster bandage casting has similarities to what was practiced throughout history. We have the convenience today of easily available pre-treated materials and release agents. The benefit of using life casting in my own work, is to achieve the realistic surface of a human body and then manipulate it. Conceptually speaking, we all take reality and view it as we will. The pieces I will display in this presentation are a physical expression of this idea.

GO37

Broken Bodies: The German Porcelain Doll Industry and Adornment

Kayla Staigvil

Forlorn, forgotten and cast away into the dirt, these once precious

items experienced the passing of time and the dropping of bombs. They were dug up from their graves and resurrected into another precious form, once again gracing the world with their now broken beauty.

My work incorporates found porcelain dolls from the Thuringia region in Northwest Germany, where there was a vast porcelain industryfor almost two centuries. Some of these companies still operate today, but a majority closed before or during WWII. The Limbach and Hertwig companies will be discussed as well as the types of dolls they produced for children and ladies alike. I will also include a brief history of the German porcelain industry and how I revitalize the fractured doll bodies into contemporary jewelry objects through the use of mixed media and traditional silversmithing techniques.

GO38

Distant Transmissions

Christine Zuercher

On behalf of the American Interterrestrial Society, Christine Zuercher, honorary astronaut and shortwave radio operator will be presenting her findings and discussing the archives and beliefs of the society in regards to photographs, exploration, and truth.

Shortwave radio and Space Race technology of the 1950's and 1960's cultivated intensely individual and collective experiences. Our research asks: how does technology allow for us to be alone together? How do these technologies cultivate tactile experiences in spite of distance? Why do photographs encourage us to explore distant lands? This research on shortwave radio and space travel as landmarks of exploration includes photographs, shortwave spy codes, a handmade spacesuit, and a growing collection of the QSL cards that shortwave operators mail to one another. Our society's mission is to ask questions and investigate the unknown through various forms of transmission technology.

GO39

Intimate Vision: Late 18th Century Eye Miniatures

Barbara Nicholson McFadyen

My current research has focused on the Sentimental and Mourning Jewelry of the Georgian and Victorian periods and has inspired my enamel jewelry work in metals and book arts. Of particular interest is the subgenre of sentimental jewelry that straddles miniature painting and portrait art, the intimate eye miniatures of the late 18th century, which was a short lived rage that faded into oblivion in the early 19th century.

These portraits are imbued with an air of secrecy and collectively referred to as "Lover's Eyes" although they were not limited to those exchanged between lovers. They also served as portraits of remembrance to commemorate friendships, family members, and those loved and lost.

By looking back at their viewer, the eye portraits created a reciprocal mode of viewing called *intimate vision* that brings the gaze of another into the heart of private experience. Through the use of gemstones and imagery these exquisite miniatures hid a symbolic sentimental language within their elaborate settings.

This presentation will investigate these eccentric and deeply private keepsakes. It will also question the traditional subject-object relationship in art by showing how these paintings were meant to see, as much as be seen.

GO40

Musical Irony in the Weimar Republic

Rebecca Sinclair Kim

The Weimar Republic (1919-1933) is a brief chapter in German history. Although it was short-lived and fraught with social, economic, and political strife, it saw a vibrant artistic life that relished new ideas and rejected old ones. Many Germans began to view nationalism and romanticism in a suspicious and cynical light, as deceptive ideals that were responsible for bringing them into World War I and delivered devastating consequences. This attitude was reflected in the musical aesthetics of the time through the use of irony. Alban Berg, Kurt Weill, and Paul Hindemith are all composers who employed irony in their works during the Weimar years. Berg used atonal techniques to underscore an irony of the human condition in his opera *Wozzeck*; Weill injected a pre-existing satire with disjunct jazz rhythms and harsh vocal techniques to enhance a depiction of an ironic social order in his *Threepenny* Opera; and Hindemith displayed the irony of nationalism in varied ways between his opera *Das Nusch-Nuschi* and his Viola Sonata Opus 11, No. 4. This paper examines these three composers, with special emphasis on these particular works, displaying a diverse use of irony that offers a glimpse of the broader artistic perspectives existent in the Weimar Republic.

GO41

Art, Gypsum, and You!

Brendan Wesley Mims

Plaster is made from the mineral Gypsum, and it has been shaping the world around us since before the time of the

Egyptians. It covered the walls of temples and pyramids, traces have been found in the archeological sights of the Vikings, and it creates the frescos of the renaissance. This amazing material is one of the few that can be pulled from the earth, broken down, and then with a little water can be turned back to its original form. These facts add to the rich history of plaster and its uses.

In my work I use plaster for the process of forming molds. I then fill those molds with a liquid clay to create tableware. The liquid clay, known as a slip, sits in the plaster mold the plaster pulls water from the slip to form a layer of clay within the mold. The use of plaster in this fashion allows me to create light weight thin tableware the would be difficult to form by hand. This process also allows for exact replication that no other process of working by hand affords. My work is used in banquettes and for celebrating other joyful occasions.

GO42

Exploring Surrealism in Figurative Sculpture

Chris Elizabeth Morgan

Just as the conscious and unconscious mind functions together, I am exploring surrealism to successfully combine the figurative and the abstract. I am interested in how expressive figurative sculpture can represent our existence in both reality and dreams. My research involves the relevancy of surrealism transitioning between these two states in contemporary figurative sculpture. Through surrealism, I hope to merge the conscious with the unconscious, the real with the imaginary, while maintaining the figurative aesthetic.

GO43

Testing a Model of the Development of PTSD Following Childbirth Resulting in Admission to the Neonatal Intensive Care Unit

Meghan Sharp & Christyn Dolbier, PhD

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Introduction: Posttraumatic stress disorder (PTSD) manifests as clinically significant symptoms of anxiety, mood disturbance, and behavioral problems following a traumatic event such as childbirth. Mothers of infants hospitalized in the Neonatal Intensive Care Unit (NICU) are at increased risk to develop postnatal PTSD. Inconsistencies in measurement of PTSD following childbirth have contributed to uncertainty of the true prevalence of traumatic childbirth and PTSD and their relationship with maternal mental health. Furthermore, the unique contributions of traumatic childbirth and stress associated with the NICU stay on PTSD symptomatology have not been explored.

Purpose: To investigate a new model of the development of PTSD in mothers of a NICU infant in which childbirth is identified as a traumatic event and NICU stress is assessed as a moderator of the relationship between traumatic childbirth and PTSD.

Method: English-speaking women living in the United States who have given birth in the past 1-3 months to a child hospitalized in the NICU are being recruited for an online survey measuring traumatic childbirth (self-report of fear of death or injury to the self or infant during childbirth), NICU stress, PTSD symptoms, prior trauma exposure, and symptoms anxiety and depression.

Results: Preliminary analyses ($N = 47$) revealed 70% of participants reported traumatic childbirth, 15% of whom experienced clinically significant PTSD. The full model predicting PTSD symptoms from traumatic childbirth and NICU stress while accounting for prior trauma, depression, anxiety, and depression was significant, $R^2 = .65$, $F(6,36) = 9.15$, $p < .001$. NICU stress significantly moderated the relationship between traumatic childbirth and PTSD symptoms, $\Delta R^2 = .04$, $F(1,36) = 4.04$, $p = .05$,$\beta = .54$, $t(36) = 2.01$, $p = .05$. Among participants who reported traumatic childbirth, those with high NICU stress were more likely to experience greater PTSD symptoms.

Conclusion: This is the first study to identify childbirth as a triggering event of PTSD for NICU mothers and investigate the influence of NICU stress on the relationship between traumatic childbirth and PTSD. High NICU stress appears to exacerbate this relationship such that mothers with high NICU stress are at highest risk to develop PTSD following a traumatic childbirth. This information can inform the development of perinatal interventions aimed at preventing traumatic childbirth and reducing maternal stress in the NICU.

GO44

Examining Drug Trafficking as Supplemental Income among Hispanic Immigrants: A cultural perspective

Amber Kay Francis

North Carolina is ranked as the 10th most impoverished state for children in the US. Over 40% of the Latino populations under 18 live in poverty in eastern North Carolina (Mitchell, 2013). Each family member must contribute resources, playing an essential role supplementing the household income. Many families work in the tobacco and produce fields, yet must ear additional income to survive. Migrant families need children

to contribute to the income. As a result, children may suffer multiple consequences including absenteeism from school during harvest season, pesticide and tobacco poisoning and loss of family income. Migrant families seldom receive adequate medical care, proper protective gear, sanitary conditions and nutrition while working in the fields. Individuals may not be supplied with proper protective gear while working in the fields and/or simultaneously despite being exposed to harmful pesticides daily (Wurth, 2014; Coursen, 2010). Some families may view drug trafficking as a necessary alternative to the daily exposure to dangerous chemicals. Families may be living in the shadows of the law as undocumented, migrant workers; including those workers who are legal face issues of prejudice and discrimination, placing them in the assumed threat of deportation. However, illegal activity is a more optimal and expeditious method of contributing to their economic household. Thus drug trafficking is a seemingly more profitable and safer means for supplementing to the children, their family and often their community. This systematic literature review will examine existing literature regarding drug trafficking among Hispanic Immigrants as a means of providing supplemental family income. From the perspective of the families, drug trafficking is a means of survival, which in turn ensures their overall health and can provide a channel for societal and economical advancement. Finding substantive research is challenging due to the illegal hiring of immigrants by farmers and corporations and the risks that are posed against the immigrant population and employers. Implications for social work practice are discussed and strategies for designing, advocating and implementing programs surrounding ethical issues that reduce the isolationism of the Hispanic Immigrant populations with the goal of establishing positive community supportive networks.

GO45

Entheseal Changes as a Reflection of Activity Patterns at 1st Century BC/AD Petra

Tara L. Stanko and Megan A. Perry, Department of Anthropology

The residents of the Nabataean capital city of Petra, Jordan remain an enigmatic element of Near Eastern history. Most research has focused on site's architecture rather than the inhabitants living amongst the city's spectacular structures. Excavations of 1stcentury BC/AD tombs from Petra's North Ridge in 2012 and 2014 recovered a sizeable sample (N=113) of Petra's non-elite inhabitants. This project explores entheseal attachments (entheses) to understand physical activity levels and patterns within this sample. Entheses are insertion sites where tendons and ligaments anchor to the bone, providing stability and support for musculoskeletal movement. Muscular tension at the attachment site can cause pronounced changes on the bone. New methods for scoring entheseal changes in biological anthropology and greater understanding of the clinical relationship between fibrocartilaginous entheses and activity have aided to advance the application of this technique. The Coimbra method was used to document fibrocartilaginous entheseal changes in the upper and lower limbs in this segment of Petra's population. Samples from a Nabataean-Roman community in Syria, a 9th century Great Moravian village, 19th century non-industrialized Holland, 20th century manual laborers from Lake Geneva, and 20th and 21st century U.S. citizens served as comparisons for physical activity levels. Results found the Petra sample to have similar activity patterns as non-industrialized settled populations, while controlling for confounders such as age and pathologies. These physical activity patterns offer a new perspective on the socioeconomic aspects of the non-elite Nabataeans of Petra, reaffirming that these residents were part of a primarily settled urban community.

GO46

Stereotyping and Spectrums: An Analysis of Homosexual Language and Hierarchies in Alex Sanchez's *Rainbow Boys*

Justin Cody Littlefield

Alex Sanchez's *Rainbow Boys* released in 2001 to critical attention. The novel was praised for having three homosexual protagonists who each represented a different homosexual identity. Young adult novels in the GLBTQ (Gay, lesbian, Bisexual, Transgender, Queer) genre had yet to write novels that centralized around more than one homosexual character. Other novels often relegated homosexual characters to the background or used them sparingly. *Rainbow Boys* broke from this trend by offering a "spectrum" of homosexuality, as the novel's three protagonists—Jason, Kyle, and Nelson—each represent a different stage of "coming out," where some characters are more accepting of their homosexuality than others. This essay seeks to undermine the idea of this homosexual spectrum, and provide a close reading of language the novel uses to privilege a heteronormative ideal of quiet homosexuality over a flamboyant stereotype. By identifying these characters in a hierarchy, rather than a spectrum, I intend to show how the novel can be damaging to a young reader's understanding of homosexuality.

GO47

Implicit Theories of Intelligence and Difference-Education as an Intervention for First-Generation Students

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Implicit theories have been used as interventions across diverse settings and populations for different purposes. Teaching students to adopt a malleable view of intelligence has been used to help middle school students during academic transition periods when grades are usually expected to decline (Blackwell et al., 2007), online in a high school setting to help students at risk of dropping out (Paunesku et al., 2015), and in a college setting to help alter African-American students' responses to stereotype threat and improve their academic performance (Aronson et al., 2002). First-generation students (FGS) are an at-risk population who have high rates of dropping out by the end of their first year of college and they tend to receive lower grades than non-first-generation students (NFGS) (Pascarella et al., 2004). Interventions that help students understand that coming from different backgrounds can impact their college experiences have been shown to be successful in helping FGS transition and succeed academically (Stephens, Hamedani, & Destin, 2014). FGS are a group who could potentially benefit from interventions that teach a malleable view of intelligence and teach the importance of differences in backgrounds. The current study tested these two interventions (separately and in combination) with FGS. Participants came into a laboratory and completed online modules that presented one of three intervention conditions or a control condition, and then completed an anagram task in order to measure performance and persistence after experiencing feelings of failure. The participants were asked about their help-seeking behaviors and were also asked if they would be willing to engage in a tutorial to improve their verbal intelligence.

GO48

From test to testimony: Resiliency after TBI Diagnosis

Quanisha M Davis

Autoethnography research is a relatively new and innovative means of studying and gathering data on oneself to connect to former research and theory. Autoethnography research uses the science of connecting research and theory to expand the literature that has been presented in former research and advocate for change within a policy, law, and/ or environment. Autoethnography research is a scientific method of connecting research to one's life story and promoting change for the good of all. When doing my autoethnographic research on "From test to testimony: Resiliency after TBI diagnosis", I had to use my parents' insights regarding the early parts of my story but the overall theme is entirely based on me. In this autoethnography, I present myself as a young, African American adult who has experienced a life- changing car accident in her childhood that resulted in a condition known as traumatic brain injury. Many people do not know what a traumatic brain injury is nor do they understand the effects that can result from it. Traumatic brain injury (TBI) is a condition where the brain is impacted by some sort of force/ trauma that can result in physical, cognitive, mental, and emotional impairments. In my situation, the car accident led to a coma and a TBI which left me paralyzed on my right side, unable to communicate, unable to feed myself, and function as an average 6-7 year old child. Because of the trauma I experienced, my family and others had to make changes to their lives and rely heavily on God to see them through. Two theories are presented that set the tone of the stress my family went through and how all of us were able to bounce back from this tragedy. The Resiliency Model of Family Stress, Adjustment, and Adaptation describes how a family can experience some sort of crisis that requires them to make changes within their environment to ensure the well-being of everyone involved. The other theory, Fowler's Spiritual theory, describes how humans develop spirituality over time and experience. Truly, the aftereffects of this accident remain with me, which influences my personal and professional life even today. Nonetheless, I feel blessed. My story has implications for the entire system and society at large and hopes to inform changes in the right direction.

GO49

Consequences of Rape as Predictors of Sexual Assault Resistance Self-Efficacy

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Rape is unfortunately highly prevalent among undergraduate women, with up to 25% experiencing rape or an attempted rape during their undergraduate careers (Fisher, Cullen, & Turner, 2000). Koss and Gidycz (1985) define rape as sexual acts performed against one's will by force, the threat of force, or when a person is unable to give consent (such as due to substance-related impairment). College rape victims face multiple potential adverse consequences, including PTSD, depressive symptoms, and problematic drinking (Bedard-Gilligan, Kaysen, Desai, & Lee, 2011; Kilpatrick, Resnick, Ruggiero, Conoscenti, & McCauley, 2007; Littleton, Grills-Taquechel, & Axsom, 2009; Zinzow et al., 2010). Experiencing these consequences are also associated with risk for experiencing further sexual victimization (Fisher et al., 2000; Katz, May, Sörensen, & DelTosta, 2010), and rape victims in general experience much higher rates of new sexual victimizations than non-victims (Gidycz, Coble, Latham, & Layman, 1993; Krebs et al., 2007). Currently, there is limited understanding as to how sexual victimization and these adverse consequences interact to increase sexual re-victimization risk. Therefore, the present study sought to examine these interactions in relation to one proposed contributor to rape avoidance—sexual assault resistance self-

efficacy. Four hypotheses will be examined and tested with an independent samples *t*-test and regression analyses on survey data gathered online from a sample of 1,955 undergraduate women, 366 of whom reported a history of rape. These hypotheses are:1) Rape survivors will demonstrate decreased sexual assault resistance self-efficacy compared to non-victims; 2) Depressive symptoms will significantly predict decreased resistance self-efficacy in victims and non-victims; 3) There will be a significant interaction between depressive symptoms and victim status, such that depressive symptoms will more strongly predict resistance self-efficacy for rape survivors than non-victims of rape; 4) There will be a significant interaction between depressive symptoms and frequently drinking alcohol among rape survivors, such that the relationship between depressive symptoms and resistance self-efficacy will be stronger among frequent drinkers than non-frequent drinkers. Addressing a gap in the literature, the study's results may help to better inform prevention programming with rape survivors, thereby reducing rates of sexual victimization.

GO50

Impact of alcohol sale regulation on drug abuse - a secondary analysis of national data sets

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Summary: There is increasing awareness of the epidemic of heroin, prescription painkiller and other drug abuse that is occurring throughout the country. One of the less examined facets of this epidemic is the relationship between the prohibition of alcohol sales and the incidence of drug-related behavior.
Objective: This study seeks to investigate the relationship between the alcohol status of a county and its drug-related behavior. We define drug-related behavior as drug-related inpatient hospital encounters and drug-related fatalities. Alcohol regulation status of a county is classified into three categories: 1) wet, where alcohol sales are not prohibited; 2) mixed, where there is some prohibition of alcohol sales, and; 3) dry, where alcohol sales are entirely prohibited. We hypothesize that there is a positive relationship between increased drug-related behavior and increased prohibition of alcohol sales (dry and mixed counties).
Study Design: The research method is retrospective secondary data analysis. Three datasets were used in this study: 1) The Agency for Healthcare Research and Quality Healthcare Utilization Project Nationwide Inpatient Sample (NIS), 2) The Center for Disease Control National Vital Statistical System Mortality Data, and 3) the Wikipedia map on county alcohol sale status. The HCUP Nationwide Inpatient Status datasets for 2010 and 2011 provided data on over 16 million individual encounters, of which over 43,000 were found to be drug-related. We examined the CDC data to provide a longitudinal study of drug-related mortality rates for each US county from 2002 through 2014. We also parsed the Wikipedia map to extract the embedded alcohol status data. This data was then integrated with the NIS and CDC data for analysis.
We used a variety of data analytics software for the project, including SAS for statistical analysis and data management, Tableau for mapping and data visualization, and Weka for knowledge analysis and data mining. We examined the effect of alcohol sale prohibition in isolation, as well as in relation to other possibly confounding variables such as race, age, patient income level and average income level.
Results: Statistical analysis, data visualization and data mining are still in progress.

GO51

Resource availability patterns in nontarget impacts of a biocontrol weevil

Erin Elizabeth Fegley, Claudia L. Jolls

Larinus planus (Coleoptera: Curculionidae) is a weevil seed head predator that adventively appeared in North America in 1971. *Larinus planus* has since been distributed as a biological control for such weedy thistles as Canada thistle and musk thistle. However, *L. planus* has begun to have negative impacts by feeding on a federally threatened thistle, *Cirsium pitcheri* (Pitcher's thistle), an endemic of Great Lakes shorelines. Flowering *C. pitcheri* are the resource for *L. planus*: the site of mating, egg-laying, and development of larvae. Nontarget impacts occur through destruction of seeds and ovules by *L. planus* larvae.

Two hypotheses have been posed that might explain the relationship between abundances of plants and their insect herbivores: (1) resource concentration and (2) resource dilution. The relationship between abundances of *C. pitcheri* and *L. planus* would then be predicted as either positive (resource concentration) or negative (resource dilution). In northern lower Michigan from June to August of 2015, I recorded resource density and insect load in 20 circular plots of 100 m^2. Data were analyzed using Spearman's rank correlation. As density of reproductive *C. pitcheri* plants increased, I observed a significant decrease in proportion of plants with damage. No significant decreases were found in insect load per head or insect load per plant as density of reproductive *C. pitcheri* increased. These preliminary results suggest that there is a general trend of resource dilution. Lower densities of *C. pitcheri* experienced higher loads of *L. planus* (i.e., high levels of nontarget impacts). This knowledge has the potential to help direct management

efforts to *C. pitcheri* areas with the highest risk for nontarget negative impacts from *L. planus*.

GO52

Fear, Competition, and Time: The interaction of predation, competition, and phenology on treefrog morphology and life-history

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Many species alter their morphology, behavior, and life-history to enhance their likelihood of surviving and/or leaving more progeny in the presence of predators. Competition for resources may modify the influence of predators on prey, but different species and different age classes of competitors resulting from different breeding phenologies may have different influences. We conducted an experiment to assess how different types (intraspecific versus interspecific [Gray Treefrog]) and age classes (same age versus older) of competitors shaped the response of a focal prey species (Pinewoods Treefrog) to its predator (larval dragonflies). Regardless of age class or type of competitor present, predators induced tadpoles to develop taller tail fins and longer tails and to have a better ability to jump farther when they achieved metamorphosis. Predators also induced tadpoles to develop wider bodies and have longer legs at metamorphosis, except when the number of individuals in the same age cohort as the focal prey was increased. Predators induced tadpoles to have narrower bodies and shorter legs at metamorphosis under these conditions. Tadpoles were generally smaller in the presence of predators except when more prey individuals of the same age cohort as the focal prey were present or when older cohorts of Gray Treefrogs were present. Predators also generally caused tadpoles to have shorter bodies at metamorphosis, except when there were older cohorts of tadpoles (both pinewoods and gray treefrogs) present. Our results highlight that the effect of predators on prey traits can vary among environments depending on the identity of competitors with which they co-occur. This adds to our understanding of how phenology impacts community assembly and phenotypic plasticity. Phenology is widespread in nature but often left out of phenotypic plasticity experiments, so this experiment can help link other experimental results with field studies that incorporate phenology to better approximate natural communities.

GO53

Improving The Cytotoxicity Of The Anti-Cancer Agent Anandamide: Structural Modification To Prevent Enzymatic Degradation

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Non-melanoma skin cancer (NMSC) is the most common diagnosed cancer in the United States with 3.5 million new cases this year. Current chemotherapeutic treatments suffer from serious side effects, proving selective toxicity for cancer cells is paramount in potential anti-cancer agents. NMSC cell lines have been shown to overexpress the enzyme cyclooxygenase-2 (COX-2) which provides a chemotherapeutic target. COX-2 is an enzyme responsible for initiating the metabolism of arachidonic acid (AA) and its ethanolamide derivative anandamide (AEA). Downstream products of AEA include a series of prostamides, ultimately leading to 15-deoxy,Δ12,14 PGJ2-EA . In cell lines that overexpress COX-2, AEA and its metabolic products have been shown to induce cell death with all indication pointing to apoptosis as the mechanism. Fatty acid amide hydrolase (FAAH) degrades AEA into AA and ethanolamine (EA). FAAH, in turn, limits the effectiveness of AEA as a chemotherapeutic. FAAH activity can be blocked by proper selection of inhibitors, however modification of AEA offers another strategy. By understanding how FAAH degrades AEA, we can strategically modify the molecule chemically to better combat the degradation. AEA and PGJ2-EA can be synthesized readily using standard synthetic protocols which allows for site selective modification. Multiple syntheses of AEA derivatives have been identified which offer the possibility of blocking the action of FAAH, creating more potent and efficient potential chemotherapeutics.

GO54

Social Status-Dependent Molecular Regulation of Dopaminergic Pathways in Zebrafish Brain

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In zebrafish (*Danio rerio*), social interactions between adult males consist of a series of aggressive encounters that ultimately lead to the formation of stable hierarchies of either socially dominant or subordinate animals. Although it has been shown that social

status leads to neurophysiological changes in brain structure and function, our understanding of how identified brain circuits are modulated by social status in vertebrate model systems is limited. The activation pattern of the Mauthner neural circuit that mediates the startle escape response in zebrafish is likely affected by social experience through the regulation of dopamine synthesis and receptor activity. The focus of this study is to determine how social experience affects the regulation of the dopaminergic pathways that in turn modulate the activity of the Mauthner escape circuit. Our results show that the dopaminergic system is modulated on a transcriptional level, with social status-dependent regulation of dopamine supply and receptor expression. Although there were no significant differences in the expression of Tyrosine hydroxylase (th), Dopa decarboxylase (ddc) and Vesicular monoamine transporter (vmat) in dominant and subordinate animals, we found that expression of Dopamine reuptake transporter (dat) was significantly up-regulated in dominant animals compared to subordinates. In addition, drd1b receptor expression was down-regulated in dominants compared to subordinates. Finally, the hypothalamic and hindbrain sub-regions of the dopaminergic system also display social status-dependent transcriptional modulation. Collectively, our findings suggest that the activation of the underlying neural circuit mediating escape behavior is modulated in a social-status dependent manner through changes in the dopaminergic system.

GO55

Climate Change and the Sea Breeze in the North Carolina Coast

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With nearly 75% of the world's population projected to live in or near coastal regions by the year 2030, understanding climatological implications of coastal phenomenon is becoming increasingly important. One such coastal phenomenon found along coastlines throughout the world is the sea breeze (SB). In the summertime, the variability of precipitation along the North Carolina (NC) coast is heavily dependent on SB-induced convection. This research aims to provide insight into how a warmer 21stcentury may alter SB evolution and precipitation along the NC coast by using the Weather Research and Forecasting (WRF) numerical model. The first phase of this study investigates the performance of the WRF model in reproducing present climate sea breeze events. The second phase of this study utilizes the pseudo-global warming (PGW) approach, which will allow comparison of present climate SB simulations (phase 1) to future replications of the same event, but with modified thermodynamics representing a warmer climate. An increase in lower-tropospheric water vapor due to a warmer climate would likely lead to increased upward vapor flux and associated upward motion. Known as the thermodynamic effect, this effect would likely be responsible for the increased precipitation expected in future weather systems. However, previous research has shown that synoptic-dynamic changes in atmospheric motion can also contribute to changes in precipitation in a warmer climate, albeit less significant. It is hypothesized that the increase in SB induced precipitation due to a warmer climate would also be controlled by the synoptic level atmospheric flow associated with the position and strength of the North Atlantic Subtropical High (NASH). As the NASH shifts westward, it is expected that the likelihood of wetter summers in the southeast will increase in the future due to increased synoptically driven moisture flux. As a result, future NC SB events would likely benefit from this synoptic response, producing increased precipitation beyond what the thermodynamic effect alone would induce. A SB case study is presented with results suggesting that future changes in the position and strength of the NASH may have significant control over the evolution and precipitation associated with future NC SB events. This would suggest that future changes in the large-scale atmospheric flow due to a warmer climate may have significant impacts on weather systems at the regional scale.

GO56

Unintended impacts and management of a biological control weevil on a rare Great Lakes dune thistle

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East Carolina University Department of Biology

Pitcher's thistle (*Cirsium pitcheri*, Asteraceae) is a federally threatened Great Lakes dune endemic. It is monocarpic, growing vegetatively for 4-8 years, flowers once, sets seed and dies with no means of vegetative reproduction. A seed-eating weevil (*Larinus planus*, Curculionidae, Coleoptera) is a biological control insect used to suppress weedy thistles. This weevil has recently spread to Pitcher's thistle, with detrimental impacts on plant populations. Land managers need information on this interaction for conservation of the thistle. My research asks: 1) what are the impacts and timing of oviposition, 2) what factors influence oviposition on heads? and 3) does an organic kaolin clay water based insect deterrent (Surround® WP) prevent impacts? To assess head vulnerability and phenology, I visited 44 plants in three populations in northern lower Michigan every 3-7 days, 11 June-17 August 2015. I counted oviposition presence/absence on all heads and recorded head size (mm), flowering condition and seed success. Of the 1,695 heads revisited, 540 (31.9%) had oviposition. I analyzed seed set of heads in three categories: unfilled/flat, filled and chewed. There were significantly fewer

filled seeds in heads with weevils (64.3 ± SE 3.11) than in heads without (24.3 ± 3.87). I used a GLMM fit to a binary logistic regression to evaluate factors that might predict vulnerability to weevils. Date (odds ratio 54.1, $p<0.001$) and head size (odds ratio 6.535, $p=0.011$) were significant predictors of oviposition. Most oviposition occurred while heads were still in bud, 11 June-7 July. To assess Surround® WP effectiveness, I painted kaolin clay or water (control) on 56 pairs of heads on 18 plants at one site. A paired t-test showed significantly fewer oviposition holes on clay (1.38 ± 0.18) vs. water (2.46 ± 0.27) treatments. There was no significant difference between treatments for chewed seeds. My results confirm that this biocontrol weevil can have significant negative impacts on Pitcher's thistle, however, it is confined to seed heads early in their development, between late June and early July. Kaolin clay offers some promise for management, but its application and time need further investigation.

GO57

Quantifying the Thermodynamics that Define Cadmium Mimicry: A Comparison to Cadmium

Rachel Anne Johnson, Dr. Anne Spuches

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Calcium is an essential biological metal that is vital for the function of numerous proteins, the regulation of numerous pathways, and cell signaling. Similar to calcium in size and charge, the toxic metal cadmium can act as a molecular mimic, disturbing the highly regulated actions of these pathways.[1] As Cd^{2+} is a borderline Lewis acid, it is interesting that it has the ability to bind to the carboxylate and carbonyl rich domains found in numerous calcium binding proteins, such as EF hand proteins, despite the hard Lewis basicity of the coordinating oxygen atoms.[2] Previous research has shown Cd^{2+} binding to both EF hand loops I and II in the regulatory domain of human cardiac troponin C.[4] This is of concern due to cardiac troponin C's role as a regulatory subunit in the heterotrimeric cardiac troponin complex which is essential for heart muscle contraction.[3] Loop I is termed the "defunct loop" and does not bind calcium[3], however, crystallography data[4] and isothermal titration calorimetry (ITC) data from the Spuches lab reveal the presence of Cd^{2+}. ITC is a bulk thermodynamic technique that can provide a full thermodynamic fingerprint of the metal binding event, including stoichiometry, binding affinity, and enthalpic contributions, however detailed analysis must be completed to account for all equilibria occurring within the reaction cell. Our research involves fully extracting out the metal-protein thermodynamic parameters, which may provide significant information about the location of cadmium binding in conjunction with structural investigations with circular dichroism.

References:

1. Choong, G. et. al. Chemico-Biological Interactions. 2014, 211, 54-65.

2. Richardt, G. et. al. Biochemical Pharmacology. 1986, 35, 1331-1335.

3. Spyracopoulos, L. et. al. Biochemistry. 1997, 36, 12138-12146.

4. Zhang, X. et. al. Acta Cryst. 2013, D69, 722-734.

GO58

Case Studies of the Impacts of Climate Change on Precipitation Organization in the SE US

Mark R Nissenbaum, Rosana-Nieto Ferreira, and Thomas Rickenbach

The delivery of precipitation through large and small scale convective features plays a key role in the hydrological cycle. Therefore, it is important to understand how the organization of precipitation will change under future climates. The organization of precipitation can be divided into widespread, heavy mesoscale precipitating features (MPF) and short-lived, isolated precipitating features (IPF). MPF are more common during the winter and transitional months as they are tied to large-scale forcing processes provided by the mid latitudes, while IPF occur more often during the summer due to variations in surface heating. The Weather Research and Forecasting (WRF) model is used to simulate a typical wintertime midlatitude cyclone passage and an ordinary summertime precipitation event in the Southeast US under the present and future climates. The model is rerun with an adjusted initial state that resembles temperature projections for the 2090s based on several Coupled Model Intercomparison Project Phase 5 (CMIP5) General Circulation Models (GCMs) from the IPCC Fifth Assessment Report (AR5). Overall precipitation in the summertime event is higher in the future climate simulations, consistent with the increase in temperatures. This could be related to an increase in the number of MPF, which produce heavier precipitation compared to IPF. In the wintertime event, changes in the organization of precipitation are masked by changes in the propagation speed of the midlatitude cyclone. The midlatitude cyclone arrives and exits the area of interest earlier, contributing to a decrease in overall precipitation in the future climate simulations.

GO59

Response of the soil and rhizosphere microbiome to long-term fertilization

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A microbiome is a community of microorganisms that occupy a particular environmental niche such as the human gut or the roots of plants. In the area immediately surrounding plant roots, exudates are released creating a unique habitat for microbes called the rhizosphere. The rhizosphere microbiome can influence plant health and growth promotion by providing nutrients and suppressing plant pathogens. Human-induced atmospheric deposition of nutrients can impact local plant-soil-microbial interactions. Specifically, anthropogenic nitrogen inputs can decrease plant community diversity and change composition; however, less is known about the effects on belowground plant-microbe interactions. Taking advantage of a long-term fertilization and disturbance project at the East Carolina University West Research Campus, we examined the influence of long-term fertilization on the soil microbiome and the rhizosphere microbiome of two plant species differing in response to fertilization. The abundance of the grass *Andropogon virginicus* L. increased in unfertilized plots and decreased in fertilized plots while the forb *Euthamia caroliniana* (L.) Greene ex Porter & Britton was common in both fertilized and unfertilized plots over time. To better understand how fertilization influences microbial diversity and composition, we will use Illumina amplicon sequencing to characterize the total bacterial (16S rRNA gene) and fungal (ITS gene) communities in bulk soil and rhizosphere soil associated with *A. virginicus* and*E. caroliniana*. We anticipate that similarly to plant communities, microbial diversity of bulk and rhizosphere soils in fertilized plots will decrease compared to control plots. In addition, the change in microbial diversity is expected to support copiotrophic, faster growing microbial communities compared to unfertilized plots supporting more oligotrophic, slower growing microbial communities. Understanding how belowground plant-microbe interactions respond to fertilization inputs can help better predict downstream ecosystem responses related to carbon and nutrient cycling.

GO60

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Head Start is a prime location for interventions aimed at improving the health and education of low-income, low-resource preschool children. Head Start classrooms are regulated through multiple levels of policy (i.e. federal, state, center-level); for example, the provision of healthy meals/snacks regulated through the Child and Adult Care Food Program (CACFP). Unfortunately, previous research has suggested excessive and/or unclear policies may limit the provision of quality nutrition education at the classroom-level. The purpose of this study was to explore the affect of multilevel policies on nutrition education in North Carolina (NC) Head Start preschools. Researchers conducted 32 semi-structured telephone interviews with NC Head Start teachers. Interviews were transcribed and coded for emergent themes following a grounded theory approach. Interrelated themes were condensed into three broad categories, and a substantive-level model emerged to explain how policy-related factors (i.e. actual policies vs. policy perceptions) influenced nutrition education (e.g. frequency, strategies) and child-related outcomes (i.e. learning outcomes, exposure). Multilevel policies and teachers' perceptions of those policies directly and indirectly affect the quality and frequency of nutrition education. For instance, teachers described sanitation policies that limited or restricted the use of food-based activities (e.g. taste testing, cooking), while policies regarding hygiene (e.g. hand washing) and regulatory schedules created time constraints in the classroom. Findings suggest that teachers' perceive their ability to provide quality nutrition education is most affected by policies at the state and center-level. Further, although supportive of nutrition education, policies originating at the federal-level lead to competing priorities in the classroom (e.g. school readiness), and may conflict with the use of standardized nutrition education curricula (e.g. educating on child interest vs. using standard lessons). Additional research is needed to further investigate the origin, intentions, and implications of multilevel policies on nutrition education in the Head Start setting.

GO61

Evaluation of Nutrition Knowledge in Eighth-Grade Students in Eastern North Carolina (NC) Based on NC Healthy Living Standards

Caroline Hodges, BS, Ashley Roseno, MS, RDN, LDN, Melani Duffrin, PhD, RDN, LDN, Virginia Stage, PhD, RDN, LDN

Adolescence is an opportune time to interest students in nutrition due to increases in growth, development, and independence; however research has found nutrition knowledge to be deficient at this age (32-38%). The purpose of this study was to develop a nutrition knowledge survey for eighth-grade students in Eastern North Carolina. Researchers evaluated 250 students in 16, eighth-grade classrooms using a 22-question researcher-developed nutrition knowledge questionnaire. Assessment questions were aligned with NC Healthy Living Standards, which suggest students should be able to: (1) use tools to analyze dietary patterns, (2) create strategies to improve dietary intake, (3) create plans for lifelong health, and (4) evaluate health information and products. Survey reliability and validity (content) were evaluated prior to study implementation. Descriptive statistics for individual items, total, and individual standard scores were analyzed. Efficacy of the tool was evaluated using item-difficulty and discrimination indexes. The survey displayed appropriate levels of item difficulty with three exceptions; two questions were identified as too difficult, and one as too easy. The majority of items also displayed acceptable (>0.30) or excellent (>0.40) discrimination (14 out of 20). Average total nutrition knowledge score was 11.82±3.26 (53.7%). Within aligned standards, students scored highest in creating plans for lifelong health (79%), and lowest in evaluating health information (37.6%). Study findings suggest eighth-grade students may possess half the nutrition knowledge they are expected learn prior to beginning the academic year, however future research should explore end of year gains in nutrition knowledge and potential impacts on dietary behaviors.

GO62

A Study of Fourth Grade Students' Focus and Engagement during Independent Reading After Participating in Physically Active Brain Breaks

Amanda Tomlin

This study investigates how brain breaks or short bouts of physical activity before independent reading time can affect a student's engagement and focus while reading independently. Independent reading time is incorporated into daily instruction in order to improve students' reading achievement; however, this time is more effective when the students are engaged and actively interacting with the text (Clausen-Grace & Kelley, 2009). This study implements six minutes of physical activity prior to the students participating in their Drop Everything and Read (DEAR) time in hopes to find that the incorporation of this into daily instruction will influence the students' engagement and focus while reading. Aerobic exercises are used since Buck, Castelli, Erwin, & Hillman (2007) noted that aerobic fitness was positively associated with overall academic achievement in reading and mathematics This study's methodology is Quasi-Experimental Pre-/Post-test comparison group research design; two fourth grade classrooms are involved where one is the intervention group and the other is the control/comparison group. The four data sources that are used are: researcher journal, engagement inventory, reading engagement self-reflection survey, and semi-structured interview. If a student is more engaged while reading, they are more likely to actively interact and comprehend the text; therefore, this study could give classroom teachers and reading educators more knowledge on how brain breaks could positively or negatively affect reading engagement and focus which could lead to an enhance reading achievement for the students.

GO63

Comparing the Learning Effects Between Pecha Kucha and PowerPoint Presentations in Occupational Safety Training

Stacy Lee Freeman

Recently, speculation has begun developing amongst researchers in terms of the effectiveness of training program presentations as well as their ability to educate learners. This is due to a number of reasons given from learners based on their thoughts of current methods of teaching concepts. To bring more meaningful information into education lectures and safety training, researchers and educators have explored a variety of concepts to enhance the learning experience in various environments. These concepts are pulled from topics such as adult learning theories, multimedia teaching, increased presentation rates, and learner interaction.

A more fast-paced Japanese method of presenting, known as Pecha Kucha, is gaining the attention of researchers and educators. It is seen as a quicker, more interesting way of teaching the material within a short period of time all while constantly keeping the attention of the listener. Pecha Kucha may have the upper hand over traditional PowerPoint presentations in terms of learning of education materials as it reduces cognitive load as there are less images and text on slides. The two presentation styles may be just as effective when compared to each other in terms of retention as both would possibly make important material easier to identify versus a regular lecture that did not use

multimedia to assist with teaching.

The objective of this research is to examine if Pecha Kucha presentations are more beneficial for learners when compared to PowerPoint presentations. Very few studies were found in regards to Pecha Kucha, but out of those that were found, a majority of them focused on what the presenter was able to take away from the presentation rather than the learner. This study assesses if Pecha Kucha presentations will provide a difference in audiences' ability to learn and retain concepts versus a traditional didactic method of presenting with PowerPoint. Secondly, it also analyzes if the audience expressed more interest in Pecha Kucha presentations than the method of presenting regularly with PowerPoint. The findings in this study will contribute to and improve previous studies of adult learning methods as they relate to the use of Pecha Kucha presentations and the effects it has within the learning environment, whether it be the classroom or occupational safety training.

GO64

Is There An App for That: Baby Boomers Adoption of Smartphone Healthcare Apps

Annie Yong Patrick

It is predicted that in 2015, approximately 500 million smart phone users will use some type of health-related app. These apps are developed with the intention to promote health and wellness behavior in its user. However, the simple availability of a technology such as an app does not imply that it will be used for its intended purpose. Much research has gone into studying the factors and developing theories of technology adoption.

The focus of this research is to study the adoption of healthcare apps for smartphone devices among the Baby Boomer population. Aging Baby Boomers are at an increased risk of developing chronic diseases that will lead to increasing costs to the consumers, healthcare providers, and the government. Healthcare apps are new technologies that are developed to increase patient-centered care, thus decreasing costs and increasing quality of health. Healthcare apps have the possibility of being a great resource to the aging baby boomer population. However, there are limited studies investigating this population and their adoption of new technologies such as healthcare apps.

Baby Boomers in North Carolina will be invited to download the healthcare app, CareZone© onto their smartphone device and use it for two weeks. After the two weeks, the participant will be interviewed and data analyzed.

GO65

Investigating Laser Doppler Vibrometry as a Tool to Measure Wetting of Dental Material

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Saliva is critical for the overall health and physiology of teeth. Among its many benefits is the property of lubrication it provides between the tooth surfaces. Recent studies have shown that crown materials lead to the degradation of the surrounding teeth, and that the degradation is due to the wear of the crown material itself. It has not taken into consideration the lack of adhesion of saliva to the material as a contributing factor to the wear of teeth.

The wetting of saliva on dental crown and impression materials will be evaluated to determine how well saliva can lubricate the material and the surrounding teeth. The purpose of this project is measure the contact angle of water and artificial saliva on specimens of the material, to evaluate the presence of lubrication. A contact angle is the measurable angle a small drop of liquid forms on a solid surface. It indicates how well a liquid can wet and adhere to a surface, which shows the bonding relationship between the two surfaces. A goniometer is an instrument used for the precise measurement of angles, in particular contact angles. A custom image-processing tool will be developed using the MATLAB software to supplement the basic goniometer measurements.

We hypothesize that saliva on crown material will have a large contact angle, i.e, saliva is not wetting the crown surface, and is therefore, not providing lubrication between the crown material and surrounding teeth. A variety of samples of impression and crown materials will be obtained from the ECU School of Dental Medicine. Contact angles of water on impression material have been previously published. We will validate our methods by replicating these studies. We will then use artificial saliva on impression material. Finally, we will repeat the experiment with crown material and compare the results to those from the impression materials.

The results of this study will provide further insight on the surface characteristics of crown material. This work is relevant to those interested in studying both the physiology and material science perspective of dental prostheses.

GO66

Practical Testing Approaches for University Portal Applications: A Case Study

Mary Frances Moore

Time and quality are two very important factors when determining the right approach for software testing needs. A software program can often be used in various environments, such as different platforms, operating systems, browsers, networks, etc., requiring a significant amount of testing in order to provide high quality and reliability of such software. Combinatorial testing is an effective practical approach to testing hardware and software configurations. Testing resources are often restricted in real practice. Varying business goals require different testing approaches, so it is impossible to have one "the best" testing approach. We experimentally investigated and analyzed several combinatorial testing approaches based on Each Choice and Pairwise methods with and without consideration of operational profiles, through the testing of an Adviser Scheduling application located in a university web portal. Test sets with various configurations were generated according to six different combinatorial strategies. The Advanced Combinatorial Testing System (ACTS) tool provided by the National Institute of Standards and Technology (NIST) was used to automatically generate pairwise test sets. The case study software application was retested for each of the proposed testing approaches. The results of each approach were compared, taking into consideration the number of test cases and corresponding detected faults found for each approach. Based on this analysis, we provided practical recommendations for the selection of testing approaches to align with different business goals. The recommendation chosen for the university web portal application allowed for improved quality and reduced time of software testing.

GO67

A Unified View of Big Data Testing

Nam Le Thai

The advent of computer systems such as cloud computing and increasing database sizes have ushered the rise of Big Data technologies, namely the generation and analysis of massive amounts of data, becoming critical tools for the scientific, business, and internet industries. Currently Big Data systems are critical proponents to software systems that billions of people use from, world stock trade, satellite networks and scientific modeling. All Big Data systems have five central properties: volume, variety, velocity, veracity, and value. While these properties apply to traditional relational database management systems (RDBMS), Big Data is consistently pushing the boundaries of size, speed, and performance of data management. The current state of Big Data development is still reliant on the testing systems used to validate and verify traditional RDBMS systems; therefore there is an array of challenges facing testing the performance, quality, functionality of critical Big Data systems. This study analyzes the problems with Big Data testing. We investigate the state-of-the-art Big Data testing, and overview modern technologies and related testing research works in the area. We also analyze applicability of existing testing methods for the Big Data area and provide practical recommendations for their usage.

Abstracts | Graduate Poster Presentations

GP1

The Pamlico Pirates: An Investigation of the North Carolina Pirates thourgh Historical and Archaeological Methods

Allyson Ropp

The Golden Age of Piracy, 1700-1730, constituted a time period of pirate activity around the world, but many chose to work near North Carolina. This paper examines those who did and if they left any remains. In June 1718, Edward "Blackbeard" Teach and his crew of pirates ran the flagship, *Queen Anne's Revenge*, aground in Topsail Inlet, North Carolina. In 1996 a team of North Carolina state underwater archaeologists excavated a wreck they believed to be his ship in Beaufort Inlet, North Carolina. Thus, Blackbeard epitomizes piracy in North Carolina and dominates local legacy and memory. But what about other pirates, particularly Henry Every, John Redfield, Stede Bonnet, Charles Vane, Richard Worley, George Lowther and William Fly? What primary political, environmental, and social factors made the North Carolina coastline attractive to pirates? This poster lays out the means for completing work on understand the links between pirates who came to North Carolina, the colonial environment, and the state's current cultural memory of them. Through historical and archaeological records focusing on primary sources such as colonial records, trade and political correspondences, contemporary pirate biographies and trials, archaeological field reports of terrestrial and underwater sites, and master's theses, along with the legends of the Outer Banks that have passed down through generations this poster presents the preliminary reseach of pirates in Colonial North Carolina in the seventeenth and eighteenth centuries.

GP2

Public Health on the Somerset Plantation

Jay Colin Menees

Purpose: Expose public health factors on the Somerset Place plantation and discuss how these factors facilitated the spread of disease among the enslaved community during the Antebellum Period.

Abstract

Disease on the southern plantation could halt working progress at pivotal times in the year and depending on the disease, decimate the enslaved population. On the Somerset Plantation in Creswell, North Carolina, there were numerous instances of disease outbreaks among the enslaved population. While scholars have combined studies of immunity with racial genetic factors, further inquiry is required on the individual plantation.

This project looks as two outbreaks (measles and dysentery) and discusses the intersection of outbreaks with public health factors. By looking at a living structures, geography, waste removal, and working conditions, this project will show the importance of public health factors as they relate to the contraction and spread of disease on an Antebellum plantation.

GP3

Financial Exploitation of the Elderly: An Exploration of the Professional Literature

Jacqueline Alice Vaughn-Heath

Financial exploitation of the elderly is an issue that has been addressed through the years from a variety of perspectives though there has been no significant decrease in its prevalence. The purpose of this paper is to conduct a systematic literature review of the professional literature and determine what it says about financial exploitation of the elderly. We compiled and reviewed scholarly, peer-reviewed articles within the years 2010-2015 using specific databases with the keywords Financial Exploitation and Elderly. After using a face validity check for the systematic literature review, the search resulted in 19 studies addressing financial exploitation of the elderly over the last five years. Of the 19 research studies, six themes emerged based on the studies' intent: prevalence, perspectives, professional knowledge, measures, programs, and risk factors specific to financial exploitation of the elderly. The researchers also determined that, based on the reviewed articles, additional research is needed to develop understanding of cultural perspectives of the elderly and their families, improving interventions and awareness, and developing policies relating to financial exploitation.

GP4

A 3D photogrammetric survey of a Florida Reef Light

Michael James Letzring

Six Florida reef lights were built during the mid- to late-nineteenth century as aids to navigation for ships passing through the Florida Straits. The lights are spread along approximately 190 miles and from east to west are: Fowey Rocks Light, Carysfort Reef Light, Alligator Reef Light, Sombrero Key Light, American Shoal Light and Sand Key Light.

The northernmost reef light-The Fowey Rocks Light was constructed in 1878 to mark the reef in Key Biscayne

and was named after the nearby British naval shipwreck HMS *Fowey* which sank in 1748. Located outside of Florida waters but within the boundaries of Biscayne National Park (BNP), it is managed by the National Park Service since 2012.

In October 2014 an onsite conservation survey was conducted by Dr. Jennifer McKinnon of East Carolina University's (ECU) Program in Maritime Studies. The survey included collecting in-situ corrosion parameter measurements and in situ environmental and cultural data in an effort to better understand the condition of the site and provide management recommendations related to that condition.

In order to both supplement the initial survey and to provide a unique data-based product for research, visitor access and interpretation, with National Park Service support I will conduct a 3D photogrammetric acquisition and 3D modeling of the Fowey Rocks Reef Light in the summer of 2016. In the spring of 2016 I will conduct a proof-of-concept pilot project using suitable proxy structure in coastal North Carolina.

GP5

The Power of Porcelain: Authority and Landscape in Early Modern Cyprus

Justin Anthony Mann

This study analyzes the distribution of the archaeological remains of coffee consumption, with the aim of understanding the results as they relate to local manifestations of authority and power. The source data used for this project is derived from the Troodos Archaeological and Environmental Survey Project (TAESP), which was directed between 2002-2007 by Dr. Michael Given and Dr. Bernard Knapp of the University of Glasgow. The survey material from this survey has been refined to focus on artifacts relating to coffee consumption, in this case Kutahya Ware and porcelain sherds, which date to the Ottoman-Modern periods. This chronological choice is due to the sole fact that coffee did not appear beyond the Yemen until the latter half of the 16th century, and by which time Cyprus was already incorporated into the Ottoman realm. To achieve the goals of this project, the coffee cup related data was organized by settlement type (i.e. Greek, Turkish, mixed, or ecclesiastical) and a comparison with the quantity of other contemporary tableware was carried out. In doing so, I attempt to show that ecclesiastical settlements (e.g. monasteries) maintain a similar archaeological signature to the civil elite class. In other words, the higher proportional observance of porcelain and Kutahya Ware in ecclesiastical settlements would not only highlight the authoritative presence of these locations in social matters, as porcelain is a well-known commodity of symbolic status, but also underscore their economic importance as the ritualization of coffee engendered great expense on behalf of the Early Modern consumer. Therefore, this analysis advocates for the use of porcelain as a key indicator in identifying social status on the archaeological landscape. In addition, historical sources that document the ritualized consumption of coffee and porcelain use, primarily in the form of traveler diaries, are used to reinforce the archaeological data. It is hoped that this study demonstrates the important role that authority and power plays in ordering the social landscape, and how archaeology can help to illuminate this relationship through the study of material culture.

GP6

Input and Transport of Terrestrial Dissolved Organic Matter in the Tar-Pamlico Estuary, NC USA

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The Tar-Pamlico Estuary is one of the major freshwater sources for the Albemarle-Pamlico Estuarine System, the second largest estuary in the US. The estuary is characterized by low suspended particulate material and very high colored dissolved organic matter (CDOM). CDOM plays an important role in coastal ecosystems, both biologically and chemically. CDOM can be mineralized to CO or CO_2 and released to the atmosphere. CDOM mineralization can also release nitrogen compounds that enhance phytoplankton productivity. CDOM is also an important part of the microbial loop, further impacting water column productivity. In addition, CDOM absorbs a significant portion of available light in coastal areas directly influencing phytoplankton and SAV production.

In May and June 2013 (4 cruises) and again from August 2014 to April 2015 (5 cruises), surface water samples were collected along the length of the estuary. Samples were analyzed for CDOM absorption, dissolved organic carbon, and other water quality parameters (e.g. chlorophyll fluorescence, total suspended matter). Discharge at an upstream USGS gage station indicated that the samples were collected during a broad range of river stages. Spatial patterns of DOC concentration were broadly similar between cruises and values were largely consistent as

well, with the exception of the September 2014 cruise that had markedly lower DOC values. CDOM absorption at 400 nm was more variable between cruises, but generally decreased with increasing salinity down estuary. Additional analysis will explore changes in the composition of the CDOM pool using spectral parameters obtained from CDOM absorption curves.

GP7

Green Extraction of Medicinal Herbs with Subcritical Water

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Due to effective remedial achievements in the medical field, wide availability, and low side effects and low costs, the use of herbal medicine has been multiplied all around the world in recent years. The traditional way of consuming medicinal herbs is to cook them with boiling water. However, this is not the most effective method in removing active pharmaceutical ingredients (APIs) from herbs. We have developed a method to extract the APIs from medicinal herbs such as *Salvia miltiorrhiza* and *Isatidis indigotica* using subcritical water. The herbs were extracted at four different temperatures, 75° C, 100° C, 125° C and 150 °C for 30 min at each temperature. The herbal extracts were then analyzed using high-performance liquid chromatography. Our results have revealed that sub-critical water extraction is much more efficient than the traditional boiling water extraction.

GP8

Evaluation of Selection Criteria for Whole Body Human Computational Phantoms for Use in Radiotherapy Research

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Introduction:

One of the limiting factors in investigating the long-term impact of radiation therapy to normal tissues is lack of detail on the doses received by structures outside of the primary radiation field. Typically, these studies only have patient-specific anatomic information within the primary radiation field. As a result, long-term radiation risk studies to normal tissues typically rely on point dose estimation; they have no way to determine the average dose a structure receives. One possible way to calculate mean dose to structures out of the primary field is to use a single, reference model that is representative of the patient population as a whole. Previously, we investigated the use of height and weight specific models to better achieve patient specificity when compared to these reference models. In this study, we evaluate two additional methods for selecting appropriate computational phantoms for an individual patient; bony anatomy matching; and anatomy matching using chord length distribution (CLD).

Methods:

Identical 4-field prostate plans were simulated on the computed tomography (CT) images of five male patients using X-Ray Voxel Monte Carlo, a radiotherapy specific Monte Carlo transport code. Each patient plan was then simulated on an additional four computational phantoms: a reference phantom; a height and weight matched phantom; a bony anatomy matched phantom, where the phantom was selected based on femoral head distance and maximum width of the pelvis, and anatomy matched phantom, where the phantom was selected using the CLD of the prostate to the bladder, rectum, and femoral heads.

Results:

Dose uncertainty for all patient cases was less for matched phantoms than for the reference phantom. Dose errors for matched phantoms were between 4.55% and 7.62% lower than for the reference phantom. Relative location errors for the left and right lungs were 6.9mm and 9.1 mm, respectively, for the matched phantoms, compared to 7.8mm and 9.8mm, respectively, for the reference phantom.

Conclusions:

This study showed that mean dose to the organs located in the missing CT coverage can be reconstructed with less dose uncertainty using matched phantoms. Using height and weight matched phantoms does yield better results in general in regards to out-of-field dosimetry than using average phantoms.

GP9

Statewide Offshore Sand Sources for Beach Nourishment and Dynamics of the Beach-Dune System along a Human-modified Coast, Northern Outer Banks, NC

Ian Conery, Dr. J.P. Walsh, Dr. D. Reide Corbett

East Carolina University and UNC Coastal Studies Institute

The beaches of North Carolina provide numerous resources and are an economic driver for the State. However, many stretches of coastline are experiencing erosion that requires mitigation. Despite the wide use of beach nourishment, there is not a centralized source on the location and volume of usable (beach compatible) offshore borrow sand. Suitable nourishment

sands are a limited resource as they must possess particular sedimentological characteristics; therefore, it is vital to better understand known quantities that will influence long-term cost and planning of beach nourishment. This an ongoing collaborative effort by ECU, State and private scientists to construct a database of all existing geophysical and geologic information; this compilation of knowledge will be beneficial to coastal managers and be made available to the public via the NC Coastal Atlas. In addition, using this database, data gaps and needs can be determined and used to set priorities for future seismic and sediment sampling.

This poster also addresses the research to examine the geomorphologic and sedimentological evolution of the beach-dune system in Nags Head and the northeastern Outer Banks, NC. The annual-to-decadal morphologic change of the beach-dune system in nourished versus non-nourished areas across Dare County will be evaluated using spatio-temporal datasets, including monthly laser elevation scans, existing airborne LiDAR, cross-shore elevation and bathymetric profiles. Beach-dune characteristics (e.g., beach and dune width and volume) will be used to classify the state of the beach-dune system (e.g., recovering and healthy) with time, and use meteorological data to help interpret drivers of change. Sediment samples will be collected monthly along the three transects across vegetated and non-vegetated dune-beach areas at specified geomorphic positions. Interpreted grain-size distribution and depositional layers will be coupled with elevation changes shown by the laser scanning to elucidate mechanisms and behavior of sediment transport. Insights gained from this research will not only inform local Outer Banks managers and residents, but likely other coastal communities facing long-term erosion.

GP10

Microbial community structure and functional diversity shifts along a freshwater-saltwater gradient

Henry Raab, Dr. Ariane Peralta

Human-induced environmental change is known to increase nutrient and carbon inputs into aquatic ecosystem already experiencing natural salinity gradients. These abiotic changes are known to have significant impacts on aquatic microbial communities and nutrient cycling functions, which can directly influence microbial ecosystem services related to carbon sequestration and nitrogen removal. Understanding how interacting environmental gradients influence aquatic microbial community structure and function remains a major knowledge gap. The goal of this study was to characterize microbial community shifts in composition and functional diversity along an environmental gradient of salinity, nutrients, and carbon along the Pamlico River. We sampled along a salinity gradient that ranges from 0 to 20 from beginning at the Tar River into the Pamlico Estuary. This drastic change in salinity was expected to affect the physiology and functionality of the microbial communities. Not only does the salinity change, but there are also high concentrations of colored dissolved organic matter (CDOM) in the Tar River. High levels of CDOM decrease the light availability in the water and can influence microbial growth. In addition, surrounding land use contributes nutrient-rich runoff into the ecosystem. Based on key changes in abiotic factors, microbial communities capable of metabolizing different carbon compounds significantly shifted along the environmental gradient. Initial results indicate aquatic microbial communities are sensitive to environmental gradients, however, future results will identify specific members of the microbial community that are sensitive vs. tolerant to these environmental shifts. Linking microbial community structure and carbon cycling potential will provide insight into how microbes respond to interacting environmental gradients.

GP11

Modeling Sterically-Congested Dimerization in the Rhodium-Catalyzed Hydroacylation of Formylstyrene: The Need for a Dispersion Functional

Thomas Shoopman

There is value in knowing how chemical reaction mechanisms work. It allows for increasing the yields of specific desired products while at the same time minimizing unwanted by-products, allowing the scientist to have discretion for chemical structure characteristics, including chirality of molecules, all while giving the ability to decrease the energy requirements by understanding the system's reaction pathway.

The synthesis of chiral indanones, and its interesting chiral variant tetralone, are used as a backbone in pharmaceutical preparations to treat diseases ranging from Alzheimer's disease to hypertension, as well as far-ranging uses in the food science crop industry. Using powerful computers to emulate atomic and molecular interactions, energy requirements can be recorded and molecular geometries can be charted along a reaction pathway in an effort to understand how energy barriers may be lowered to reduce costs and improve product yields.

The reaction pathway involves rhodium-catalyzed hydroacylation, which bifurcates to produce the indanone and tetralone products. The indanone formation involves a single vinylbenzaldehyde substrate molecule, whereas the tetralone product is afforded by the dimerization of two of the substrate molecules. The application of the computational methods and parameters in the

form of density functionals, solvent environments, and basis sets demand that care be taken to accurately reflect the nature and characteristics of the reaction pathway. The presentation will address these components.

GP12

Best Management Practices: The Intersection of Flap Gate Function and Fish Passage

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Blueback Herring *Alosa aestivalis* and Alewife *Alosa pseudoharengus*, collectively termed "river herring," and other species use the four manmade canals outfitted with water control structures (WCSs) that connect Pamlico Sound to Lake Mattamuskeet within Mattamuskeet National Wildlife Refuge (MNWR). River herring population declines range-wide led to a moratorium on river herring in 2007. There is currently a no-harvest provision for both commercial and recreational fisheries of river herring in both riverine and coastal waters of North Carolina. Current WCS design has a limiting effect on the passage of these species to and from Lake Mattamuskeet through the four manmade canals. Recent changes to WCSs include the tightening and replacement of seals to prevent leaks from the sound side of the WCSs, total replacement of top-hinged aluminum gates, and/or installation of side-opening aluminum gates. The new side-opening WCS design may cause less water to flow through the WCS. This loss of flow may limit access to and from the lake for river herring based on a reduction in open gate availability for entry. Factors affecting WCS function in this unique system merit further study. The goal of my study is to understand operation of the WCSs and influences of lake hydrology on river herring passage to and from Lake Mattamuskeet. Two questions addressed by this presentation are: 1) How are river herring affected by WCS function? 2) What differences exist between WCS designs under varying hydrological conditions? The results of my study will be used to develop a management strategy for WCS operation.

GP13

Determination of NC Southern Flounder Offshore Spawning Migration & Habitat Through Active Acoustic Telemetry

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Southern flounder (Paralichthys lethostigma) is an economically important species throughout its range, targeted by commercial and recreational fishers. Since 2000, an average of 2.34 million pounds were landed by the commercial industry, representing approximately 95% of the US commercial harvest. Over the same time period, 350,423 pounds were landed by the recreational industry. However, stock assessments conducted in 2004 suggested that the North Carolina (NC) population was overfished and had been experiencing overfishing since 1991. Thus, the stock was classified as 'depleted'. The most recent proposed management plan was deemed unsuitable for implementation and the population's status had not improved. An understanding of the location and timing of spawning, and the possible fate of larvae spawned in those locations will greatly increase the likelihood of successful management of the species. Identification of offshore habitat will enable further research on the dynamics of the stock for more successful, and possibly inter-state, fishery management through the Atlantic States Marine Fisheries Commission (ASMFC) and South Atlantic Fishery Management Council (SAFMC). Furthermore, knowing where spawning occurs off NC's coast is critical to protecting these areas from threats of possible seismic exploration, offshore energy development, and offshore sand sources for beach re-nourishment. The proportion of fish that return to the sounds and rivers post-spawning is also an area of concern. In this study we used Vemco tags and receivers in combination with an SV2 Waveglider autonomous ocean robot to search for mature flounder after their egress from the sounds and estuaries of NC. Fish were collected in Core Sound, NC from commercial pound nets and released near Beaufort Inlet. Stationary Vemco receivers were also used in partnership with the Atlantic Cooperative Telemetry (ACT) Network and Ocean Tracking Network (OTN) member researchers and institutions, as well as the NC State University Center for Marine Science and Technology both in Bogue/Core Sounds and offshore artificial reefs. Our goals are 1) identify the number of (tagged, assumed mature) southern flounder that egress offshore, 2) search for offshore adult/spawning habitat areas, 3) use partnership with ACT/OTN to report flounder detections outside NC waters (if any), and 4) determine if any tagged individuals return to inshore NC waters in the spring post-spawning.

GP14

Comparing the current interglacial to the last: Foraminiferal assemblages from the Sunda Shelf, northeastern peninsular Malaysia

Bailey Gwynne Donovan

Studying paleoenvironments from the last interglacial and glacial period can help determine what environments to expect as our current interglacial progresses to a glacial period. A large portion of the world's population lives in the countries surrounding the South China Sea (SCS) and are affected by seasonal monsoon variations as well as the interglacial/glacial cycles. High resolution paleoenvironmental records have been obtained from the Sunda Shelf, Southern SCS in previous studies. Incised paleovalleys within the Sunda Shelf allow for higher accommodation space of Holocene sediments and therefore, a higher resolution record. We are comparing the current and last interglacial interval by analyzing marine cores from the Sunda Shelf. A multiproxy approach will be used to reconstruct a paleoenvironmental record by employing bulk sediment magnetic susceptibility (BMS), elemental analysis using X-ray fluorescence spectrometry (XRF), and foraminiferal assemblages. Foraminiferal data will be interpreted by comparison with surficial foraminiferal assemblage data acquired across the shelf off Kuala Terengganu (KT), northern peninsular Malaysia.

Two gravity cores, TER15-GC11B and TER15-GC8A, were collected ~40 km and ~90 km offshore of KT, and subsequently subsampled at the Universiti Malaysia Terengganu in the summer of 2015. Preliminary C-14 data show sediments in core TER-GC11B were deposited during the current interglacial (Holocene) and sediments in core TER-GC8A were likely deposited during the last interglacial (late Pleistocene). Preliminary BMS data has shown a relatively low range of BMS values for TER-GC8A (1.72-2.23 nm^3/kg), indicating little paleoenvironmental change. In addition, TER-GC11B shows a decrease in values up-core (decreasing from ~1.42 to 1.04 nm^3/kg), indicating a decreased flux of sediment into the area. XRF data will be compared with BMS values to determine possible factors affecting BMS changes. Foraminiferal assemblages from each core will be inferred to determine paleoenvironmental conditions. This research will be able to compare to previous and future studies to forecast environmental changes that people living near the SCS can prepare for.

GP15

Major- and trace-element composition of garnet as an indicator of rare-element mineralization in pegmatites

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Garnet is a common accessory mineral in both, NYF (Nb-Y-F) and LCT (Li-Cs-Ta) families of granitic pegmatites. The compositions of garnet are mostly members of the spessartine ($Mn_3Al_2Si_3O_{12}$) - almandine ($Fe_3Al_2Si_3O_{12}$) solid solution series. Previous research has shown that an increase in Mn/(Mn+Fe) in garnet is associated with increased fractionation of the melt that results in a more evolved pegmatite. These evolved pegmatites typically belong to the LCT-rare-element class and are important sources of strategic metals (Li, Cs, Ta, Nb, Be and rare-earth elements (REEs)). Given the importance of these scarce resources geologists have examined trace elements in common minerals such as feldspar, tourmaline, and muscovite to improve our understanding of fractionation in pegmatites. Although being widespread in pegmatites, little work has been done to examine the trace-element composition of garnet and its relationship to economic rare-metal mineralization.

In this study we present the major- and trace-element composition of garnet from a wide variety of pegmatites to determine the evolution of a pegmatite melt during crystallization. Trace-element compositions are being used to differentiate between barren pegmatites and those that are fertile with respect to economic rare metals. Garnet from 31 pegmatites encompassing both LCT and NYF families were made into thin sections and subsequently analyzed for major elements via electron microprobe (EMP). Trace-element compositions of garnets were collected by laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS). Trace-element and geochemical discrimination diagrams are currently being constructed to examine for variations or similarities among garnet from different pegmatites. Preliminary results of chondrite-normalized REE plots suggest that garnets in NYF pegmatites exhibit higher concentrations of heavy REEs (HREEs) as well as a large Eu anomaly. In contrast, garnet in LCT pegmatites has low concentrations of HREEs, a smaller Eu anomaly, and uncharacteristic REE patterns.

GP16

Defining the Origin of an Anomalous Sand Ridge Field in Pamilico Sound, NC, USA

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The Outer Banks of North Carolina have been shown to undergo geomorphic change, exhibiting varying degrees of barrier island continuity during the late Holocene. These changes affect the environmental conditions (salinity, tidal and wave energy, currents, etc.) in the Pamlico Sound, the estuarine system behind

the Outer Banks. The modern estuarine system is characterized by minimal tidal energy (tidal range of 10 cm), and limited exchange with the marine environment through three inlets, resulting in the accumulation of organic-rich muds in the basin, and low- to mid-salinity estuarine foraminifera. However, an anomalous relict sand ridge field occurs in the eastern Pamlico Sound basin, suggesting different hydrodynamic conditions may have existed in the past. The field extends up to 10 km into the basin, and is oriented perpendicular to the barrier islands, and consists of a sand unit that is partially covered by mud. To understand the geologic history and origin of this sand ridge field, two vibracores that recovered the sand unit are being analyzed for sedimentology, foraminiferal assemblages, and age. Chirp seismic data are also being examined to understand the dimensions and stratigraphy of the unit. Additional cores and analyses are planned. Possible explanations for the ridges include: 1) tidal deposits during a phase of greater tidal influence; 2) major storm deposits; 3) tsunami deposits, possibly associated with failure of the nearby Cape Fear Slide. The sedimentology reveals a coarsening upwards trend which is unusual when compared to dominantly fining up sequences associated with overwash and flood-tide delta deposits. Previous paleoenvironmental work suggests the sand ridges were deposited under high salinity conditions. Defining the mechanism of formation of this sand ridge field will assist in the understanding of the geological evolution of the region.

GP17

Spatial and Temporal Variability of Nitrogen in Groundwater Beneath Three Large Onsite Wastewater Treatment Systems in Eastern North Carolina

Samantha Elizabeth Haskett

Elevated concentrations of nitrogen in groundwater and surface water are a public health and environmental concern. High nitrate-nitrogen concentrations in water supplies can lead to health problems like methemoglobinemia, and high concentrations in surface waters can cause eutrophication. Prior research has shown that in some settings, onsite wastewater systems may contribute significant concentrations of nitrogen to groundwater and surface waters. However the nitrogen treatment efficiency of onsite systems is variable, and may be influenced by factors such as climatic conditions, soil types, and system types. This project will include evaluating the spatial and temporal variability of nitrogen in groundwater beneath three large onsite wastewater treatment systems in Eastern NC. Each system uses a different method of effluent dispersal (low pressure pipe, pump to distribution box, and pressure manifold). Water sampling was initiated between 3 and 5 years ago for these systems and will continue until Fall 2016. Groundwater levels and water quality parameters including total nitrogen, nitrogen species, temperature, specific conductivity, dissolved oxygen, and pH are being monitored. The concentrations of nitrogen in septic tank effluent and groundwater beneath the three systems will be evaluated to determine if there are significant differences in nitrogen treatment between the 3 systems. The data will also be analyzed to determine if there are differences in treatment for certain years and seasons.

GP18

Holocene Paleoenvironmental Reconstruction of the Sunda Shelf, off Northeastern Peninsular Malaysia

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The East Asian Monsoon (EAM) affects roughly half of the world's population, especially those located around the South China Sea (SCS). Separated into summer and winter monsoons, the EAM is largely responsible for the agricultural practices and livelihood of those who live in the region. The objective of this study is to gain a better understanding of Holocene (11,700 BP–Present) paleoenvironment/paleoclimates of the Sunda Shelf (located in southern SCS). Similar studies have been conducted in the deep SCS, however little paleoclimate work has been done in the southern Sunda Shelf. The city of Kuala Terengganu (KT), Peninsular Malaysia is located on the western Sunda Shelf and is subjected to the EAM seasonally, with intensification around the winter monsoon. Cores taken from this area could be the key to understanding the variability of the EAM in this area.

In 2015, two gravity cores were collected 33 and 37 km offshore of KT at 55.7 m and 56.5 m water depth. The cores were subsampled every 1 cm and analyzed for various paleoenvironmental indicators (proxies). Based on previous studies the following 3 paleoenvironmetal proxies were chosen; 1) Bulk sediment magnetic susceptibility (BMS). 2) Elemental analysis by x-ray fluorescence (XRF) spectrometry to obtain concentration percentages of; aluminum (Al) (12.175%–17.206%), calcium (Ca) (3.056%–10.809%), iron (3.381%–53517%) and titanium (0.593%–0.78%). 3) Foraminiferal assemblages will be used as environmental indicators, as they have restricted environmental zones. Preliminary data suggest a maximum age of 7,000 years, representing an age range within the Holocene. BMS values decrease up-core; possibly indicating a decrease in the amount of terrestrial material supplied to the shelf over the last 7,000 years and suggesting a decrease in the amount of rainfall over the area. An inverse relationship between Al and Ca values was found; this could be related to changes in terrestrial sediment or from a change in the production or dissolution of marine

calcium carbonate. This work will be used as a continuation upon other studies in the area to build a complete picture of the Holocene paleoenvironment/paleoclimate, which can be used to better predict future cycles of the EAM and its impacts over those who live near the SCS.

GP19

Evaluation of Barrier Sprays for Mosquito Control in Eastern North Carolina

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Mosquitoes can be a nuisance and also transmit pathogens causing numerous diseases worldwide. Homeowners and others may hire private companies to alleviate mosquito-related issues. Here, two pyrethroid insecticides (Suspend® Polyzone® [deltamethrin] and Bifen Insecticide/Termiticide [bifenthrin]) used in mosquito control were evaluated on blocks of properties in two neighborhoods (Magnolia Ridge: 1-6 lot blocks, 2,100 – 7,500 m^2/block and Cedar Ridge: 1-3 lot blocks, 1,300 – 4,200 m^2/block) in eastern North Carolina for 23 weeks from May 18 – October 19, 2015. Properties were treated by The Mosquito Authority operators using backpack mist blowers every 21 days. At 17 fixed sampling locations (13 treatment and four control lots), Centers for Disease Control and Prevention carbon dioxide-baited traps were deployed overnight once/week for the duration of the experiment (377 trap nights). Oviposition traps (ovitraps) were deployed weekly at the same 17 locations and ovistrips remained in the field for seven days as a measure of *Aedes albopictus* abundance. Mosquitoes were identified to species, quantified, and tabulated by location and week. Analysis of variance was used for each neighborhood to determine the extent to which abundance of eggs or adult mosquitoes differed between treatments and weeks. We observed differences in mosquito abundance between neighborhoods, treatments, and weeks and differences varied between species. Adult and egg abundance was generally significantly higher in traps placed on control properties (no insecticide) compared to traps placed on treatment properties. In both neighborhoods, the abundance of *Psorophora columbiae* and *Ae. vexans* was significantly higher in control versus treatment traps. Bifenthrin and deltamethrin showed differences in efficacy (e.g. *Ae. vexans, Anopheles punctipennis,* and *Ps. ferox* abundance was higher in traps placed on bifenthrin compared to deltamethrin and control properties), but effects varied between neighborhoods and species.

GP20

Genome Editing in *Camelina Sativa*: Herbicide Resistance and Oil Composition

Aimee Alyssa Malzahn, Yiping Qi

Oilseed plants are a large industry, with the US spending an estimated $300 million a year on canola meal and seeds. *Camelina sativa* is a hexaploid oilseed that is cold and drought resistant and survives fungal infections that canola plants can't. Camelina oil is currently used for cooking and commercial applications, but also has the potential to become a future biofuel. While Camelina has many desirable traits, it is highly sensitive to the classes of herbicides sulfonylureas and imidazolinones. A single point mutation in the *ALS* gene of Arabidopsis confers a herbicide resistant phenotype. Due to gene homology, a point mutation can be expected to confer this phenotype in Camelina. With this altered plant, today's farmers can increase their yield and Camelina can be planted on fields already exposed to these herbicides. Our second goal is concerned directly with oil production in the seeds. The genes *FAD2* and *FAE1* will be knocked out. The concentration of oleic acid, an ingredient in a good, viscous biofuel, will be compared between wild-type and mutant plants. We hypothesize that mutant plants will double their oleic acid content. Two proof of concept studies will also be discussed. Using a YFP, it will be demonstrated that the important seed storage protein cruciferin can be edited. A knockout will potentially create more space in the seed for oil, thus making it an important protein for study. The ability to edit three homoalleles in germline cells will also be demonstrated by creating a knockout of phytoene desaturase; yielding an easily identifiable albino dwarf.

GP21

The origin of chert and its potential effect on porosity and permeability in the Onondaga Limestone in New Jersey

Kelsey L McGee

The origin of chert and its effect on porosity and permeability is unknown in the Onondaga Limestone in New Jersey. The Onondaga Limestone extends from central New York parallel with the Appalachian Mountains down through New Jersey, Pennsylvania, West Virginia, and Virginia. The formation was formed during the Middle Devonian period, and has conformable boundaries with the Marcellus Shale above and the Schoharie and Esopus formations below. In general, limestones make good reservoir rocks for groundwater and hydrocarbons due to the porosity and permeability affecting storage and flow. Chert, which often appears in limestones, is known to affect the porosity and permeability of the host rock. My intent is to analyze the chert

present in the Onondaga Limestone, and determine its origin and effect on porosity and permeability. This will glean important information on potential reservoirs within the formation.

GP22

Actuarial Science-Parameter Estimation in Mortality Models

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Actuarial science is the discipline that applies mathematical and statistical methods to assess risk in insurance, finance and other industries and professions (Wikipedia). In the pricing and hedging of life insurance product, the mortality rate plays the most important role. There have been several models to estimate the mortality rates, and two models that have been widely used are the Gompertz' law of mortality and the Makeham's law of mortality. The two models determine a mortality rate based off of extensive data analysis over the span of a specified time. The mortality rate is defined as the probability of either death or survival. The use of the two models, Gompertz and Makeham, allows one to calculate the death or survival over the course of time. The issue of time is particularly relevant to both models, with each preceding year the probability of death and survival change in conjunction with the independent variable time. The two models also consist of two important variables of particular interest. These variables of interest are the constants/parameters through which both models are dependent upon for accurate probabilistic approximations of death and survival.

We estimated parameters B and c for Gompertz as well as the A, B and c for Makeham, that form the basis of each model, and compared them with the ones in the literature, Melnikov and Romaniuk [1], for example. We utilized the data from the 2010 U.S. Life Tables and compared the performances of the two models for a better approximation with the given data. We used a scientific computing software Maple for the computations.

GP23

Iron isotope fractionation in the Skaergaard intrusion, Greenland: implications for magmatic differentiation and planetary formation

Alex Hammerstrom, Adriana Heimann

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Stable iron (Fe) isotopes provide a useful way to study many magmatic processes. Determining Fe isotope fractionation factors during magmatic differentiation can provide insight into understanding the overall evolution of magmatic systems. Understanding differentiation processes in large magmatic systems is important because they are responsible for producing the various igneous rocks found on Earth as well as many economically significant ore deposits. Furthermore, Fe isotope fractionation can also help to understand the formation of Earth's crust and provide insight into the formation of meteorites and other planetary bodies. Fractionations in stable Fe isotopes exist in high-temperature mafic/ultramafic terrestrial crustal and mantle rocks as well as in extraterrestrial (lunar, martian, meteorites) mafic rocks; however, the processes driving fractionation in these environments during magmatic differentiation are poorly understood.

This work will seek to determine the causes and effects of Fe isotope fractionation during magmatic differentiation in the Skaergaard layered mafic intrusion in Greenland. The Skaergaard intrusion is a simple igneous system formed via a single pulse of magma. This simplicity makes it a natural laboratory to study the geochemistry of a large magmatic system. Previous studies on Fe isotope fractionation have mostly focused on bulk-rock isotope compositions, and not much has been done on in-situ mineral compositions. This study will consist of in-situ femtosecond-laser ablation-multi collector-inductively coupled plasma-mass spectrometry (FS-LA-MC-ICP-MS) analysis of individual minerals and bulk-mineral Fe isotope analysis by MC-ICP-MS. The goal of these analyses is to determine inter-and intra-mineral Fe isotope fractionations in an effort to answer the question of whether Fe isotopes fractionate during magmatic differentiation.

GP24

Stratigraphic and structural controls on gas production of the Upper Devonian Gordon sandstone located along the Catskill shoreline complex in southern West Virginia

Jonathan Reid Noles

Domestic gas production is in ever increasing demand as a result of instability in the petroleum market in the Middle-East. Conducting production and reservoir potential analyses allows for continued development of production and a better predictor of how long a particular well or play will be productive. The Gordon sandstone is a shoreline deposit that has been a producing area in northern West Virginia. Production from the Gordon in southern West Virginia is along a trend that appears to be seaward of the projected shoreline. The Gordon sandstone in southern West Virginia is composed of two linear trends both of which strike N-S. The first trend is approximately 100 miles long, 12 miles wide, and comprised of three successive sand bodies roughly 20 feet thick each. The second trend is approximately 25 miles long,

6 miles wide, and comprised of a thin porous basal layer with thin interbedded silt, and is nearly 5 feet thick. The first, primary trend produces gas from the middle sand body which has maximum geophysical log porosities ranging between 9% to 16%, while the secondary trend has a porosity ranging between 6% to 7%. Stratigraphic and structural controls on gas production will be determined by analyzing geophysical logs, then using the data to construct cross sections and isopach maps for the three successive sand bodies. A better understanding of the stratigraphic and structural controls of gas production for the Gordon ""offshore"" depostional environment will allow for predictions of similar Gordon deposits that may occur elsewhere offshore.

GP25

Reducing Stormwater Runoff and Nutrient Inputs in Lower White Oak River Watershed

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Portions of the lower White Oak River and surrounding waters in Carteret County, NC are nutrient sensitive and/or impaired due to elevated concentrations of fecal-indicator bacteria. Over the last few decades, the community of Cedar Point and land surrounding Boathouse Creek, a tributary of the lower White Oak River, has experienced an increase in construction, land development, impervious surfaces, and runoff. Stormwater runoff has been identified as the primary source of non-point pollution. The purpose of this study is to reduce the volume of stormwater runoff and associated contaminants through the use of best management practices (BMPs) that will facilitate infiltration. Infiltration promotes the treatment and removal of these contaminants through physical, chemical, and biological processes. Beginning in May of 2015, routine monitoring of surface waters at 8 locations within the Boathouse Creek area was initiated. The monitoring included monthly surface water measurements of pH, temperature, turbidity, dissolved oxygen, specific conductance, oxidation reduction potential, and stream flow. Quarterly samples were analyzed for total dissolved nitrogen, ammonium, nitrate (NO_3), and phosphate. In excess, these nutrients can cause detrimental effects to aquatic ecosystems. Stable isotopic analyses ($\delta^{15}N$ and $\delta^{18}O$) in NO_3 from surface waters are also being conducted to determine potential sources of NO_3. Similar methods and analyses are being used for 6 storm events. Preliminary data show relatively low concentrations of total dissolved nitrogen (0.72 to 0.82 mg/L) and phosphate (most < 0.03 mg/L) during base flow conditions. Isotopic analyses indicate that the most likely source of NO_3 in the waters is wastewater from humans or animals. Monitoring will continue after implementation of the BMPs in order to determine their effectiveness in reducing runoff and pollutant transport.

GP26

High Resolution Nitrogen Transformation Monitoring in Tree Box Filters in Durham and Goldsboro, North Carolina

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Tree Box Filters (TBFs) are a novel Best Management Practice (BMP) that utilize urban area street trees to aid in stormwater capture, retention, and treatment. TBFs encourage denitrification and assimilation in an effort to reduce nitrogen species concentrations (e.g. nitrates and ammonia) in the captured stormwater. Early research reveals that TBFs successfully reduce pollutants; however, the literature is lacking information pertaining specifically to nutrient reduction and nitrogen transformation. Furthermore, advances in monitoring techniques have made high resolution water quality observation possible, but have yet to be utilized in analyzing TBF processes.

During an 18 month monitoring period, I will be observing hydrologic properties, and pollutant fluctuations to better understand nitrogen transformation in four Silva Cell TBFs in Goldsboro and Durham, North Carolina. To monitor nitrates, ammonia, dissolved oxygen, oxidation reduction potential, conductivity, and pH, two water quality sondes will be used to collect high frequency data (10-minute intervals). Surficial groundwater monitoring wells (2 sites) and water level loggers (4 sites) will be deployed to observe water table fluctuations, internal residence time, and drawdown rates. Additionally, grab sampling and handheld monitoring will occur during at least 12 storm events to validate sonde data, and test for pathogen capture. The provided information from each monitoring technique will further the understanding of TBF processes, and provide beneficial data for defining this BMP's potential for stormwater management.

GP27

Characterizing Coastal Subenvironments With Modern Foraminiferal Assemblages In Bogue Banks, North Carolina

Nina Maria-Elena Shmorhun, Stephen J. Culver, David J. Mallinson, Kathleen M. Farrell

North Carolina's (NC) coastline consists of an extensive barrier island system with associated inlets. Recent studies examine barrier island evolution through correlation of stratigraphic sequences that represent past coastal environments. Current methods to glean information about paleoenvironments and barrier island migration involve the characterization of siliciclastic sediments. However, there are no datasets that characterize onshore and offshore foraminiferal assemblages of discrete coastal subenvironments. In this study, a dataset of foraminifera will be established for modern subenvironments of Bogue Banks, Bear Island, and Bogue Inlet, NC. Modern surface sediments from Bogue Banks, Bear Island, and Bogue Inlet will be collected from subenvironments defined *a priori*. For each surface sample, foraminifera will be picked and identified. Discriminant analysis will be used to test the hypothesis that *a priori* subenvironments can be distinguished based on their foraminiferal assemblages. Foraminiferal assemblages of Holocene sediments in vibracores from the Bogue Banks region will be classified into coastal subenvironments via comparison with the modern foraminiferal assemblages using discriminant analysis. This work will contribute to our understanding of coastal stratigraphic architecture in clastic settings.

GP28

Hickory Shad: A Valuable, yet Poorly Understood Recreational Species

Ryan James MacKenzie, Roger Rulifson

The Hickory Shad *Alosa mediocris* is a species of anadromous fish present on the East Coast of the United States, from Florida to the Gulf of Maine with one of the largest populations located in Eastern North Carolina. Although not largely commercially harvested, Hickory Shad are valued as one of the most popular recreational fisheries in North Carolina. Despite its popularity, the scientific community has largely overlooked Hickory Shad with little actual research being done on the life history; the current stock status is unknown. A closely related species, the American Shad *Alosa sapidissima*, has been used as a substitute in stock assessments. Accurate identification of Hickory Shad stocks are crucial in determining a successful management strategy for the species. Our research goal is to determine whether spawning populations show fidelity to natal streams and, if so, estimate the amount of wandering between populations. Fish samples will be collected via electrofishing in several stream systems in North Carolina. In addition, individuals collected from more northern coastal populations will provide out-groups. Morphometric analysis ("geomorphometrics") will be conducted on both the body shape of the fish, as well as the otolith (ear bone). Morphometric differences have the potential to identify among populations at relatively low cost and quickly; however, success of this technique has had limited success with related fish species. Otolith chemistry will determine similar isotopic signatures within a population, and signatures among populations will be compared to identify wandering individuals. We hypothesize that these tools of otolith shape, chemistry, and body morphometry will identify individual populations, which in turn will provide valuable information in developing fishery management plans for the species independent of the American Shad.

GP29

The Identification and Quantification of Oxygenated Polycyclic Aromatic Hydrocarbons in Biochar Leachates by Molecular Analytical Methods

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The proposed benefits of biochar (residues of the incomplete combustion of biomass) as a carbon-negative soil amendment have led to its wide application in soils. However, recent studies have shown that the carbonaceous matter in biochar (BC) may not be as refractory in the soil environment as previously assumed. For example, mobilization or transformation of the organic molecules in biochar may occur. Many of these molecules are referred to collectively as dissolved black carbon (DBC). Previous studies have shown that compounds found in DBC, such as polycyclic aromatic hydrocarbons and oxygenated polycyclic aromatic hydrocarbons (PAHs and OPAHs, respectively), if mobilized can have adverse effects on aquatic and terrestrial organisms. This study will identify and quantify PAHs and OPAHs in aqueous leachates from a variety of biochars. These

experiments will improve our understanding of how organic compounds in biochar may be mobilized and trasformed. As a result, this study will help identify how DBC plays a role in the environmental carbon (C) cycle.

GP30

Evaluating Fe Isotope Fractionation in the Sakergaard Intrusion through Bulk-rock Fe isotope analysis

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The Skaergaard intrusion is one of the best studied layered mafic intrusions on the planet. Layered mafic intrusions are important because they often contain economic deposits of platinum group elements, copper, and nickel. Previous work has focused on silicic intrusions and volcanic deposits, but layered mafic intrusions have not yet been analyzed in depth for Fe isotope fractionation. Iron isotopes fractionate due to processes in the magma chamber during crystallization. The main question to be addressed here is how do Fe isotopes fractionate within the Skaergaard intrusion? This question will be answered through bulk-rock Fe isotope data and *in-situ* Fe isotope compositions of magnetite. Preliminary data are presented showing the petrography of the Skaergaard intrusion and characterizing exsolutions of magnetite and ilmenite. Petrographic analysis has been conducted on 49 thin sections. Grain size and mineralogy varies through the Layered Series, Upper Border Series and Marginal Border Series. The main minerals of the Skaergaard intrusion are plagioclase, clinopyroxene, orthopyroxene, olivine, magnetite, and ilmenite. In the upper zone, apatite appears as a cumulus phase, and inverted pigeonite is present in certain layers along with clinopyroxene and orthopyroxene. Representative thin sections from each zone were analyzed via SEM-EDS in order to quantify and characterize the relationship between magnetite, ilmenite, and ulvospinel. The exsolutions have been divided into 9 types according to shape. The majority of magnetite grains contain exsolutions, with sizes ranging from 5μm to 5mm. The data collected from the SEM-EDS will be used to assist in the interpretation of *in-situ* Fe isotope compositions of magnetite. This research will provide a basis for Fe isotope analysis of more complex layered mafic intrusion systems.

GP31

A study of Wimble Shoals: Geologic history, dynamics, and influence on sediment tranport

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Throughout much of the east coast of the United States, our mainland is protected by series of barrier islands. Some of the most iconic, as well as dynamic, of these barrier islands are the Outer Banks. The Outer Banks are thin strips of continuous sand, broken only by a few inlets. In many coastal studies, onshore processes of erosion and accretion have been correlated to the location of nearshore morphological features, such as ridges, shoals, and shore-oblique bars. Wimble Shoals off of Pea Island and near Rodanthe, NC on the Outer Banks is a major morphological feature that consists of 5 shore-oblique ridges. Although the nearshore morphological features impact the onshore realm, little is known about Wimble Shoals' geologic history and dynamics and how this feature affects currents, waves, and onshore processes such as accretion and erosion on adjacent Pea Island. Wimble Shoals' spatial extent, seasonal variability, and morphological characteristics have been studied, but no one has examined how this shoal's formation impacts currents, waves and sediment transport to the onshore realm. Perhaps, these shoals are redirecting currents throughout the water column, as well as focusing wave energy on certain areas of the shoreline, thus creating erosion or accretion hotspots. With the use sediment cores, sediment grain size, and model analysis, I will determine the geologic history and dynamic of Wimble Shoals. Using these same procedures, I will also examine how Wimble Shoals is directing energy toward specific areas of the shore, thus eroding the beach. This new understanding of the geologic history and dynamics of Wimble Shoals will provide a better understanding of its impacts on nearshore and onshore processes of sediment transport. With this information, I hope to determine why there is such variability in erosion rates around Rodanthe and Pea Island. While this study will specifically help us to understand the nearshore and onshore morphology changes and how they are related to Wimble Shoals, the results can also be applied to understand other shoal complexes, oblique-bars or sand ridges along many coastal ocean shorelines.

GP32

Identifying spatial and temporal variability of beach properties on Pea Island, Outer Banks, North Carolina, USA

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Pea Island, a wildlife refuge located along the Outer Banks, contains a barrier island beach continually reshaped by dynamic

processes including currents, waves and wind. The landscape responds to these forces through changes in sedimentation and morphology over time. This investigation will identify measurable spatial differences in morphology and sediment character (e.g., grain size, mineral content, angularity) compared with previously collected data to track temporal changes. Previous work has quantified erosion rates along this shoreline, but has not investigated mesoscale changes in beach property variability on Pea Island. A lack of understanding exists regarding the current distribution and properties of sediment due to the dynamic nature of this location. We will observe environmental conditions, record sediment attributes, and conduct grain size analysis to identify differences in sediment type and possibly provenance. The investigation will continue by producing digital elevation models (DEMs) using real time kinematics and LiDAR to collate with available archived data. The DEM results combined with sediment character will provide a complete characterization of morphology and beach properties on Pea Island. Comparing results with archived beach profiles will show temporal variability that can show trends in erosion and deposition. This information is important to future planning for coastal managers on the Outer Banks and at the NC Department of Transportation monitoring NC Highway 12. Park rangers at Pea Island National Wildlife Refuge, who are charged with protecting and promoting habitats of many migrating waterfowl and endangered species, will also find this information useful in the execution of their mission.

GP33

From Workaholism to Burnout: The Effect of Psychological Capital

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The present study seeks to examine the relationships among workaholism, psychological capital (PsyCap), and burnout. According to a recent article by Sussman, Lisha, and Griffiths (2011), it was estimated that approximately ten percent of the general U.S. population can be considered workaholics. These employees may, at first, reap the benefits from their obsessive and highly involved behavior (Clark et al., 2014). However, research shows that workaholic tendencies undoubtedly lead to a number of consequences that are detrimental to the employee's physical and psychological well-being, as well as to the organization itself (Clark et al., 2014). As the problematic nature of workaholism continues, it becomes imperative that research be conducted to alleviate the consequences of the syndrome. Thus, the current study seeks to determine whether the presence of PsyCap has the ability to weaken the relationship between workaholism and burnout. Similar to findings in previous research, we expect that (H1) workaholism will be positively correlated with burnout and that (H2) PsyCap will be negatively correlated with burnout. While the relationship between workaholism and PsyCap has been largely unexplored, the variables have previously demonstrated various contrasting relationships. Thus, we hypothesize that (H3) workaholism and PsyCap will be negatively correlated. Lastly, as a positive personal resource, we hypothesize (H4) that PsyCap will moderate the relationship between workaholism and burnout, such that the greater the level of psychological capital, the weaker the relationship between workaholism and burnout. To test our hypotheses, a multiple regression analysis will be conducted and the interaction effect of workaholism and PsyCap will be assessed. A Process Hayes analysis will then be employed to determine the moderating effect.

GP34

A Comparison Study of ADHD in Relation to Substance Use and Depression among a College Student Sample

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College student substance abuse is associated with a variety of negative consequences, including diminished academic performance (Egan et al., 2012). In addition, college students with a diagnosis of ADHD are at greater risk for developing both substance abuse problems (Mesman, 2015) as well as academic difficulties (Rabiner, 2012). The purpose of the present study was to assess alcohol abuse and non-prescription stimulant medication misuse among early college students, as well as to compare rates of alcohol and other substance use, depression, and academic functioning by ADHD status. Participants included 1,748 early college students, between the ages of 18 and 25 (M =18.51, *SD* =.74), who were largely female (F =68.4%) and predominately Caucasian (71.3%). Participants were assessed through an online Qualtrics survey. Approximately 11% of the sample reported that they had received a diagnosis of ADHD. Participants who reported a diagnosis of ADHD were more likely to report binge drinking in the last month, consuming alcohol 3-4 times or more per week, experiencing greater alcohol-related problems (RAPI abuse factor), using an illicit substance in the last year, and misusing non-prescription stimulant medication. They were also more likely to self-report a diagnosis of depression and have PHQ9 scores above the cutoff for depression. There was not a significant difference between groups on reported GPA. In addition, among participants who reported a diagnosis of ADHD, there were no differences on substance use variables between individuals prescribed ADHD medication and those

not prescribed ADHD medication. Participants with a self-reported diagnosis of ADHD who reported taking prescribed medication did have significantly higher PHQ9 total scores for depression. In addition, individuals with a reported diagnosis of ADHD who also reported prescribed medication had significantly lower academic performance (GPAs) than those not prescribed medication. This brings into question if those prescribed medication are adequately treated, and taking their medication as prescribed. Future studies should attempt to further address these differences in substance abuse risk between college students with and without ADHD as well as the possible role of mediating variables.

GP35

Do you get by with a little help from your friends: Psychophysiological arousal differences when discussing romantic disagreement with friends versus partners.

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There are benefits from understanding how partners involve their social networks in their romantic relationships (Jensen & Rauer, 2014). When couples encounter relationship challenges, both partners typically seek to resolve disagreements by turning to each other or by seeking counsel or support from friends (Helms, Crouter, & McHale, 2003). Previous researchers (Proulx, Helms, & Payne, 2004) examined the frequency of turning to friends to disclose romantic problems, but gaps remain in this literature. Disclosing areas of disagreement within a relationship can be distressing with a partner, (Butler & Gardner, 2003) and potentially with a friend. This study utilized galvanic skin response (GSR), an objective psychophysiological measure, to assess physiological arousal or stress accompanying disagreement disclosure to partners and friends. While there is some psychophysiological data from romantic partners engaged in conflict (Levenson, Carstensen, & Gottman, 1994), to our knowledge, no research has examined partners' psychophysiological state while discussing their romantic relationship with their friends.

By measuring GSR, we sought to determine whether partners were physiologically stressed when discussing romantic disagreements with their partners and with their friends, and if stress was greater when talking with partners or with friends. Preliminary analyses included data from 18 couples as they disclosed disagreements with each other and with a self-identified close friend. Results utilizing paired *t*-tests suggested that males' discussions with partners ($t(15)=6.31$, $p<.01$, $d=.50$); and with friends ($t(15)=5.88$, $p<.01$, $d=.70$) and females' discussions with partners ($t\ (15)=3.21$, $p<.01$, $d=.38$); and with friends ($t\ (15)=6.96$, $p<.01$, $d=.66$) were significantly more stressful than baseline readings. Moreover, we found that males ($t\ (15)=3.00$, $p<.01.01$, $d=.21$) and females ($t\ (17)=2.147$, $p<.05$, $d=.25$) were both more physiologically stressed (i.e., higher GSR scores) when discussing relationship problems with friends when compared to discussing these issues with their partners. Thus, although discussing romantic problems with both partners and friends can be stressful, it seems these discussions are more stressful with friends. Implications for researchers and practitioners are discussed.

GP36

Social Justice Issues in Subsistence Fishing in Coastal North Carolina

Elizabeth Ann Brown-Pickren

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Fishing is a popular activity and provides a good source of inexpensive healthy nutrients to those who have access to fishing grounds, as do most residents of eastern North Carolina. Two issues have emerged in coastal North Carolina recreational fishing recently. First, increasing restrictions are limiting access to fishing through the new licensing structure and development of coastal properties. Second, self-caught fish pose a risk from contaminants that may be unknown to anglers. Surveys of coastal anglers found misinformation about contaminants, scanty knowledge of fish consumption advisories, and confusion due to mixed messages from state agencies. Fishing is especially important to low-income rural residents and the survey revealed resentment towards new license requirements and the belief that management decisions had been made without input from those who would be most affected.

GP37

A Socioeconomic Perspective of Resource User Compliance in Fisheries

Christina Marie Wiegand

The National Marine Fisheries Service (NMFS), a line office of the National Oceanic and Atmospheric Administration (NOAA) is charged by the Magnuson Stevens Fisheries Conservation and Management Act of 1976, with managing fisheries within the United States' Exclusive Economic Zone (EEZ). With increasing resource scarcity and multiple uses, achieving high levels of compliance with regulated limits on species-specific catches will become crucial to achieving the long-term sustainability of fish stocks. This is why, historically, fisheries management agencies have put an emphasis on monitoring, control and enforcement of regulations. The literature from social psychology and economics provides a backdrop for understanding fisher response to regulation. Research in the field of social psychology has focused on how personal perceptions of morality and equity, and an individual's social environment influence compliance decisions. Becker (1968) provides the foundational economic model assuming that rational risk averse individuals compare on the net economic gains associated with compliance v. noncompliance. As sanctions become more severe and/or the likelihood of being detected increases the individual will optimally choose higher levels of compliance. The purpose of this research will be to provide an overview of compliance theory from both an economic and social psychology perspective, and to integrate these models of human behavior with ecological models used for fishery stock assessments. The goal of this research is to identify management strategies that best address both the ecological and human dimensions of fisheries.

GP38

Communicating Weather Information through Social Media-rology: An Assessment of the National Weather Service's Social Media Content and Account Analytics

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The explosive growth of social media has revolutionized the way organizations communicate and disseminate information to a general audience. To engage a more technology-savvy public, the National Weather Service (NWS) implemented plans to expand its online presence through social media websites like Facebook and Twitter. These efforts have broadened the ability of the NWS to provide critical information on weather, water, and climate to the millions of Americans who depend on forecasts and advisories every day. Through a collaborative internship with the United States Department of State, I developed infographics and other educational material in coordination with the NWS to enhance social media activity and effectively promote weather safety and preparedness messages. This study assesses the analytics of NWS social media accounts to identify patterns relating to the level of attention, impact, and engagement garnered by each social media post between December 2015 and January 2016. Some of the information attained from the analytics includes the number of views, impressions, likes, and shares generated by each individual post. Additionally, a content analysis was performed on user comments and interactions in order to gauge reactions to, and opinions and individual perceptions of the weather-related information posted by the NWS. Initial findings indicate that significant weather events (i.e., a winter storm or tornado outbreak) generate more activity and online traffic to NWS Facebook and Twitter pages, resulting in increased audience interaction. Further, posts that are accompanied by visually aesthetic infographics and images perform well in relation to all posts from the NWS. While this study is still in its infancy, we hope preliminary insights will shed light on the potential to maximize functionality of NWS social media accounts and increase the organization's potential to reach a wider segment of the American population.

GP39

Percieved Role Management and Parent Self-Efficacy

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Parenting interventions have the potential to make a significant impact on the prevention and treatment of major social and mental health problems with children (Sanders & Kirby, 2014). According to Nelson, Froehner, and Gault (2013), almost a quarter of college students in the United States are parents. From this large number, less than half (40%) will actually complete their degree. College and universities recognize the income potential of successful marketing to nontraditional students as well as their social responsibility to deliver education to all kinds of students, but unfortunately insight ends there (Hadfield, 2003). There has been much research conducted with nontraditional students (i.e first generation, minority, or lower SES students), but very little has been focused on the unique experiences of those who are student parents (Moreau & Kerner, 2015). Using a Family Systems theory approach the current study seeks to make a contribution

to the existing literature on parenting education by examining the effects of Matthew Sanders evidence based program, Positive Parenting Program (Triple P), with college students who are parents, both at East Carolina University and Pitt Community College. This study will investigate parental confidence and competence upon completion of Triple P in relation to parental role management and parental self-efficacy. The two research questions that will be answered and presented at Research and Creative Achievement week:
1.) Does exposure to a Triple P seminar have a positive increase on the parental competence (self-efficacy and satisfaction) and role management of student parents?
2.) Does the type of educational institution have a difference with the parental competence (self-efficacy and satisfaction) and role management of student parents?

GP40

Written in Stone: Headstone Material Change in North Carolina

Simon Goldstone

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In the late 19th and early 20th centuries, a shift from marble headstones to granite has been observed across the United States and in parts of Canada, as well. The goal of this study is to determine when this shift in headstone material occurred in North Carolina, and what factors contributed to this transition. Another objective is to determine how this shift impacted the expression of cultural meaning in North Carolina cemeteries. By examining how the shift from marble to granite caused changes to headstone morphology and style, this project will show how memorialization of individuals is influenced by headstone manufacturing processes. Ultimately, this study illustrates the effects of industrialization on the North Carolina cultural landscape as manifested in the state's cemeteries by analyzing the means of production and the expression of ideology.

GP41

Factors that Influence Older Women's Long-Term Care Decisions

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While 70% of US elders will require future long-term care, few plan accordingly and most decisions are made in a crisis. These crises are more pronounced for women as they are more likely to age alone and in poverty. Data from two-waves of semi-structured interviews with a sample of 10 white and 10 African American women aged 60 and older in eastern North Carolina are used to examine the relationship between long-term care planning and demographic variables; social support, medical history, attitudes toward aging, and past caregiving experiences.

GP42

Brunswick Town Wharf Construction Analysis

Stephanie Byrd

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Before roadways became the main mode of travel, waterways were the primary way to transport people and goods. Colonial cities and towns with access to rivers and oceans saw heavy sea traffic and this would require a place for ships to dock, often in ports where a wharf stood. Wharves are structures that were built to allow ships to stay deep enough in the water to float but close enough to the water's edge for ease of unloading. Wharves are made from wood or stone and run perpendicular to the coastline, and often have a parallel end with the water current for unloading cargo. Brunswick in southern North Carolina, near Wilmington, was a colonial town that had several wharves built in the life of the town. One of the wharves has become exposed due to water level changes during low tide, uncovering artifacts related to the time of the town. Mainly occupied from 1726 to 1776, the construction of the wharf has given a better understanding to how colonists lived along the river and what artifacts can be recovered from the wharf along the water's edge. The investigation into the first crib nearest the land has the best preservation from being under water. From this preservation, a further understanding of the way the timbers were placed and who the structure was anchored in the water can be determined. The first crib acted as a barrier from the river washing small artifacts away. These artifacts paint a picture of the type of items that were unloaded from ships as well as items that fell into the wharf from daily life. Prior excavation from Stanley South in the 1950s and 1960s focused mainly on the land that was Brunswick with little more than mapping the waterfront and the structures that remained. The most resent excavation is the first large scale undertaking to understand the layout of the wharf and artifacts that remained.

GP43

Workaholism and Aggressive Behavior: The Potential Moderating Effect of Perfectionism

Sarah Wellman, Dr. Shahnaz Aziz

The current study aims to fill a gap in the research on aggression in the workplace and the presence of workaholism. Past

research does not answer the more specific question of what the relationship, if any, is between workaholism and aggression. Previous findings link aggression to amount of time worked, which is a critical factor of a diagnosis of workaholism. This could indicate that a link exists between agression and workaholism. Workaholism is also commonly found to correlate with perfectionism. We hope to add to the existing body of knowledge on aggression and workaholism by exploring the connection between workaholism, aggression, and perfectionism. Consistent with previous research, we expect: (H1a) workaholism will positively correlate with aggression; (H1b) perfectionism will positively correlate with aggression; (H1c) workaholism will positively correlate with perfectionism. We also hope to find a moderator: (H2) the relationship between workaholism and aggression will be moderated by perfectionism, such that the greater the level of perfectionism, the stronger the relationship between workaholism and aggression. Linear methods will be used to test correlational hypotheses, however, a moderation model will be used to test the significance of the moderation of perfectionism in the relationship between workaholism and aggression.

GP44

Change and Continuity at the Coast: A social network analysis of adaptation in Dare County, North Carolina

James Evan Fulks

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With the ever-growing body of research on the adverse effects of climate change, there is an increasing need to understand the unique social complexities of those impacted. Specifically, I seek to understand what hinders or initiates environmental engagement. With a more clear picture of life on the coast, the underlying factors that affect participation can be identified. This poster investigates the relationship between personal networks, perceptions about environmental changes, and environmental participation of long-term residents in Dare County, NC, a rural area that is among the most threatened by sea-level rise. I focus on ethnographic research with business owners and self-employed people dependent on the local economy, as these individuals have a long-term investment to living in the area. Network data illuminates not only how well connected these people are within the community, but also their ability to access resources and information related to environmental issues. Findings from this study show how perception and recognition of environmental challenges need to be addressed differently among age groups and regions of Dare County to engage in more effective adaptation planning.

GP45

A Spatial Analysis of Bounded Cemeteries at the Town Creek Site (AD 1150-1400) in the Southern Piedmont, NC

Paige Ford

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Previous mortuary studies have explored the links between the presence of bounded cemeteries and the existence of corporate groups within ancient communities. This poster examines two cemeteries at Town Creek, a State Historic site in the North Carolina Piedmont. Town Creek is a Mississippian civic-ceremonial center located in the southern Piedmont of North Carolina, near the Pee Dee River, and was occupied from approximately AD 1150-1400. The site consists of a platform mound and central plaza, surrounded by archaeological features indicative of kin group cemeteries. The spatial distribution of individuals, artifacts, and select burial attributes within each cemetery are used to investigate variability between groups, and to place these groups within the context of the site's history. Analysis suggests the presence of distinct sub-groups of burials within each cemetery, and comparisons among cemeteries suggest that considerable variation in spatial arrangement occurred among cemeteries. Through examination and comparison of the internal structure of such spatially discrete areas, archaeologists can continue to investigate the creation of social memory and identity of corporate kin groups as a method of understanding connections to economic and political control.

GP46

Effectiveness of Visual Supports in the Home for Preschool Age Children with Autism: Implementation of Modified TEACCH Methodology

Laura Elena Velez, Linda Crane Mitchell

Researchers will examine the effectiveness of visual supports in the home for preschool age children (3-5 years old) with Autism Spectrum Disorders (ASD) using modified TEACCH methodology. Four parents of children with ASD will be trained on implementing visual schedules for daily routines and activities to use in the home. The children are diagnosed with ASD with moderate delays and have not previously used visual schedules or supports in the home. The study involves a four week time period and parents are required to collect data of their child's use of visuals through written data forms as well as iPad video recordings. A mixed methods design will be used in order to collect quantitative and qualitative data. The following research questions will be answered in the present study: (1) Is implementing TEACCH in the home effective? (2) Are parents

able to be trained to implement visual schedules and visual work systems into the home? (3) Do visual schedules help children with ASD become familiar with daily routines? (4) Do visual work systems increase the child's ability to complete assigned tasks independently? The researchers hope to find that parents can be trained and are able to successfully teach and implement visual supports in the home for their child with ASD. By the end of the four weeks, the researchers anticipate children will use visual schedules for daily routines and activities independently and with ease.

GP47

The Endless Pursuit for Self-Validation through Attainment: An Examination of Self-Esteem as a Moderator in the Relationship between Workaholism and Work Stress

Shannon Zamary, Dr. Shahnaz Aziz, Dr. Lisa Baranik, Dr. Karl Wuensch

Department of Psychology, East Carolina University

The current study seeks to investigate the relationship of workaholism and work stress in the context of self-esteem. Previous research has examined the relationship between workaholism and self-esteem. However, conflicting evidence suggests a more complex relationship, potentially with a third variable. The current research is a unique contribution to the literature because it examines self-esteem as a moderator in the relationship between workaholism and self-esteem. A survey with three self-report measures will be administered to a large heterogeneous sample of professionals. Researchers hypothesize that the relationship between workaholism and work stress will be moderated by self-esteem, such that the greater the level of self-esteem, the weaker the relationship between workaholism and work stress. Implications of this research are relevant to human resource professionals, as the current study aims to better identify employees who are at-risk for workaholic behaviors, and therefore at-risk for health concerns and diminished productivity.

GP48

Teacher Perceptions of Kindergarten Readiness Regarding Social and Emotional Factors

Kelsey Zary, Craig M. Becker, PhD

This pilot study is being conducted to determine teacher perceptions of kindergarten readiness of social and emotional factors. It is also the introduction of an instructional tool and the feasibility of using it within this environment. Most information currently focuses on the academic factor of kindergarten readiness, yet intrinsic motivation is considered one of the things that will ultimately impact this. This study hopes to introduce behavioral change methods through a lesson plan and use the EC Tool developed specifically for this age group to assess changes occurring. The study will be performed at the Child Development Center at East Carolina University in the 4-5 year old group. Teachers will be supported and trained in the use of the tool and lesson plans associated and how to introduce them to the students. The tool is aligned with North Carolina Foundations for Early Childhood. This type of classroom was chosen due to certain variables being controlled for, such as what is being eaten for snack and lunch during the day. There is also a self-report sheet that the instructors will show the students how to use. It is intended to bring awareness to the behaviors and will not be used as a punitive measure. Teacher observations will also take place while the students are using the self-report form and a pre- and post-assessment measure will occur. Currently the outcomes to be measured are whether or not the student uses the self-report sheet and does so correctly and if students demonstrated changes in the behaviors measured between the pre-and post-tests. Similar tools and intervention based methods were used successfully in the ages of college students through older adults previously. These methods were adapted from business models involving quality management methods. After pilot testing we hope to continue by going into a pre-school or elementary school where less variables are controlled for to determine if the tool is something that will be utilized fully by the teacher and students to improve their performance in school.

1. Becker, C. M., Moore, J., Whetstone, L., Glascoff, M., Chaney, E., Felts, M., & Anderson, L. (2009). Validity Evidence for the Salutogenic Wellness Promotion Scale (SWPS). *American Journal of Health Behavior, 33 (4)*, 455-465.

2. Becker, C. M., Cooper, N., Atkins, K., & Martin, S. (2009). What Helps Students Thrive? An Investigation of Student Engagement and Student Performance. *Recreational Sports Journal, 33*(2), 139-149.

GP49

There is Always More I Could Say: Older Lesbian Responses to an Open Ended Question

Brittany Bullock

Past literature has demonstrated that older lesbians prefer participating in qualitative research compared to quantitative research. This is due to their resistance to categorization, simplification, and their mistrust of researchers. Historically a

difficult population to access for research studies, the current cohort responded in the greatest numbers to an online survey of a 100 questions on a wide variety of topics. There were 456 participants in the survey, with the average age of the participants at 62.9, ranging from 51 to 86 (mdn = 62, mode = 55, sd = 6.91).

Pertinent to the current study focus, at the end of the survey, the participants were provided with an open-ended question, which asked, "Is there anything else you would like to tell us about your life experience as a lesbian?" This question allowed the participants to candidly share information that may have not been covered throughout the duration of the 100 question survey. As well, it provided the participants with an opportunity to share in their preferred method. Two hundred and nine participants opted to answer this open ended question.

The 209 responses were analyzed via content sorting. Two researchers independently analyzed and coded the data, then met repeatedly to consider one another's findings, reach agreement, and discuss next steps. Resulting themes were then collapsed and will be presented.

GP50

Comparing Methodologies for Documenting Commingled and Fragmentary Human Remains: A Case Study From Petra

Emily Elizabeth Sussman, Dr. Megan Perry

Commingled and fragmentary human remains are a common occurrence in archaeological and forensic contexts, but only a few methods have been developed to record these complex assemblages. Conventional inventory methods, such as the *Standards for Data Collection from Human Skeletal Remains,* document the presence and completeness of specific portions of skeletal elements and the minimum number of individuals (MNI) represented by each bone portion. This rather subjective method for MNI calculation does not provide much transparency for future researchers using these data. However, new techniques for recording, analyzing, and MNI calculation have been developed using zooarchaeological zonation methods (e.g., Osterholtz 2014), which document specific features present rather than more general measures of completeness.

This study identifies any significant differences in MNI calculation results using *Standards* versus Osterholtz's methods, through reanalysis of the assemblage of fragmented, commingled remains recovered during the 2012 season of the Petra North Ridge Project (preliminary MNI = 30).The MNI based on Osterholtz's visual-based system was not significantly different from that using *Standards*. Therefore, the precision of the two methods combined with the better metadata in Osterholtz's system suggests that this one should be the choice for individuals working with commingled and fragmentary remains.

GP51

Parental Visitation of Infants in a Neonatal Intensive Care Unit and Special Care Nursery: Barriers, Reasons, and Facilitators

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Background: Children born prematurely are at risk for long-term neurocognitive delays and poorer academic performance at school-age. Research suggests that the health outcomes of neonates hospitalized in the Neonatal Intensive Care Unit (NICU) is affected by parental involvement in care. Although many NICUs have attempted to mitigate barriers to visitation, the frequency and quality of parental visits continue to vary between families and across the NICU stay. Likewise, hospitals that serve rural populations face unique factors and disparities in health care not found in urban areas, which could negatively affect NICU visitation.

Purpose: To identify barriers to, reasons for, and facilitators of parental NICU visitation at a hospital with a large rural catchment area.

Method: Up to 100 biological parents of infants hospitalized for at least 7 days in the NICU or Special Care Nursery (SCN) at a large southeastern medical center are being recruited to complete an online survey upon their infant's discharge. The survey assesses barriers to, reasons for, and facilitators of visiting their infant in the NICU and/or SCN. Medical chart review will be conducted to obtain frequency of parental visitation, length of hospitalization, and medical history of the infant.

Results: Preliminary findings (based on data from 8 mothers and 2 fathers) follow. Demographics: 50% White, 50% African American; 90% living with other parent (40% married); 70% employed full time, 70% some college but no degree; average income $51,000. Most common visitation barriers: having to take care of things at home; having other children at home to care for; and being upset by the way baby looked or acted or treatments being received. Most common visitation reasons: wanting to get to know baby; feeling it was their parental responsibility; wanting baby to recognize them; and being with baby elicited positive feelings. Most common visitation facilitators: baby responding well when they visited; and NICU staff answered questions honestly.

Significance: These preliminary results identify common parental NICU visitation barriers, reasons, and facilitators. Objective parental visitation data obtained from medical records will allow for identification of barriers, facilitators, and reasons most strongly related to visitation. Information from this study can inform the development of policy and intervention aimed at increasing parental visitation.

GP52

Generational Dyslexia: Adolescents with Dyslexia Being Raised by Parents with Dyslexia

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Dyslexia is a condition in the brain that makes it difficult for an individual to acquire and process language including reading, writing, and spelling (Merriam-Webster, 2016). Extant literature suggests that dyslexia impacts not only language acquisition, but nearly every facet of one's life, including educatoin, work, leisure, and relationships. This lifelong leaerning difference is often familial and is extremel common, affecting up to 17% of the population (Merriam-Webster, 2016). A growing body of literature shows approximately 30% to 66% of children with dyslexia have a parent with dyslexia, as cited by Bergen et al., (2012). Little research has been conducted on the social and emotional aspects of familial dyslexia. The aim of the present study is to gain insight into the day-to-day experiences of adolescents with dyslexia being raised by parents with dyslexia. The study began with adolescent interviews and focus groups at a dyslexia-specific private school in the United States. The audio recorded interviews were transcribed and then analyzed by the research team with a qualitative phenomenology method. From the students' individual stories, five main categories were developed to convey the collective story. The first category is support including the parent with dyslexia, family, peers, friends, teachers, negative support, outlets utilized, and advice received from others. The second category is self-perception including feelings that were shared from the adolescents, perceptions that they had about dyslexia, advice given to other adolescents and parents with dyslexia and future plans excluding school. Dyslexia stories is the third category which includes emotions, experiences, and memories. The fourth category is educational journey including school memories and future aspirations. Generational dyslexia history is the fifth category including history and stories of parents, grandparents, siblings, aunts, uncles, etc. Implications for practice, policy, and future research will be highlighted. Our hope is to provide an opportunity for adolescents with dyslexia who are being raised by a parent/s with dyslexia to have their voices heard. Future plans include publishing a manuscript in a peer-reviewed, scholarly journal.

GP53

"I Read it, You Should Read it Too!" Increasing Students' Motivation to Read Through Book Talks, Book Choice, and Book Recommendations

Faison Charlton Powers

This action research study utilizes case study methodology characterized by single group pre-/post-test design to investigate the question, "in what ways does emphasizing reading as a social event through student book choice, book recommendations, and student-led book talks affect 2nd grade students' motivation to read?" The single group of participants will consist of the 19 students in one second grade class. All participants will be given a pre-test prior to the study, and then two post-tests upon the completion of the study to measure growth and changes that occurred as a result of the intervention.

Students will have the opportunity to read any books of their choosing throughout the study (Gambrell, 1996; Miller, 2012; Miller, 2015). This includes any books from the classroom library, the school library, the public library, or from home. As students finish reading books, they will have the opportunity to recommend the books they have read to other students by filling out a premade book recommendation template, which will include the following: Book title, book author, a short summary of the book, why the student chose to read the book, why the student recommends the book, the student's name, and a star rating of the book out of 5 stars (Gambrell, 1996; Johnston, Ivey, & Faulkner, 2011). Students will then have the opportunity to discuss books they have read with other students who have read the same books. Students will organize their book talks by signing up for a 15-minute time slot with their name and the book title on a blank block schedule. Other students may also sign up to join the conversation about the book(s) on the schedule if they have read the book(s) by writing their name underneath the title of the book they wish to discuss, and then meeting to talk about the book during the selected time slot (Certo, Moxley, Reffitt, & Miller, 2010; Heller, 2006; Miller, 2015; Young, 2014). Students will also have the opportunity to write about the book(s) they have read and discussed in their language arts journal after each book discussion in which they participate (Mclaughlin, 2012).

Data will be collected through four different data sources: The Motivation to Read Profile as a pre- and post-test, the Garfield Reading Attitude Survey as a pre- and post-test, individual student interviews as post assessments, and a researcher journal.

GP54

An Analysis of a Stone Artifact Cache from the Shelor Site in Montgomery County North Carolina

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Prehistoric artifact cache discoveries are poorly understood archaeological phenomena. A few such occurrences consisting of groups of stone artifacts buried in forgotten underground pits are known in North Carolina. This research presents the results of an analysis of the accidental discovery of 81 stone artifacts during landscaping activities by a Montgomery County resident. Referred to as the Shelor cache the analysis focused on placing the artifacts in their prehistoric temporal and spatial context.

A typological comparison using existing collections focused on a quantitative analysis of artifact dimensions including length, width, thickness, and weight. A qualitative analysis focused on an analysis of flaking patterns and stone type. The results of these analyses indicates a consistent artifact form with little variation in size and shape that appear to represent a collection of unfinished spear points. Moreover, a visual inspection of the stone texture, groundmass color, and the presence/absence of mineral inclusions suggest the artifacts all appear to be made from a single type of rhyolite that was probably obtained from a nearby stone quarry in the Uwharrie Mountains. Although analyses are not yet complete, tentative results suggest this artifact cache represents a group of stone tools in an early stage of manufacture deposited during the Middle Archaic period (8,900–5,800 BP). The intended purpose of the cache is still unclear. Typically artifact caches are located some distance from known stone sources and were probably intended to supply items for later use where time or materials were in short supply. But the fact that these artifacts appear to be located close to their probable stone source is somewhat unexpected. While it may not be possible to know with certainty the intended purpose of the cache, hypotheses can be developed for future testing. Overall, this research contributes to the existing knowledge of cache discoveries in North Carolina and provides valuable information for future research regarding this rare archaeological phenomenon.

GP55

Rhetorical Analysis of the 2015 Chapel Hill Shootings: Media Portrayals of Victimized Muslims in Western Media

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In this research, I will use orientalism and critical whiteness studies to explore the relationships between race and religion in U.S. media coverage on the individuals involved in the Chapel Hill shootings in February 2015. The current theoretical frame will help exemplify how Islamic ideologies favor specific constructions of race between members of a minority group compared to members of the majority group. The archetypal representations of Islamic persons versus the white majority in Western media are conflicting when the minority is victimized and the dominant group is perpetrated. A rhetorical analysis of news coverage on the Chapel Hill shootings reveals how the media portrays the nature of this incident and the racial groups of the victims and the perpetrator.

GP56

Psychological Toughness, Grit, Physical Fitness, and Physical Activity in ROTC and Non-ROTC Students

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Mental toughness may develop in college students, particularly in Army Reserve Officer Training Corps cadets (AROTC), as they navigate their way through challenging situations. **PURPOSE:** To examine mental toughness, grit, physical activity, and physical fitness (aerobic fitness and muscular strength and endurance) of AROTC and non-AROTC students over the course of the first semester in college. **METHODS:** Undergraduate students were recruited from AROTC (n=8) and the Department of Kinesiology (KINE; n=5). Participants completed the Grit Scale and the Mental, Emotional, and Bodily Toughness Inventory (MeBTough). Aerobic fitness was assessed with a treadmill test. Muscular strength and endurance were assessed with push-ups, modified pull-ups, and plank tests. Moderate-to-vigorous physical activity (MVPA) was measured via accelerometers. All measures were taken at the beginning and end of the first semester. Repeated measures ANOVAs were used to examine changes across the semester for each group (AROTC vs. KINE). Cohen's delta (*ES*) was used to examine the size of changes from pretest to posttest for each group. **RESULTS:** No significant (p>.05) group, time or interaction effects were found for any psychological variable. For the AROTC group, *ES* estimates showed no change (<0.08) in Grit, total MeBTough, or the bodily toughness subscale. A small increase (*ES*=0.24) in mental toughness and a small decrease (*ES*=-0.27) in emotional toughness were observed. For the KINE group, a small to moderate increase in Grit (*ES*=0.37)

and mental toughness (*ES*=0.27) were seen. Moderate to large improvements were seen for the KINE group in total MeBTough (*ES*=0.73), bodily toughness (*ES*=0.87), and emotional toughness (*ES*=0.67). For both groups, no significant or meaningful changes in muscular strength and endurance measures were seen. A small decrease in aerobic fitness (*ES*=-0.30) was noted in the AROTC group, while no change was seen in the KINE group (*ES*=0.03). For MVPA, no significant interaction effect was seen, although both groups showed decreases (*ES*=-1.19) over the course of the semester. **CONCLUSION:** In this sample of AROTC cadets, changes over the first semester in college in Grit, total MeBTough scores, and bodily toughness were small and less than the corresponding changes seen in the KINE group, possibly due to higher pretest values for the AROTC group. No improvements in aerobic fitness, muscular strength and endurance, or physical activity were seen in either group.

GP57

A Social Norming Advocacy Campaign to Reduce High-Risk Drinking Among the East Carolina Student Population: Less Drinking, More Thinking

Walter Ryan

Background: Heavy alcohol use has been well documented among college students, and many students embrace heavy-drinking habits for the first time during their 1st year at university. About 20-25% of college students had drinking problems, or had experienced consequences related to drinking, as well as increased risk of heavy episodic drinking" (El Ansari, Stock, & Mills, 2013). Binge drinking has been cited as the "number one public health problem affecting college students" (Wechsler, et al., 2002). Despite being recognized as a major health problem, and increased national attention given to the issue of binge drinking on college campuses, there has been little or no change in student drinking behavior over the past three decades (Wechsler, et al., 2002).

Campaign Goals and Objectives: The health and social consequence of excessive drinking among college students is significant. The goal of this advocacy campaign is to reduce high-risk drinking among college students at East Carolina University (ECU) by 15% over the next 12 months (primary end-point). Additionally, the data will be analyzed to compare / contrast this cohort to larger study results and establish if local trends are comparable with those reported in the literature (secondary end-point).

Overview: Social norming campaigns, as they relate to college alcohol consumption, work by reframing data that "traditionally highlights the minority of students who are boozing up heavily and presenting it with a focus on the majority who aren't" (Thomas, 2002). At least 30 campuses nationwide have attempted social norming programs to reduce drinking among students (Thomas, 2002). According to studies (Perkins, 2002; Haines, 1996) well-designed norming campaigns can contribute to a reduction in consumption by college students.

Study Design: A total of 100 East Carolina University students will be recruited to participate in pre- and post-intervention surveys about personal alcohol use and perceptions of other students' drinking. Over the course of the campaign study participants will receive campaign messages via a variety of channels. Messages channels will include a blend of media based communication and interpersonal communication. Social Media, such as Twitter, YouTube, and Facebook will feature prominently in message dissemination as will print media in the form of brochures, flyers, and advertisements. Interpersonal communication will focus on working with campus organizations.

GP58

Tuscarora as Trade Middlemen Between Colonists and Interior Piedmont Tribes of North Carolina

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While the role of trade between Native American groups and early European colonists in North Carolina has been documented historically, the archaeological manifestations of this interaction is less well known. As with several other tribes in North Carolina during the early historic period, the Tuscarora are thought to have acted as middlemen receiving trade goods from European colonists and trading them to more distant Native American groups further inland. A handful of historical sources note that the Tuscarora might have been middlemen for the Algonkians along the coast and the Siouan groups in the piedmont areas. The Tuscarora's control over trade helped them maintain power in the region, especially in warfare. Due to the introduction of the fur trade the Tuscarora used their location to their advantage and controlled the trade routes in the area. The most promising fieldwork and analyses of the archaeological record relating to the Tuscarora and trade was conducted by East Carolina University along the Contentnea Creek drainage area in Greene County.

The objective of this project is to test an existing archaeological model identifying archaeological signatures of "middlemen sites" developed from Native American sites in the Piedmont against the archaeological pattern of trade goods recovered from the Fort Neoheroka site of the Tuscarora in Greene County. Some scholars suggest that the Tuscarora were a trading intermediary for

European goods traded to Siouan tribes in the interior piedmont of North Carolina. Patterning in the types and frequencies of trade goods recovered from Fort Neoheroka are compared to patterns in the types and frequencies of trade goods from a known "middleman" Siouan site in the Piedmont. Comparing the archaeological patterns between the two sites will, in part, test the applicability of the trade pattern identified in Siouan Piedmont sites to that of the Tuscarora in the Coastal Plain.

GP59

Intermediate Teacher Perceptions After Implementation of a Hands-on, Integrative Food-based Curriculum

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Standardized testing places pressure on teachers to prioritize core subjects such as mathematics and science instead of nutrition; however, previous research has shown that integrating nutrition education into other subjects may save time and enhance learning. The purpose of this study was to examine fourth-grade teacher perceptions after implementation of a hands-on, Integrative food-based curriculum (Food, Mathematics, and Science Teaching Enhancement Resource (FoodMASTER) Initiative's Intermediate (FMI)). FMI features 24 hands-on, integrated food-based science lessons that are aligned with national mathematics and science standards. Over the 2008-2009 academic year, 17 fourth-grade classrooms in Ohio [9] and North Carolina [8] implemented FMI in their respective classrooms. Teachers completed formative and summative evaluation surveys to assess their perceptions of the food-based lessons during and after implementation of the curriculum. Data was collected and analyzed using quantitative data and qualitative approaches. All teachers reported having an excellent (64.7%) or good (35.3%) experience with FMI. Teachers reported students displayed enthusiasm for food-based learning within the content areas of science (100% most to all of the time), mathematics (70.6% most to all of the time), and nutrition (93.8% most to all of the time). Common barriers to implementation included time, equipment issues, and teacher nutrition knowledge deficit. Alternatively, facilitators included standard alignment, real-life applicable lessons, and introduction to new foods. Utilization of integrative curricula, such as FMI, may be one strategy for promoting nutrition education in the classroom. Future research should investigate methods to decrease identified barriers to support implementation of nutrition concepts in the classroom.

GP60

N-3 polyunsaturated fatty acids incorporate into cardiolipin of cardiac mitochondria in obesity accompanied by increased levels of complex I and V

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The comorbidity of cardiovascular disease with obesity is a growing concern. One potential treatment for cardiovascular disease is the supplementation of n-3 polyunsaturated fatty acids (n-3 PUFAs) in the diet. The use of n-3 PUFAs to treat cardiovascular disease has been studied extensively but with mixed efficacy. We propose that the inconclusive results are due in part to the use of fish oil supplements with varying amounts of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Our lab is studying the functional and mechanistic effects of pure EPA and DHA ethyl esters on cardiac tissue in the context of obesity. For this study, our lab tested the effects of EPA and DHA on cardiac mitochondrial structure and function in obese mice. C57BL/6 mice were fed a lean control, a high fat diet, and high fat diets enriched with either 2% EPA or DHA ethyl esters for 15 weeks. After feeding, we first tested if EPA and DHA incorporated into cardiac membrane phospholipid acyl chains. The results indicated that cardiolipin, the hallmark phospholipid of the mitochondria and key component of oxidative phosphorylation machinery, did take up both EPA and DHA. Mice fed a high fat diet enriched with EPA had a 0.5-fold and 1.6-fold increase in 20:4 and 20:5 acyl chains respectively. With a DHA enriched high fat diet, there was a 1.7-fold increase in 22:6 acyl chains. Along with the significant increases in polyunsaturated acyl chains, the uptake of EPA and DHA also corresponded to decreases in shorter saturated and unsaturated acyl chains. In addition, acyl chain remodeling with EPA and DHA was also seen in other mitochondrial phospholipids including phosphatidylcholine and phosphatidylethanolamine. Next, we discovered that mice fed a high fat diet had reduced mitochondrial protein content including complex I and complex V of oxidative phosphorylation when compared to the lean control mice. This reduction in protein amount was rescued by the addition of EPA or DHA to the diet. Overall, these data indicate that EPA and DHA supplementation alters the structure of cardiac mitochondrial membranes. Also, these membrane changes may affect the function of mitochondrial proteins including the complexes involved in oxidative phosphorylation, which is currently under investigation.

GP61

GLUT4 is not necessary for overload-induced glucose uptake in mouse skeletal muscle

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Glucose transporter (GLUT4) mediates skeletal muscle glucose uptake in response to acute exercise and insulin stimulation; yet, its role in the regulation of glucose uptake in response to chronic stimuli is less clear. Functional overload of skeletal muscle is a chronic stimulation that increases muscle glucose uptake. The glucose transporter(s) that mediate this response is not known. The purpose of this study was to determine whether GLUT4 is necessary for overload-induced glucose uptake in mouse skeletal muscle. Muscle creatine kinase-Cre recombinase mice were bred to GLUT4 loxP mice to produce wild-type (WT)/control (CON; Cre+, LoxP+), muscle specific GLUT4 heterozygous (mGLUT4HET), and muscle specific GLUT4 knockout mice (mGLUT4KO): only female, 11-12 week old, littermates were utilized. To assess the role of GLUT4 in overload-induced muscle glucose uptake WT/CON (n=10), mGLUT4HET (n=6), and mGLUT4KO (n=3) mice underwent unilateral tenotomy of the gastrocnemius and soleus to induce plantaris muscle hypertrophy. After 7 days, muscles were isolated and incubated in [^{3}H]-2-deoxyglucose to assess muscle glucose uptake. Basal glucose uptake was decreased in the mGLUT4HET (33±8%) and mGLUT4KO (80±3%) mice compared to WT/CON mice. Overload increased glucose uptake to the same absolute level in all groups, making the percent change in overload-induced glucose uptake greater in the mGLUT4HET (114±22%) and mGLUT4KO (553±79%) mice compared to WT/CON (50%±14%). GLUT4 is not responsible for overload-induced muscle glucose uptake. To assess whether glucose transporter 1 (GLUT1) could be involved, GLUT1 immunoblots were performed in plantaris muscles from WT mice following 5-days of overload (n=4). GLUT1 protein expression was increased (2.7 fold) in response to functional overload. Collectively, these results demonstrate that GLUT4 is not required for functional overload-induced skeletal muscle glucose uptake and suggest that GLUT1 may be the transporter responsible for this effect.

GP62

Mitochondrial uncoupling-independent increase in muscle respiration likely mediates anti-obesogenic phenotype of phosphatidylethanolamine methyltransferase null mice

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Increased energy expenditure can prevent diet induced obesity. Mice with a whole body knockout for phosphatidylethanolamine methyltransferase (PEMTKO) have elevated metabolic rate and are protected from high-fat diet (HFD)-induced weight gain. However, the site and mechanism behind increased respiration in PEMTKO mice is unknown. We hypothesized that skeletal muscle energy expenditure may be elevated in PEMTKO mice compared to wild type (WT) controls. Consistent with published data, PEMTKO mice were protected from diet-induced obesity and exhibited increased whole-body energy expenditure without changes in food intake or habitual activity. To examine energy expenditure in skeletal muscle, intact flexor digitorum brevis (FDB) muscle fibers were isolated from 10 week HFD-fed WT and PEMTKO mice and cultured for the measurements of respiratory rates. FDB fibers from PEMTKO mice displayed a greater basal oxygen consumption rate compared to WT controls, despite having no difference in oligomycin- or FCCP-induced respiration. Saponin permeabilized gastrocnemius fibers from WT and PEMTKO mice assessed for ATP produced per reduction of oxygen (P/O) did not reveal any differences in respiratory efficiency for ATP production. In summary, elevated resting muscle energy expenditure likely promotes protection from diet-induced obesity in PEMTKO mice. However, mitochondrial energy uncoupling did not explain increased muscle respiration, suggesting that an alternative mechanism promotes increased energy expenditure in skeletal muscle.

GP63

Volumetric Breast Density, Breast Cancer Subtypes and Race

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Mammographic density (MD) is a term used to describe the proportion of radiopaque, fibroglandular/dense tissue on a mammogram. Multiple studies have shown a two-to-six-fold increased risk of breast cancer (BC) in women with the highest measures of MD. Unlike the commonly used subjective visual measures, fully-automated volumetric methods for quantifying breast density have been shown to be reliable and take into account the 3-dimensional nature of breast tissue. BC is classified into several different subtypes which have varying associations with factors such as parity and race. The differences in volumetric breast density (VBD) among BC patients with different subtypes of BC have not been elucidated. We hypothesized that significant differences in VBD and the components that comprise VBD (i.e. fibroglandular volume (FGV) and total breast volume (BV)) occur in triple negative (TNBC) and hormone positive (HPBC) BC patients.

We conducted a retrospective study of breast cancer patients from Eastern North Carolina diagnosed between 2006 and 2013. Age, race, body mass index (BMI), BC subtype and raw mammographic data for the contralateral cancer free breast were collected for all patients. Volpara™(v1.5.12), an FDA-cleared fully automated software was used for estimating FGV, BV and VBD.

Of the 1840 BC patients, 492 had TNBC, while the remaining 1348 had HPBC. Among TNBC patients, 249 were African American (AA) and 237 were White with an average BMI of 33.7 and 28.2 kg/m^2, and average age of 55 and 58, at diagnosis, respectively. In this subgroup, AA had a mean VBD of 7.4±4.3%, FGV of 72.03±35.9 cm^3, and BV of 1180.7±667.6 cm^3 while White patients had a VBD, FGV, and BV of 8.1±5.4%, 58.1±30 cm^3, and 870.3±447.1 cm^3, respectively. Among HPBC patients, 398 were AA and 929 were White with an average BMI of 33.9 and 30.1 kg/m^2, and average age of 59 and 62, at diagnosis, respectively. In this subgroup, AA had a mean VBD of 7.3±4.7%, FGV of 67.3±38.6 cm^3, and BV of 1142.6±705.2 cm^3, while White patients had a VBD, FGV, and BV of 8.9±14.4%, 57.5±35 cm^3, and 863.1±474.5 cm3, respectively.

Overall AA cancer patients have a higher BMI, lower VBD and, higher FGV and BV compared to White patients regardless of BC subtype. TNBC patients were younger and had higher average FGV compared to HPBC patients. Association of volumetric density measures to BC subtypes may differ compared to visual measures. An ongoing case-control study will clarify these associations.

GP64

Novel Prostamide, 15-Deoxy-$\Delta^{12,14}$ Prostamjide J_2, Displays Anti-Melanoma Activity in VIitro and In Vivo

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Melanoma is the most aggressive and deadly form of cutaneous neoplasm in the United States, representing a major clinical challenge. Our lab previously showed that the endocannabinoid, arachidonyl ethanolamide (AEA), induced cell death in non-melanoma skin cancer (NMSC) cells through the cyclooxygenase-2 (COX-2) mediated formation of novel J-series prostamides (PMJs). Our group was the first to chemically synthesize the primary metabolite, 15deoxy, $\Delta^{12,14}$ prostaglandin J_2 – ethanolamide (15d-PMJ_2), which displayed potent and selective cytotoxicity in NMSC cells. As such, we hypothesized that the selective cytotoxicity of 15d-PMJ_2 would be observed in other forms of skin cancer, including melanoma. B16F10 murine melanoma cells and non-tumorigenic Melan-A cells were treated with various concentrations of 15d-PMJ_2 for 24 hours and cell viability was measured using MTS assays. At 5μM, 15d-PMJ_2 decreased viability by 63%, while Melan-A viability was not affected. To verify that cell death was due to apoptosis, the cleavage of caspase-3 and PARP was examined by conducting Western blot analysis. 15d-PMJ_2 markedly increased caspase-3 and PARP cleavage only in B16F10 melanoma cells. Previous studies performed by our group in NMSC indicated that 15d-PMJ_2 was a strong inducer of ER-stress and that this pathway may be required for apoptosis. To investigate the mechanism of 15d-PMJ_2 induced apoptosis in melanoma, we examined ER-stress responses. Melan-A and B16F10 melanoma cells were treated with 5μM 15d-PMJ_2 and evaluated for CHOP and p-PERK expression by Western blot analysis. Melanoma, but not Melan-A cells exhibited a notable increase in CHOP and p-PERK expression when treated with 15d-PMJ_2. To determine the anti-melanoma activity of 15d-PMJ_2 *in vivo*, B16F10 allograft tumors grown in C57/BL6 mice were dosed subcutaneously with 0.5 or 5.0 mg/kg 15d-PMJ_2 for 5 days. Tumors treated with 15d-PMJ_2 exhibited significantly reduced growth and mean weights compared to vehicle and untreated animals. TUNEL analysis of tumor tissues indicated a large presence of necrotic and apoptotic cells in 15d-PMJ_2-treated tumors compared to vehicle and untreated tumors. To determine whether 15d-PMJ_2 induced ER-stress *in vivo*, tumors were assayed for p-PERK and CHOP10 levels by IHC. These markers were elevated in 15d-PMJ_2 treated tumors. Taken together, these findings suggest that the novel prostamide,

15d-PMJ_2, possesses potent and selective anti-melanoma activity *in vitro* and *in vivo*.

GP65

Acyl chain remodeling has a strong influence on the mixing behavior of cardiolipin in model mitochondrial membranes

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Cardiolipin (CL) is a unique phospholipid that is primarily found in mitochondrial membranes. Cardiolipin contains four unsaturated acyl chains and is localized to the inner mitochondrial membrane where it plays an important role in structure and function. A decrease in CL content, remodeling of acyl chains, and/or peroxidation contributes toward mitochondrial dysfunction in heart failure, ischemia-reperfusion injury, and diabetes. However, underlying mechanisms by which changes in CL influence mitochondrial function are unclear. The focus of this study was to determine how specific variations in CL acyl chain composition influence the mixing behavior and packing of heterogeneous mixtures of phospholipids that model the inner mitochondrial membrane using Langmuir monolayers and synthetic unilamellar lipid bilayers. While unsaturated CL species promote a liquid-expanded phase within a Langmuir monolayer that is more elastic, remodeling the acyl chain composition of CL to saturated fatty acids results in a lipid monolayer that prefers the liquid-condensed phase and is less elastic. To further evaluate these findings, differential scanning calorimetry (DSC) was implemented to determine the mixing behavior of CL with other phospholipids. These results show that saturated CL species exhibit poor mixing behavior with other phospholipids, while unsaturated CL species exhibit superior mixing behavior with other phospholipids. Taken together, our results show that remodeling of cardiolipin acyl chains leads to lipid-lipid immiscibility, which has strong implications for protein activity.

GP66

Thermal pain withdrawal reflexes in MEIS1 knockout mice, a possible animal model for Restless Legs Syndrome (RLS)

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Restless Legs Syndrome (RLS) is a chronic sensorimotor disorder characterized by uncomfortable sensation and the urge to move the legs. Symptoms occur most often in the evening or at night and can severely disrupt sleep. Genome-Wide Association studies (GWAS) point to a role of genetic factors surrounding the MEIS1 (MEIS homeobox 1) gene, which plays a role during neural development. RLS patients show a reduced mRNA and protein expression of MEIS1. Currently, the first line of drug therapy for RLS uses dopaminergic agents, but no behavioral data are available that have assessed the effects of these compounds on thermal pain withdrawal latencies as a model for enhanced sensitization or pain in the MEIS1 knockout (MEIS1 KO) animal model.

Here, we compared pain withdrawal latencies in MEIS1 KO mice and their appropriate wild type controls (WT) using a Hargreaves' apparatus (IITC Inc.). Based on our previous studies using the dopamine D3 receptor (D3R) knockout mouse (D3KO), animals were i.p. injected with either sham (control), levodopa (L-dopa, 10 mg/kg), pramipexole (a selective D3R agonist, 0.5 mg/kg), SKF 38393 (D1R agonist, 1 mg/kg), SCH 39166 (D1R antagonist, 0.1 mg/kg), or morphine (2 mg/kg).

Under sham conditions, we did not find any difference in thermal latency responses between WT and MEIS1 KO. L-dopa significantly increased withdrawal reflexes in WT but not MEIS1 KO, while pramipexole increased them in both WT and MEIS KO. In contrast, activation of the D1R did not modify responses in WT or MEIS1 KO, however block of the D1R pathway increased thermal reflexes significantly in MEIS1 KO but not WT. Lastly, morphine had similar effects in WT and MEIS1 KO in increasing withdrawal latencies.

Together, the data from this behavioral study indicate that sensory (thermal) responsiveness in MEIS1 KO animals is largely unaltered over WT controls, suggesting that the MEIS1 gene may only play a minor functional role in the sensory dysfunctions observed in RLS patients.

GP67

Manipulation of glutamatergic neurons in the arcuate nucleus of the mouse hypothalamus is sufficient to alter metabolic regulation

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Background: An obese population is a major driver of health care costs in America. Weight is largely controlled by neurons in the brain, such as hypothalamic pro-opiomelanocortin (POMC) and agouti-related peptide neurons (AgRP). Glutamatergic neurons serve as the primary excitatory neurotransmitter in the central nervous system and are local to POMC and AgRP neurons. This study aims to demonstrate the metabolic effects of gain and loss of function in glutamatergic neurons of the arcuate nucleus (ARC) of the hypothalamus.

Methods: Male Vglut2-ires-cre (cre only expressed on glutamatergic neurons) mice received microinjections with adeno-associated virus. Infection induces cre-dependent expression of designer receptors for activation (n = 8) or inhibition (n = 5) of glutamate neurons. All mice were measured after intraperitoneal (IP) injection (.03mL/10g bodyweight) of saline and again after IP injection (.03mL/10g bodyweight) of the designer drug clozapine-N-oxide. Energy intake at night time and after over-night fasting were recorded. Energy expenditure was measured by indirect calorimetry in TSE Systems chambers using the Comprehensive Lab Animal Monitoring System. Immunofluorescence was conducted to verify accuracy of viral microinjection to the ARC.

Results: Data shows that activation of ARC glutamatergic neurons results in increased fasting induced food intake, significantly reduced night time energy expenditure, and significantly decreased respiratory exchange ratio, whereas, inhibition of ARC glutamatergic neurons significantly reduces night time and fasting induced food intake, and significantly increases respiratory exchange ratio. No changes are observed in weight after chronic inhibition of ARC glutamatergic neurons.

Conclusion: This project demonstrates an anabolic role of glutamatergic neurons in the ARC of the mouse hypothalamus.

GP68

Determination of optical parameters of turbid samples through Monte Carlo simulations

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Visible and near-infrared light of wavelength between 400 and 1600nm can penetrate into turbid samples, including most human soft tissues such as the skin, with larger depth over longer wavelength and therefore offers potential applications for functional imaging and medical monitoring without ionizing radiation hazards. The fundamental challenge in medical application of optical imaging in this wavelength range is to understand the relation between the optical signals measured from a turbid media sample and its characteristic parameters defined with accurate optical models. Light interaction with turbid media can be characterized by four optical parameters of scattering coefficient μ_s, absorption coefficient μ_a, anisotropy factor g (assuming a HG function as the scattering phase function) and refractive index based on the radiative transfer and effective medium theories. To determine these optical parameters, one has to solve an inverse problem which requires accurate measurement of optical signals from a turbid sample and an accurate model of light scattering with appropriate boundary conditions to obtain calculated signals. Monte Carlo (MC) methods have been widely applied as an accurate statistical model to simulate light transport in turbid samples and obtain calculated signals for comparison with the experimental results. In this project we have improved an existing MC code to simulate light transport in a turbid sample and signal detection. Diffuse reflectance Rd and diffuse transmittance Td can be obtained by the MC code as functions of the optical parameters and the results can be used for design of experimental systems for measurement of Rd and Td. Results of Rd and Td calculations and performance evaluation will be presented.

GP69

T cell death-associated gene 8 (TDAG8) stimulates negative selection and acts as a tumor suppressor in hematologic malignancies

Calvin R. Justus, Edward J. Sanderlin, and Li V. Yang

TDAG8 is a proton sensing G-protein coupled receptor that is predominantly expressed in human peripheral blood leukocytes as well as the spleen, thymus, and lymph nodes. TDAG8 was originally reported as a gene that is highly expressed during glucocorticoid induced apoptosis of immature thymocytes. In addition, TDAG8 was recently reported to inhibit c-myc expression, a potent oncogene that drives various blood borne cancers. We used publicly available bioinformatics software and revealed the expression of TDAG8 is reduced in the majority of hematologic malignancies in comparison to normal leukocytes indicative of a tumor suppressor. To investigate the function of TDAG8 in hematologic malignancies we stably restored its expression in U937 lymphoma cells using a MSCV-huTDAG8-IRES-GFP vector (U937/TDAG8) and used the empty vector

MSCV-IRES-GFP (U937/Vector) as a control. To determine the effect TDAG8 expression has on U937 cell proliferation, U937/Parental (GFP-) and U937/TDAG8 (GFP+) or U937/Vector (GFP+) cells were co-cultured for two weeks and cell populations were quantified using FACS. Interestingly, restoring TDAG8 expression stimulated negative selection leading to a reduced population of U937 cells with the MSCV-TDAG8-IRES-GFP construct while the MSCV-IRES-GFP control was not affected. Biochemical analysis confirmed that restoring TDAG8 expression inhibits c-myc and stimulates the cleavage of caspase 9, 7, and 3 indicating reduced cell proliferation and increased apoptosis as potential mechanisms for negative selection. Additionally, restoring TDAG8 expression significantly inhibited primary tumor growth in SCID mice. Immunohistochemistry confirmed that c-myc expression is reduced and cleaved PARP is increased in U937/TDAG8 tumors when compared to the U937/Vector controls demonstrating that a similar mechanism occurs in vivo. In this study we establish that TDAG8 acts as a tumor suppressor in U937 cells by inhibiting c-myc expression and stimulating apoptotic signaling. The bioinformatics data that has been uncovered also suggests that TDAG8 stimulates negative selection in various hematologic malignancies. Revealing TDAG8 as a tumor suppressor is valuable because it presents a new potential therapeutic target for several common forms of leukemia and lymphoma.

GP70

Reactive byproducts of catecholamine metabolism and lipid peroxidation disrupt oxidative phosphorylation efficiency in cardiac mitochondria

Margaret-Ann M. Nelson, Ethan J. Anderson

A pathogenic role for lipid peroxidation byproducts (LPPs) within cardiac mitochondria, most notably the reactive aldehyde 4-hydroxynonenal, has recently been reported by our laboratory using a model of diet-induced obesity/insulin resistance. Monoamine oxidase (MAO), an outer mitochondrial membrane-bound enzyme responsible for catecholamine metabolism, produces a reactive catechol-aldehyde and H_2O_2 upon substrate deamination. Catecholamine metabolism by MAO has been implicated in heart failure via mitochondrial dysfunction. While previous studies have examined LPPs and MAO in mitochondria individually, the combined effects of these reactive byproducts on mitochondrial oxidative phosphorylation (OxPhos) are unknown. In this study, we examined the effects of catecholamine metabolism via MAO within mice deficient for glutathione peroxidase 4 ($GPx4^{+/-}$), a lipid peroxide-specific antioxidant enzyme that we recently observed to be reduced in human heart with aging and diabetes. Simultaneous ATP production and O_2 consumption were measured in cardiac mitochondria isolated from 8-10 week old $GPx4^{+/-}$ (n = 6) and wild-type (WT) (n=4) mice in the presence of 25uM DA or 75uM NE. Both DA and NE significantly decreased ATP production in $GPx4^{+/-}$ mice by 15% and 13%, respectively ($p<0.05$). Furthermore, the ATP/O ratio, an indicator of OxPhos efficiency, was also reduced in $GPx4^{+/-}$ mice in the presence of DA and NE ($p<0.02$, $p<0.0057$). These catecholamine-dependent disruptions in OxPhos were mitigated by MAO inhibitors. Catecholamine-dependent decreases in ATP production or ATP/O ratio were more moderate and not significant in mitochondria isolated from WT mice ($p>0.5$). These preliminary findings provide evidence that MAO-derived reactive byproducts disrupt cardiac mitochondrial OxPhos in mitochondria deficient in GPx4, which has implications for cardiomyopathy and metabolic disorders in aged and diabetic patient populations.

GP71

Deletion of LPCAT3 Promotes Enhanced Insulin Signaling in Skeletal Muscle

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Aberrant lipid metabolism has been linked to skeletal muscle insulin resistance. The exact identity of the lipid species that promote skeletal muscle insulin resistance among the human population remains unclear. In this study we utilized primary muscle cells isolated from lean-insulin sensitive (LN) or obese insulin-resistant (OB) individuals to characterize differences in the muscle lipidome free of contaminating cell types. OB muscles contained lower levels of various species of lysophospholipids (lyso-PLs) compared to LN, a finding that has never been previously described. RNAseq experiments in the same set of samples identified three genes involved in lyso-PL metabolism (PPAP2A, LPIN3, and LPCAT3) to have greater expression in OB vs. LN. Strikingly, lentivirus-mediated deletion of LPCAT3 in C2C12 myotubes resulted in increased insulin signaling (phosphorylation of IR, Akt, AS160) in the absence of, and at various concentrations of insulin. LPCAT3 deletion had no effect on cell morphology, myotube differentiation, fiber type, or abundance of enzymes of the electron transport chain. Future studies should focus on the cellular mechanisms by which LPCAT3 affects IR phosphorylation.

GP72

Phosphatidylethanolamine N-methyltransferase is required for respiratory uncoupling in brown adipose tissue

Jordan M. Johnson, Anthony R. P. Verkerke, Timothy D. Heden, Edward J. Wentzler, Tara M. Narowski, Chien-Te Lin, Katsuhiko Funai

Phospholipids form the lipid bilayer of cellular and organelle membranes. Changes in composition of membrane phospholipids are capable of altering the activity of membrane bound proteins. Mice lacking phosphatidylethanolamine N-methyltranferase (PEMT), which forms phosphatidylcholine from phosphatidylethanolamine, are resistant to diet-induced obesity and exhibit increased energy expenditure. The purpose of this study was to determine if ablation of PEMT would increase the oxidative capacity and energy expenditure of brown adipose tissue (BAT). BAT is an attractive potential target for treating obesity because of its ability to dissipate energy as heat through uncoupling protein 1 (UCP1). We therefore assessed the abundance of UCP1 and other mitochondrial enzymes in BAT from wild type or PEMTKO mice following a 10-week high fat diet. Surprisingly, mice lacking PEMT exhibited a 93% reduction in UCP1 protein content ($p < 0.001$) despite a lack of difference in mRNA expression. Additionally, abundance of complexes I, III, and IV of the electron transport system were reduced by 62%, 34%, and 71% respectively in PEMTKO mice. However, ATP synthase expression was increased by 57% ($p < 0.001$). In isolated mitochondria, absence of PEMT led to a reduction of oxygen consumption without a change in ATP production, indicating decreased proton uncoupling. No difference was observed in mitochondrial density between the groups. Analysis of the mitochondrial phospholipid composition by thin layer chromatography revealed a 43% reduction in cardiolipin ($p < 0.01$). Others have demonstrated that cardiolipin is important in maintaining UCP1 stability and activity, suggesting that PEMT deletion may promote UCP1 membrane instability by reducing mitochondrial cardiolipin content. In conclusion, ablation of PEMT lowers mitochondrial cardiolipin, leading to a loss of UCP1 protein, mitochondrial uncoupling and energy expenditure in BAT. These results demonstrate that PEMT plays a previously unappreciated, but important role in BAT mitochondrial function.

GP73

Characterization of *ftz-f1* in *Drosophila* oogenesis

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Oogenesis is a complex developmental process that is critical for an organism's survival. Cells within the reproductive tissue must coordinate to produce a viable, mature gamete. The *Drosophila melanogaster* (fruit fly) ovary provides a unique model system to study this complex biological process within living tissue. The adult ovary contains well-characterized populations of stem cells, including germline stem cells (GSCs) that are tightly regulated by local signals from their niche, intrinsic cues, and long range signals, and ultimately give rise to oocytes and nurse cells. Each follicle must undergo defined phases of development in order to produce a mature egg. The steroid hormone ecdysone has been widely characterized in oogenesis and is required for GSC fate and function, differentiation of stem cell progeny, and follicle survival and maturation. Despite the therapeutic relevance of exploring this level of regulation, the precise signaling pathways have not been clearly elucidated. When the ecdysone ligand binds to its nuclear receptor, it initiates a cascade of transcription factor activation that enables a cell's biological response to the steroid hormone. Nuclear receptor *fushi tarazu transcription factor 1* (*ftz-f1*) acts in concert with ecdysone signaling during insect growth and metamorphosis, and promotes somatic stem cell maintenance in the *adult* testis, but its role and impact on oogenesis is poorly studied. Since *ftz-f1* is evolutionarily highly conserved with members of the human NR5A family, further study of the cellular mechanisms controlled by *ftz-f1* may provide insight into the basic mechanisms of nuclear receptor interactions in more complex organisms. Our preliminary data indicates that loss of *ftz-f1* in ovarian cells leads to complex ovarian phenotypes. Interestingly, *ftz-f1* mutant ovarian cells display characteristics associated with defective ecdysone signaling, including poor stem cell maintenance and impaired maturation and survival of developing follicles. As *ftz-f1* loss-of-function phenotypes appear to recapitulate ecdysone loss-of-function mutants, our data suggest that *ftz-f1* may permit ovarian cells to respond appropriately to ecdysone signaling. Given the similarity between *ftz-f1* and human nuclear hormone receptors, our data may indicate that steroid hormone competence in human stem cells is regulated in an equivalent manner.

GP74

THC Treatment During Adulthood Reduces Persistent Effects of Chronic Mild Stress on Zebra Finch Song Behavior

Tessa L. Holland, Ken Soderstrom

Zebra finches learn a complex song during a developmental sensitive period through a process of sensorimotor integration and auditory feedback, which shares features with language development in humans. Chronic CB_1 receptor agonist treatment during this developmental period persistently alters zebra finch

song quality, suggesting that exogenous CB_1 receptor agonist treatment alters normal late postnatal brain development. Presently, we are studying the persistent effects of psychological stress on song development and adult song. An acute stressor activates the hypothalamic-pituitary-adrenal (HPA) axis, causing an increase in stress hormone corticosterone. Endocannabinoids mediate the inhibition of the HPA axis, following cessation of the stressor, via negative feedback. We hypothesize that psychological stress, by endogenous CB_1 receptor agonism in the HPA axis, may exert persistent effects on song learning, similar to exogenous drug treatment.

Developing (50 days old) and adult (>100 days old) male zebra finches were administered vehicle or THC (3 mg/kg) treatments and concurrent no stress or stress treatments (n=4) daily for 25 days. Injections occurred at 11 AM, and stress treatments were administered at 2-7 PM using a chronic mild unpredictable stress paradigm. 2-3 stressors were randomly chosen per day, and possible stressors included restraint stress (30 minutes), white noise (1 hour), rubber snake (1 hour), bright light (1 hour), or food and water deprivation (1 hour). Following the 25 day treatment period, zebra finches received no treatment for >25 days, until developing animals reached maturation. Zebra finches were recorded for 24 hours, and brains were collected for Golgi-Cox and immunohistochemistry experiments.

In preliminary data, zebra finches treated with Vehicle + Stress during adulthood showed increased singing output compared to the Vehicle + No stress group ($p<0.05$, two-way ANOVA, Bonferroni posttest), which may reflect social significance of song in stress. THC co-treatment with stress treatments prevented this effect ($p<0.05$, two-way ANOVA, Bonferroni posttest). Future analyses will compare differences between developmental and adult treatments on song activity, song quality, and dendritic spine density in song regions, and results may have implications for the role of psychological stress and drug abuse in adolescent brain development.

GP75

Hyaluronan-cell interactions are essential for adipocyte differentiation of 3T3-L1 cells

Samantha Sellers and Cheryl Knudson

Abstract withdrawn

GP76

Simulation study of diffraction Imaging for single cell assay with realistic optical cell model

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Polarization diffraction imaging (p-DI) provides two-dimensional images whose textures can be analyzed to characterize 3D morphological features and molecular information of biological cells without the need to stain. To quantify the correlations between textures of p-DI data and cellular features, we have investigated p-DI simulation with realistic 3D structures of cells and storing the simulated images in a p-DI database. The purpose of this research project is to simulate and store a large amount of p-DI data in order to identify and compare differences in morphological features among different cell types for future applications such as diagnosis of circulating tumor cells for early diagnosis of cancer. We have integrated several software packages developed in our lab on reconstruction of 3D cell structures from confocal image stacks, modeling of light scattering by single cells and optical ray tracing to simulate the optical imaging system in acquisition of p-DI data. Stored p-DI data will include images simulated from virtually reconstructed optical cell models created from confocal microscope image stacks of cells. The p-DI database will provide a training data set for development of future computer algorithms to examine and classify cells based on correlations between p-DI textures and 3D features of the imaged cells.

GP77

Identifying Low Frequency Intracellular Calcium Signals: An Image Processing Application

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Biomedical measurements are observations of physiological activities of orgnisms that can range from single cells to whole organ images. These measurements contain useful information to bridge scientific knowledge gaps. Physiological measurements however are often contaminated by measurement noise or by subsystem interference, making direct analysis a challenge. Biomedical signal & image processing applies

mathematical-based algorithms to extract significant information from biomedical signals. This study applies power spectrum and cross-correlation MATLAB-based algorithms for the detection of intracellular calcium signals in co-cultured neonatal rat heart cells and a rat clonal liver derived stem cell (WB F344 cells). *In vitro* studies on stem cell differentiation in a cardiac microenvironment, suggest that cytosolic communication between cardiac and progenitor cells results in calcium-induced transcription of cardiac specific genes. This can result in a cardiac phenotype in the WB F344 cells. Yet, this mechanism is not fully understood because of weak calcium signals with low signal-to-noise ratio. Calcium signals were extracted from pre-recorded confocal image scans of co-cultured cardiomyocytes and WB F344 cells from day 1 through day 9. Signals were pre-processed using a low-pass Butterworth filter to attenuate high frequency component. Frequency domain power spectrum was applied to the signals to determine calcium activity. The power spectrum reveals the most dominant frequencies present in a signal irrespective of noise levels. To determine the similarity between calcium signals acquired from myocytes and stem cells and any time lag differences, a time-domain cross-correlation analysis was performed. Power spectram resuslts demonstrate sensitivity of the MATLAB-based algorithm in detecting calcium peaks in neonatal rat heart cells. So far, no calcium peaks were detected in WB F344 cells from day 1 to day 9 in co-culture. Time-domain cross correlation analysis confirmed positive peaks between both signals. This study suggests that the MATLAB-based algorithm can detect calcium signals in the presence of high frequency noise. It is hypothesized that WB F344 cells may not have a fully developed mechanism for cycling calcium at these early time points. Future work will determine the robustness of the developed algorithm in detecting lower calcium cycling frequencies in WB F344 cells and other progenitor cells in co-culture systems.

GP78

Poly(ethylene Oxide)/β-Lactoglobulin Nanofibers: Chemical Crosslinking Assessment for Applications in Tissue Engineering

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Introduction: Electrospinning has been shown to be an efficient and cost effective method for generating nanofibers from polymer solutions. A 2014 study reported the feasibility of using poly(ethylene oxide) (PEO) and β-lactogobulin (BLG) to produce electrospun nanofibers and used heat treatment as a successful method for crosslinking; however, this process is time extensive. A 2011 study reported sodium trimetaphosphate (STMP) to effectively crosslink pullalan/dextran nanofibers during electrospinning. The goal of this study was to investigate STMP as an alternative crosslinking method for producing PEO/BLG nanofibrous scaffolds for tissue engineering. Successful chemical crosslinking by STMP would substantially reduce the time required to produce defect-free PEO/BLG nanofibers.

Materials & Methods: PEO is a water soluble, synthetic and biodegradable polymer used in biomedical and food applications. BLG is a globular protein, whose main constituent in whey protein. BLG possess prophylactic properties and may offer specific health benefits such as antibacterial, antiviral and anticarcinogenic effects. STMP is a water soluble, crystalline cyclic polyphosphate inorganic salt and it is use food-grade phosphorylated starches preparation**.** 8% PEO and 12% BLG (w/v) aqueous solutions were prepared. STMP was added to PEO/BLG solutions at 2, 4, 6 and 8% (w/v) concentration. 10% NaOH (aq) (v/w) was added to the PEO/BLG/STMP solution at a 1:20 volume ratio to activate crosslinking prior to electrospinning. Rheological and conductivity measurements ($n \geq 3$) for all STMP concentration solutions were recorded and averaged. Confocal laser scanning microscopy images were used to assess fiber morphology and topography.

Results and Discussion: Adding STMP to PEO/BLG solutions required higher electrospinning voltage to achieve fiber formation. Increasing STMP concentration decreased maximum solution viscosity and increased solution conductivity. Beaded nanofibers were observed in all electrospun fibers for all STMP concentration. Based on these results, we are investigating additional STMP concentrations methods to enhance crosslinking to produce defect-free nanofibers.

Conclusions: Using STMP for chemical crosslinking may reduce the time required to produce PEO/BLG nanofibrous scaffolds. New studies will focus on optimizing STMP concentrations necessary to produce defect-free nanofiber scaffold for use in tissue engineered products.

GP79

Hrb27C is required for *Drosophila* female germline stem cell maintenance

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Stem cells maintain an undifferentiated fate while creating new

daughters destined for differentiation. Effective use of stem cells as tools for clinical therapy requires a detailed understanding of the molecular mechanisms that control their fate *in vivo*. A variety of molecular signals influence stem cell fate, including local signals from adjacent cells and long-range hormonal signals; however, little is known about how hormones promote the undifferentiated fate. Germline stem cells (GSCs) in the Drosophila melanogaster ovary are the ideal model to study the mechanisms of stem cell maintenance on a per-cell basis *in vivo*. GSCs are known to be directly regulated by the steroid hormone ecdysone, which is structurally and functionally similar to human sex hormones. Using a forward genetic screen of two previously published data sets, potential downstream targets of ecdysone signaling were identified. One gene that was identified to have GSC loss was *Heterogeneous nuclear ribonucleoprotein at 27C*(*Hrb27C). Hrb27C* is a member of the heterogeneous nuclear ribonucleoprotein (hnRNP) family of RNA binding proteins that aid in the localization, maturation, and translation of newly formed RNAs. To gain further insight into the function of *Hrb27C* in*Drosophila* oogenesis, we are investigating whether and how *Hrb27C* regulates GSC maintenance. Using *Flippase/Flippase Recognition Target (Flp/FRT)*- mediated recombination, we created homozygous *Hrb27C* mutant GSCs and used molecular markers to track their fate. Our results show that *Hrb27C* mutants display greater GSC loss than their respective controls, indicating that *Hrb27C* is required for GSC maintenance. Future experiments will be aimed at determining the cause of GSC loss and determining if other hnRNPs work independently or in complex with *Hrb27C* to control GSC maintenance. This will allow a better understanding of the function of *Hrb27C* and the hnRNP family in the regulation of stem cell fate, and provide insight into the mechanisms by which steroid hormones maintain stem cell fate in adults *in vivo*.

GP80

An evidence based update on dysphagia in individuals with Parkinson's disease

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The objective of this presentation is to provide an evidence-based review of breakdown in swallowing, also known as dysphagia, in individuals with Parkinsonian disorders and the status of the available treatment methods for dysphagia in individuals with Parkinson's disease. This presentation is a product of an ongoing thesis project relating to the development of efficacious treatment method for oropharyngeal dysphagia in individuals with Parkinson's disease. Swallowing is a complex sensory-motor act involving neurophysiological inputs at various levels. Several physiological aspects related to movement in the oral, pharyngeal and the esophageal areas are involved. While it is a known and reported fact that Parkinson's disease leads to impairments in motor control and coordination, the understanding of the specifics of neural changes in relation to impairments in oro-pharyngeal motor control for swallowing remains to be understood. We reviewed articles in relation to general motor control in swallowing functions and the neurobiological impairments in Parkinson's disease and propose a hypothesis of how the loss of inhibitory motor control in Parkinson's disease could potentially be related to impairments in swallowing functions. The potential of a treatment method, the Lee Silverman Voice treatment method which is traditionally used to treat voice impairments in such patients to improve swallowing related functions is discussed. Furthermore, we also propose hypotheses concerning changes in neural connectivity as a result of treatment methods for dysphagia in patients with Parkinson's disease.

GP81

Characterizing the role of *Cul-5* in follicle encapsulation during *Drosophila* oogenesis

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In mammalian and *Drosophila melanogaster* ovaries, oocytes are surrounded by somatic follicle cells, which produce a variety of factors necessary for proper oocyte growth and development. Proper encapsulation of the oocyte by somatic cells is therefore essential for producing an egg that is ready for fertilization and deposition. Many signaling pathways have been linked to the encapsulation process; however, it is still not fully understood. Cullin Ring Ligases (CRLs) have been shown to associate with several diverse signaling pathways, including those that are known to regulate oogenesis. Each CRL is composed of a scaffolding protein from the Cullin family, and a RING-domain containing protein that facilitates recruitment of ubiquitin ligases. Several Cullins have been identified, each possessing a similar protein structure but with variable binding affinity. In *Drosophila*, several *Cul-5* loss-of-function alleles have phenotypes implicated in the development of the egg chamber, resulting in early follicle death and inviable offspring; however, the molecular mechanisms have not been described. We are testing the functionality of each component of the Cul-5-containing CRL on each cell population involved in the follicle encapsulation process. Our preliminary results suggest that Cul-5-containing CRLs are primarily required in developing follicle cells for proper encapsulation. Loss of either *Cul-5* or the RING protein *Roc-2b* results in fused follicles,

ruptured follicular epithelium, and improper cyst encapsulation. Our studies also suggest that *Cul-5* may mediate signaling between the follicle cells and the underlying cyst. We are currently testing whether altered JAK/STAT, Notch/Delta, or Wnt signaling, known to regulate cyst encapsulation, are responsible for these phenotypes. Further progress towards fully elucidating the encapsulation process may lead towards a better understanding and treatment of infertility.

GP82

Use of Electroencephalographic Technology to Correlate Brain Activity and Blood Glucose Levels

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The conventional method of monitoring blood glucose is through the use of finger stick testing. The lancing procedure associated with glucose monitors is often cited by people who self-monitor to be painful, and one of the many reasons monitoring is not performed as often it should be. This study examines a potential non-invasive method of glucose monitoring that correlates brain activity with blood glucose levels (BGLs). The goal is to build a predictive computer model to monitor a participant's blood glucose level through brain activity.

The materials used in this study are the Emotiv EPOC (a 14-lead EEG headset), Freestyle Freedom Lite (glucose monitors), non-diabetic volunteers, apple juice, and MATLAB. Each participant wears the Emotiv EPOC for a one-hour recording session. During the recording session each participant uses a blood glucose monitor to check their BGL four times. Monitoring of BGL is performed once at the beginning of testing, 30 minutes into testing, 45 minutes into testing, and at the conclusion of the 60-minute test period. In order to increase the participant's BGL the participant drinks apple juice, containing 35 grams of carbohydrates, 15 minutes into the recording. Using MATLAB, a polynomial curve is fit to the collected glucose data. The EEG data is filtered through a median and bandpass filter, converted to frequency domain, and divided into the 5 frequency bands associated with brain activity. The curve fit to the collected BGL data is then interpolated to estimate each participant's BGL every 16 seconds. The EEG data is parsed into 16-second windows and used to train an artificial neural network (ANN). The window then moves forward by 50%, resulting in 8 seconds of new data, and 8 seconds of overlap to fully train the network. Current data showcases the occipital channels, having an R value greater than 0.70, to be the most promising for developing an ANN.

GP83

Using MRI to investigate the superior pharyngeal constrictor muscle among racial groups

Ashley Ritter, Lakshmi Kollara, Leigh Ann Pfeiffer, Dr. Jamie Perry

The purpose of this study is to provide preliminary data on the superior pharyngeal constrictor (SPC) muscle and the effects on race in individuals using MRI. Studies examined the velopharyngeal muscle, including the SPC, using dissection (Barsoumian, Kuehn, Moon, & Canady, 2009; Mehendale, 2004), histology (Kuehn & Kahane, 1990), electromyography (Kuehn & Moon, 1994), and muscle biopsy during surgery (Lindman, Paulin, & Stål, 2001). However, these are destructive and invasive methods for assessing muscle tissue and function. Magnetic resonance imaging (MRI) has been demonstrated as a useful tool for imaging due to its ability to visualize the muscles, *in vivo,* something no other imaging technique has accomplished three-dimensionally*in vivo*. The SPC muscle is responsible for posterior and lateral pharyngeal wall movement during velopharyngeal function. Abnormalities of this structure may result in hypernasal speech. It is important for respiration, swallowing, and velopharyngeal valving (Kuna, 2000). Superior pharyngeal constrictor muscle thickness has been examined in individuals in velocardiofacial syndrome (VCFS) to determine the presence of pharyngeal hypotonia (Zim et al., 2003). Results indicated the thickness of SPC muscle is significantly less in subjects with VCFS than without VCFS. The purpose of this study is to provide preliminary data on the SPC muscle and the effects on race in adult individuals using MRI. In accordance with the IRB, 20 healthy subjects between 19 and 32 years of age (mean age 23.3 years +/- SD 4.1 years) were recruited to participate in the study. Measurements on the MRI images included: SPC muscle thickness, velar length, velar thickness, velar knee to PPW, PNS-PPW, and VP ratio. The mean SPC muscle thickness (mean= 3.69mm), velar muscle length (mean=38.14mm), and velar thickness (mean= 11.6 mm) in the present study are similar to previously reported investigations (Zim et al., 2003; Perry et al., 2014.) Preliminary results are being reported at present. Data from this study can be added to the body of literature regarding the velopharyngeal anatomy. It may aid in tailoring patient specific surgery and decrease the need for secondary surgeries. There is limited research regarding the SPC muscle and even less data concerning its variations between races. It is important for professionals to understand normal anatomy of a structure specific in each race before they can treat abnormalities in all populations.

GP84

Plasma Norepinephrine and Dopamine Levels are Independent Predictors of Risk for Atrial Fibrillation following Cardiac Surgery

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Postoperative atrial fibrillation (POAF) remains the most common (~30% of patients) and costly complication following cardiac surgery, although its etiology remains obscure. In a previous study, we established that patients who experience POAF following cardiac surgery have significantly higher monoamine oxidase (MAO) activity in their right atrium, compared with patients who remain in sinus rhythm. Since MAO is the primary enzyme responsible for catecholamine metabolism, we tested the hypothesis that plasma catecholamines norepinephrine (NE), dopamine (DA), and epinephrine (Epi), along with plasma MAO-B, would also be associated with an increased risk of POAF. A total of 324 patients undergoing cardiac surgery at East Carolina Heart Institute were prospectively enrolled from July 2014 through December 2015. Blood samples were obtained preoperatively, prior to the patients receiving anesthesia. Plasma NE, DA, Epi and MAO-B were measured using ELISA method. Poisson regression analysis was performed on quartiles of these variables, using POAF as the outcome variable. All 3 catecholamines were significantly associated with POAF in univariable analysis, while MAO-B was not. Interestingly, in multivariable analysis when adjusting for history of heart failure, arrhythmia, and additional co-morbidities, quartile 4 of plasma NE and DA was independently associated with POAF with relative risk (RR) and 95% confidence intervals (CI) of 4.0 (1.80-5.0) ($p<0.0001$). These findings suggest that preoperative levels of plasma NE and DA may have clinical utility as predictive markers for POAF, potentially allowing for preventative therapies in high-risk patients. This would lead to decreased hospital length of stay and associated healthcare costs, in addition to improved patient outcomes. Further studies are needed to validate their utility as predictive markers, and to better understand their mechanisms in arrhythmogenesis.

GP85

Social status-dependent modulation of dopamine of an identified brain circuit

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Stressors induce rapid physiological changes that affect both peripheral and central body systems. Chronic stress causes an elongated state of these physiological changes, which is detrimental to the health of the organism. One specific form of chronic stress is social interactions that lead to hierarchy formation. Zebrafish form social hierarchies that consist of either socially dominant or subordinate fish. We have observed that once a social hierarchy has been established, behavior patterns and displays between males reflect their social standing. The objective of this project is to determine the effect of social stress on dopaminergic modulation of an identified brain circuit. When startled, zebrafish produce a stereotyped escape response, C-start escape, mediated by the activation of the Mauthner command neurons, which innervate spinal motor neurons. To test escape behavior, we used bath electrodes to record far-field potentials of fish in a chamber in response to auditory pulses of increasing intensity (70-105 decibels). We observed that socially subordinate fish have a lower threshold for producing the Mauthner escape when compared to both dominant and communal control fish. This result suggests that chronic social stress may influence underlying neural signaling responsible for this escape behavior. To better understand the neural bases of the behavioral observations, we are testing whether social stress has an effect on dopaminergic availability. Through application of L-DOPA and dopamine agonists and antagonists, we have found that dopamine's effect on the Mauthner escape circuit is social status-dependent. Gaining a better understanding of how chronic social stress influences the dopaminergic pathway will aid in the possibility of prevention and treatment of disorders and diseases caused by a modification of natural dopaminergic function.

GP86

Study of Metabolic and Hypothalamic Neuronal Changes in 3xTg Alzheimer Mice Model with an Early Exercise Treatment

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Alzheimer disease (AD) is a neurodegenerative disease associated

with a variety of comorbidities and health risks including metabolic changes and neuronal degradation. Neuronal degradation is especially prevalent in the prefrontal cortex and hippocampus, areas associated with memory and decision making abilities. However, little is known about the effects of AD on the hypothalamus, a key area of metabolic regulation. Studies have emerged within the last decade supporting the idea that AD is highly associated with metabolic dysfunction. By using a genetically modified animal model of Alzheimer disease, we have observed that the triple transgenic AD mouse model (3xTg AD) have significantly increased oxygen consumption, respiratory exchange ratio, and decreased locomotion activity as early as 12 weeks of age, which is before reported AD related symptoms occur, indicating that there is a metabolic imbalance in the 3xTg AD model. Furthermore, there is a significant decrease in certain hypothalamic neuronal populations, such as TH (Tyrosine hydroxylase) expression neurons and POMC (Proopiomelanocortin) expression neurons in the 3xTg AD model starting as early as 12 weeks of age. The findings suggest that hypothalamic neuronal degeneration might be associated with metabolic dysfunction in the early stages of 3xTg AD model. Since early metabolic changes can be seen prior to the development of AD, it might serve as an avenue of exploration into early detection and treatment. It is unclear whether an early exercise intervention, before the onset of AD, can delay or ameliorate the disease by correcting the metabolic profiles that occur simultaneously with degeneration of the central nervous system in the 3xTg AD model mouse. By utilizing the TSE Metabolic Calorimetry System, we will study the effects of an early exercise training intervention on oxygen consumption, respiratory exchange, and other metabolic markers of AD in the 3xTg AD model.

GP87

Examining Unequal Enrollment and Use of Patient Portal

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A patient portal is a secure website through which patients can access personal health information in their Electronic Medical Record (EMR) and typically make use of communication, self-management, and administrative functionalities. As one of the requirements in the CMS Meaningful Use program, patient portals that are being implemented in the medical field to engage patients to access their health data and manage their own health. The code name for the Patient Portal included in this study is called MyChart. The purpose of this study is to determine whether there are disparities in the enrollment and use of a patient portal (MyChart) in an academic primary care center serving a largely low-income patients in eastern North Carolina. This is a retrospective study that examines enrollment and use of MyChart among the patient population. Data analysis will be performed on information extracted from the Electronic Health Records (EHRs). Specifically, Chi-square tests will be used to examine the differences in patient portal enrollment and use by patient demographic (Race, Insurance Status, Gender, Age) and health characteristics. Logistic regression analysis will be performed on the patient demographic and health characteristics to determine if there is an independent association between these variables and the enrollment and use of patient portals. At completion, this study will be able to demonstrate whether or not there is a disparity in enrollment and use of patient portals. This study will provide the necessary background information for future research that will be performing interventions using the identified target population.

GP88

The Relationships Between Physical Capacity and Biomechanical Plasticity with Age During Level and Incline Walking

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Aging induces biomechanical gait adaptations including decreased ankle torque and power and increased hip torque and power during the support phase of walking. This distal-to-proximal shift in joint contributions to level walking has been termed biomechanical plasticity. The magnitude of this biomechanical plasticity appears to increase in more difficult tasks, such as ascending inclines, and in low-functioning elderly adults. We are unable to find, however, any systematic investigations of the relationships between age-induced biomechanical plasticity and physical capacity or task difficulty. We propose such analyses will provide a novel and precise mathematical assessment of the amount of biomechanical adaptation associated with reduced physical capacity in elderly adults.

Based on previous research, we expect that as physical capacity decreases, biomechanical plasticity will become more pronounced. Further, biomechanical plasticity will become

even more pronounced during the more difficult task of incline walking. The purpose of this study is to examine the relationships between physical capacity and biomechanical plasticity with age during level and incline walking.

30 elderly adults (70-85 years old) will be recruited to partake in this study. On an initial visit participants will sign informed consent, complete the Short Form Health Survey (SF-36) to determine physical capacity, become familiarized with the laboratory set up and study protocol, and determine each participant's self-selected gait speed. On a second visit, participants will undergo gait analysis over a 25-meter level walkway and an incline ramp (3.2-meters long; 10 degree grade) at both their self-selected and controlled (1.3 m/s ± 5% for level; 1.2 m/s ± 5% for incline) walking speeds. Motion data will be captured using an 8-camera motion capture system and ground reaction force data will be collected using an embedded force platform for level trials and a portable force platform placed in the ramp for incline trials. Joint torques, powers, and work at the hip, knee, and ankle of the right leg will be analyzed. Biomechanical plasticity will be quantified as the ratio of positive work done at the hip to ankle joint. Separate regression analyses between SF-36 scores and biomechanical plasticity ratios for level and incline walking ($p<0.05$) will be used to test our hypotheses.

GP89

County Health Rankings in North Carolina: A comparison between 2010 and 2015

Alexandria Baker

Background: The County Health Rankings and Roadmaps (CHR) was created to monitor the health status of counties within every state. The CHR intended to raise awareness about population health and how the environment impacts population health. It was first released in 2010.

Objective: The objective of this project was to assess the County Health Rankings data for the 100 counties in North Carolina to determine the characteristics of counties that have made improvements in health outcome and health factor rankings from 2010 to 2015.

Methods: Data from the 2010 and 2015 CHR were used in this project. Chi-square tests were used to compare characteristics of counties by improvement status (in health outcome and health factor rankings) by geographical location (East, Piedmont, West), governance structure (single county vs. multicounty), and rurality (rural vs. urban). Health outcomes include length of life and quality of life. Health factors include health behaviors, clinical care, social and economic factors, and physical environment. Improvement in these two ranking categories was determined by subtracting the rank in 2010 from the rank in 2015. If the difference was a negative number, the county was classified as ""improved"". Otherwise it was ""not improved"". SPSS was used to analyze the data.

Results: From 2010 to 2015, 44.0% of the counties improved in outcome rankings and 45.0% improved in factor rankings. As for the outcomes rankings, rural counties were more likely to improve (46.3% vs. 41.3%) than urban counties. Counties in the eastern region of North Carolina were more likely to improve (53.7% vs. 32.4% and 45.8%) than in the piedmont or western regions. Counties with a multi-county governance structure were more likely to improve (61.9% vs.39.2%) than in single counties structures. As for the factor rankings, rural counties were more likely to improve (46.3% vs. 43.5%). Counties in the eastern region of the state were also more likely to improve (51.2% vs. 31.4% and 45.8%). The counties with a multicounty governance structure were more likely to improve (53.4% vs. 43.0%).

Conclusion: Less than half of the counties made improvements in outcome rankings and factor rankings from 2010 to 2015. Counties with a multicounty governance structure, in the eastern region of the state, or in rural areas, were more likely to make improvements in rankings.

GP90

The Optimal Age CPR Education Can Be Implemented in School Curriculum: A Systematic Review

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Despite improved cardiovascular illness prevention, cardiac arrest remains a significant public health problem and a leading cause of death in the United States and many parts of the world. Cardiopulmonary Resuscitation (CPR) is a lifesaving technique preformed when someone's breathing or heartbeat has stopped. A major obstacle to reducing mortality is lack of bystander action. Children are not often thought to be knowledgeable and capable of performing CPR; however, with proper instruction and practice, it has been proposed children can administer CPR effectively. Studies suggest a variety of ages for capability because conclusions are drawn from varying study designs and an assortment of interventions. This study examines the question at what age/grade are children cognitively and physically proficient to correctly perform CPR. A systematic literature review using the Joanna Briggs Institute approach will review all literature published on CPR education and children. A systematic

review is the appropriate approach because there is no universal measurement to assess a child's cognitive and physical capabilities to perform CPR.

Studies included for review contain quantitative measurement of participant's cognitive or physical ability to perform CPR and suggest an age or grade that proper CPR technique is successfully performed. Searches for literature are conducted in CINAHL, PubMed Medline, Ovid Medine, and PsycINFO online reference databases. A tabulation of the summary data compares studies with respect to: number of participants, intervention type, outcomes, and inferences made from conclusions. Rates are calculated to determine success of intervention amongst different ages. A descriptive narrative explains the outcomes of each intervention with respect to statistical significance. It is anticipated that performance scores will vary amongst ages but the age for cognitive capability will be higher than the age for physical capability.

GP91

Lean Six Sigma Project: Improving Referral to Listing Time for Kidney Transplant Candidates

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For years, Vidant Medical Center (VMC) and East Carolina University (ECU) have improved the lives of end-stage renal disease (ESRD) patients in eastern North Carolina through kidney transplantation. The healthcare industry has an increasing focus on applying quality assessment and process improvement (QAPI) metrics to advance patient outcomes. This project will focus on the pre-transplant metrics; time from referral to evaluation/ H&P, H&P to listing and the combined metric; referral to listing. Currently, referral to listing at VMC takes 11 months (2.9 months referral to H&P, 8 months H&P to listing). Prolonged time from referral to H&P results in waste and rework for pre-transplant coordinators responsible for moving candidates through the process. Prolonged time from H&P to listing results in excessive patient inventory and creates a chaotic and complicated workflow.

Transplant Leadership at VMC has realigned the referral to listing target with industry standard: 90 days from referral to listing (30 days from referral to H&P and 60 days H&P to listing). A review of referral to listing data reveals evaluation delays are primarily due to patients obtaining dental clearance, evaluation appointment scheduling and patient contact issues. Additionally, a decrease in defects associated with transplant candidate suitability at evaluation and selection committee is critical in reducing cost and removing waste from the process

Vidant Medical Center is using a Lean Six Sigma approach to reduce time from referral to listing by improving process efficiencies and reliability. Process improvement efforts are focused on dental clearance issues, patient scheduling and patient contact. The potential candidate review process before the evaluation appointment and prior to presentation at selection committee are visualized using value stream mapping. This project will decrease referral to listing times for the ESRD patient population seeking transplantation at VMC and increase patient and staff satisfaction by providing a standardized and reliable evaluation process.

GP92

Effect of public health structure on public health expenditures: Evidence from North Carolina

Julia R. Land, Abigail W. Terkeltoub, V. Deepika Sarvepalli

Background- A review of empirical studies published between 1990 and 2007 finds evidence of economies of scale and scope in the delivery of public health services. The evidence also suggests that key organizational and governance characteristics of public health agencies may explain differences in service delivery across communities. There is also a need to examine structural changes in public health delivery systems and their efficiency effects on service delivery and outcomes. The structural changes in the public health system subsequent to policy implementation of S.L. 2012-126 (H 438) in North Carolina provide natural experiment data that can yield information about the effects of public health structure on conduct and performance.

Study Objectives- To determine the differences in public health and human services expenditures in North Carolina counties before and after the S.L. 2012-126 (H 438) policy changes and budget expenditure variation among public health structures. This study addresses the following questions: What are the differences in public health expenditures in North Carolina counties before and after the policy changes? What are the differences in public health expenditures across the various public health structures in North Carolina?

Methods- Secondary data were collected regarding the public health or human services expenditure totals for 74 counties in 2009-2014 from the Comprehensive Annual Financial Reports available to the public on county websites. Matched Pair t-Tests

and Independent T-tests were performed to measure expenditure differences across public health structures (such as pre and post legislation, voluntary Consolidated Human Service Agency (CHSA), BOCC, and CHS).

Results- The findings indicate that the expenditure differences are not statistically significant. There is no evidence that budget changes are dependent upon a specific public health structures (CHSA, Non-CHSA, BOCC, CHS in the counties of North Carolina.

Conclusions- Study results indicate that no specific public health structure is advantageous to expenditures as a performance measure. This information will be helpful in determining topics of future research, questioning and investigation on the economic trends and public health structures on a much larger scale.

GP93

Assessing Barriers to Parental Involvement in Care of Infants and How Parental Involvement Affects Infant Self-Regulation Skills in a Neonatal Intensive Care Unit and a Special Care Nursery

Aaron Russell, Lauren Forrest, Samantha Jones

Health and long-term outcomes of neonates hospitalized directly after birth is affected by the work of medical professionals and by parental involvement in care as parent-infant attachment is interrupted (Vergara, Anxalone, Bigsby, Gorga, & et al., 2006). Research shows that parental involvement in infant care during hospitalization in the Neonatal Intensive Care Unit (NICU) has positive effects on infant neurocognitive development and regulation (Reynolds, et al., 2013; Weber, Harrison, & Steward, 2012; Johnson, 2008). Therefore, parental care in the NICU is crucial to the neurodevelopment and health of the infant. However, studies have found that parents often face barriers that prevent them from taking part in their infant's care while the infant is hospitalized (Gonya & Nelin, 2012). The present study has two purposes. The first is to identify primary barriers affecting parental involvement in infant care at the NICU and Special Care Nursery (SCN) in a Level 1 trauma hospital in rural eastern North Carolina. The hospital has unique logistic factors, including high percentage of low SES families and the large rural geographic area served, that may make parental involvement more difficult. Parent surveys will be conducted around the time of infant discharge from the NICU or SCN setting separately with consenting mothers and fathers. These surveys include questions regarding the parent level involvement, internal and external barriers to involvement, frequency of visitation, etc. The second purpose of the study is to determine whether parent visitation and involvement have a measureable impact on infant self-regulation. This will be done by comparing parent survey data with results from a standardized evaluation that measures an infant's ability to self regulate. It is expected that infants who have parents that are more involved in their care will have better self-regulation skills. Results will identify high frequency barriers to parental visitation and aide in the development of interventions to increase opportunities for infant-parent interaction or other supports in NICU and SCN.

GP94

The Nurses' Physical Activity Study: Caring for You so You can Care for Others

Brianna S. Clemmons, Bhibha M. Das, Matthew T. Mahar, Ann M. Schreier, Charles D. Kemble

The negative impact of compassion fatigue and stress on patient and nurse health and safety is well established. For this reason it is imperative to find ways to decrease a nurse's risk for compassion fatigue and stress as his/her time in the nursing profession increases.

PURPOSE: The aim of this study was to assess the relationship between physical activity and stress and compassion fatigue among nurses in eastern NC.

METHODS: Nurses (n=18, 94% females) were assessed for physical activity via the Fitbit Flex activity tracker over a 7 day period and stress and compassion fatigue via questionnaires. Pearson correlations were used to determine the relationship between physical activity and stress and physical activity and compassion fatigue.
RESULTS: Compassion fatigue (39.1±9.7) was significantly correlated with time spent in moderate physical activity (7.7±10.0 minutes/day; r=-0.56, $p<0.05$) and time spent in vigorous physical activity (8.0±9.2 minutes/day; r=-0.51, $p<0.05$). Perceived stress (31.3±3.1) and time spent in moderate physical activity were also significantly correlated (r=-0.50, $p<0.05$).

CONCLUSION: Compassion fatigue and stress are common among nurses. Given the effects these have on patient health and safety, it is imperative that employers come up with solutions to help lower the risk for compassion fatigue and stress in this population. These results show that relationships exist between physical activity and compassion fatigue and physical activity and stress. A physical activity intervention among nurses may be needed to fully see the effects of physical activity on compassion fatigue and stress.

GP95

Exposure to Heat Stress, Ultraviolet Radiation and Other Occupational Health Hazards Among Groundskeepers at East Carolina University

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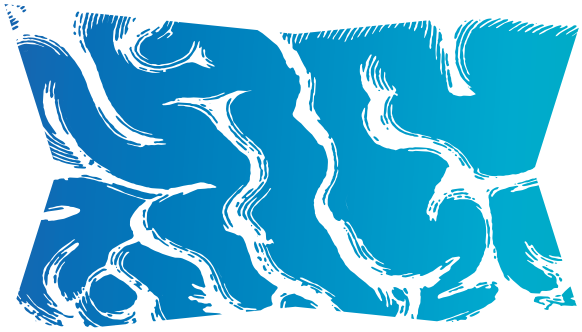
Approximately 840,000 workers are employed as groundskeepers in the United States. In the southern US, groundskeepers typically work most of the year outdoors, performing physically demanding duties. Because a large amount of work time is spent outside, groundskeepers are exposed to various workplace hazards that contribute to illnesses and injuries. These hazards include physical hazards (hot temperatures, cold temperatures, UV radiation [UVR]), various arthropods (e.g., mosquitos, ticks), and ergonomic hazards associated with bending, kneeling, and awkward posture for prolonged periods, and heavy lifting without assistance. The purpose of this study is to assess the exposure to heat, cold, UVR, arthropods, and ergonomic hazards among groundskeepers. Groundskeepers (N=50) employed at East Carolina University (ECU) were recruited to complete pre-and post-surveys to determine any changes in hazard exposures and knowledge on personal protective equipment (PPE) use and ergonomic techniques during the course of the study. Heat stress indices in groundskeeper work areas were recorded at 3 different times (morning, noon, afternoon) during the day using heat stress monitors. UV indices in groundskeeper work areas, along with observable PPE use, weather; and performed task, were recorded at 3 different times (morning, noon, afternoon) throughout the day. UV indices were measured using a Solarmeter digital radiometer. Arthropod collections were conducted in selected work areas on selected days. Diurnal vectors were collected using tick drags, while nocturnal vectors were collected using dry ice baited CDC light traps (placed at 5 PM; collected at 8AM the following morning). All specimens collected in traps were either frozen or placed in ethanol, and identified to species using dichotomous keys. Heat stress, UVR monitoring, and vector collection were conducted during 3 seasons: summer (July-August), fall (September-October), spring (April-May). This study is a first of its kind and will be used to develop a worker protection program at East Carolina University.



GP96

Design and Development of an Android Application for Edema Measurement

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A clinician uses the swelling (edema) of the extremities to assess a patient's heart condition by pressing his/her thump on the patient's leg and checking the amount of pitting (indentation) in the skin. Because it is not convenient for heart patients to evaluate their own edema, clinicians may fail to accurately assess based only on weekly or monthly measurement. To solve this significant problem, an Android application for edema measurement is designed and developed. The primary functionality of the application is to, based on signals received from sensors, calculate and show the edema score. The edema score is represented with a number between 1+ and 4+, where 4+ indicates the most severe level. To support the calculation, we designed a hardware device, consisting of a displacement sensor, a force sensor, and an IOIO board, where the IOIO board connects the Android device and all the sensors. The application can also read the patient weight data directly from a weight scale through IOIO board, calculate and display the patient BMI (Body Mass Index), and show the trend of weight and edema score within the most recent 30 days. Additionally, the application gathers patient's health information by asking their feelings and the level of difficulty experienced in breathing. All the data are stored within a built-in database. To date, all the functions are completed, with the exception of the essential algorithm for edema score calculation, which is still under development. The user friendliness of the application is yet to be tested.

GP97

Changes in the Velopharyngeal Anatomy and Physiology following the Remediation of the Posterior Nasal Fricative: A single subject case study

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Recent research reveals controversies in the management of speech sound disorders associated with cleft palate and/or velopharyngeal insufficiency (VPI). However, the implementation of a motor based therapy approach in this clinical setting has

been found to be beneficial. Cleft palate speech is frequently conceptualized as an articulation disorder resulting from learned compensatory misarticulations (Grundy and Harding, 1995). Remediation of articulation disorders in this population have responded favorably to a motor based therapy approach. Phoneme-specific nasal emission (PSNE) is a common misarticulation that is seen. It is the result of utilization of the posterior soft palate against the pharyngeal wall to compensate for the inability to produce fricative and affricate sounds such as /s/ and /z/. This is a learned, maladaptive articulatory pattern that is amenable to therapy. However, the effects of this therapy approach on the anatomy and physiology of the velopharyngeal mechanism is not well documented. This study aims to evaluate the use of a motor based therapy technique for the remediation of the posterior nasal fricative. Significant differences between pre- and post- therapeutic measures of the velopharyngeal anatomy are hypothesized. Magnetic resonance imaging will be utilized to visualize pre- and post-therapy anatomical changes to the velopharyngeal mechanism. Results and clinical significance will be discussed.

GP98

A Phenomenological Exploration of the Rewards and Challenges of Non-Profit Animal Care Work

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Given a dearth of literature regarding non-profit animal care workers, all of whom potentially face health-related risks, a need existed to explore these individuals' collective lived experiences and perceptions. The purpose of this study was to describe non-profit animal care workers' lived experiences of and meanings associated with their work. The researcher employed a qualitative phenomenological approach that was guided by Moustakas (1994). She used maximum variation purposive sampling to identify ten study participants who had at least one year of employment experience in a non-profit animal care facility located eastern North Carolina.

Data were collected by means of participant drawings of the meaning of animal care followed by in-depth, open-ended interviews. She addressed study rigor by maintaining an audit trail, data triangulation, saturation, member checks, and reflexivity. Data analysis revealed the themes of ""Making a Difference"", ""A Passion for Animals"", Animal Care as ""All Consuming"", and ""Stress, Burnout, and Coping"".

Participants' valued ""Making a Difference"" in their own lives as well as the lives of animals and communities. Participants perceived their work in animal care as contributing to their personal well-being and knowledge, in part because they had a ""passion"" for the work and a love of animals. Some likened their experiences with animals as a type of therapy. Participants, who often saw animals being brought to the facility as a consequence of harsh circumstances, found rewards and redemption from positive volunteer interactions.

Participants juxtaposed the positive attributes of animal care with emotional and physical ""stress"" or trauma. Participants described their work as highly variable, fast paced, and unpredictable yet routine. Their work-related responsibilities were described as unrelenting and ""all consuming"" and could negatively impact their personal relationships and behaviors. Employment in a low-wage, under-resourced environment resulted in a physical, emotional, and self-described mental ""burnout"". They used ""coping"" strategies including supportive interactions, compartmentalizing, physical activity, leave-taking, and spirituality.

Non-profit animal care workers are an unrecognized population at risk for health issues with need for health education and promotion. They also have a need for employee stress management, professional development opportunities, and advocacy regarding health and well-being efforts.

GP99

Effect of Local Public Health Agencies' Structure on Effectiveness in Reducing Adult Tobacco Use

V Deepika Sarvepalli, Julia R Land, Abigail W Terkeltoub

There are five types of local public health agencies in North Carolina: county health departments (CHDs), district health departments (DHDs), public health authorities (PHAs), consolidated human services agencies (CHSAs) and public hospital authorities. In June 2012, legislation (S.L. 2012-126) was passed that authorized more counties to form CHSAs. Since then, the number of CHSA in North Carolina increased from 2 in 2012 to 20 in 2015. There is evidence that consolidation and intergovernmental coordination in public health systems can improve performance, outcomes and cost-effectiveness. A major problem that confronts public health is tobacco use, which is the leading cause of preventable death in the United States. In 2013, the overall smoking rate in North Carolina was 21% whereas the national average was 17.8%.

The aim of this study was to find out if restructuring of LPHAs into CHSA had an influence on their effectiveness in reducing

adult tobacco use in all the 100 counties of North Carolina. The study hypothesized that the type of public health structure will have an effect on the public health performance, which in turn will have an effect on health outcomes.

The target population of the study was current adult smokers in all the 100 counties of North Carolina. Secondary data on adult tobacco use were collected for the years 2010-2015. Data was obtained from North Carolina county health rankings. Secondary data for LPHA types for the years 2010-2015 were obtained from University of North Carolina School of Government website. The study conducted a one-way ANOVA test, using the software SPSS. The analysis compared the means of adult smoking rates across the five public health structures for the years 2010-2015. The results of the study showed that there was a decrease in overall smoking rates for all the LPHA types from 2010-2015. The mean of smoking rates for CHSA was lower when compared to the other two types of LPHAs (DHD and CHD) for years 2010-2012. The mean difference between CHD and CHSA showed statistical significance for years 2010-2012. Although, the data obtained in the study did not produce statistically significant results for the years 2013-2015, it does show some evidence about the importance of CHSA in improving public health performance, which can result in improved and better health outcomes. The study can certainly provide knowledge for future research on effectiveness of restructuring of LPHAs on various health outcomes.

GP100

Gaze Control in Collegiate Players During the Hitting Phase of Softball

Alexandra S Fieldhouse

Softball has gained popularity in the recent decade. Part of this increased popularity is due to the fact that hitters have become much more successful against tougher pitching than what was accomplished in the past. Currently, there is no visual behavior research with softball hitters, however, recent work on baseball hitters has demonstrated that baseball players are not able to track the ball from a simulated pitcher's hand all the way to the point of contact. With different pitching styles, a bigger ball, closer distances, and equivalent speeds, it is unknown whether softball hitters have more efficient eye movements compared to baseball hitters. Athletes in both sports utilize dynamic visual acuity (DVA) which is an ability to discriminate the fine parts of a moving object as well as accurately determine the relative motion of the object. Therefore, the purpose of this study was to examine the visual tracking abilities of softball hitters while trying to hit high velocity pitches. In addition, a secondary purpose is to understand the value of an eye tracker to help improve performance for those who play the game at a high level. Fifteen Division I collegiate softball hitters with a minimum of eight years of experience completed two trials of ten pitches from a live pitcher while wearing a mobile eye tracker. The dependent measures included fixation location, fixation duration, and batting performance (the outcome of each pitch during the trials). Results demonstrated that the hitters were able to track the ball during the pitcher's motion up until their predicted location of ball and bat contact. Overall, the results showed that it is not possible to track a pitch from the release point all the way to the point of contact. However, the softball hitters are still successful in being able to track the ball as far as possible while having to make the split decision if they are going to swing or not.

GP101

Minority farmers' needs, access and knowledge of Vocational Rehabilitation Services: evidence from Minority Farmworkers in Eastern North Carolina

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Background. According to the Bureau of Labor Statistics, farming is one of the ten most dangerous occupations in the United States. The potential for work related injuries is high and the increase in disability among farmers is inevitable. Disabling injuries endured by farmers affect their livelihood, but farming with a disability, though challenging, is not impossible. Past research indicates that farmers have low access to services that assist individuals with disabilities to be employed. This is particularly true among minority farmers.

Study Objectives. The objective of the study is to determine the disability-associated needs of minority farmers in NC, whether they have information about available services; obstacles to accessing services; types of services needed; and methods of improving access to services.

Methods. In this exploratory phase of the study, we will gather information from minority farmers through four focus groups with African American farmers, Latino farmers, Native American farmers and with women farmers. All focus group discussions will be conducted in Eastern North Carolina. The discussions will be taped and transcribed. Focus group data will be analyzed using Nvivo – a qualitative data analysis package.

Expected Results. The study expects to identify an informational and access gap particularly to the Vocational Rehabilitation services available to this population. Further, insight would suggest minority farmers are unaware and/ or afraid of

utilizing the VR services available. Along with this population experiencing an inability to access said services. Lastly, the expectations include a legislative limitation hindering minority farmer's access to the VR services.

GP102

Comparison of parent and child rankings of fruit and vegetable liking to assess parent accuracy as proxy reporters

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Young children are often considered unreliable reporters of dietary preferences. As an alternative, parents can be used as proxy reporters for their children. However, external factors, such as foods offered in the preschool or childcare environments, can influence the validity of parents' ability to accurately report their children's preference for specific foods. The purpose of this study is to examine the validity of parents' responses of preschool-aged children's fruit and vegetable (FV) liking. Parents reported child FV liking using a 5-point likert-scale. A validated 5-point hedonic pictorial tool was used to assess children's liking for each FV. Parent-reported child liking was compared with their preschool children's reported liking for 10 FVs (n=24 parent/child pairs). Data were analyzed using Spearman's Rho Correlation Coefficient and Wilcoxon's singed-rank tests. Significant, negative relationships were observed between parent/child responses for two FVs (grapes r_s= -0.42; broccoli r_s= -0.42). Significant, positive differences between parent and child responses were observed among oranges (P: 5.0; C: 4.5; p= .035), grapes (P: 5.0; C: 4.5; p= .018), and overall fruit rankings (P: 5.0; C: 4.5; p= .023). All other relationships were not significant. Finally, while not significant, two noteworthy trends were observed within the data: (1) parents ranked children's liking of the surveyed fruits higher than the children, and (2) children ranked liking of the surveyed vegetables higher than the parents. Results provide preliminary evidence that using parents as proxies for assessing liking among young children may not produce valid data for certain types of FVs. Further research exploring the validity of parents as proxies for children's FV liking in a larger, more diverse sample is warranted.

GP103

Effects of public health structure on chlamydia incidence: Evidence from North Carolina

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Background: There are numerous health indicators for the overall health of a community. North Carolina has the 10th highest chlamydial infection rate in the nation, therefore chlamydia incidence rate is one of the health indicators that the N.C. Division of Public Health monitors closely. In 2011, the North Carolina General Assembly enacted Session Law 2012-126, House Bill 438 in order to promote efficiency and effectiveness in the administration of human services and to strengthen the local public health infrastructure. Consequently, seven different types of local public health agency (LPHA) structures were formed to run public health in North Carolina, two of which are consolidated human service agencies (CHSA). The most prevalent structure type is a standalone local health department (LHD) run by a county board of health (BOH). Little research has been conducted regarding how these structural have effected public health effectiveness in reducing chlamydia incidence rates in N.C.

Objectives: The focus of this study is to determine the effects of structure on public health's effectiveness in reducing chlamydia incidence rates in North Carolina.

Methods: Secondary data were obtained from county public health reports, the US Census Bureau and the Department of Agriculture, for the years 2010-2015. The data included county-level chlamydia incidence rates, whether each county is rural or urban, and type of Local Public Health Agency structure operating in the county. The data were used for several comparative analyses: i) rural and urban counties; ii) between counties with Consolidated Human Services Agency and those without CHSAs; iii) within counties of CHSAs before and after the legislation was adopted in 2012 and iv) across the different local public health agency structures.

Results: Counties had higher chlamydia incidence rates after forming Consolidated Human Services Agencies than before. Differences in chlamydia incidence rates in rural and non-rural settings and across local public health agency types were statistically insignificant.

Conclusion: No particular public health structure is more effective than another in curbing chlamydia incidence rates in North Carolina. However, consolidation of public health agencies seems to have a negative effect on efforts to curb chlamydia incidence rates.

GP104

Movement Variability of Lower Extremity Mechanics in Post-Meniscectomy Runners

Marie Morrissette, Nathan Blaylock, Richard Willy, Stacey Meardon

Purpose/Hypothesis: Movement variability in either extreme can be detrimental to one's health. Altered movement variability occurs following injury and may reflect a lack of motor system adaptability. The influence of injury on adaptability has not been examined. We aimed to examine adaptability to temporal constraints during a running task in persons following knee surgery. Accuracy in adapting running cadence to rhythmic auditory cues was examined.

Subjects: 10 subjects post meniscus repair of the knee (7 male, 3 female 21.2±2.0yo) matched to 10 controls (7 male, 3 female: 22.5±1.5yo)

Materials/Methods: Participants ran at self-selected running speed on an instrumented force treadmill while ground reaction force (GRF) data were collected for 20 sec. Preferred stride rate was determined using a running monitor. Participants then ran at their self-selected speed with modified step rates corresponding to +5 and +10% increases in preferred step rate while GRF data were collected. A metronome cued step rate increases; 30 seconds of adaptation were allowed. GRF data were processed to identify consecutive strides. Stride time was considered the time between 2 sequential initial contacts by the same limb. Mean stride time (ST), stride time error (STE), ST standard deviation (SD), coefficient of variation (CV) and ST sample entropy (SE) were the outcome variables of interest. Repeated measures ANOVAs and polynomial contrasts were used to evaluate group and condition effects on variables of interest (?=0.05).

Results: With each increase in stride rate (+5%, +10%), there is a decrease in mean ST in both groups analyzed ($p<0.01$). ST SD also increased as stride rate increased in both groups ($p=0.001$), as did CV ($p<0.001$). In contrast, STE was greater in those post knee repair when compared to the controls, increasing as stride rate increased ($p<0.023$). Sample entropy analysis of stride time is currently in process.

Clinical Relevance: Persons post meniscectomy may have reduced adaptability, as demonstrated by greater stride time error during a novel target task. Running step rate modification is used clinically to reduce knee loads. After meniscectomy, patients' may be less adaptable to novel running conditions, thereby having increased difficulty reducing knee joint loads in response to gait modification. Increased practice time is likely needed in order to establish stable stride times when adopting a new cadence.

GP105

Pre-Season Ultrasound Elastography of the UCL in Baseball Pitchers

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The ulnar collateral ligament (UCL) is the primary stabilizer of the medial elbow and is critical to its stability during overhead throwing motions such as the baseball pitching motion. The UCL undergoes significant stress throughout the baseball pitching motion, particularly during the latter stages of the arm cocking phase and throughout the arm acceleration phase. Previous studies have shown the structural and material properties of the medial elbow, including UCL length, space, thickness, and the gap space of the ulnohumeral joint, change due to the stress of the baseball pitching motion. However, the stiffness of the UCL in baseball pitchers has not yet been explored.

The purpose of this research was to use ultrasound elastography to examine the differences in the structural and material properties of the UCL in the throwing arms and non-throwing arms of collegiate baseball pitchers. We collected traditional B-mode ultrasound and shear wave elastography (SWE) images on a sample of Division I collegiate baseball pitchers. B-mode images were used to measure UCL length, UCL thickness, UCL space, and the ulnohumeral gapping of the elbow. SWE images were used to measure the stiffness of the UCL. The elbow was flexed 30° and the upper arm was supported to allow for ulnohumeral gapping. The participants then held a 1kg weight in their hand, keeping their wrist relaxed during the image taking process. Each image was taken three times, and the mean values for each measurement were calculated.

Initial data from this study show decreases in UCL stiffness (171.2 ± 31.45 vs 205.2 ± 35.47) and UCL length (21.78 ± 3.06 vs 23.33 ± 0.83) inthe participants' throwing arms compared to their non-throwing arms. The data shows increases in UCL thickness (1.32 ± 0.07 vs 1.31 ± 0.05), UCL space (4.52 ± 0.68 vs 4.37 ± 0.66), and ulnohumeral gapping (5.06 ± 0.71 vs 4.42 ± 1.26) when comparing participants' throwing arms compared to their non-throwing arms. This suggests greater compliance in the throwing arm UCLs of collegiate baseball pitchers, as demonstrated by decreased stiffness and increased ulnohumeral gap space. Additional study is needed to confirm these results and determine the effect of these changes on injury risk.

GON1

Quantitative Analysis of CD4+ and CD8* T Cell Structures and Morphology based Classification

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Conventional methods to study intracellular structure and function have typically used confocal microscopy as a 2D imaging modality with high contrast. Since confocal microscope allows acquisition of image stacks consisting of many 2D slices, the image stack can be reconstructed to create a 3D structure for quantitative characterization and analysis of cells' 3D morphology. In this study, we used a previously developed software to reconstruct the 3D structures of CD4+ and CD8+ T cells extracted from human spleen tissues. With the reconstructed data, we have obtained quantitative 3D parameters to analyze these cells' morphology by performing voxel based calculations with nucleus and mitochondria segmented from cell cytoplasm. The morphological features of the two T cell subtypes were investigated and compared through t-test and scatter plots. We further employed a machine learning algorithm of support vector machine to evaluate classification of the two subtypes based on their 3D morphological features. The results of 3D morphology analysis and cell classification will be presented.

GON2

Using Six Sigma DMAIC to Optimize Heat Setting Process for Paint Roller Nap Cover Fabrics

David Kurgatt

P&A Industrial Fabrications LLC

P&A Industrial Fabrications has embraced six Sigma principles to drive its vision for relentless improvement, passion in service to its customers, employees and community. As a market leader in woven nap fabrics, P&A has embarked on lean six sigma tools to drive its continuous improvement initiatives.

The approved charter for this project has envisaged an estimated annual savings of US $350,000.00 across available gamut of raw materials supply for products subjected to heat setting process after the project is fully implemented.

Nap fabrics used in paint roller covers are required to meet nap height specifications measured as the overall fabric thickness from its backing to meet substrate paint application standards. Consistency in heat setting process outcomes is key to achieving customer specifications for nap fabrics. Excessive shrinkage or variation in shrinkage during heat setting will lead to non-conforming nap fabric heights and costly adjustments, tweaking quality downgrading in downstream finishing processes.

In the measure phase of this project an exploratory analysis of shrinkage levels in yarn between suppliers identified in SIPOC was carried out using a two-way ANOVA. The analysis examined the effect of supplier and heat setting temperature levels on yarn shrinkage. There was a statistical significance between the effects of vendor and temperature level on yarn shrinkage, $F(2,42)=19.78$, $P= .000$. These exploratory results emphasize and indicate that there is significant vendor factor contribution to process variability.

This paper will discuss the six sigma DMAIC tools applied in this project and will highlight results and opportunities for process optimization, improvement and controls that will be used to meet expected annualized savings.

GON3

Reducing Call Transfer Time Using Lean Six Sigma

Travis Dodson

Abstract: Determining where to transfer an incoming call to within an organization can be time consuming even for the most seasoned receptionists. The time the caller is waiting to be transferred can positively and negatively impact the remaining customer interaction for those downstream of the receptionist. Waiting for long periods of time to have the call transferred may cause a caller to feel frustrated and take out their frustrations on the next person receiving the call. This study will investigate the current average call time to transfer an incoming caller, make recommendations to reduce the average wait time, and monitor the suggested changes to determine the results. I will use the Six Sigma methodology to conduct this investigation, following the DMAIC cycle of Define, Measure, Analyze, Implement and Control. The goal of the study is to reduce the average transfer time by 50%, in an effort to save the callers money as well as the organization. By reducing the transfer time by half, the customer will experience savings in time spent on the phone, and the organization may be able to reduce the staff necessary to transfer the incoming calls.

Abstracts | Post Doctoral Scholar Presentations

PD1

Phosphatidylserine decarboxylase regulates skeletal muscle respiration by its action on Complex II

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Low aerobic capacity is the strongest predictor of all-cause mortality. A large contributor to aerobic capacity is skeletal muscle mitochondrial respiration. A plethora of data has emerged describing the role of mitochondrial proteins in respiration in skeletal muscle, but much less is known of mitochondrial phospholipids. Phosphatidylethanolamine (PE) is the most abundant phospholipid synthesized within skeletal muscle mitochondria, a reaction mediated by the enzyme phosphatidylserine decarboxylase (PSD) that resides in the inner-membrane of mitochondria. In wild type C57BL6/J mice, PSD gene expression was highest in tissues with high oxidative demand (i.e. soleus and diaphragm). Five-weeks of treadmill training (30 min/d, 5 d/wk, 12 m/min, 3-6% grade) increased skeletal muscle PSD gene expression ~68% ($P<0.05$) and isolated mitochondrial PE content by ~18% ($P<0.05$). In C2C12 skeletal muscle myotubes, a lentivirus mediated knockdown of PSD reduced mitochondrial PE content by ~27% ($P<0.05$) and maximally (FCCP) stimulated respiration by ~77% ($P<0.05$). This reduction in maximal respiration was mediated by a ~65% ($P<0.05$) reduction in Complex II (succinate dehydrogenase) mediated respiratory activity, without effecting Complex I, III, or IV mediated respiratory activity. Markers of mitochondrial biogenesis or fusion were not altered with the PSD knockdown, but the protein abundance of light chain 3B II, a marker of autophagy activation, was increased by ~ 91% ($P<0.05$). The PSD knockdown altered mitochondrial morphology by apparently increasing fragmentation. In summary, reducing skeletal muscle mitochondrial PSD expression reduces mitochondrial PE content and maximal respiration by reducing Complex II mediated respiratory activity. Mitochondrial PE biosynthesis plays an important role in regulating the oxidative capacity of skeletal muscle.

PD2

Voluntary exercise training improves hypothalamic function via suppression of apoptosis induced by high fat diet in mice

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Background: Exercise training plays a critical role in the regulation of glucose homeostasis and body weight, especially under obesity conditions induced by western style food and lack of daily physical activity. However, the central nervous system mediated mechanism of exercise training on metabolic function has not been fully understood.

Methods: This study was conducted by using C57BL6 male mice for normal chow diet, high fat diet treatment and high fat diet along with voluntary running wheel exercise training for 12 weeks. Metabolic function was examined by using the Comprehensive Lab Animal Monitoring System and magnetic resonance imaging; phenotypic analysis included measurements of body weight, food intake, glucose and insulin tolerance tests, as well as insulin and leptin sensitivity studies. Immunohistochemistry was utilized to identify amount changes for phosphorylation of STAT3 and POMC neurons in the hypothalamus. TUNEL assay was performed to check high fat diet induced hypothalamic apoptosis.

Results: 12 weeks of voluntary exercise training partially reduces body weight gain and adiposity induced by a high fat diet. This is mainly done via increased energy expenditure despite normal energy intake. Local and systemic insulin sensitivity was also enhanced in the exercise training group versus the high fat diet group. The POMC neuron number is significantly reduced in high fat diet treated mice, and this reduction is remarkably restored by exercise training compared with the high fat diet treatment alone. TUNEL assay revealed the exercise training rescued high fat diet induced hypothalamic neuronal apoptosis.

Conclusion: Taken together, our data suggests that voluntary exercise training improves metabolic symptoms induced by high fat diet; in part through suppression of hypothalamic apoptosis.

PD3

Targeted Overexpression of Mitochondrial Catalase Protects Against Ischemic Myopathy in High Fat Fed Mice

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Type 2 diabetes (T2D) is a major risk factor for the development of peripheral arterial disease (PAD). Clinically, patients with both T2D and PAD generally respond poorly to current interventions and have higher rates of morbidity and mortality outcomes. The underlying mechanisms linking T2D and PAD are not fully known. In the current study, we hypothesized that high fat feeding induced reductions in mitochondrial respiratory function and increases in oxidative stress would exacerbate tissue loss and myopathy following murine hindlimb ischemia, a model of PAD. Furthermore, we hypothesized that this could be rescued with transgenic overexpression of mitochondrial catalase (MCAT). After 6wk high fat feeding, limb tissue necrosis, skeletal muscle mitochondrial respiratory function and content, histological markers of ischemic lesion, and muscle regeneration (centralized nuclei) were unaffected, despite clear evidence of glucose intolerance and insulin resistance. After 16wk of high fat feeding (a duration known to reduce respiratory capacity and increase oxidative stress), limb ischemia resulted in substantially greater limb tissue necrosis. In parallel, 16wk high fat feeding decreased mitochondrial respiratory capacity at baseline and even further following ischemia, despite no apparent changes in mitochondrial content. However, 16wk high fat feeding in MCAT and wild-type (WT) littermate mice revealed that catalase overexpression was sufficient to rescue limb tissue loss and mitochondrial respiratory function. Catalase overexpression also reduced the area of ischemic lesion and improved muscle regeneration and function. Altogether, the current data provide a potential mechanism linking T2D and PAD and highlight the ability to therapeutically target mitochondria to attenuate ischemic pathology.

PD4

Shared neural substrates of species recognition between parental and parasitic songbirds

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In many social animals, early exposure to conspecific stimuli is critical for the development of accurate species recognition. For example, songbirds rely on conspecific 'tutors' for appropriate species-specific song development. Obligate brood parasitic birds, however, forego parental care and young are raised by heterospecific hosts. Having evolved from a non-parasitic ancestor, how do brood parasites recognize their own species? Studies of non-parasitic parental songbirds (e.g. zebra finch) have revealed that the primary and secondary auditory forebrain areas are critical in the differential processing of conspecific vs. heterospecific songs. Here we evaluate whether the same auditory brain regions underlie species recognition in adult pin-tailed whydahs (Vidua macroura), a brood parasitic songbird that is sister-taxa to non-parasitic estrilid finches, including the model species zebra finch (Taeniopygia guttata). First, we found captive whydahs to exhibit a greater behavioral response (vocal and movement) to conspecific vs heterospecific (zebra finch) song playbacks. Using functional magnetic resonance imaging (fMRI), we detected an increase in the mean volume of the blood oxygenation level dependent (BOLD) response to con- vs. heterospecific songs within the auditory forebrain. Finally, we found greater expression of the immediate early gene ZENK (egr-1) within the auditory forebrain following exposure to con- vs heterospecific songs. Our study demonstrates that neural activation is located within similar forebrain regions as those of parental songbirds. The evolutionary transition to brood parasitism, therefore, likely involved changes to existing proximate mechanisms–"evolutionary tinkering"–rather than wholesale reworking of neural substrates for species recognition in songbirds. Thus, developmental shifts of experience-dependent neuroplasticity likely enable brood parasites to recognize their own species and avoid (mis)imprinting on the host's phenotype.

PD5

Chemotaxis response regulatory proteins CheY1, CheY2, and CheY3 function distinctively in *Borrelia burgdorferi*

H. Xu, K. H. Moon, P. Sekar, M. Saad, R. M. Wooten and M. Motaleb

Chemotaxis two-component systems govern the rotation of flagellar motors, which allows rapid responses to different environmental stimuli. More than 50% of all sequenced prokaryotic genomes contain at least one chemotaxis signal

transduction system. Though many of those genomes possess multiple sets of chemotaxis genes, at least one of them is dedicated to control motility. The chemotaxis gene that control motility was also seen to be involved in bacterial virulence. However, in most bacterial species, where there is multiple sets of chemotaxis genes, there is very little known about what role these additional chemotaxis genes perform. Notably, *Borrelia burgdorferi* possesses multiple sets of chemotaxis genes, including three response regulators*cheY1*, *cheY2*, and *cheY3*, of which only *cheY3* was observed to control motility *in vitro*. As suggested by the *in vitro* studies, the Δ*cheY3* was attenuated in mouse infection by either needle-injection or *Ixodes* tick bite. Although neither Δ*cheY1* nor Δ*cheY2*displayed motility or chemotaxis defects *in vitro*, the Δ*cheY2* was severely attenuated in mouse infection via needle-injection. While Δ*cheY2* survive normally in ticks, those ticks were unable to transmit the spirochetes in mice. Interestingly, Δ*cheY1*displayed no notable defects in their abilities to survive within mice or ticks. Our data suggest that CheY2, despite having all the properties of a chemotaxis response regulator, function distinctively than most other CheY proteins. Based on their *in vitro* and*in vivo* properties, we propose that CheY3 serves as the classical chemotaxis response regulator protein whereas CheY2 may serve as a regulator for a virulence determinant in *B. burgdorferi*.

PD6

CaMKKα signaling increases GLUT4 translocation to the plasma membrane in skeletal muscle

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Skeletal muscle is the major site for glucose disposal in the human body. In type 2 diabetes, while the ability of the muscle to take up glucose in response to insulin is impaired, the ability of insulin-independent stimuli such as exercise to increase muscle glucose uptake is preserved. Thus, understanding how exercise regulates muscle glucose uptake on a molecular level could lead to new treatments for type 2 diabetes. Acute exercise increases glucose uptake via the glucose transporter, GLUT4, which translocates from intracellular vesicles to the plasma membrane. Recent work from our group has shown that expression of a constitutively active from of Ca^{2+}/calmodulin-dependent protein kinase kinase α (CaMKKα) increases glucose uptake additively with insulin and in insulin-resistant muscle. Despite these findings, no studies have investigated whether CaMKKα increases glucose uptake via GLUT4. The goal of this study was to determine if in skeletal muscle, constitutively active CaMKKα expression could stimulate GLUT4 translocation to the plasma membrane, and if so whether the effects were additive with insulin. To examine muscle GLUT4 translocation, cultured mouse skeletal muscle (C2C12) cells stably overexpressing GLUT4 with an exofacial HA epitope tag were obtained and differentiated into myotubes. To activate CaMKKα signaling, myotubes were infected with adenoviruses that co-express active CaMKKα + green fluorescent protein (GFP). GFP-only infected myotubes served as control. After 2 days, myotubes were serum starved for 3 hours to allow for GLUT4 internalization, and then left untreated or maximally stimulated with 500 nm insulin for 20 min. Myotubes were fixed, and the amount of membrane bound GLUT4 detected using an HA-tag antibody and peroxidase/luminescence reaction. Constitutively active CaMKKα expression increased membrane GLUT4 levels 35% over GFP only controls, demonstrating for the first time that CaMKKα can stimulate GLUT4 translocation in skeletal muscle. Insulin increased membrane GLUT4 237%, while active CaMKKα + insulin increased membrane GLUT4 519%, suggesting a synergistic effect of insulin and CaMKKα on GLUT4 translocation. Collectively, these results indicate that activation of CaMKKα signaling increases membrane bound GLUT4 and suggest a convergence of insulin and CaMKKα signaling to promote GLUT4 translocation in skeletal muscle.

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PD7

Docosahexaenoic acid improves the decrement in antibody production associated with murine obesity upon influenza infection through the production of CD138+ cells.

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Obesity is associated with diminished antibody production against influenza infection. Given the prevalence of obesity in the United States, this population is at risk for infectious diseases due to diminished B-cell responses. Based on our previous observations of the benefits of n-3 polyunsaturated fatty acids (PUFA) on B-cell antibody production, we hypothesized that the n-3 PUFA docosahexaenoic acid (DHA) treatment could improve

the humoral immune response to influenza infection in a mouse model of obesity. Our findings reveal that DHA supplementation in mouse diet improved hemagglutination inhibition (HAI) titers accompanied by an improved body weight loss after influenza A/PR/8/34 infection. DHA had no effect on HAI titers in the lungs although lung viral transcripts were significantly lowered compared to the control. Mechanistically, 17-HDHA synthesized from DHA is reported to boost antibody production by increasing the frequency of $CD138^+$ plasma cells. Flow cytometry analyses revealed DHA increased the frequency of $CD138^+$ cells in the bone marrow compared to the high-fat diet. Lipidomic analyses showed a significant increase in the levels of 17-HDHA and 14-HDHA. Overall, our work suggests that dietary supplementation with DHA could be a valuable therapeutic strategy to improve the immune response of the obese against influenza infection.

PD8

Synthetic Plant Transcription Factors: TAL Effector Activators or Repressors (TALEAR)

Levi G Lowder

Over the last decade, genome editing in plants has become an efficient and pragmatic method for carrying out functional genomics and applied biotechnology. We previously generated synthetic transcriptional activator-like effector nucleases (TALENS) for multipurpose gene editing applications in plant systems. These genome editing tools enable effective study of endogenous gene functions and engineering of novel traits in plants. For example, we were able to use synthetic TAL effectors to mutagenize endogenous genes in Arabidopsis. Most significantly, we were able to modify these TAL effectors to facilitate homology directed repair (HR) induced tagging of endogenous genes. This technique allows, for the first time, tagging of endogenous genes with heterologous fusion elements such as GFP or immunological epitopes. In this study we aim to expand the usefulness of TAL effectors in plants by engineering TALEN-based artificial transcription factors. This is accomplished by fusing inactivated TALENS to transcriptional *a*ctivator or *r*epressor domains (TALEAR). Tandem expression of TALEN-activators and TALEN-repressors allows for simultaneous activation and/or repression of multiple genes. We present preliminary data showing activity of functional multiplexed TALEAR activity in *Arabidopsis*. Currently studies are aimed at validating our preliminary results and assaying stable inheritance of TALEAR activities. The capabilities of these tools are well suited for synthetic biology applications and generating novel traits in agricultural crops.

PD9

Role of PUF-8/Pumilio and CSR-1/Argonaute in Cell Fate Decision of Caenorhabditis elegans Germline

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The precise regulation of sexual fate (sperm or oocyte) lies at the heart of reproduction and fertility. The nematode Caenorhabditis elegans hermaphrodites produce a discrete number of sperm during larval development and then switch to produce oocyte during adulthood. This sperm-oocyte switch is tightly regulated by a number of positive and negative genetic regulators. Its aberrant regulation results in sterility.

Previous, it was reported that two PUF RNA-binding proteins, PUF-8 and FBF-1 act redundantly to inhibit sperm fate specification in the C. elegans germline. PUF-8 also works together with LIP-1 (dual specificity phosphatase) to repress sperm fate specification by inhibiting Ras-MPK-1 (an ERK homolog) signaling pathway in the C. elegans germline. These results hypothesize that PUF-8 may act as a central regulator in the sexual fate decision. Here, we performed RNA interference (RNAi) screening to identify more regulators that probably function with PUF-8 to inhibit sperm fate specification in the C. elegans germline. Our focused RNAi screening has identified CSR-1 (a homologous to mammal Argonaute proteins) as a key regulator: although csr-1(tm892) single mutants are sterile because of abnormal chromosome segregation, they produce sperm and oocytes. However, most puf-8(q725); csr-1(tm892) double mutants had sperm fate cells and no typical oogenic germ cells. Notably, these germline defects were rescued by the inhibition of Ras-MPK-1 (an ERK homolog) signaling pathway. These results indicate that PUF-8 and CSR-1 act redundantly to repress sperm fate specification by inhibiting Ras-MPK-1/ERK signaling pathway in the C. elegans germline. Next, to test whether CSR-1 is sufficient to induce oocyte fate, we analyzed the germline phenotype of CSR-1::GFP transgenic animals, which is expected to overexpress CSR-1 in the germline. Surprisingly, CSR-1 overexpression induced oogenic germ cells even male germlines. All together, we suggest that PUF-8 and CSR-1 may induce oogenic germ cell fate by inhibiting Ras-MPK-1/ERK-mediated sperm fate specification. Importantly, these regulators are broadly conserved, hypothesizing that similar molecular circuitry may control germ cell fate in other organisms, including humans.

Abstracts | Undergraduate Oral Presentations

UO1

Smoothing Package Labeling and Scanning with Universal Leaf

Joseph Stepusin, Daniel Stancil

Universal Leaf runs multiple lines where finished product runs downstream via chain driven rollers. The finished product is packaged in one of two styles of cardboard boxes with varying dimensions and total weight. Universal's leading customer requires two labels that specify the package content's grade and lot number. The customer requires labels to be accurately placed on two opposite sides of the container to enable a smooth and predominantly automated receiving process.

Universal currently utilizes a single worker at each conveyer to hand label each side of the package, requiring the worker to walk around thirty unnecessary feet per package. This employee is also required to manually scan each side of the package with an outdated scanning system that occasionally fails to accurately record package label data.

The capstone project we decided on will ideally eliminate excess worker movement by incorporating an automated turntable that rotates the package 180 degrees, allowing the worker to remain stationary while manually applying the two package labels. After the package is labeled, we would incorporate an automated scanning system that would be fixed to the conveyer slightly farther down the conveyer. Ideally, this scanner will help eliminate error caused by human variation by providing the worker more time to focus on correct product label placement.

UO2

Design for Low-Profile Electric Telescopic Pass-thru Ratcheting Wrench

James Powell, Joshua Adams, Owais Siddiqui, Joshua Katsikis

Our Cordless Pass-Thru Ratcheting Wrench is a must have add-on for any Milwaukee tool owner as well as any mechanic or do-it yourselfer. The idea behind this product is to use the Milwaukee M12™ battery pack that would be used in your existing battery operated hand tools, for example electric drills, electric impacts etc. Our design will be a low profile design that will also telescope to allow access to tight confines. The Cordless Pass-Thru Ratcheting Wrench will have both standard and metric through sockets and the design of these sockets can be made proprietary based on the companies demand. It based on an existing concept which is sold by sears as the (C3 Max Axess) our changes will consist of a smaller body and battery pack to allow for use in tighter places. The changes will also include the addition of a telescopic handle which will increase the reach of our tool allowing the user to get into tight spots where electric drills and impacts cannot. It will utilize the 12 volts lithium-ion M12™battery pack and internals from the M12™ (2467-20) ¼" Right Angle Impact Driver. It is a light weight, compact and ergonomic hand tool. It is made up of Chrome Vanadium steel for critical components and a hard plastic polymer for the body with soft ergonomic rubber over mold grip for comfort and non-slip. It will include forward and reverse lever on the handle of the wrench with a placement under the user's fingertip to allow the user more control of the tool while it is in use. The Cordless Pass-Thru Ratcheting Wrench will be a great add on tool to any existing tool kit.

UO3

Dedicated Virtual Test Environment for Collegiate Cyber Defense Competition

Nicolas Jaron Brey

In 2014 alone, hackers exposed personal information of 110 million Americans, roughly half of the country's adults. Information security is a field that requires skilled individuals to secure important content. Cyber-attacks are growing exponentially and can lead to dire consequences if malicious individuals acquire financial, medical, or government records. Successful execution of this project will provide East Carolina's current and future CCDC teams with a strong foundation of Information Security to enter their careers with.

A dedicated learning environment for East Carolina's Collegiate Cyber Defense Competition team will be developed, tested, and deployed. CCDC is a national cyber-defense competition that challenges teams of students from different universities by having them defend a network against security professionals. The aforementioned project acts an isolated modular test environment consisting of Virtual Machines networked together. Students are able to use this environment as a catalyst to improve their knowledge about Linux, networking, firewalls, applications, services, file systems, and security. Through the use of extensive documentation, it is our hope that future students will be able to improve and change the environment to make it continually viable for ECU's CCDC club.

UO4

Bioprocess Design for Production of Human Granulocyte-Macrophage Colony Stimulating Factor/ Neuroantigen Fusion Protein

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Multiple Sclerosis (MS) is an autoimmune disease causing neural and motor malfunction. The underlying cause of MS stems from the body's own immune system attacking antigens found within the nervous system. A tolerogenic vaccine approach that has demonstrated positive results in both rat and mouse models of MS has been identified. The vaccine is comprised of a fusion protein that reprograms specific immune cells to not attack the nervous system. By doing so, the fusion protein addresses the seemingly underlying cause of MS. At this time, the team has started to investigate the humanized version of the tolerogenic fusion protein. The team identified the fusion protein with the greatest likelihood of success to be Granulocyte Macrophage-Colony Stimulating Factor (GM-CSF) and Myelin Basic Protein (MBP) 83-99. Now the production of the fusion protein GMCSF-MBP_{83-99} must be described. Development of procedures to create a construct, to transfect the construct into an expression vector, and analysis of bioreactor configuration, harvest, purification and protein quantification are currently underway.

UO5

A comparison of finite element simulation, analytic prediction and experimental measurements of mode shapes in a center driven square plate with free-free boundary conditions.

Mikaela Howell, Teresa Ryan

An understanding of how a complex structure responds to an input vibration begins by first understanding the responses of simple structures. All structures have one or more natural frequencies, or frequencies at which the structure vibrates when acted upon by an outside force. When vibrating at one of these natural frequencies, different areas of the structure will move while others remain still, creating a characteristic standing wave pattern of movement known as a mode shape. This work investigates the vibration of a simple rectangular plate by comparing a finite element simulation, analytic prediction from plate theory, and experimental measurements of the response frequencies and associated mode shapes. The experiment mimicked the vibrating plate experiments of Ernst Chladni dating back to the early 19th century. The plate is supported by a post in the center, creating free boundary conditions on all edges. The support post is driven by a mechanical shaker using sinusoidal excitation and a custom LabVIEW interface to control input frequency and amplitude. A custom Chladni demonstration apparatus is used to apply sand to the vibrating plate. Vibrations were applied over a band of frequencies and the mode shapes experienced by the plate were illustrated as patterns in the sand allowing them to be seen with the naked eye. Photographs of mode shapes are taken at multiple resonant frequencies as determined by peaks in the perceived acoustic radiation levels. Solidworks was used to create a finite element simulation of the plate with the set parameters. The simulation indicated how the plate should react at varying frequencies by predicting the mode shapes. The data gathered are compared to the plate theory predictions and the finite element simulations.

UO6

Three Dimensional Atmospheric Property Measurement System to Support Modeling of Acoustic Propagation in the Littoral Environment

Melissa Ann Hall, Teresa J. Ryan

Military operations in the littoral environment are conducted for reasons ranging from infiltrating enemy lines to conducting reconnaissance and gathering information. The safety of our warfighters relies heavily on avoiding detection. Radar is a key military tool for detection but the technology for radar stealth is much different from acoustic stealth. The atmospheric acoustic problem has not been studied as extensively as radar in air and sonar underwater. The atmosphere is an inhomogeneous medium and it is important to know the different atmospheric parameters because they affect acoustic propagation. One of the strongest factors affecting propagation is air temperature. A temperature inversion, where it is cooler closest to the ground and warmer as height above ground increases, results in sound waves that travel slowest closest to the ground and increase speed farther from the surface. These wave speed differences cause the sound wave to bend downward, refracting more sound energy toward the surface. This phenomenon, called an acoustic duct, makes distant sound sources more audible during a temperature inversion. This work uses a compact, lightweight sensor to measure temperature, humidity, pressure and GPS location. Measurements will be taken across a range of horizontal distances and at varying

heights from ground level to approximately 100 meters. The goal of this work is to understand the required spatial resolution of these atmospheric parameters in order to design and implement a three dimensional atmospheric mapping system. This atmospheric measurement system will support related efforts in modeling acoustic propagation. Being able to accurately measure atmospheric parameters will allow for effective acoustic modeling that can be used to plan offshore movements with less probability of detection.

UO7

Design and Adaptation of a LabVIEW Controlled Scanning Laser Doppler Vibrometer

Matthew Robert Bogard, Dr. Teresa Ryan

A Laser Doppler vibrometer (LDV) is a highly sensitive, non-contact measurement method for the surface velocity of a single point on a vibrating structure. Fundamentally, LDV measures the frequency shift of a reflected laser beam to characterize a moving surface. Single point measurements are sufficient for some applications. Commercially available scanning systems typically steer the laser using a mirror to measure the vibration of flat planar surfaces. For more complex non-planar geometries, two-dimensional scanning techniques cannot accurately characterize the structure. A three-dimensional scanning LDV enables full characterization of both simple and complex surface geometries. A system of three high-resolution linear translation stages are the physical foundation for the East Carolina University (ECU) scanning LDV system. An existing LabVIEW framework for a five-axis scanning LDV is being adapted for use with the ECU hardware. Quality LDV measurements require physical repeatability which involves coordination of hardware and software. Laser focus has a significant impact on the quality of the LDV measurements. Other systems require hardware such as a laser range finder or other profilometry to optimize the focus of the laser. The system at ECU alternatively uses signal level feedback from the vibrometer itself to determine the three-dimensional scan geometry. For each location in the x-y plane to be measured, the laser height is adjusted in the z-direction to maximize the signal level. This ensures optimal laser focus for each location and, thus, improves the quality of the LDV measurements. In addition to the optimization of laser height, the mechanical system must be reliably repeatable. This repeatability is accomplished by using a homing routine to initialize each scan. The homing routine defines a fixed coordinate system to allow for accurate placement of the LDV beam within the measurement space. This work summarizes the development of subroutines for both the homing sequence and the signal level contour determination for the ECU scanning LDV system.

UO8

The Effects of Calcium Content in Soils on the Federally Endangered *Thalictrum cooleyi* of North Carolina Pocosins and Pine Savannas

Ivy Catherine Culver, Dr. Claudia L. Jolls

Thalictrum cooleyi Ahles (Cooley's meadowrue) is a federally endangered, rare herbaceous species found in very wet, loamy pine savannas of North Carolina, Georgia, and Florida. Pine savannas are characterized by palustrine hydrology and oligotrophic, acidic soils. Some rare plant species are associated with high calcium soils (calcifiles). An unpublished report suggests that soils associated with populations of this meadowrue have different soil chemistry and plant nutrients than do soils where the plant is not present. Knowledge of soil and other habitat characteristics is crucial to *T. cooleyi* conservation. We collected soil field samples near and away from *T. cooleyi* plants at Shaken Creek Preserve, Pender Co., NC and had soil nutrients analyzed. Soil with*T. cooleyi* present was distinctive from that lacking *T. cooleyi*, i.e., higher mean pH (5.06 ± 0.14 vs. 4.51 ± 0.05), calcium content (718.55 ± 108.22 vs. 248 ± 33.16 mg/dm3), CEC (6.57 ± 0.53 vs. 4.48 ± 0.27 meq/100 cm3), and base saturation (59.89 ± 4.08 vs. 32.22 ± 2.66%). Such values are characteristic of sandy, clay-based soils of the Coastal Plain, considered relatively infertile soils. These results suggest that less acidic pH, higher CEC, base saturation, and calcium content may be associated with the presence of the plant. We also asked whether the soil nutrient, calcium, affects growth of *T. cooleyi*. In a greenhouse, we grew 57 total plants in Fafard 3B soil/sand mix, 19 plants in each of three treatments suggested by the literature: 1) none (control), 2) 0.5% (low), or 3) 2.0% (high) calcium by weight. We measured several growth responses of each plant every month for seven months. There were no significant differences in mean longest leaf length and number of leaves per plant among treatments. Not all plant growth metrics respond to higher calcium levels in the greenhouse, particularly in artificial soil mixes; plant response is complex and confounded. Soil characteristics such as base saturation and CEC also can affect aluminum content, toxic to plant growth. Whether caused by or correlated with *T. cooleyi* presents, soil type, including pH and calcium, plays an important role in distribution of this federally endangered plant species.

UO9

Seed bank potential and temperature as a germination requirement of Thalictrum cooleyi

Erika M. Dietrick, Claudia L. Jolls, A. Renee Fortner

Plant conservation efforts strongly rely on knowledge of seed

biology for species restoration. Knowledge of seed viability, dormancy, and germination all contribute to our understanding of the seed bank, seeds dormant in the soil that contribute to population recruitment. *Thalictrum cooleyi* Ahles (Cooley's meadowrue) is an endangered perennial herb endemic to the fire-dependent pine savanna ecosystem of the southeastern US. Virtually nothing is known of its seed biology. We studied the germination requirements and seed bank potential of Cooley's meadowrue, specifically, response to temperature. We divided 300 seeds randomly, as three replicates of 50 seeds each in Petri dishes on moist sand, among four treatments with either the presence or absence of 2.5 min high heat and/or cold stratification. Seeds were then exposed to 3-4 wk of germination conditions (25:15 ºC, light:dark) in the laboratory. We also tested seed bank potential by comparing germination of 1) bags of seed buried in the pine savanna, 2) seeds in outdoor pots in Greenville, NC, and 3) control seeds germinated in the laboratory. Overall, we had 61% germination across all treatments. Student t-tests showed that high heat did not promote germination of Cooley's meadowrue. Cold stratification increased germination three-fold and seeds readily germinated after a winter outdoors. Longer periods of cold (8 wk) yielded higher germination rates than did shorter periods (2 wk). Thus, a period of cold is required to break dormancy in Cooley's meadowrue, corroborating previous work. This work suggests that Cooley's meadowrue has the potential to form a transient seed bank of at least one year. Our research offers new knowledge of seed biology which can aid conservation of Cooley's meadowrue, specifically, methods for restoration and possible impacts from global warming.

UO10

Suppression of claudin-7 enhances human lung cancer cell survival

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Claudin-7 belongs to a group of tight junction membrane proteins that play vital roles in many human diseases including human lung cancer. Lung cancer is noted to be the leading cause of cancer death for both men and women in the United States, with statistics reporting mortality rates as high as 85% and five-year survival rates as low as 15%. Lung cancer is especially prominent in North Carolina where there is a historical background of tobacco production, and its use is quite prevalent. Our current study focuses on the role of claudin-7 in human lung cancer cell survival under the exposure of tumor microenvironment. Hypoxia is one of the tumor microenvironment conditions and plays an important role in cancer progression. To achieve the hypoxia condition, HCC827 human lung cancer cells with normal claudin-7 expression (control) or with claudin-7 knockdown (KD) were treated with 1% O_2 (hypoxic) for 3 days. The cell counting assay showed that the percentage of dead cells were significantly lower in KD cells compared to that of control cells. The immunofluorescent staining analysis also supported our finding through depicting the decreased expression of cleaved PARP in KD cells than that in the control cells ($p<0.05$). Reduced cleaved PARP expression means the cell survival is better since the cleaved PARP signal is activated in cell apoptosis. Western blot results further confirmed that the suppression of claudin-7 promoted cancer cell survival and reduced cell apoptosis. These results support our hypothesis that claudin-7 has a tumor suppression role in human lung cancer growth and suppression of claudin-7 enhances lung cancer cell survival under tumor microenvironment hypoxia condition through inhibiting cell apoptosis. This study is supported by 2015 Undergraduate Research and Creative Activity Award from ECU Division of Research and Graduate Studies.

UO11

The Morphological Characteristics of Step-pool Systems in Tropical and Non-Tropical Environments

Elisa G Alfonso

Researchers over the past decades have examined the formative processes, morphology, and stability of step-pool systems. Step pool streams display an alternating pattern of near vertical drops called steps (ribs of large particles deposited across the width of the channel), scour holes (consequent pools), and mild-sloping treads. These features reduce kinetic energy caused by water, which otherwise erodes the channel. Therefore, they greatly reduce channel erosion, consequently increase channel bed stability, and also represent an ecologically stable riverbed formation in mountain streams. The variation in water depth and velocity allow for great diversity in terms of the habitats available, as well as a great degree of biodiversity. Consequently, studying these bed forms is crucial, and studying the morphology of these bedforms informs our understanding of their stability and formative processes. Here, my research examines the data collected from these systems in nature, which runs counter to a majority of the recent studies that have relied on physical modeling approaches to understanding these complex features. Furthermore, the bulk of the research to date focuses on step-pool formations in non-tropical environments. This paper will combine the data collected at a tributary to the Rio San Lorencito in Costa Rica with that of tropical and non-tropical site data collected from the publications of other authors in

order to compare and see if morphological/geomorphometric (form quantification) differences exist between the two different environments. Geomorphometric and other environmental factors such as size of drainage basin, annual rainfall, and discharge measurements in the sites utilized in the research literature, as well as their percieved stability or instability, will serve as a model for predicting the stability or instability of our system in Costa Rica. The objective of this research is to gain a better understanding of step-pool morphology, to see if the morphological parameters previously accepted should be revised in the case of a tropical step-pool system, and evaluate the stability of our step-pool system.

UO12

The Effects of Coal Ash Pond Runoff on pH and Microbial Respiration in River Sediments

Sarah Elizabeth Judy, Dr.Marcelo Ardon-Sayao

Coal combustion residuals are by-products of energy production resulting from the burning of coal. The coal combustion residuals, or simply coal ash, are then cleaned from the furnaces and added to water to form a thick concoction which reduces the chances of the ash becoming airborne. In the United States, 32% of all the coal combustion residuals are placed into open, water filled containment ponds where the solids settle and the liquid excess is released into a natural water system. The addition of coal ash to river sediments from runoff has the potential to disrupt the river ecosystem by hindering the absorption of nutrients in the lower levels of the food chain which could, in turn, be detrimental to the higher levels of the food chain. The present study involved the collection of sediment samples upriver, downriver, and beside of a coal ash pond in Goldsboro, North Carolina. These samples were then transported to the lab and split into thirty-six labeled respiration chambers and the changes in respiration and pH were measured and recorded over time using a specialized probe. Preliminary analyses suggest that sediment pH was significantly lower upriver of the coal ash pond and significantly higher beside the coal ash pond. However, there seems to be no significant difference in microbial respiration when comparing the sediment samples from above, beside, and below the coal ash pond. By understanding the effects of coal ash spillage from the electricity industry specifically on soil pH and cellular respiration, we will be able to better learn how it can upset the aquatic ecosystems of rivers and develop a possible solution.

UO13

Understanding Justice Through the Myth of Perses: Reflections on Hesiod's *Works and Days*

Hannah H Forde-Smith

At some point during the 7th c. BCE, a shift occurred within the world of classical Greek poetry, introducing dramatic changes both culturally and stylistically. Working at the apex of this period was Hesiod, a poet responsible for a multitude of texts, three of which survive today (*Theogony, Works and Days,* and *Shield*). Hesiod's extant works can be defined as short, epic poems featuring unusual fusions of intense mythological genealogy and practical pastoral methodology. One ideal, however, dominated all others throughout his works: justice. *Works and Days* is grounded in Hesiod's concept of justice and his overarching belief that it had the ability to define our humanity. For Hesiod, justice was intimately connected with work. They were interdependent, inextricably linked, and imperative to living a moral life and establishing a moral economy. While Hesiod's obsession with justice and labor is evident throughout the *Works and Days*, what remains unclear is to whom the work was intended to address.

As readers, we are inherently charged with postulating why Hesiod chose to employ such a complex mode of narration and such an intricate manner of storytelling. Rather than expanding on the Prometheus myth or taking the opportunity to offer advice to his wayward brother, Hesiod is using *Works and Days* as a way to engage in a more profound treatise on justice. Throughout centuries of academic inquiry and speculation on *Works and Days,* the myth of Prometheus and the apparently nonfictional presence of Perses have been repeatedly treated as if apparently disconnected. Scholars have disregarded and continuously deemphasized any possible deeper, allegorical meaning and connection between the two. I would argue that this represents a critical problem in terms of reading and understanding Hesiod. I would further argue that the presence of Perses is an element of figurative language, a literary straw man, a myth carefully designed to teach a more profound lesson, the implications of which cannot be overstated. To read *Works and Days* too literally, too historically, and too biographically, is to lose the true meaning of Hesiod's message. Despite being almost 2700 years old, *Works and Days* still has something to offer, especially when approached in an original and novel way. My research will be rigorous and will be comprised of a number of various avenues of inquiry including, comparative analysis, both intertextually and intra-textually, as well as literary criticism.

UO14

Is Fast Food Really the Culprit? A Fight against Obesity

Trenton Gray Clayton

East Carolina University students see fast food all day – driving through town, strolling around campus, or even walking through the football stadium. Some people attribute fast food to obesity, while others attribute personal choices to obesity. Obesity, however, is now a major disease, reaching epic proportions globally – with more than 1.9 billion adults overweight, and at least 600 million of them clinically obese (WHO). Obesity can be linked to chronic disease and disability, ultimately leading to death. New research from the Harvard School of Public Health has shown that obesity can actually result from spontaneous mutations in single genes, so-called monogenic mutations. While both genetics and personal choices can affect the likelihood of getting obesity, can fast food also cause people to become obese? In my research essay, I question the idea of fast food causing obesity. My research, which draws on published articles and government Websites, is based on four simple questions: does proximity to restaurants influence obesity, are increasing food portions causing obesity, are restaurants purposefully trying to make people fat, and are humans actually addicted to fast food? The persuasive claim I would like to present at the Research and Creative Achievement Week is the possibility that fast food does not cause obesity. People have been putting the blame on fast food for years, when, in fact, it seems likely that while fast food may be aiding to obesity, what people eat is ultimately their choice and is not a direct cause of obesity.

UO15

The Influence of Parental Involvement on Student Learning when Language and Cultural Barriers for Parents of ESL Students Exist

Morgan Rose Shelor

Linguistics research that evaluates best practices of second language acquisition must go beyond student-teacher interaction and should evaluate how parental involvement and parental treatment influences student outcomes. For the estimated 4.1 million English language learning students in the US school system, how parents are treated and involved in their learning becomes critical as it is well established that having one's parents involved in his schooling improves his learning outcomes. I want to compile linguistics research and research about parent-school involvement and use it to evaluate the effectiveness, ethics, and practices of language-learning classrooms. I want to interview parents about how the schools treated them, especially for parents who have little English proficiency, whether they were included in parent activities and were they treated fairly and with dignity, whether their students were pushed to become mainstreamed before they were ready or found the assistance they needed, whether their native language and culture were honored or disrespected, and how language and culture barriers affected parent/teacher relationships.

UO16

Reimagining Home: 'Heimat' and Identity in Friederike Unger's 'Bekenntnisse einer schönen Seele' (1806)

Daniel J Franch, Dr. David L Smith

The term *Heimat* occupies an important role in German culture, literature, and the collective conscience of German-speaking people, likely because Germany became a nation state later than many Western European countries. Until 1871, Germany had been culturally, politically, and linguistically fragmented; unlike France or England, German speakers had no standard language and no central court. *Heimat*, or the notion of ""home,"" became especially important in German-speaking lands of the late 18th- and early nineteenth centuries because the term suggested a physical and social space Germans could call their own, one that held the promise of political and cultural stability.

My research is unique in that it analyzes the notion of *Heimat* in Friederike Helene Unger's 1806 novel *Bekenntnisse einer schönen Seele*. Ms. Unger's treatment of Heimat and its ramifications for personal/cultural identity are noteworthy for two reasons. First, Ms. Unger wrote the novel in response to a work by Johann Wolfgang von Goethe, the preeminent author of the day and one of Germany's most celebrated cultural icons, still today. Second, Ms. Unger was writing and publishing her work at a time when men dominated the literary market and discussions regarding Germany's cultural identity. As a woman writing in a decidedly patriarchal society, her work provides unique perspective on German culture and related concepts such as *Heimat* and patriotism—the latter of which is discussed generally by male writers and associated overwhelmingly with masculine identity (one way to show one's manliness was to fight as a soldier for his fatherland). In my reading of the novel, I am especially interested in how the German idea of *Heimat* is manifested through the protagonist Mirabella and her lover Moritz. I claim that Ms. Unger uses Mirabella and Moritz's relationship to demonstrate that humans need others in their lives to be complete, and that their feelings and actions reveal Ms. Unger's desire for Germany to develop both cultural and political unity. Moritz has the choice to either work in the Prussian bureaucracy or join the army and fight for Frederick the Great in the Seven Years War. He chooses to fight but dies tragically from a bullet that pierces his heart. Mirabella is devastated because she loses her lover and feels

incomplete and alone in a foreign land because she is away from her Heimat.

UO17

From Equality to Exclusion: Women's Roles in the Early Christian Church

Kathryn M. Medinas

The ordination of women in the modern church is a controversial subject evoking heated debate amongst Christians. Although ordained female pastors do exist, the overwhelming majority of people who stand behind a pulpit on Sunday are male. The Christian woman's expected roles vary with the discipline of each denomination, and even then members within the same congregation still may disagree on what a woman's place is. The most conservative disciplines might expect women to be completely submissive to their husbands, work quietly in the church kitchen, or forbid them from even leading the scripture reading at Sunday worship. Some others may limit women, though not as strictly; for example, a woman may teach a Bible study, but only to other women or children--she may not be allowed to have leadership over men. The opposite end of the spectrum does not differentiate expectations between women and men, and therefore women are able to participate and lead in any aspect of the Christian way of life. For the purposes of this research, I focus specifically on the ordination of women, since this characteristic demonstrates egalitarianism.

Not unlike any other religion with sacred texts, Christians use the Bible to explain how or why they practice their religion in a particular way. Consequently, it is often biblical scriptures which limit women's roles in the church, specifically scriptures found in letters written by the apostle Paul to the first century church. The first century church was simply a Jesus-following movement within Judaism. The letters addressing these communities are the most organic resource modern scholars have to understanding the foundation of Christianity. Therefore, because they are closest in time and space to the Pauline churches, these documents are used in this research to understand women's roles in these communities. By study of the New Testament era, Pauline authorship, and analyzing the original Greek text in which the New Testament was written, this research reveals that arguments which use Paul's letters to disqualify women from ordained ministry are misguided. In fact, under Paul's guidance, the first century church affirmed women. Women were regarded as equals in this movement, and they were leaders within the Pauline communities.

UO18

The Organizer's Handbook: A Framework for Effective Societal Change

William Conner Sokolovic, Juan J. Daneri

This paper aims to examine the techniques and tactics involved in the creation, organization, and management of movements for social and or societal change. My research, done across a wide variety of interdisciplinary topics, has shown that there are certain best practices that are conducive to effective change. In order to study these concepts, this study investigates a variety of topics that provide didactic support for my hypothesis, including but not limited to: name selection, communication and semantics, and image maintenance. This study demonstrates why some movements are successful in comparison to others, as well as offers advice on successful general practices based on this type of interdisciplinary research.

UO19

The Impact of Client and Auditor Gender on Auditors' Judgements: a Replication and Extension

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This study is a replication and extension of a previously published experiment specifically examining whether or not the gender of a client in relation to the gender of the auditor will influence the auditor's judgment. Within our instrument, a client provides unverified rationale as to why the value of the auditor's initially proposed adjusting journal entry (AJE) is incorrect and should be adjusted. The replicated instrument contains one randomly manipulated variable, the client's gender, and one measured variable, the auditor's gender. The dependent variable provides information regarding the influence of the client's rationale on the auditor's final AJE. In our extension of the instrument is the introduction of an additional manipulated variable potential impairment of independence. We test whether impairment of independence impacts the auditor's judgement and thus the amount of their proposed AJE.

UO20

Hobby Lobby: A Case of Values in Corporate America

Llora Harris, Brittany Little

Hobby Lobby, Inc. is one of the largest arts and crafts stores in America. As a privately owned company, Hobby Lobby is based and operated on the Christian beliefs of the David Green's family since it was founded in 1972. After the Patient Protection and Affordable Care Act (ACA) passed as legislation and was upheld by the Supreme Court in 2012, Hobby Lobby filed a suit with the Oklahoma court system. They stated that the health mandate of providing insurance for four specific life-threatening contraceptives for their employees (required by the ACA) went against their religious beliefs.

The case, Burwell V Hobby Lobby involved the Department of Health and Human Services' decision to sue Hobby Lobby for not following the mandate because it was a corporation. This specific case garnered tremendous national news coverage, social media buzz and even protests outside of several Hobby Lobby stores. On June 30, 2014 the Supreme Court made the decision that closely-held corporations can be exempt from providing certain contraceptives based on religious freedom. They concluded that the mandate and punishment went against their rights filed under the Religious Freedom and Restoration Act (RFRA) of 1993.

This case study examines the details and supporting arguments regarding the Supreme Court's decision in the publicly controversial case and Hobby Lobby's public relations management as a private corporation.

UO21

The Objectivity of Accountants' Judgments: A Replication and Extension

Samantha L. Dawson, John T. Reisch

This study examines accountants' objectivity in estimating the value of an account. Its purpose is to determine whether professional objectivity, in generating a fair and unbiased accounting estimate, will be influenced by the possible conflicts of interest. Students, proxying as accountants, completed an experiment to test the impact of two factors that could create a conflict of interest: a client's legal position and fee structure. We hypothesize that accountants will be influenced by their client's legal position when providing estimates, and will be even more influenced when there is the possibility of being paid a fee contingent on the estimate.

UO22

How do study abroad experiences impact students: A first hand account

Katelyn Paige Craft

Study abroad experiences are considered an important aspect of education within any field of study. Benefits include appreciation and understanding of cross-cultural behavioral differences, cultural and professional development of students, and students greater understanding of issues related to social justice and advocacy (Schwebe & Carter, 2010; Lumkes, Hallett & Vallade, 2012; Santos Figueroa, 2015). However, to date there aren't many studies that have documented how short term interdisciplinary study aboard experiences, such as those held for 9 or 10 days impact student learning and change their lives. Thus, this study makes an important contribution on this understudied topic.

In the present study the researcher examined the thoughts and perceptions of college students upon returning to the United States after a brief study abroad program in the Dominican Republic where the students also completed a service learning component. The students each wrote a synthesis essay detailing their experiences while on the study abroad trip, reflecting on how this study aboard experience impacted their learning and their life in general. Two researchers used the constant comparative analysis (Glaser & Strauss, 1967) to read through the reflective journals and formulate emerging themes. These themes were discussed, altered and changed and only after final consensus between researchers themes were formulated. The study lends insight into the importance of study abroad experiences for the students and draws implications for the higher education students and faculty who want to plan such learning experiences for the students.

UO23

The University of North Carolina at Chapel Hill Academic Scandal

Jessica Willard, Morgan Tilton, Taylor Bandi, and Elizabeth Brueck

The University of North Carolina at Chapel Hill was established December 11, 1798. UNC has earned a reputation as one of the most well known universities in the world. The NCAA's report stated 18 years of "unchecked" class work in the African and Afro-American (AFAM) Studies department is as the head of this investigation. This case addressed the steps UNC is taking to deal with the academic scandal and ways they are going to assure this doesn't happen again.

UNC has neither confirmed nor denied the allegations of academic irregularities. The school made attempts to push the blame on the academic department saying the athletics had no part in the scandal. The investigation reported that of the 3,100 students participating in these paper classes over half were athletes. These AFAM classes were known as GPA boosters, advisors would push students into these classes who were on scholarships or on sports teams to keep them in good University standing.

This Case demonstrates the importance of honesty and integrity. Since the University is so large and in the public eye the NCAA will have to make an example out of the UNC-CH to make sure they keep their credibility. The case also gives various outcomes since this is an ongoing case.

UO24

The True Believers of Islam

Cayla Mackenzie Rodney

Introduction: Islam, the world's second largest religion, but the number one most misunderstood. In the fore front of all news pieces and discussed in all political debates, Islam is suddenly being defined by acts of terror and extremism. With this grizzly association, the mass public sees this religion in a light it does not deserve and my project attempts to reverse this false affiliation. As an individual with no religious affiliation, I hope to create a common ground of respect for non-believers and believers of all faith.

Methodology: My project is a photojournalism piece that combines the words of Muslim students at East Carolina University with images of them doing every day activities they love. The written part of the piece discusses two main points: 1) the fundamental beliefs of Islam that each student practices in their life and 2) one piece of information that the individual student found most important to share with America about Islam. The written work aims to educate the audience on each individual while the images put a face to the platform. Forcing the audience to see the humanity. These portraits challenge the videos and images we see on the news that feature terrorists labeled as Muslims. My images prove that these Muslim students are not at all like the news proposes; rather they are just like you and me.

Intention: After completing this project, the second step is to inform the campus. With the final project compiled my aspiration is to have professors give me a few minutes of their class time to present to their class. Certain courses such as Ethnic studies, History classes, and Religious studies could greatly benefit from viewing this presentation. This initial step of educating East Carolina University's campus will hopefully lead to further outlets that will allow my project to inform others on and off campus. Aside from direct presentations, I plan to take this project on social media full force. Just as much as Muslims are being defaced on different sources of media, I plan to help rebuild this peaceful religion's reputation starting with my community. Through my resources and the many people who helped me create this project, I know the message will reach a large audience. With the combination of on campus forces and social media outlets, this project will greatly influence the American perception of Islam. My hopes are for people to realize that this is a peaceful religion that deserves respect and understanding.

UO25

Abercrombie & Fitch Case Study

Ellen Grace Lee, Morgan Comer, Olivia Richmond

Abercrombie and Fitch, a nationally known clothing store, has recently had decrease in sales and popularity. This study examines the Public Relations issues surrounding Abercrombie and Fitch and their diversity policy specifically through the Equal Employment Opportunity Commission (EEOC) vs. Abercrombie and Fitch Supreme Court case. The EEOC claimed that the company violated Title VII portion Civil Rights Act of 1964 when Abercrombie and Fitch denied Elauf was denied a job because her hijab violated the company's "Look Policy." The Supreme Court ruled 8 to 1 in favor of Elauf. However, this is not the only issue. Abercrombie and Fitch has been in the media for other countless previous offences. They are also most recently being sued by 62,000 employees. This case study will examine the causes of Abercrombie and Fitch's decline and public backlash, compare Abercrombie's diversity policy amongst their competitors and analyze the company's business strategies and public relations tactics.

UO26

Rape Culture in American Society – What Factors Influence Citizens' Opinions toward Rape Victims in the United States?

Victoria Ruth Eaton

Often victims of sex crimes are reluctant to report their incidents to authorities for fear of facing persecution by juries. About one in eight women are raped and the percentage of case dismissals due to victim withdrawal is 51 percent for rape, compared to 47 percent for robbery and 64 percent for nonsexual assault (Flowers 2006). This new law could lead to rape victims seeing their assailant in living spaces and classes, as the university

would not be able to take action without involvement from law enforcement. Victim withdrawal from prosecution has been linked to the notion of victim-blaming in American society (Hocket et al. 2015). Research has shown that the victim is often questioned about what he/she was wearing; how much he/she has had to drink; whether or not he/she was alone, and several other incriminating, victim-blaming pieces of evidence (Vonderhaar and Carmody 2015). Scholars have done extensive research in this field, but a majority of studies are done in the context of university culture. While victim blaming has been explored and discussed in the literature, there has not been a comprehensive study that compares victim blaming on college campuses versus the larger population. This study is intended as an analysis of public opinion. The purpose of this study is to examine victim blaming inside and outside of the university culture and draw comparisons between victim blaming among young college students and the rest of America. A literature review and research design are used to test victim-blaming. Two methods are used to sample two target populations: East Carolina University students and the United States adult population. These methods of distribution are the university survey system called ECUQualtrics, and Amazon's Mechanical Turk, a paid survey distributor. This medium has been shown to provide the most valid general sample (Berinsky et al. 2012). The following survey will generate empirical, quantitative data that are analyzed through multivariate regression analysis. The independent variables are gender, sexuality, age, political ideology and whether or not the participant is a college student. The dependent variable is degree of victim blaming.

UO27

Examining Motivational Factors that Influence the Likelihood of Fraud

Samuel Roebuck, Dr. Linda Quick

In partial fulfillment of my undergraduate Honors College requirements, I have conducted the research study described in this paper investigating the motivational factors that influence the likelihood of fraud. In recent past, corporate America has seen some of the largest fraud scandals in history. This research study examined motivational factors, used as independent variables, money, ideology, and coercion to see how participants responded to hypothetical scenarios in which they had to make a decision on revenue recognition. By distributing online surveys, I collected preliminary data supporting the idea that ideology potentially is a stronger motivational than money or coercion. By analyzing and running tests through SAS Analytical Software, the data directionally supported my hypotheses. Additional data will be collected in the coming months to provide further support for my hypotheses.

UO28

Audience Inequality in Sport: Track and Field vs. Popular Sports

Pol Solanellas

Track and field represents the oldest form of organized sport, yet it is not the most practiced or the most supported by the general public. Instead, contemporary sports such as football and soccer play primary roles in the lives and hearts of sport. Particular dynamics influencing this emerge in different cultures, communities, and scenarios, and this article explores how changing these dynamics can be used to affect track and field's popularity in today's society. Several notable elements that may be involved in excluding this sport from its potential role include: team aspects; cultural differences between continents; the "game" element; personal identification with a team; approachability of the sport; and, finally, mass and social media. It is worthwhile to consider these aspects collectively rather than individually in order to allow track and field to gain an audience representative of the effort, and skill of its athletes.

UO29

Development of a Meal Creation Tool to Assess Knowledge and Preference among Preschool Children

Sarah Lisson[1], Shannon Bolyard[1], Archana Hegde, PhD[1], L. Suzanne Goodell, PhD, RD[2], and Virginia Stage, PhD, RDN, LDN[1]

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Knowledge and preference towards healthful foods can help researchers better understand developing health behaviors; however, few validated tools are available to evaluate these constructs among young children. The purpose of this study was to develop and pilot-test a Pictorial Meal Creation Tool (PMCT) to assess preschool children's knowledge of and preference towards healthy foods and beverages commonly served during snack and mealtime. Researchers developed and cognitively evaluated 32 high-quality photographs of foods and beverages. The final PMCT featured 20 photographs presented to children in five groups (four photographs/group): snack, main entrée, fruit/vegetable side dish, dairy/grain side dish, and beverage. The PMCT was administered to 32 children in three early childcare centers on two separate sessions: (1) knowledge was assessed by asking children to select a healthy snack, meal (entrée, two side dishes), and beverage for a proxy teddy bear; (2) preference was assessed by asking children to select a ""preferred"" snack, meal, and beverage for themseleves. Data were analyzed using

Spearman's Rho and Wilcoxon signed-rank tests. Foods were ranked from least healthy (1) to most healthy (4). No significant differences between the selected ""healthy"" and ""preferred"" snacks (H=2.50±1.38; P=2.00±1.08), meals (H=2.31±.65; P=2.14±.48), or beverages (H=2.20±1.19; P=1.87±.97) were observed; however, children's ""healthy"" selections ranked higher on average. Photographs are a promising way to assess knowledge and preference among preschool children. The application of PMCT to assess children's food preferences is promising; however, further research is needed to determine the efficacy of these methods to assess knowledge. Further validation research in a large sample is warranted.

UO30

Student Co-teaching in a Postsecondary Foreign Language Classroom

Paige A Vaughan, Daniel Franch, Dr. Jill Twark

Co-teaching is "two or more professionals delivering substantive instruction to a diverse, or blended, group of students in a single physical space" (Cook & Friend 1995). Much of the literature that exists on co-teaching focuses on its effects in special education classrooms or classes with special education students. The present study examines the question: How does co-teaching in a foreign language classroom affect student teachers personally and professionally? Our study involves being co-teachers with Dr. Jill Twark, a German professor in the Department of Foreign Languages and Literatures. Together we each co-taught a section of German 1001 with Dr. Twark in the fall 2015 semester. The present study involves two steps. First, a literature review was conducted on co-teaching methods and strategies in the foreign language classroom. Literature on co-teaching in non-foreign language classrooms was also surveyed to expand our knowledge base. An important hypothesis that we wish to present at the Research and Creative Achievement Week is that co-teaching provides an innovative mentoring opportunity for undergraduate students by improving students' skills in planning, delivering instruction, and assessing. Second, we determined what methods worked best using the data from our personal reflections, class observations, assessments, and co-teaching surveys conducted with the students from two co-taught German 1001 classes. The present study contributes to existing research within the field of foreign language education and informs practice and policy.

UO31

Morphosyntactic variation of subject pronoun expression in an emerging dialect of Spanish in eastern North Carolina

Anna A Lawrence & Stephen A. Fafulas

For the past several decades, the Spanish-speaking population in eastern North Carolina (eNC) has been increasing rapidly. While much is known of other Spanish varieties spoken in urban regions in the United States (US), little is known about the formation of Spanish communities in the rural south, a relatively new area for Hispanic immigration. This project aims to fill that gap by: 1) documenting the socio-demographic and linguistic characteristics of this specific population through sociolinguistic interviews and participant questionnaires, and 2) analyzing the results in order to add to our knowledge of Spanish morphosyntax by noting specific properties that make this emerging Spanish community's dialect different than other bilingual Spanish varieties around the US.

The methodology used in the current study includes: (a) collections of speech samples through sociolinguistic interviews, (b) targeted narrations of Mayer's "Frog, Where Are You?" picture book, and (c) participant profiles through a Background Language Proficiency (BLP) questionnaire. The speech samples have been transcribed, and analysis is ongoing. Specifically, we target the (non)expression of verbal subjects as our dependent variable. Because Spanish permits both null and expressed verbal subjects (1a), while English typically permits only the latter (1b), we test the effects of bilingualism and language contact in the spoken Spanish of this speech community.

(1) a. (Ø) Fui al supermercado vs. Yo fui al supermercado

(1) b. I went to the supermarket vs. (Ø)Went to the supermarket

We relate this (non)expression of verbal subjects to the amount of time that participants have spent in eNC. We hypothesize that the Spanish spoken in this particular community will express a higher rate of explicit subject expression with increased duration of residence in eNC, and will contrast from that of other bilingual Spanish communities in other regions of the US, particularly when compared to more urban regions.

Our study fulfills a core mission of East Carolina University (ECU) in establishing ties with the local community, particularly this minority group. It also meets the goals of ECU's SoCIOLing Lab (https://blog.ecu.edu/sites/sociolinglab/), which aims to document languages and cultures in eNC.

UO32

"There is no longer Jew or Greek, there is no longer slave or free": The Civil Rights Movement and the Methodist Church in North Carolina.

Tyler Houston Moore

Honors College, East Carolina University

The Civil Rights Movement was a transformative period in United States History. This era of great change is undeniably tied to religion, with the most important events during this period occurring in the South, also known as the "Bible Belt." While the Civil Rights Movement was a national movement and was influenced by not only many forms of Christianity, but many religions, this study focuses on one state and one Christian denomination. North Carolina was not a hotbed of action for the Civil Rights Movement like Alabama or Mississippi, but the state struggled with integration and issues of race like any other southern state. The Methodist Church was not particularly known as being a leader on issues of civil rights or racial justice. This study attempts to examine the average Christian denomination, in an average southern state. The Methodist Church in North Carolina, and the Methodist Church as a whole, remained segregated until 1968. This lack of change was due to the diverse array of opinions among both clergy and laity on the issue of race. The hypothesis I desire to present at the Research and Creative Writing Week is that while the Methodist Church in North Carolina attempted to ignore the Civil Rights Movement initially, it began to slowly embrace integration and civil rights as the movement progressed. In short, the Methodist Church was not shaping society at the time, but was being shaped by it.

UO33

Uptown Greenville Master Plan: Abstract and Statement of Purpose

Zachary Alan Pate

Greenville, North Carolina is a rapidly growing, small city located in the heart of Eastern North Carolina. Known as the educational, cultural, commercial, industrial, and medical hub of the eastern portion of the State, Greenville is poised to have a very bright future. With a current population of nearly 93,000 within the city limits, Greenville has experienced explosive growth, more than doubling in population over the past 20 years. Fueled by the continued growth of East Carolina and the Vidant Medical Campus, these trends should continue into the foreseeable future.

As Greenville has expanded into the countryside of Pitt County, suburban commercial and residential development had all but nearly eliminated commercial activity in the Center City. This trend has been common across the United States, with rapid suburban expansion draining the lifeblood from the traditional downtown core of American cities. Up until very recently, Uptown Greenville had experienced significant decline in economic activity, as many businesses fled to the outskirts of town.

Today, Uptown Greenville's fortunes are changing rapidly. Public investment in various aspects of Center City revitalization have sparked a flurry of proposed and completed private development projects. A push by local leaders to create a more viable, walkable, and vibrant Uptown core has been reflected in these developments and proposals, as these projects are multi-story, zero lot line projects that are creating a true ""urban atmosphere"" Uptown. Most of these projects have incorporated multiple land uses, such as residential above street level retail, yet some of the latest proposals have not.

As private interest in Uptown development grows on a daily basis, taking from the success of projects that have been recently completed, community leaders have expressed the need for a comprehensive, Uptown Greenville Master Plan. The purpose of this Plan is to guide growth and enhance the quality and aesthetics for future developments Uptown. The need for this is exasperated even further given the very limited land area present in the Center City. Growth Uptown should be thoughtful, have active street level uses where ever possible, and should be of the highest and best use for the site it is built upon. This plan will address these issues and act as a guidebook for future developments in the Uptown area of Greenville.

UP1

The Connection between Microglia and ΔFosB in Nicotine-Induced Sensitization to Drugs of Abuse

Kristen Taylor Lane

During adolescence, exposure to nicotine can lead to the brain's sensitization to other drugs of abuse later in life. ΔFosB is a transcription factor that comes from the FosB gene that plays a key role in the sensitization process. Nicotine is a psychoactive drug that is known to increase the levels of ΔFosB in the brain regions associated with drug reward and sensitization during the onset of puberty or adolescence in rats (Soderstrom et al. 2007). Microglia, the resident immune cells in the brain, also may play a role in the sensitization process. The goal of this project is to illustrate this role between microglia and ΔFosB through experimentation on periadolescent male Sprague Dawley rats. Minocycline, tetracycline antibiotic known to suppress microglia activation, was used to determine whether microglia activation plays a role in ΔFosB induction during early adolescence. Once daily intraperitoneal injections were done for a period of 10 days, PND 35- 44, the days that bracket the onset of puberty in rats. Rats used in this experiment were divided into four groups: 0.4 mg/kg nicotine, 30 mg/kg minocycline, minocycline 30 minutes prior to nicotine, and a vehicle control. Immunolabelling and cell counts were done for ΔFosB. Nicotine alone increased the density of ΔFosB immuno- labeled neuronal nuclei in the dentate gyrus of the brain by 34% from the control. Additionally, the minocycline pre- treatment 30 minutes prior to nicotine administration reduced the amount of ΔFosB present by 15% from nicotine treatment alone. From the results so far, it can be concluded that these minocycline pre- treatments inhibit nicotine's facilitation of ΔFosB expression in the dentate gyrus. This also suggests that microglia activation may play a role in ΔFosB induction, since minocycline inhibits microglia activation.

UP2

The Transgenerational Effects of High-Fat and High-Sugar Diets and Exercise on the Development of Drosophila First and Second Generation Offspring

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With the childhood obesity rates increasing, it is imperative to understand the effects of different diets and activity on offspring development. While studies have shown maternal high-calorie diet is a significant risk factor for the offspring's sexual dimorphism and metabolic conditions, emerging evidence suggests that obese and diabetic fathers may also contribute to offspring metabolic phenotype. In this study we asked whether different diets and exercise of fathers may produce an effect on offspring development; including time of development, male female ratio, and offspring activity levels. Drosophila Melanogaster represent a unique model for transgenerational studies because of its well-known genetics, short life cycle, well-defined developmental stages, and fast reproduction rates. Development of the F0, F1, and F2 generations were analyzed by observing the first day of appearance of larvae, pupa, and adult, and by collecting daily larvae and pupa on each tube wall until the first adults hatched. The total number of adults was obtained by counting the number of males and females produced in each tube for nine days after the first adult appeared. Male Drosophila fathers in this research were put on a control diet for 3 days then high-fat, high-sugar, and control diets for 5 days. After 5 days of being on a diet, all male flies were mated with control virgin females on control food. Previous experiments showed there was a significant difference ($P<0.001$) in the time required for both larvae and pupa to first emerge between the high-sugar diet and all other treatments in F0 and F1. We observed a significantly accelerated rates of adult flies emergence in F1 vs F0 in all examined groups. The observed differences indicated a significant change in the rates of development in the F0 offspring compared to one another and to the control father group due to paternal diet. No significant differences between the ratio of males and females and overall number of males and females produced from the F0 and F1 groups were observed. Overall, the data suggested different diets of fathers have impacts on the rate of development of their offspring.

UP3

Altered regulation of E2f1 in Drosophila germline stem cells

Taylor D. Hinnant and Elizabeth T. Ables

Like embryonic stem cells, many adult stem cells undergo a modified cell cycle that lacks the canonical gap or growth phases found in differentiated cells. Growing evidence suggests that some regulatory pathways dictating cell fate are associated with the cell cycle machinery; however, the molecular connections remain unclear. The Drosophila ovary is a well-characterized organ that contains a population of stem cells, known as germline stem cells (GSCs), which serve as an exceptional model for study of cell cycle control in stem cells. The ability of Drosophila

ovaries to create mature oocytes depends on the maintenance and proliferation of GSCs, just as many other tissues rely on their tissue-specific stem cells to maintain tissue integrity. The proliferative ability of GSCs, and other tissue-specific stem cells, must therefore be tightly regulated. To further understand this regulation, we characterized the Fluorescence Ubiquitin Cell Cycle Indicator (FUCCI) system in GSCs. We found that the transcription factor E2f1, normally destroyed in early S phase, is present throughout the entire cell cycle. E2f1 is responsible for transcriptional regulation of many genes required for the entry of a cell into S phase, making it an important component of proliferative control. However, loss of E2f1 has only minor affects on maintenance of the GSC fate. Additionally, proliferative and maintenance control may not be dependent on the degradation of the E2f1 protein, as a non-degradable mutant does not cause any defects in this aspect. These findings provide further insight into the regulation of the balance between maintaining cell fate and proliferation in these asymmetrically dividing cells.

UP4

BAY 41-2272 attenuates arterial smooth muscle cell migration in Smad3-dependent manner

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Cardiovascular disease (CVD) is the leading cause of death and illness in the United States and worldwide. Smooth muscle cell (SMC) migration and secretion of extracellular matrix materials are key components of adverse vascular remodeling which is associated with this disease pathology. Cell attachment mediates adherent cell migration and is largely dependent upon integrin binding, matrix metalloprotease balance, and extracellular matrix expression at the leading and lagging edges of migrating cells. Intracellular Smad3 is an important signaling factor that is associated with pro-growth phenotypes and that is involved in a number of vascular growth disorders including atherosclerosis and fibrosis. Because uncontrolled SMC migration and deposition of extracellular matrix are critical components of CVD, the purpose of this project is to determine Smad3 as a possible key mediator of growth factor-stimulated vascular fibrosis. Early findings from our lab using the pharmacologic cyclic GMP agonist BAY 41-2272 (BAY) have led us to theorize a promising mechanism through which pathologic vascular SMC growth can be regulated. Preliminary data in rat primary vascular SMCs suggest that BAY not only decreases migration but also decreases total and active Smad3 expression. In light of these findings, in the current proposal our hypothesis is that BAY induces vascular protection in the form of preventing cell migration and that this occurs in a Smad3-dependent fashion. To test this hypothesis we will use two genetic approaches to overexpress or knock-down intracellular Smad3 expression and then perform cell migration assays in the presence or absence of BAY. Using this approach, we will be able to accurately determine if Smad3 is responsible for our observed BAY-mediated growth protective phenotype. Conclusions from this study will increase our understanding of vascular biology and will also highlight a potential therapeutic target in Smad3 as capable of combating cell migration as a foundation of CVD.

UP5

The Involvement of the Protein Phosphatase Inhibitor PPP1R2 in Primary Cilia Formation

Nadiya Volodymyrivna Yerich

Every mammalian cell contains a primary cilium that is responsible for detecting environmental cues and transmitting these signals into the cell via numerous receptors on the surface of the cilium. Disruption of cilia formation has severe effects on growth and development of the organism. A class of genetic diseases, termed ciliopathies, results when defective proteins prevent growth of cilia or detection of environmental cues. Previous work by ourselves and others has shown that Protein Phosphatase-1 (PP1) and the kinases AurA and Nek2 are involved in the growth and retraction of cilia, with PP1 counteracting the effects of the kinases. We have recently identified an activator of PP1, PPP1R42 that stimulates cilia growth in the ARP-19 cell line. We hypothesize that another PP1 binding partner, PPP1R2, which is a negative regulator of PP1, would have the opposite effect on ciliation: the number of cilia in these cells will be reduced compared to the control. To do this, we overexpressed PPP1R2 by transfection of the PPP1R2 plasmid into cells followed by serum starvation to induce the cells to produce cilia. In order to detect cilia, we stained the cells with antibodies to acetylated tubulin, which is specific for microtubules of the cilia, and to gamma tubulin, a marker for the basal body at the base of the cilia. We then determined the percentage of ciliated cells in overexpressing cells compared to cells expressing a vector without PPP1R2. The results were less striking than when cells were transfected with the activating subunit PPP1R42; however, the number of cells producing less cilia increased resulting in a greater range of ciliation. This indicates that there may be some decrease in cilia, however the results were not significant. Next, we will measure cilia number in actively dividing cells and in cells where cilia are already disassembling in order to determine whether there is an effect of PPP1R2 overexpression under these conditions.

UP6

Early nicotine exposure altered larval neuromuscular function and adult germline apoptosis via miRNA-dependent mechanisms.

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MicroRNAs fine tune the expression of target genes needed for homeostasis. Our pilot study showed that nicotine altered 17% miRNAs in *C.elegans* larvae. Here, we plan to investigate the role of microRNAs in mediating nicotine-induced adolescent and adult-onset phenotypes: larval pharyngeal pumping, adult germ line apoptosis, and survival. Worms were treated with nicotine during the postembryonic stages with either 20μM and 20mM. For the pharyngeal pumping assay, videos were recorded for at least 15 worms/group to compute average pumps/sec. For adult apoptosis and lifespan assays, worms were washed off treatment before gametogenesis and allowed to grow till adulthood on nicotine-free media. Day 1 adults were stained with SYTO12 or acridine orange and apoptotic cells were counted for at least 50 gonads per treatment group. The remaining 200 worms were counted and transferred every 1-2 days until all worms died. Kaplan-Meier curves were used to compare the survival curves across treatment groups. Our data suggests that post-embryonic nicotine exposure inhibited pharyngeal pumping and increased germ cell apoptosis in WT, but not mutant worms. Due to the conservation of those signaling pathways, our results provide insights for miRNA-based treatment strategies for nicotine disorders in early and late stages.

UP7

The effects of acute exercise on POMC neuron activity levels in the arcuate nucleus of the hypothalamus.

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Background: Obesity is usually associated with defects of energy intake and energy expenditure, which are tightly controlled by the central nervous system, particularly, in the hypothalamus, Pro-opiomelanocortin (POMC)-expressing neuron is a key regulator of energy metabolism. While much is known about the role of pro-opiomelanocortin (POMC) to control energy expenditure, less is known about how forced energy expenditure may activate these neurons.

Methods: 3 month old AgRP-Cre/B6 mice (n = 6) were randomly assigned to the treadmill exercise group or sedentary group. The exercise group was introduced to a treadmill and then ran at a speed between 12-13 M/min on an incline (8.75% grade) for a duration of an hour. The control group was introduced to the treadmill and spent 60 minutes at treadmill speed of 0 M/min. Mice were sacrificed immediately after the bout of exercise by intracardial perfusion. Brains were harvested and stored in 10% formalin for post-fixation. 30 μM sliding microtome sections were stained for immunofluorescence. Double immunofluorescence was conducted for POMC and cFOS, a neural metabolite of activation. To identify activation of POMC neurons, fluorescent images were taken and images were overlaid to count co-localization between POMC and cFOS.

Results: There were a significantly greater number of arcuate POMC and cFOS co-localized neurons in the exercise group compared to the control group. No difference in the arcuate POMC neuron count was observed between groups.

Conclusion: The significantly greater number of arcuate POMC and cFOS co-localized neurons in the exercise group indicates that the acute exercise activated POMC expressing neurons in the hypothalamus compared to the sedentary group. Activation of POMC neurons demonstrated in this study may contribute to exercise induced lean phenotype.

UP8

Effect of spinal cord injury on dopamine receptor expression and morphine responsiveness

Nzita M. Lutete, Jacob Yow, Kori L. Brewer Ph. D

Spinal Cord injury often results in chronic neuropathic pain that is frequently treated with opioids such as morphine. Morphine's effect on SCI pain decreases over time. Interactions between μ-opioid (MOR) receptor and the Dopamine (DA) receptors may play a role in this loss of effect. The objective of this study was to determine if SCI alters the expression of DA receptors in the spinal cord in a manner that might contribute to the loss of morphine responsiveness after injury. Prior to surgery baseline testing was conducting on 8 rats in which thermal pain threshold

and mechanical pain threshold were measured through the Hargreaves and Von Frey tests respectively. The rats were then divided into 2 groups, QUIS-injected (SCI) and Sham surgery (control). The animals were tested for sensory thresholds again 21 days post surgery. Animals were then tested again over a 3-day period after administration of morphine, a D1 receptor antagonist, or a mixture of the two drugs. Spinal cords were then collected and protein extracted for Western Blot analysis of DA receptor expression levels. Both morphine and the combination of morphine + D1 antagonist increased mechanical thresholds compared to the 21-day post injury levels ($p=0.04$ & 0.02, respectively). Thermal thresholds were significantly increased with the combination treatment ($p=0.03$) but not with morphine alone ($p=0.10$). Western blot results showed that there were no differences in DRD1, DRD2 or DRD3 expression levels in QUIS-injected vs. sham rats 25 days post injury. The results were not what was expected, which may have been due to the small group sizes or the severity of the lesion of the QUIS rats. Analysis of the spinal cord lesion showed only mild injury which may not have been severe enough to induce changes in protein expression. Future studies will need to decrease variability by increasing the group sizes and also confirm sufficient lesion in the injured animals.

UP9

Synthesis and Characterization of Novel Naphthalimide Fluorophores as Candidates for Drug Conjugation

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Many current chemotherapeutic drugs do not possess tumor cell selectivity and are therefore rendered ineffective due to off-target effects. The Van Dross lab has previously investigated the endocannabinoid arachidonyl ethanolamine (AEA) and its metabolites, which have been shown to selectively induce cell death in tumorigenic keratinocytes with minimal effect on healthy cells. Understanding the pharmacokinetics and intracellular properties of these drugs, such as uptake rates and intracellular concentrations, will provide information necessary for therapeutic dosing. To do so, we have chosen to attach naphthalimide fluorophores to AEA. Naphthalimides are relatively small, yet feature high quantum yields and structural variability at their "southern" (4-position) group. The purpose of this study is to characterize naphthalimide fluorophores to identify the best candidate(s) for drug conjugation.

In preliminary work, 4-amino and 4-morpholino naphthalimide fluorophores were synthesized and confirmed by ^{1}H-NMR and ESI-MS. The cytotoxicity of the amine and morpholine fluorophore core molecules was examined in JWF2 and HaCaT cell lines by MTS assay, a colorimetric test which uses reductase enzyme activity as a marker for the number of live cells present. The morpholine fluorophore caused minimal reduction in cell viability up to 20 μM in both cell lines, whereas the $-NH_2$ fluorophore caused a significant decrease in viability at 5, 10, 20, and 40 μM in HaCaT cells. Confocal microscopy showed a greater intensity of the morpholine fluorophore in the tumorigenic keratinocytes at 30 minutes compared to the non-tumorigenic keratinocytes. The 4-amino fluorophore demonstrated intense fluorescence in both cell lines. The morpholine fluorophore's lack of cytotoxicity and selective accumulation in tumor cells make it a preferred candidate for drug conjugation. It will be appended to AEA, as will other naphthalimides with desirable properties. Subsequent studies will use HPLC and mass spectrometry to determine if the AEA conjugates are metabolized by COX-2 (like normal AEA), and if so, if they induce apoptosis.

UP10

HTLV-1 basic leucine zipper factor directly interacts with small Maf transcription factors

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Human T-cell Leukemia Virus Type 1 (HTLV-1) is a complex retrovirus which preferentially infects CD4+ T-cells. Endemic to Japan, regions of South America, Africa, and the Caribbean, HTLV-1 is transmitted through breastfeeding, sexual contact, and contact with infected blood or blood products. In 5% of cases, HTLV-1 infection leads to Adult T-cell Leukemia (ATL) after a 40 to 60 year period of low viral activity. Diagnosis of ATL is equivalent to a death sentence as currently available treatments only serve to extend the life of patients by a few months.

HTLV-1 encodes unique regulatory and accessory proteins which are important for viral replication as well as modulating host cell activities. One of these proteins includes the HTLV-1 basic leucine zipper factor (HBZ). Clinical research reveals that HBZ is the only viral protein consistently expressed in patients with ATL, and *in vitro* transformation assays support that HBZ is important for cellular transformation. The exact mechanisms by which HBZ promotes cellular transformation are not known; therefore,

understanding the molecular biology of HBZ and other proteins is important for developing effective treatments for ATL.

HBZ is a nuclear protein that has been shown to interact with cellular transcription factors in the CREB/ATF and AP-1 families, as well as with coactivators including p300/CBP. These interactions regulate or deregulate expression of host cell and proviral genes. One focus in our laboratory is to identify and characterize novel interactions between HBZ and cellular proteins. HBZ interactome studies performed in our laboratory reveal that HBZ interacts with the small Maf family of basic leucine zipper (bZIP) transcriptional regulators. Leucine zipper dimerization between small Mafs and other compatible bZIP proteins allows them to be recruited to Maf Responsive Elements (MAREs) on the genomic DNA as transcriptionally repressive homodimers, or as transcriptionally active heterodimers. The goal of this project is to characterize the interaction between small Mafs and HBZ. We hypothesize that interaction between HBZ and small Mafs occurs directly through a dimerization of each protein's leucine zipper. We will use *in vitro* GST pulldown assays to address our hypothesis and confirm that this interaction is one of leucine zipper dimerization.

UP11

Effect of Achilles tendon moment arm on knee joint contact forces

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Musculoskeletal (MSK) models are used extensively in the study of human movement. The validity of a given MSK model is affected by the architectural features of the system. The Achilles tendon moment arm is one important architectural characteristic of lower extremity MSK models as it transforms ankle plantar flexion moment present during many functional weight bearing activities to Achilles tendon force. Because the gastrocnemius muscle, which crosses both the knee and ankle joints, inserts to the Achilles tendon, the magnitude of the Achilles tendon moment arm affects knee joint contact forces. However, current estimates of Achilles tendon moment arm vary widely and are apparently influenced by factors including ankle joint position, measurement technique, and muscle contraction level. For example, some estimates of Achilles tendon moment are a constant value while others vary as a function of ankle angle. Imaging techniques (such as magnetic resonance imaging (MRI)) to produce direct measurements of the Achilles tendon moment arm tend to be larger than those using ultrasound (US) technology. Finally, estimates of the Achilles tendon moment arm while plantarflexor muscles are contracted tend to be larger than those measured during a state of rest. The purpose of this study is to compare Achilles tendon force and knee joint contact forces during walking and running using a musculoskeletal model and five different estimates of Achilles tendon moment arm (MRI/contracted, MRI/rest, US/contracted, US/rest, constant value). Three dimensional gait and ground reaction force data from 10 participants will be used as inputs to a knee joint musculoskeletal model from which tibiofemoral joint, patellofemoral joint, and Achilles peak force and force*time impulse will be derived using 5 separate Achilles tendon moment arm estimates. Comparisons of the effect of Achilles tendon moment arm will be made using repeated measures ANOVA (alpha = .05).

UP12

Targeting GSK-3b to Prevent At- and Below-Level Pain Following Spinal Cord Injury

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Chronic neuropathic pain is a common and debilitating secondary consequence following spinal cord injury (SCI). SCI pain is classified as either at-level or below-level pain (several segments beneath the injury). Evidence from our lab suggests that GSK-3β activation may be a new target to reduce maladaptive nerve plasticity that contributes to this pain. The purpose of this study is to determine if early treatment with a GSK-3β activator (LY294002) will reduce the incidence of at- and below-level pain behaviors. Long-Evans rats received a dorsal horn injection of either quisqualic acid (SCI) or saline (SHAM-control). Animals received either LY294002 or the vehicle delivered once daily for 3 consecutive days following surgery. Below-level (evoked) pain responses were determined by measuring changes in noxious thermal stimuli and mechanical stimuli. Burrowing and the presence of overgrooming (at-level sensory disturbances) were used as measure of spontaneous pain. LY294002 significantly reduced the prevalence of overgrooming and the development of below-level evoked pain responses 22 days after SCI. Based on these results, activation of GSK-3b may represent a new therapeutic target to prevent the development of SCI pain.

UP13

Diet-induced obesity reduced aortic smooth muscle contractions via nitric oxide signaling in pregnant rats

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Introduction: Pre-existing obesity increases the risk of maternal and fetal complications during gestation and is associated with systemic vascular dysfunction. We hypothesized that diet-induced obesity would impair aortic artery contractile responses and endothelium-mediated relaxation in pregnant rats.

Methods: Female rats were fed for 3 weeks prior to pregnancy and throughout gestation either normal chow (LN-Preg, n=8) or normal chow plus lard and liquid sucrose (OB-Preg, n=8). Contractile responses to phenylephrine (PE, 10-9 – 10-5 M) were measured in isolated thoracic aortic segments in late pregnancy, in the presence and absence of inhibitors of ERK1/2 (PD98059, 10-5 M), nitric oxide synthase (NOS, L-NAME: 10-4 M) and cyclooxygenase inhibitor indomethacin (10-5M). Endothelium-mediated relaxation to acetylcholine (10-9 – 10-5 M) was also measured.

Results: OB-Preg aortic rings had reduced sensitivity to PE compared to LN-Preg arteries (%Contraction, OB-Preg: 86.4±6.78; LN-Preg: 137.0±7.80, $p<0.005$). NOS inhibition increased contractile responses to PE in OB-Preg arteries to a greater extend as compared to LN-Preg vessels and abolished the differences between groups (%Contraction, OB-Preg: 165.9±8.03; LN-Preg: 154.3±6.40). Contraction to PE in the presence of NOS and cyclooxygenase inhibition or ERK1/2 inhibition did not further increase contractile responses in either group. Additionally, there were no differences in relaxation responses to Acetylcholine.

Conclusions: In contrast to our hypothesis, pre-existing obesity reduces aortic artery contractile responses to α1 adrenergic stimulation in late pregnancy and this response appears to be mediated by NO signaling mechanisms.

UP14

SH3PX1 is required for follicle encapsulation in the Drosophila ovary

Jasmine Gabriel Hughes, Dr. Elizabeth Ables, Dr.Graydon Gonsalvez, Lawrence Hicks

Changes in cell morphology can have a dramatic impact on cell function. One feature of many migrating cells, including invasive cancer cells, is the formation of thin actin-based membrane protrusions called filopodia; however, the molecular mechanisms controlling membrane curvature during filopodia formation have not been fully described. Sorting Nexin-9 (SH3PX1 in *Drosophila*) is a protein that aids actin formation and the process of endocytosis. In *Drosophila* Schneider 2 cells, targeted knock-down of *SH3PX1* resulted in the formation of protrusions around the cell. Intriguingly, over-expression of *SH3PX1* also resulted in the formation of dramatic protrusions. It is unclear whether SH3PX1 plays similar roles in filopodia formation *in vivo*.

Follicle formation in *Drosophila* ovaries requires the activity of escort cells: triangular cells with long thin filopodia that wrap new germ cells and assist in their encapsulation by somatic follicle cells. Preliminary studies in my laboratory demonstrated that*SH3PX1* mutants have increased escort cell number and follicle encapsulation defects; however, it is unclear whether *SH3PX1* is required directly by escort cells for proper function. To test whether *SH3PX1* is both necessary and sufficient for escort cell function, I will independently examine the effects of overexpression and knockdown of *SH3PX1* specifically in escort cells. I will use immunofluorescence to mark escort cells in *SH3PX1* mutants and control flies and measure any potential changes in the number or morphology of escort cells. These studies will help us understand the biological role of membrane curvature, with future applications in cancer biology.

UP15

Developing a Musculoskeletal Model of Landing

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Anterior Cruciate Ligament (ACL) injuries are one of the most common sports related injuries that occur. These injuries result in loss of play time, are painful, and limit a person's quality of life while injured. ACL injuries often occur when a person is landing from a jump when the knee is close to full extension. However, it is not well understood why people adapt a landing control

mechanism which results in landing with an extended knee.

Musculoskeletal modeling is a useful tool to understand and predict how the body will act during a particular motion. By using simulated data, the exact control mechanism the model utilizes and the optimization criterion are known, allowing for a more robust understanding of the neuromuscular control mechanism of a particular motion which is difficult to obtain from experimental data. Additionally, there are few optimization control models for studying landing. Therefore, the purpose of this study is to develop a musculoskeletal model of landing to study the control mechanism of landing. We hypothesize that a model which minimizes acceleration of the head during landing will be the underlying control mechanism.

A subject specific optimized landing model will be developed using MATLAB. A 4 segment (foot, shank, thigh, head/arm/trunk) two-dimensional model with six muscle groups (soleus, gastrocnemius, vasti, recti, hamstrings, and gluteal) will be used. The model will be optimized to minimize the acceleration of the head. The model will be validated using experimental landing data collected from a 3D motion capture system.

UP16

Cognitive performance during a gait retraining program to address running mechanics associated with tibial stress injuries

Samantha Niland, Nicholas Murray, Michael Baggaley, Stacey Meardon, John Willson, Richard Willy

During basic combat training, tibial stress injuries (TSI) are particularly disabling, requiring enforced rest for 8-17 weeks and result in medical discharge in 39%-60% of Soldiers who sustain this injury. Impact forces during running have previously been associated with TSI. Gait retraining, with real time feedback from a wearable feedback computer, has been shown to reduce impact forces during running in healthy individuals. However, it is unknown if a similar reduction occurs in runners with a past history of TSI. Due to the myriad of tasks that require a Soldier's attention, it is essential that cognitive performance is unaffected by any TSI intervention. Therefore, it is essential that any gait modification does not have a negative impact on cognitive performance. For our study we are enrolling healthy runners from University and local running clubs who have had a history of TSI. The retraining protocol aims to reduce impact forces during running through a re-training protocol using a wearable feedback computer. First, baseline running mechanics will be assessed via standard motion capture procedures while each participant runs at their self-selected speed on an instrumented treadmill. As each participant continues to run on the instrumented treadmill, dual task performance will then be concurrently assessed by administering a cognitively demanding task ("go, no-go") via a large monitor mounted in front of treadmill. Next, participants will be cued to increase their running cadence by 10%, via a wearable feedback computer, and then to maintain the 10% increase in cadence while completing a second dual task as running data continue to be collected. Participants will then be issued a personal mobile feedback computer and asked to meet the 10% increase in running cadence during their next 8 training sessions. Participants will attend a final data collection in which running mechanics will be re-assessed with and without a dual task. We will assess a) the impact performing a dual task has on running mechanics; b) the effect an increase in running cadence has on impact forces in individuals with a past history of TSI; c) if the ability to match the new running cadence is affected by performing a dual task; d) if subsequent retraining sessions result in an increase in running cadence without impaired dual task performance while completing a cognitive task. We aim to enroll 8 participants by March 1st, 2016.

UP17

The role of intracellular metabolic regulators in metabolic reprogramming and inflammatory responses in macrophages

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INTRODUCTION: Cardiovascular disease, diabetes, and even cancers are seen as metabolically-linked diseases. Metabolism and immune response are closely interrelated processes. Metabolic imbalance, either through energy surplus or deficiency, can closely affect immune response. Specifically, macrophage behavior has been found to be closely linked to the metabolic environment of the human body. An accumulation of lipids triggers the pro-inflammatory M-1 response of the macrophage, which is linked to metabolic disease. However, unsaturated fatty acids trigger the anti-inflammatory M-2 activation, which is associated linked to protection of cells and wound healing. While this relationship is well studied, the mechanisms by which these activations are triggered are widely unknown.

PURPOSE: The purpose of this experiment is to determine the role of intracellular metabolic regulators in metabolic reprogramming and the corresponding inflammatory responses in macrophages.

METHODS: Bone marrow cells were harvested from wild type mice and then differentiated into macrophages. Macrophages

were exposed to LPS/γ-interferon or IL4 to stimulate an M-1 or M-2 response, respectively. Then, macrophages were lysed and the desired protein was isolated. The protein was evaluated by western blot for the presence of phosphorylated AMPK (pAMK) and phosphorylated AKT (pAKT).

RESULTS: The M-1 stimulation resulted in an increase in the phosphorylation of AKT. The M-2 stimulation had no effect on AKT. Meanwhile, the M-2 stimulation resulted in an increase in phosphorylated AMP kinase. Conversely, the M-1 stimulation had no effect on AMP kinase.

DISCUSSION: The phosphorylation of AKT may be important in regulating the metabolic response associated with the M-1 activation of the macrophage, the pathway responsible for metabolic diseases like cardiovascular disease, diabetes, and some cancers. AMP kinase may be important for the M-2 activation of the macrophage. It will be important to determine if exogenous fat will influence the extent of AKT and AMP kinase activation.

UP18

Use of MRI in assessing structural and functional aspects of the velopharyngeal mechanism: evolution, current trends, and future directions

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The velopharyngeal mechanism is comprised of a muscular flap that extends from the roof of the mouth to the back wall of the pharynx. The mechanism creates a seal between the soft palate and the pharyngeal walls. The seal creates a barrier to separate the oral and nasal cavities. The location of the mechanism and seal makes it difficult to obtain data from the muscles of the mechanism. In the past, videofluoroscopy and nasendoscopy were used to examine the mechanism. None of the tests allow for clear images of the underlying musculature. In recent years, magnetic resonance imaging (MRI) has been used to provide speech-language pathologists with accurate and precise images of the mechanism. The purpose of this paper is to discuss the evolution and current trends of the use of MRI in assessing the velopharyngeal musculature.

Studies regarding the use of MRI on the velopharyngeal mechanism differ in subject groups, variables, and condition stimuli. Fifty-three articles have been compiled and studied in order to obtain information. The ages of the subjects range from infants to adults. A majority of the tests were conducted on normal individuals. Other population groups include those with velopharyngeal insufficiency, submucous cleft palates, and syndromes like 22q11.2 deletion. A comparative discussion of the subject groups will occur. The need for research performed on children and clinically challenging populations will also be examined. The parameters regarding MRI and testing type has changed. The relevancy of the variables analyzed, the point of insertion and diameter of the muscles and others will be examined to see what has changed over the course of time. Studies have shown an evolution in MRI testing from static, rest conditions to phrase utterances. Changes in these condition stimuli will also be observed. A discussion of new test variables and condition stimuli will follow their respective section. The technology of MRI scanners has also evolved. Information about two-dimensional and three-dimensional scanners, the length of the scan, and the strength of the scan will be obtained in order to examine the improvements in technology. A discussion on the positive and negative implications of this change will be taking place. The future directions of MRI imaging in regards to the mechanism will be examined as well. The study provides comprehensive data on the use of MRI in assessing functional and structural aspects of the velopharyngeal mechanism.

UP19

Determining the role of the Early Gene at 23 in *Drosophila melanogaster* oogenesis

Radhika J. Kothadia, Dr. Elizabeth Ables

Drosophila melanogaster (fruit fly) females undergo oogenesis to create oocytes from undifferentiated stem cells in the ovary. Similar to estrogen in humans, the steroid hormone ecdysone in fruit flies has a known role in facilitating oogenesis. The ecdysone signaling pathway is highly studied as it can help us draw parallels between *Drosophila* and human reproductive processes. After ecdysone binds to an ecdysone receptor (EcR), EcR activates transcription of many genes, such as *E74*, *E75*, and*E78*. These early genes code for proteins that are essential for *Drosophila* tissue repair, development, and reproduction. One of the early genes, the Early Gene at 23 (*E23*), is thought to be a target of ecdysone signaling, but little is known about its function. Because *E23* is expressed in multiple cell types and highly expressed in *Drosophila* ovaries, we hypothesize that *E23* plays a role in *Drosophila* viability, reproduction, and oogenesis. To determine the role of *E23* in *Drosophila* viability and reproduction, flies harboring transposable element insertions in the *E23* locus were analyzed for potential mutant phenotypes. Our experiments using these lines suggested that *E23* is not needed for viability or reproduction. We also tested whether *E23* affects oogenesis in more subtle ways, using high-resolution confocal

microscopy. However, results indicate that *E23* does not affect oogenesis or the development of a mature egg. Although my data currently suggests that *E23* is not needed for the survival of *Drosophila*and its offspring, it may have other important functions within the fruit fly.

UP20

Can Early Life Exposure to Lead Impact Synaptic Loss in a Transgenic Rodent Model with a Predisposition to Alzheimer's Disease?

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Alzheimer's disease (AD) is a leading cause of death in the United States for the oldest portion of the population. A growing body of evidence suggests that in addition to genetic susceptibilities, early-life events can increase a person's risk of developing AD. Our research therefore focuses on a "double-hit" model of AD that includes genetic risk factors combined with an early-life exposure to a toxicant (lead acetate) in a rodent model. Our primary goal was to determine if these combined hits of genetic susceptibilities and toxicants could increase the onset and/or the severity of AD pathologies in the brain. Our hypothesis is that with early life exposure to lead, the predisposed transgenic strain of rodent will have an early increase in synaptic loss relative to the wild-type strain. However, efficient methods of measuring outcomes are still being improved by our research group. As synaptic loss is being studied as pathology in AD, we are using synaptic loss as a marker of onset and severity in our AD model. Synaptosomes, isolated synaptic terminals from neurons, were made from the hippocampuses of male and female mice of various ages that included a transgenic model (mutated to express risk factors of genetically-induced AD) and a wild-type model exposed to a control solution or to a lead acetate solution given orally for five days prior to weaning. To prepare synaptosomes, hippocampal samples were first homogenized in a homogenization buffer. Following homogenization, samples were processed through a series of centrifugations. The final collected pellet was the crude synaptosome fraction that was used for analyses. Total protein concentration in the prepared synaptosomes was measured with a traditional Bradford protein assay to determine overall synaptic loss. The protein concentrations were correlated to the different treatment groups to determine if age, sex, and strain, influenced synaptic loss in combination with lead. Preliminary results indicate that the transgenic animals have lower protein concentrations in the synaptosomes, which suggest that the genetic predisposition may be more sensitive to early-life insults that may impact synaptic degeneration. Currently, the laboratory is evaluating the levels of specific protein markers in synaptosomes to determine the mechanisms by which degeneration may occur.

UP21

High glucose in the major pelvic ganglion increases sympathetic neurons, decreases parasympathetic and nitrergic neurons, and promotes apoptosis

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Introduction: Diabetes mellitus (DM) is a common disorder that causes progressive damage to the autonomic nervous system leading to erectile dysfunction (ED). While the pathophysiology of smooth muscle and endothelial dysfunction have been characterized, the molecular basis of neurogenic ED in DM remains to be elucidated. This study examined the impact of high glucose on the survival of parasympathetic, sympathetic and nitrergic neurons and apoptosis in primary cultured neurons from major pelvic ganglion (MPG).

Methods: MPGs were collected from male Sprague-Dawley rats (n=6) and neurons were dissociated and plated on laminin coated coverslips. After 24 or 48 hours, neurons were exposed to high glucose (45mM) for 24 hours and compared to time-matched control neurons (25mM glucose). Neurons were fixed and stained with immunofluorescence for neuron-specific class III beta-tubulin to measure axon length and branching, neuronal nitric oxide synthase (nNOS, nitrergic), vesicular acetylcholine transferase (VAChT; parasympathetic) and tyrosine hydroxylase (TH; sympathetic) and TUNEL assay for apoptosis. Ten images were taken at 100x of each coverslip for analysis and data is represented by average per high powered image.

Results: The total number of neurons, neurite length and number of branches per high powered field was significantly decreased after 24h exposure to high glucose ($p<0.05$). The percentage of nNOS positive neurons decreased 10% in the 24h and 50% 48h plated neurons after high glucose ($p<0.05$). High glucose did not impact VAChT positive neurons in the 24h plated group however there was a 30% decrease in the 48h group ($p<0.05$). Interestingly there was a 25% increase in the number of TH neurons after high glucose in 48h neurons ($p<0.05$). After high glucose, there was

a 2-fold increase in the number of apoptotic TUNEL positive neurons in both groups ($p<0.05$).

Conclusions: These data demonstrate that high glucose stimulates a decrease in the number of erectile promoting parasympathetic/nitrergic neurons and an increase in sympathetic neurons that support a contractile/flaccid penile state. Furthermore there is a decrease in the overall number of neurons, neurite branches and neurite length, and increased apoptosis in high glucose conditions. Additional studies are required to determine how to protect the erectile promoting neurons from cell death under high glucose conditions to lead to new therapeutic strategies for diabetic men suffering from ED.

UP22

Novel Role for Scavanger Receptor-BI in Ozone Induced Lung Injury

Michael J Yaeger, Bin Lou, Dr. Sky Reece, Dr. Christopher Wingard, Dr. Kymberly M Gowdy

Significance: Ozone (O_3) exposure is associated with increased cardiopulmonary-induced morbidity and mortality. O_3 does not have direct effects on the pulmonary and cardiovascular system; rather it generates modified lipids and proteins in the lung. These modified products bind and stimulate pattern recognition receptors (PRRs) and stimulate the pulmonary immune response. It is has been found that O_3 is directly responsible for the creation of oxidized phospholipids in the lung. **PRRs** are capable of recognizing the oxidized phospholipids and clearing them, decreasing the amount of inflammation they can cause.

Purpose: The purpose of this project is to a) observe the role of scavenger receptor B-I (SR-BI) during the pulmonary immune response after O_3 exposure, and to b) determine if SR-BI is important for the clearance of oxidized phospholipids formed after O_3 exposure, causing vascular inflammation and dysfunction. SR-BI is a multi-recognition PRR critical in cellular uptake of cholesterol ester from high density lipoprotein. Recently, we reported that SR-BI plays a role in the pulmonary immune response to lipopolysaccharide (LPS) but the contribution of SR-BI to O_3 induced lung injury is unknown. In the current experiment, mice sufficient and deficient in SR-BI were exposed to O_3, and biological samples from their lungs were analyzed. It was found that mice deficient in SR-BI had increased levels of neutrophils within their lungs compared to the mice sufficient in SR-BI. This result indicates SR-BI plays a protective role in the pulmonary immunological response to O_3 exposure.

Hypothesis: The hypothesis of my project is that O_3 causes the creation of specific oxidized phospholipids that leak through the alveolar membranes and cause cardiovascular disease and that SR-BI is critical for the clearance of oxidized phospholipids.

Role in Project & Methodology: My role in the project will be concentrated on the understanding when oxidized phospholipids are formed after O_3 exposure and if they leak systemically. I will also be examining if SR-BI deficient mice have an increase in oxidized phospholipids in the lung and blood after O_3 exposure. Dr. Kym Gowdy will be guiding me on how to perform her designed experiments for exposing mice to O_3, dissecting the mice, harvesting lung tissue, and performing analysis on oxidized phospholipid development in both SR-BI sufficient and deficient mice.

UP23

The Role of Prenatal Hormone Exposure on Neurobehavioral Alterations in a Rat Model of Autism Spectrum Disorders

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Purpose: The role of prenatal hormone exposure (PHE) in producing neurobehavioral impairments in rats, as an animal model for autism spectrum disorders (ASDs), is being studied. Both PHE and behavioral testing - in the form of trace eyeblink classical conditioning (ECC), a hippocampal-dependent task are being conducted. Afterwards, the possible link between changes in neuron number within the hippocampus and alterations in ECC will be examined. Neuron number is thus an important brain indicator of behavioral function and dysfunction.

Significance: Approximately 1 in 68 children are diagnosed with an ASD, and annual costs in the U.S. for each child are estimated at $2.3 million. While the precise causes for abnormal brain development in ASDs are not known, environmental contributions – particularly androgens and estrogens - may play an adverse role. Further, the effect of PHE on hippocampal function is not well-understood, allowing for studies that may help elucidate their involvement in ASDs.

Role & Methodology: Because the hippocampus is vulnerable to environmental teratogens, we hypothesize that PHE will alter associative learning in trace ECC. Pregnant Sprague-Dawley rats received daily injections of either dihydrotestosterone

propionate (8 mg/kg), estradiol benzoate (50 mg/kg), or corn oil alone (vehicle) from embryonic days 15.5-17.5. Their adult offspring (two of each sex) were tested as adults (3 months of age) using trace ECC, which was carried out for 6 consecutive days. Afterwards, their brains were extracted and stored. Changes in neuron number using unbiased stereology within hippocampal cell layer CA1 will be examined in this project.

Preliminary Results: Preliminary results from the ECC data indicate altered learning in PHE rats. The nature of this alteration may be elucidated with correlating brain and behavior measurements. Findings from this study may help to determine the link between cell number and ASDs, so that treatments targeted at enhancing cellular function can be implemented.

UP24

Analysis of the Molecular Morphology of Mouse Heart by MALDI-TOF/MALDI-IMS

Justin Parks, Stephan Lefcoski, K'Shylah Whitehurst, Kim Sandquist, Lisandra E. de Castro Brás, and Jitka A. I. Virag

The ability to elucidate protein changes in myocardial infarcted areas of heart tissue versus health tissue assists in the understanding of what biological processes are changing that may lead to novel preventative measures or treatments. Protein localization in tissue sections was once a technique limited to immunohistochemistry. Immunohistochemistry is limited with the number of analytes per assay and is often costly. Matrix-assisted laser desorption ionization (MALDI)-imaging mass spectrometry (IMS) is a novel alternative method for measuring large distributions of analytes at one time and can be used to generate chemical images representing target molecular ion profiles for spatial information. MALDI-IMS has been used to study distribution of metabolites, lipids, peptides, and proteins in tissue sections.

For this project, MALDI-IMS was utilized to spatially locate the distribution of endogenous protein EphrinA1 within mouse heart tissues. Specifically, the progressive loss of endogenous EphrinA1 expression in cardiomyocytes was tracked at different time points following non-reperfused myocardial infarction (MI). At 0, 1,2, 4, and 7 days post-MI, the heart was harvested and snap frozen. Tissues were sectioned at 10 micron thickness, mounted on ITO slides, and MALDI matrix was applied by various methods to assist in the ionization process. To increase protein coverage and identification, trypsin was used to digest the proteins *in situ* followed by sublimation of the MALDI matrix. Our goal was to resolve ephrinA receptor (EphA-R) co-localization with ephrinA1 expression, as well as downstream intracellular mediators in order to understand the sequence of events that occur in response to MI.

Initial results demonstrate the detection of endogenous EphrinA1 in uninjured myocardium and the intensity signal decreased following MI in the injured region. These data suggest that endogenous EphrinA1 is irreversibly lost from apoptotic cardiomyocytes as a consequence of ischemia. For our future experiments, we will administer exogenous recombinant ephrinA1-Fc, which attenuates myocardial injury, to elucidate the mechanisms by which it acts to preserve endogenous ephrinA1 expression and reduce damage. Ultimately, the goal is to understand how ephrinA1-Fc reduces myocardial infarct injury so that therapeutic agents tailored to specifically target the cells of interest can be developed.

UP25

Determination of $Gd_3N@C_{80}(OH)_{20}$ interaction with Fe^{2+}

Andrew Farlow Reid

In modern society, the MRI machine is an essential diagnostic tool to determine if there are anomalous tissues by contrasting their images from normal tissue. The one issue with MRI technology is that its sensitivity is not very high. Although there is this drawback, new contrasting agents can be added to increase this sensitivity by giving water molecules a new route, which allows water molecules to relax and thus give a more desired concentration. The contrasting agent, $Gd_3N@C_{80}(OH)_{20}$, will be tested to see if the complex can pass through the blood-brain-barrier. Through fluorescence emission testing and putting the results in an equation, the finding constant (K_b) and binding number (number of molecules bound to the $Gd_3N@C_{80}(OH)_{20}$) will be found in the interaction of the complex with a Fe^{2+} solution and can be used to determine if the complex can penetrate the barrier. To perform the fluorescence emission test, a probe molecule with 10 microliters of the complex will be prepared with 75 mL of D_2O and then an emission of fluorescence will be taken of this solution with an excitation line at 350 nanometer. Emission spectra will be collected for the initial solution with 10 microliters of the complex solution at room temperature in a quartz cell and then collected after adding 2 microliters of Fe^{2+} solution. This will be repeated for each of the 2 microliter increments until 10 microliters of the complex have been added in total. The steady-state emission spectra experiment will be executed on a PTI QM-4CW fluorimeter system equipped with a xenon lamp, double monochromator for excitation, and a photon counting R928 PMT detector. Based on previous testing, we expect to see a gradual increase in fluorescence intensity and then a decline at a certain volume of Fe^{2+} solution added, which

will show that there is a static quench factor that has come into effect.

UP26

Improved Oosporein Synthesis

Joel Glotfelty, Dr. Brian Love

Biological activity is a sought after trait in pharmacology and chemical synthesis due to the applications that biologically active compounds have in pharmaceutical and biomedical industry. One such compound is oosporein, which has been shown to have both anti-biotic and anti-viral properties. The current synthesis of oosporein is cost effective and efficient but results in a 50% yield of usable product. This work focuses on adjusting the methodology of oosporein synthesis to obtain the biologically active compound in a higher yield. The improved synthesis of oosporein will then be used in an attempt to synthesize the structurally similar compound biembelin. Biembelin has never been synthesized, but is thought to have biological activity due to its structural similarity to oosporein. Successful synthesis of biembelin would allow the compound to be tested for biological activity and could provide the world with another potent component for anti-biotic or anti-viral pharmaceuticals.

UP27

Novel migration assay using cultured internal pudendal artery smooth muscle cells: New methods to study vascular erectile dysfunction

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Erectile dysfunction (ED) can be an early indicator of cardiovascular disease (CVD), the number one killer of Americans and individuals worldwide. The internal pudendal artery (IPA) provides the primary supply of blood flow to the penis, and uncontrolled smooth muscle cell (SMC) proliferation and migration within the IPA compromise normal hemodynamics and contribute significantly to ED. Unfortunately, current therapies such as phosphodiesterase inhibitors do not effectively work in patients with underlying vascular dysfunction, and thus mechanistic research into pathologic growth and remodeling of the IPA is warranted. The purpose of this study was to characterize IPA SMCs using a newly developed, physiologically-relevant in situ migration assay. Phenotypic validation of rat primary IPA SMCs showed positive expression of the smooth muscle differentiation marker alpha smooth muscle actin (αSMA), and trypsinized cell diameters were comparable in size to other highly characterized rat and human SMC types. Migration analyses using a traditional wound healing assay (tip injury) on two different adhesion substrates showed significant increases in percent recovery after 16 hours for tissue culture (TC)-treated plates compared to glass bottom plates (23.33 ± 1.99 vs. 29.87 ± 2.56). Using our newly developed laser capture microdissection (LCM) technique for evaluating cell migration within perfusion microchannels under more realistic physiological conditions, improved accuracy and precision were noted (based on initial wound widths) and significant differences in percent recovery between TC-treated and glass bottom slides were not observed. In summary, this study established a method for the characterization of rat primary IPA SMCs, which has not been reported in the scientific literature to date, and evaluated a new cell migration assay for performing in situ wound healing in perfusion microchannels under physiologically-relevant conditions. These methods provide unique in vitro tools to elucidate mechanisms of clinically important aspects of IPA remodeling and SMC migration foundational to the pathogenesis of ED and CVD.

UP28

Exploring Alternative Strategies for the Synthesis of 15d-PGJ_2-EA: Diversification of Synthetic Routes to A Potent Anti-Cancer Agent

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The compound, 15-deoxy-$\Delta^{12,14}$-prostaglandin-J_2-ethanolamine (15d-PGJ_2-EA), is in an active line of research for treating non-melanoma skin cancer and has shown promising potential as a chemotherapeutic drug. There is evidence that suggests 15d-PGJ_2-EA may be effective against other cancer types as well. With this drug currently undergoing animal studies, a large quantity (~1 g) is needed to further research efforts. Thus, it is beneficial to have a synthetic strategy using abundantly available precursors. Examination of the metabolic pathway that leads to *in vivo* production of 15d-PGJ_2 suggests that the synthesis could be started from an upstream metabolite, prostaglandin-D_2 (PGD_2), as opposed to 15d-PGJ_2. By exploring the possibility of beginning synthesis from a different precursor, the routes for obtaining 15d-PGJ_2-EA are diversified. This could potentially lead to more cost effective methods for synthesis of the drug. The research objective is ultimately to perform dehydration reactions on PGD_2 in organic solvents using chemical dehydrating reagents, such as $POCl_3$, to make 15d-PGJ_2. Using a model system, a strategy to mimic the dehydration reaction has been

developed using inexpensive and readily available reagents. The method uses 3-hydroxy-2,3-dihydro-1H-inden-1-one because it contains one of the relevant functional groups in PGD_2, a β-hydroxycyclopentanone. This research will determine if the dehydration can be carried out efficiently *in vitro* under non-aqueous conditions and provide a possible economical means of obtaining 15d-PGJ_2-EA. If this synthesis proves successful and high yielding, then two different routes to the synthesis of 15d-PGJ_2-EA are readily feasible: 1) dehydration followed by amide coupling or 2) amide coupling to form PGD_2-EA followed by dehydration.

UP29

Mcm10 is required for proper oogenesis and early embryogenesis in Drosophila Melanogaster

Lucas Thade Hopkins, Michael C Reubens, Tim Christensen

Mcm10 has been linked to several essential biological processes in eukaryotic organisms. Two such processes are proper replication of the genome and the establishment and maintenance of chromatin states. Misregulationof Mcm10 is detrimental and has been linked to various types of cancer. Previous studies in unicellular systems have helped uncover the complex functions of Mcm10 in DNA replication. However, these studies have been ineffective in understanding the function of Mcm10 within multicellular organisms. Support for the essential nature of Mcm10 has been revealed through the detection and analysis of defects in embryos and ovaries in the female germline in Drosophila (fruit fly). By using the multicellular model Drosophila melanogaster, we utilized three hypomorphic alleles to aid in the identification of the potential biological functions of Mcm10 in the generation of fruit fly ovaries and development of embryos. Our results indicate that Mcm10 is an essential factor during embryogenesis and female specific reproduction. Further investigation of mcm10 function in multicellular systems could help elucidate the mechanisms underlying the development of human cancers, potentially allowing for the creation of more effective diagnostic tools in medicine.

UP30

HTLV-1 encoded protein HBZ inhibits the transcriptional activity of the cellular factor GATA-4

Stephanie T Nguyen, Kimson Hoang, Diana Wright, Isabelle Lemasson

Human T-cell Leukemia virus type 1 (HTLV-1) is a complex retrovirus that infects CD4+ T-cells. A certain subset of infected people will develop a deadly leukemia called adult T-cell leukemia (ATL). ATL is a very aggressive disease and when the patient is diagnosed with the acute clinical subtype, the median survival time is 6 months. We found that HTLV-1 infected cells and ATL cells abnormally express the transcription factor GATA-4. GATA-4 is from the GATA family of factors that contain a zinc finger DNA-binding domain that binds the consensus DNA site [(A/T) GATA(A/G)]. To activate transcription, GATA proteins recruit the coactivator p300 and its paralogue CBP to the DNA. GATA-4 regulates transcription of genes involved in embryogenesis and myocardial differentiation and function. Usually, GATA-4 is not expressed in T-cells, but GATA-3 is. Surprisingly, we found that HTLV-1 infected cells and ATL cells do not express GATA-3. To understand the role of GATA-4 in HTLV-1 infected cells, we focused on the interaction between GATA-4 and p300/CBP. We found that GATA-4 binds to the histone acetyl transferase domain (HAT) of p300/CBP, and more specifically the cysteine/histidine domain 3 (CH/3). One of the viral proteins produced by HTLV-1, known as the HTLV-1 basic leucine zipper factor (HBZ), also binds the CH/3 and HAT domains of p300/CBP. Using biochemical assays, we found that HBZ out competes GATA-4 for binding to the CH/3 domain. In luciferase reporter assays, HBZ repressed transcription by GATA-4, which may mean that HBZ prevents GATA-4 from recruiting p300 to the DNA for activation of transcription. We would like to extend our studies to HTLV-1 infected cells and determine whether a subset of GATA-4 can still bind p300 and activate transcription. There are several other viral proteins that are produced by HTLV-1, and GATA-4 may function with one of them at a different time during HTLV-1 infection.

UP31

Evidence for a Role of Aurora A Kinase in Spermiogenesis

Brian Elgart, Rong Wang, Chris B. Geyer, and Ann O. Sperry

Primary cilia are analogous to sperm flagella: both are membranous extensions from the cell body that contain a microtubule based axoneme composed of either a 9+2 arrangement of microtubules (sperm flagella) responsible for motility or a 9+0 arrangement in primary cilia which are immotile. While many studies support a common mechanism for growth and maintenance of these two structures, much more information is available concerning primary cilia. Little is known regarding the specific molecular mechanisms involved in formation and maintenance of flagella in male germ cells. It is the goal of our work to investigate regulatory molecules in flagella formation. Previous studies by others have demonstrated the importance of protein phosphatase-1 (PP1) and the kinases AurA (Aurora A) and Nek2 (Never in Mitosis related kinase 2) in regulation of cilia formation and retraction. Both AurA and Nek2 are located at the basal body of primary cilia, bind PPI and

are involved in control of cilia length and number. The location of these kinases at the basal body, a microtubule based structure that nucleates the axoneme, is consistent with their involvement in regulation of cilia dynamics. Important for our studies, an AurA like protein has been found to control flagellum length in the unicellular eukaryote *Chlamydomonas reinhardtii*. As a first step to bridge the gap between our understanding of the molecular mechanisms underlying cilia dynamics with the lack of information concerning flagella formation in male germ cells, we have used a conditional mutant mouse in which AurA kinase is absent only in spermatids. Preliminary data from breeding trials indicate that KO males are subfertile. Testes of these animals display a heterogeneous phenotype with some animals having grossly abnormal tubules lacking spermatids while others have testes with only minor disruption of tubule architecture. These results are consistent with our hypothesis that AurA plays a role in sperm morphogenesis.

UP32

Linimar Forgings Carolina-Future State Plant Layout (Process Flow Improvement)

James R Huza, Elijah D Stubbs, Petre E Franks, Brandon W Marsh

The project that we will be taking on this semester is a plant layout and process flow improvement project for Linamar Forgings Carolina LFC. We will begin by creating a current state AutoCAD layout of the current layout of the plant. Upon completion, we will then embark on creating a future state map which will be created by factoring in Linamar's expansion plans. We will also take into consideration current process flow as well as implementing our recommendations for improvement. The goals for the future state map would be to eliminate muda (waste) by implementing tools we have learned in various core classes. In order to successfully complete our project we quickly realized that organization and time management would be major factors for successfully completing the project given our time constraint.

UP33

Assembly and validation of impedance tube measurement system and design of custom 3D printed impedance calibration standards

Landon Colton Moody, Teresa Jean Ryan

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An impedance tube measures the interactions between a selected material and a sound wave. The ECU tube is 10 centimeters in diameter and approximately 1.2 meters long which gives it effective frequency range of up to approximately 2000 Hertz. The tube is sealed on one end and allows for different attachments on the free end. A speaker is permanently housed in the sealed end. The ECU system will be able to measure both acoustic reflection and transmission coefficients. The reflection coefficient is the parameter that describes how much of a wave is sent back, or reflected, towards the source of the wave. When measuring the reflection coefficient, the open end of the tube is capped with a permanent plunger to provide a rigid boundary that will allow wave reflection. The transmission coefficient is the parameter that describes how much of the wave goes through the material and how much is absorbed by the material. When measuring the transmission coefficient, the tube is extended beyond the sample to allow the wave to go through the material. Once these reflected or transmitted waves are characterized, particular material properties such as the stiffness and damping coefficient can be calculated. These characteristics are important when selecting materials for buildings, architectural acoustical considerations, vehicle acoustics, characterizing porous media, and many others. This work will describe the assembly and initial calibration of the impedance tube. There are a variety of ASTM and ISO standards that relate to the measurement of acoustic properties of materials. These experiments will use samples of known impedance and will be conducted according to the ASTM testing standard E1050-98. This work will also involve designing, 3D printing, and testing a set of calibration standards with a variety of pore sizes that can be used to validate measurements against analytic solutions.

UP34

Flander's Manufacturing Abstract

Brandalyn Joy Watts, Richard Davis, Suleiman Alkhalifa, Theandre McCoy

Businesses must keep ahead of competition by assessing their manufacturing plants. New technologies can create cost efficient solutions that will not only save money but also time. The switch to more automated and robotic solutions are transforming industry by adding more flexibility and creating a better use of human recourses.
Our project is to create a robotic solution for Flanders fiberglass filter manufacturing. Fiberglass filaments are spun on to the winder and they are sprayed with different resins to keep it from breaking in processing afterwards. Currently, a large plastic sheet is used to cover the floor and protect the fiber glass from the resin that spills onto the floor when the filaments are removed from the winder. Flanders make two different fiberglass colors in their plant: white and green. The green resin causes a problem because it tends to get everywhere.
Our robotic solution requires that the wool never touch the floor

but is rolled straight from the winders into another roll. The roll; however, must have a plastic wrap that is wound simultaneously with the fiberglass wool so that during the curing process the fiberglass does not stick to itself. Our solution is robotic roller arm that travels above the ground on support of a pre-existing I-beam. The arm is able to rotate 180? to change directions due winders being on both sides of the room. The arm features a black plastic roll that is attached to the fiberglass and is spun directly onto a black pipe that the fiberglass is fitted to. Before being fitted to the pipe, the fibers and the plastic fit through two cylinders that press them together. All of these actions are motorized and decreases human recourses and the time for the winder to start a new roll. The pipe after being rolled with the fiberglass and the plastic are then spring released onto a drying rack and the end of the room.

UP35

The Advantages and Disadvantages of LEED Design & Certification

Suzannah Holt Turner

In recent years, designing buildings to be environmentally sustainable has become more important to many different people. One of the most common methods of determining the level of sustainability is known as LEED Certification. While the program aims to benefit everyone interested in green design, there are several advantages and disadvantages that must be considered before deciding to certify a particular building. Some of the advantages of LEED Certification including research-backed standards for credibility, a wide range of areas are considered for certification, and that LEED Certification is seen as a "business investment" to make more people want to build buildings to that standard, despite the higher costs that are associated with "green design." Some of the disadvantages include an un-weighted point system, the expense and difficulty that is involved in trying to become LEED certified, and an isolated evaluation process that ignores both the context and performance of a building. Environmentally sustainable structures are an important part of buildings in the future, but there are many costs and benefits that must be weighed before deciding to become LEED Certified, both as an individual and as a business. This research is intended to put into context the decision to LEED certify a proposed high school in Morrisville, NC. The design of this school is a part of the United States Green Building Council, North Carolina Triangle Chapter's Natural Design Competition. Overall, certifying a building can improve the owner's standing in the community, and can increase the value of the building and save money over time, but both of these things come at an additional cost to the owner's.

UP36

Flander's Improvement Project

Zachary Alan Cleghorn, Marcus Alexander Henderson, Matthew Jefferson Brown, Samuel Thomas Saunders

On January 14th, 2016, Flanders Corporation requested help from East Carolina University's Industrial Engineering Technology program. Waste reduction is what Flanders needed help on. Flanders makes and manufactures air filters for multiple applications. However, Flanders is spending a lot of money on proper waste disposal for excess fiberglass materials.

The task will require our team to use multiple lesson tools that East Carolina University has given us. First, the team will create a lean manufacturing design to help reduce cost. Second, my team will research to find ways to reuse/resell the waste products. Third, our plan will be sent to the plant management to be approved. Lastly, once approved, our project will come into effect at Flanders Corporation.

Being that this project is a "real-world" scenario, it will strengthen our college's relationship with the company. It will also hopefully lead to a job proposal, and future internship positions for East Carolina University students.

UP37

Raspberry Pi vs. Arduino Uno: Synchronizing Acoustic Measurements Over Large Distances

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The current method for air and sea navigation and surveillance is radar. Radar has been in use for many decades, and has been studied extensively. The sounds produced by a boat provide another way to detect crafts up to a range of approximately 10 km. Identifying and understanding acoustic propagation within the littoral environment allows new developments in acoustic stealth. Military naval operations can also use this information collected from this research in determining acoustic detectability from the shore of their crafts. In order to further study these properties of sound and make accurate acoustic propagation measurements over long distances, accurate 3 dimensional GPS location data is required. One GPS module needs to be at the source of sound while the other needs to be at the receiver on shore. The GPS modules will be constantly log time and position information to enable the synchronized acoustic measurements. The importance of the GPS is that the time information in both locations is synchronized to the satellite array allowing for high

precision comparisons regardless of the distance between the source and receiver. This work will compare the suitability of the Raspberry Pi II B and Arduino Uno platforms for implementing these measurements.

UP38

Microcontroller-based Synchronization of Long-distance Acoustic Measurements

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Global positioning system (GPS) receivers use transmissions from satellites that carry stable, precise atomic clocks. These sensors can be found in devices ranging from cellphones to cars. This work proposes GPS technology to provide precise timing and location information for acoustic measurements. Sound will be recorded at two locations and GPS will be used to provide synchronization of the measurements. The speed of sound in dry air at 20 C is 343 m/s. Given a 5 km distance between two points, 14.6 seconds passes before the sound created at one position is heard at the second. If the speed of sound were to change to 341 m/s due to a cooler temperature of 19 C, 14.7 seconds would pass before the sound was heard. Sound travelling in air that is warmer at higher altitudes causes a greater amount of acoustic pressure due to the refraction of sound back down to earth. This greater amount of acoustic pressure means the sound would be louder. Knowing this 0.1 second difference or how loud the sound would be could lead to completely different outcomes. An example in which this would be helpful is that of a naval vessel attempting to drop off troops without being detected. Depending on local weather conditions the perceived loudness of an offshore boat may vary by 100 percent or more. This exemplifies how understanding acoustic propagation has the potential to save lives. Understanding how sound changes due to meteorological parameters such as temperature profile, velocity profile, precipitation, and atmospheric turbulence is a necessary step. Precise time and position information is required to detect such small changes in acoustic propagation. A NAVSYNC CW46 GPS Sensor is capable of such sub-millisecond precision. A QL200 PIC development board will be programmed to interface with the sensor and prompt the user to enter the desired test time. Measurements will be recorded at the programmed time regardless of the distance between the source and the receiver. The program may also produce a trigger pulse to generate the sound that is to be recorded and begin the recording process. This synchronized recording will provide ample accuracy in calculating time of flight and sound pressure level for the sound that is being recorded. In conclusion, this work will contribute to understanding how the atmospheric variables affect sound. This work provides a low cost alternative to expensive, commercially available, high accuracy, synchronized data acquisition platforms.

UP39

Improvement Plan for End-Line Product Storage

Wesley Arlen Capar, Brendan Matthew Falls, Matthew Tyler Hall, Dylan Carter, Kanchan Das

This study applies a lean manufacturing approach to improve the productivity of an engine control unit (ECU) production line at Keihin, a North Carolina based industry that produces ECUs for Honda and Acura. Currently, the production line is experiencing a bottleneck at the final inspection station where the products are placed into receptacles for shipping. This issue is causing prolonged cycle times and line backups, which ultimately affects the lead time of the production process. Along with the extended lead times, organizational and ergonomic issues have evolved due to constant material handling and overall workspace clutter.

Initially this study aims to collect data using time and video studies of the current operation in order to create a current state value stream map that will set a baseline for the current inflow and outflow of the production process. Once a time standard has been observed and developed the first step will involve a 5S organizational initiative along with a new layout in order to have the workspace as organized and accessible as possible. With these tools being implemented this will allow us to update the standard operating procedure to include the changes that have been executed. The results include an improved layout for production line, decreased lead times, diminished worker fatigue, as well as a process that can be replicated throughout the production lines.

UP40

Identifying a Range of Materials to be used as Tactile Evaluation Standards

Keely McKinley, Jatasia Williams, Teresa Ryan, Colleen Janeiro

When designing medical equipment, it is critical to ensure that a medical device's design satisfies user needs. Inputs focusing on the device-user interface can include software, labels, instructions, displays, controls, components, and accessories necessary to maintain and operate medical devices. The user-device relationship is critical to allow the operation to be simple and risk-free to avoid any complications. By concentrating on user interface, there are opportunities to simplify a device's operation and required skills to perform medical procedures which ensure patient safety. There are also FDA regulations to confirm safety

compliance of the medical device as well as ensure that Current Good Manufacturing Practice regulations (cGMPs) are followed.

In the medical industry, user needs can refer to the patient or the trained professionals who use the equipment. Handling is an important factor when considering the device's ease of use. There are a number of things that can impact the handing of medical devices such as gloves, bodily fluids, and the device itself. Due to this, testing procedures must be in place to verify that materials are manufactured with consistent strength and dexterity characteristics.

In accordance with cGMPs, test methods should be evaluated for the reliability and reproducibility of these characteristics. When evaluating destructive test methods, having a supply of predictable and consistent materials to test is useful in order to make standards. These materials must have a range of consistent engineering material properties such as tensile strength and resistance to compressive and shear loads. By finding materials that do so, test methods can be created and evaluated to enable quality control departments to adequately assess the mechanical properties of various materials. The goal of this project is to identify and evaluate an array of test materials that can be used for the assessment of destructive test methods.

UP41

Carbon-Hydrogen Bonds and Transition Metal Catalysis

Nicholas Christian Garcia, Dr. Yumin Li

Study in Carbon-Hydrogen bond activation has already shown implications for converting plentiful methane to methanol. Advancement in reaction control and increasing the effectiveness of C-H bond activation aims to bring us closer to practical applications for various fields.

Transition metal catalysis is a subtopic of Carbon-Hydrogen bond activation. Molecular dynamics analyses using Gaussian 09 software are used to study transition metal complexes for the following cases: ground state and triplet state. With calculations being performed for the following cases: geometry optimization (with and without a dichloromethane solvent), TD (time dependent), and molecular frequency. These calculations are carried out in order to study four types of transition metal complexes. This research is ongoing, and findings and conclusions will be published at a later date.

Further insight concerning transition metal complexes, and how they activate C-H bonds, will aid in making C-H bond activation processes more effective and economical.

UP42

Analyzation and Improvements of Sun Energy 1

Reuben Holtzman, Monty Samuel, Brandon, Gordon, Tyler Nixon

Sun Energy1 is a commercial solar plant construction company that is using manufactured solar panels, to establish a solar farm for its clients in order to provide large amounts of electricity. The project we are working on is in Edgecombe County, NC, located in the town of Conetoe. Conetoe II is the given name for the project site, which is currently one of the largest solar farms on the east coast. It is set to provide 112 megawatts of clean energy to Duke Energy and will be distributed throughout the state of North Carolina. For this project we have planned to evaluate and oversee production in order to establish a more efficient construction process. Furthermore, we will be reviewing site commission procedures in order to monitor timeliness of the work on the site with goals aimed at managing and preventing waste. With such a grand project and work site, we definitely are placing safety as a key focus, making sure we examine OSHA guidelines and standards according to the appropriate regulations for each task and potential job.

UP43

MV & ODP Pack area layout (current layout, time study, potential new layout, time improvement)

Ethan Ross Gwynn, Aaron Grant, Logan Vaughn, Hayden Holleman, Forrest Coleman

Background: ABB makes voltage and current transformers for government and private company use. We will be working in the testing and packaging department. Right now, ABB has been using a system of testing and packing that is flawed. This current system contains backtracking and poor time management. We believe that the system can be improved. On January 29th we toured the ABB plant and were explained all of the constraints of the project. We also met ABB employees that will work with us on the project.

Objectives: Our main objective is to solve the issues with testing and packing at ABB. This in turn should provide both cost savings and increased productivity. We will focus on rearranging the testing and packing areas of the plant. We hope to leave ABB running noticeably more efficient.

Methods: We intend to implement as many changes as possible. Based off what we have seen so far, we have come up with these four methods:

- Identify the slowest processes.
- Eliminate defects at the source.
- Rearranging work sales for efficiency.
- Manipulate services sequences of items needed for manufacturing.

UP44

Tempo Trainer

Antonio S Jones

Repetition is key when it comes to mastering a desired skill. Repeating an exercise contributes to learning and leads to an individual mastering his or her craft. Any skill comes with hard work, patience, and repetition. These principles can be applied to any given task. The significance of this project will allow a user to master rudiments, with feedback from a specific encoded program. A rudiment is a series of notes strung together that a percussionist uses to practice their striking and tempo. Metronomes have been used for quite some time in helping musicians stay in rhythm with pieces of music. Having a program that gives immediate visual feedback to the user, overall, can prove to be beneficial as to how synchronized they are to a particular selection of music. The rudiment will be encoded using a program, LabVIEW, and will enable the user to play the rudiment on an electronic drum pad. The signals generated from the drum pad will allow the user to see how well he or she matches with the encoded rudiment. The feedback will show how closely the playing matches with the rudiment. Once the feedback is analyzed the user will have the option of playing the rudiment again, or inputting a new one to master. The idea of this project is to create a tempo trainer that gives readers a response as to how well they are playing a desired rudiment. Guitar Hero is an example of such a device. It strings together a series of notes, and the player must strike the drum accordingly. The game then gives the reader a response as to how well the note they played, matches with the note in the song. The tempo trainer being designed in this project will be designed on a similar basis but will allow the user to input desired rudiments. The complexity of the design will give user feedback as well.

UP45

Semantic Knowledge Use in Different Discourse Types

Caroline Rachel Abashian, Stephen Kintz, Heather Harris Wright

Semantic knowledge is an individual's internal representations of a given object. In turn, semantic memory relates to the general knowledge and memory systems an individual uses for understanding concepts. Concepts are grouped into categories. Yet most research into semantic knowledge and category types is performed at the single concept level. Research is needed into the use of semantic knowledge and category types within discourse and across different discourse types. The purpose of this study, then, was to expand previous research by examining how semantic knowledge and category types were used in different types of discourse produced by adults across the adult lifespan. Cognitively healthy, younger (n=30, 20-39) and older (n=30; 60-89) participants told stories from single pictures and recounts that were transcribed and coded for 10 domains of semantic knowledge and also *living* and *nonliving things*. When exclusively examining living things, results indicated significant differences for stimuli but not for group. Additionally, there is no interaction between group and stimuli. For semantic knowledge types, there were significant differences for group and stimuli, but there was no interaction between group and stimuli. These findings extend previous research into the use of category and semantic knowledge types within discourse, and highlight the importance of examining multiple forms of discourse when analyzing the communication abilities of younger and older adults.

UP46

Writing apprehension and its relationship to self-efficacy in undergraduate nutrition and dietetic students

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Introduction: Writing competency is crucial to most occupations. Research has shown that apprehension towards writing has influenced individuals' academic and vocational preferences and decisions. Additionally, research suggests the most effective way to decrease apprehension and improve self-efficacy towards writing is through exposure and practice. The purpose of this study is to explore the relationship between apprehension and self-efficacy towards writing among undergraduate Nutrition Science students. **Methods:** Researchers collected data from 79 intended and declared undergraduate Nutrition Science students from a single university in Eastern North Carolina Fall 2015. Of these students, 42 juniors/seniors were enrolled in a required 3-hour writing intensive (WI) Nutrition Research Methodology (NUTR 3500) course. At the beginning of the semester, all students completed a 46-item online survey assessing their level of apprehension and efficacy towards writing using a 5-point scale (Strongly Agree to Strongly Disagree). Additionally, students enrolled in the WI course completed the survey at the end of the

semester. Data was analyzed using Spearman's rho Correlations and Wilcoxon signed-rank tests. **Results:** Overall, 86.7% of the sample was female and 77.1% Caucasian. Only 13% stated their experiences prior to pretest had contributed towards their ability to "write clearly and effectively". Levels of apprehension were lowest among juniors (3.10±.29), while efficacy was highest among seniors (2.54±.57) and lowest among juniors (2.31±.51). No significant correlations were observed between apprehension and efficacy. A significant decline in efficacy was observed pretest (2.52±.56) to posttest (2.34±.62) for students enrolled in the WI course; however, while not significant, a decrease in apprehension was also observed. **Conclusions:** Overall, juniors majoring in Nutrition Science presented lower levels of writing efficacy compared to freshman/sophomore and seniors. Further, after completion of NUTR 3500, efficacy declined among juniors. This decline may have been related to "respondent shift-effect"; the lack of prior exposure to WI courses within their major may have resulted in a false sense of writing confidence. Future research should consider the use of a retrospective pre-test to assess the impact of shift effect on writing apprehension and efficacy, and should explore methods for improving efficacy while also decreasing apprehension.

UP47

Social Factors Impacting Exercise Behavior

Mark Everett Nabell, Michael D. Baker Jr.

It is known that people are more likely to maintain exercise routines when they exercise with a partner, but most studies have not examined the influence on the sex of the partners on their exercise routines.? This study aims to determine whether or not the presence of a potential mate will influence partnered exercise routine duration, intensity, and frequency. In addition participant weights and lung capacities will be used to measure the strength of this relationship and serve as physiological dependent variables? Participants will be instructed to perform cardiovascular exercise routines of their choosing. Some participants will be assigned to partners of the same sex, others will be assigned to partners of the opposite sex, and a control group will exercise alone. The control group will include participants of both sexes as well. Various hypotheses will be tested with and against one another, and it is expected to find that participants in the opposite sex condition will exercise together more frequently and at higher intensities than participants in same sex or control conditions. It is also predicted that this effect will be particularly strengthened if the partners find one another physically attractive.

UP48

Fair Enough: Farmer-Led Councils and Adopting Best Management Practices

Yanira Campos, Dr. Nels Paulson

This project evaluated farmer social networks in order to better understand the impact it has on adopting best management practices regarding the phosphorus pollution in Menomonie, Wisconsin. Previous literature revealed that perceptions of fairness have been correlated with an increased satisfaction in resulting decisions and satisfaction with management. This research answers questions concerning the perception of fairness within farmer social networks and the impact it has on adopting best management practices. Farmers within the Red Cedar Watershed were mailed surveys and interviewed. Through the use of OLS regression, fairness, education, gross farm sales, and willingness to participate in farmer-led councils were identified as important predictors of adoption best management practices. Considering the importance of best management predictors, willingness to participate in farmer led councils was further analyzed in order to understand its predictors, which included PageRank (a social network metric), farm size, and the interaction between farm size and PageRank. This research is important to better understand how the interactions between the government and farmers can be improved upon in order to help resolve phosphorus pollution and provide a better quality of life for all those in the surrounding areas.

UP49

Convergence Skills as Demanded by Newspaper Employers and Taught by University Journalism Programs

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Convergence—the blending of old-media and new-media content delivery technologies—poses challenges for prospective new hires in journalism (State of the News Media, 2013), and for university journalism programs. In the past, journalists were expected to align with skill sets specific to print or broadcast content delivery technologies. Nowadays, with convergence, print journalists must have some level of broadcast-news skills, and broadcast journalists to have some level of print skills. Both print and broadcast journalists would need social media skills.

Kraeplin and Criado (2005) find a disconnect between the academy and the news industry in how important it is that new

hires in journalism have convergence skills. On the industry side, research by Wegner (2013) and Massey (2005) find that print and broadcast journalists need core skill sets, and some Web/multimedia skills. Huang et al. (2006) and Kraeplin and Criado (2005) find that university journalism programs are moving into training for convergence, but Royal (2005) and Moody (2010) question the success of that change. However, the studies of university programs rely mostly on surveys of program directors and professors.

The goal of this study is take an updated look at job ads for U.S. newspapers, and to take a different approach to looking at university journalism programs. The overall goal is to determine which journalism skills are newspapers are looking for in entry-level hires, such as fresh graduates, and which journalism skills are being taught in university programs. Newspaper job ads were examined in a content analysis to determine transferable skill sets employers find important. Syllabi from journalism programs at North Carolina universities were content analyzed to see which transferable skills are being taught to students. Moreover, a survey is being conducted of journalism students at those universities.

Preliminary findings suggest that the job ads and syllabi emphasize core journalism skills, such as news-writing and news-gathering. The job ads also show some demand for print-news hires with video, photography and social media skills. Whether journalism educators are putting enough emphasis on convergence skills is discussed.

UP50

Koru Mindfulness and Meditation to Address College Student Stress

Ellie Kim, Adam May, Christi Mobley, Christyn Dolbier

Introduction: College students experience numerous and varied demands (stressors) while they are still in the process of developing skills and acquiring resources to enable them to meet those demands. The resultant stress they experience increases their vulnerability to mental and physical health problems as well as academic difficulties. Thus, there is a need for effective stress management programs in this population. There is an impressive accumulation of support for mindfulness meditation as an effective stress reduction intervention. Building on this empirical support, two psychiatrists with vast experience working with college students developed Koru as a standardized 4-week mindfulness-based intervention tailored to this population. An initial study shows promise for its effectiveness in reducing stress.

Specific aims: 1) To determine the feasibility of offering Koru at East Carolina University (fall 2015); and 2) to test Koru's effectiveness in decreasing stress and emotional distress and increasing mindfulness (spring 2016).

Method: *Fall semester*: the research team established recruitment and implementation protocols and put them into practice. Koru participants are recruited from flyers on campus, emails to student organizations, program directors, and advisors, and referrals from the counseling center. The Koru intervention is co-taught by a health psychologist certified in Koru and a counseling psychologist on staff at the counseling center. They adhere to the Koru manual regarding intervention content, group dynamics, and communications with participants. *Spring semester*: recruitment and implementation continue and the pre-post survey is being introduced. Once enrolled in Koru, participants are invited to complete a survey before and after they participate in the intervention. The surveys consist of psychometrically sound measures of mindfulness and psychological symptoms.

Progress: *Specific aim 1*: In the fall semester, 40 out of 66 (61%) students who indicated interest were offered Koru; 20 out of 40 (50%) of those invited participated in Koru; 16 out of 20 (80%) of those who participated completed Koru (attended at least 3 out of 4 sessions).

Expected results: *Specific aim 2*: We hypothesize that survey respondents who complete Koru will demonstrate significant decreases in stress, depressive and anxiety symptoms and an increase in mindfulness pre- to post-intervention.

UP51

Practice Oriented Teaching in Professional Writing

Alexander Walton Prunka

This project aims to assess the successes and challenges of practice oriented teaching in professional writing courses, specifically at East Carolina University. The subject is the publication of *The Lookout* by members of a University course, rather than a student group.

The Lookout is the undergraduate research journal of East Carolina University. It is both written and published by students. Creation of *The Lookout* is the term-length project for students enrolled in English 3870: Introduction to Publishing and Editing, an annual Fall Semester course taught by Dr. Donna Kain and rooted in practiced oriented teaching. Through a variety of assignments and an exam, students are taught editing roles, technique, and conventions. This knowledge is then applied to the process of publishing a journal from start to finish.

Through the embedded project of publishing *The* Lookout, students truly benefit from practice oriented teaching. The class

is divided into several "task groups," each of which is an essential part of the production. From communication with authors, to designing the layout, students collaborate with one another and between groups to achieve the final product.

Publication of *The Lookout* both teaches students how to edit and how to complete a finished, professional work. It reflects similar demands to professional editing, just on a smaller scale. Perhaps the greatest driving force behind the success of *The Lookout*is the higher stakes in its publishing. Rather than producing works which will only be judged by the instructor, *The Lookout* is available to anyone with web access.

UP52

Sex & Social Media Apps

Erin Kelsey Mahoney

Smartphones have overwhelmingly become accepted among college students; and social media applications (apps) provide a forum for students to meet a wide array of individuals. As college students are in an age group associated with risky sexual behaviors, this study is intended to explore those sexual health behaviors associated with the use of social media apps.

To help explore these two behaviors, a thirty-one question survey was developed to explore associations between frequency of safe-sex practices, rates of sexual partners, STIs, sexual violence, and the usage of a select group of social media apps. Previous research has shown that over 50% of sexually transmitted infections (STIs) and 34.7% of female rapes occur among college aged students. Additionally 50% of all sexual assaults in college students occur in conjunction with alcohol, which is found readily among this demographic. In a study conducted between 2013 and 2014, Rhode Island's Department of Health has reported that STIs are increasing due to "using social media to arrange casual and often anonymous sexual encounters." New Zealand has also reported over 50% of all syphilis cases in 2012 were associated with the popular social media app Grindr.

For this study, IPAR granted access to 5,000 random ECU undergraduate emails. Students were invited to complete an online anonymous survey hosted through Qualtrics. An initial contact email followed by four scheduled reminders were sent to students. Upon completion of the survey, participants were given the opportunity to link to a separate incentive page. This page collected contact information should they wish to be considered for one of 30 incentive gift cards. Incentive funding was provided through the Undergraduate Research and Creativity Award. Among the current respondents, 20% have reported experiencing a sexual encounter with someone they met via social media. Of this subsample, 34% reported not using a condom or other barrier method. Data collection is ongoing and analysis will begin in mid-February.

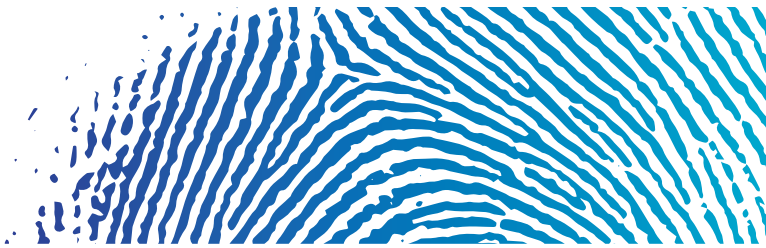
UP53

The Effect of Mud Plume Generation During Escape on the Dynamics of Social Interactions of Crayfish (*procambarus clarkii*)

Allison Hope Everett, Dr. Fadi Issa

Department of Biology, East Carolina University

Crayfish can be found in sooty substrate environments where they live in communal based habitats where they form a social hierarchy that allows for dyadic interactions and agnostic behaviors to occur. A Social hierarchy is a formation of social status between one male crayfish with another male crayfish where one is dominant and the other is subordinate. A dominant male crayfish is more likely to approach and attack a subordinate male crayfish and a subordinate male crayfish is more likely to retreat and create a tail-flip escape response that generates a whirl of mud in the direction of the dominate male crayfish, or attacker, called a mud plume. The ventral nerve cord in a male crayfish that is associated with the tail-flip escape response contains 4 giant axons, the medial giant (MG), lateral giant (LG), non-giant (NG), and segmental giant (SG). The MG and LG axons are the two most associated with the tail-flip escape response. In this study the main focus is determine how the generation of mud plumes affect the dynamics of dyadic interactions of Procambarus clarkii male crayfish using two experiments. First, an experiment was conducted to investigate how different substrate composition (sooty or gravel) affects dyadic interactions between male crayfish during an escape response. An analysis to find the intervals (in seconds) between both tail-flip and next encounter, and retreat and next encounter were conducted. It was hypothesized that a sooty substrate composition has a higher effect on the dyadic interactions between crayfish during an escape response than a gravel substrate composition. Second, analyses of the mud plume vectors that are generated during an escape response were conducted using high-speed videography. The objective was to determine if the mud plume generated during an escape response is purposefully directed towards the attacking predator or if it is an involuntary response that directs the mud plume in the general area of the attacking predator. Our results indicate that the mud plume generated during an escape response is purposefully directed towards the attacking predator with great deal of accuracy.



UP54

"Emotional Intelligence Comparison of Hospitality and COB Undergraduate Students"

Megan Selene Woodlief, David Rivera, Jr. PhD

Purpose: The purpose of this project is to better understand how College of Business undergraduate academic performance is related to their level of emotional intelligence. It is also the goal of the researchers to examine the differences in emotional intelligence that may exist between disciplines within a College of Business.

Significance: The results of this research can be used in the adaptation of how professors teach College of Business students in an effort to better prepare them for a professional career. The comparison of emotional intelligence may also allow students to better choose a specific field of study within the College of Business.

Hypothesis: If a student shows higher levels of emotional intelligence, then it is expected that their GPA will reflect these results in a positive manner.

Methodology: Researchers will be using an anonymous, approved survey that will analyze the Emotional Intelligence of the student. This study will also include questions regarding the gender, major, and GPA range of the student while remaining anonymous. The goal of this survey is to reach approximately 500 students throughout all the Hospitality Management program in addition to College of Business students. This voluntary survey will be handed out in multiple Hospitality Management and general College of Business classes to ensure a variety of participant, spanning across all ages, genders, and concentrations. The survey should only take approximately ten minutes to complete.

UP55

Osteoporosis Knowledge Among College Students: A Comparison between Non-Athletes and Athletes.

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Osteoporosis is a disease characterized by low bone mass and deterioration of the bone. As a preventable disease, knowledge about osteoporosis, adequate calcium intake, and regular weight bearing exercise are positive factors that help reduce the risk of developing osteoporosis in later years. Extensive research has shown that peak bone mass is reached by the third decade of life, hence the importance of prevention efforts for young adults in the growing years (Puttapitakpong, 2014). We hypothesize for this study that athletes will have a higher knowledge of osteoporosis-related factors compared to non-athletes. This study used a cross sectional research design. A questionnaire consisting of two perception questions about one's susceptibility of developing osteoporosis, an Osteoporosis Knowledge Test (OKT) with 24 items, and demographic questions was administered to East Carolina University students (n=223)- non-athletes (n=125) and athletes (n=98). The OKT is a validated instrument used to determine osteoporosis knowledge. The athletes were recruited from the East Carolina University athletic department and the non-athletes were recruited from an introductory nutrition course. Data was analyzed using IBM SPSS statistics version 20 was with p value set at 0.05. The final sample included in analysis were a total of 216 with mean age 19.82± 1.43 (age range between 18-27 years). There were 123 non-athletes (96 females and 27males), and a total of n=93 athletes (47 females and 46 males). On the OKT, the total mean scores for non-athletes and athletes were 12.65± 3.23 and 12.55± 4.53 respectively. Mean scores on the risk factors was 5.26 ± 1.73 for non-athlete's compared 4.52 ± 2.37 athletes. The OKT Exercise subscale mean was 8.03± 2.92 and 8.43± 3.50 for non-athletes and athletes respectively. On the OKT Calcium subscale, the mean was 9.88 ± 2.47 for non-athletes compared to 8.59 ± 3.34 for athletes. Levene's test computed showed a statistically significant difference in the Osteoporosis risk factors (p=0.010) and Calcium subscale (p=0.002) means scores for athletes and non-athletes. The findings suggest the need for strategies to increase osteoporosis knowledge and awareness among college students, particularly athletes. In addition to regular high intensity exercises, it is important that athletes are knowledgeable about the risk factors and calcium-rich food sources in the prevention of osteoporosis.

UP56

Small Firm Marketing Strategies Targeting East Carolina University Students

Camryn Anne Keeter, David Silver

The legal sector has undergone a transformation in the past three decades. The traditional view of marketing in the legal sector has been described in the past as inappropriate, unprofessional, and an overall disliked practice (Hodges). Since the legalization of service advertisements in 1977, law firms have used various marketing methods such as Yellow Pages or social media (Callahan). While some firms have adapted to a new age of advertising, others remain reliant on the traditional word-of-mouth technique (Ellis). The legal profession has experienced considerable growth and as a result, traditional techniques are no

longer sufficient enough to ensure a firm's success (Hodges).

While there is more marketing than ever in the legal sector, some firms are not using the most effective strategies or are still ignoring marketing as an essential business function (Taylor). Unfortunately, marketing is an underdeveloped and under researched practice in the legal sector and is often the management function that is most difficult to master (Ellis.) More research regarding marketing law firms is needed to better understand what methods are most effective.

The purpose of this particular study is to determine the effectiveness of marketing strategies targeting college students that are implemented by small law firms in Greenville, North Carolina based on the perceptions of college students at East Carolina University. I will utilize a web-based survey to determine what marketing strategies are effective in attracting potential clients and creating firm awareness. ECU students make up approximately 15% of the population of Pitt County, North Carolina (United State Census Bureau). The results of this study could be an indication for the most effecitve marketing strategies for law firms located in similar- sized towns that are homes to universities.

UP57

Women in Leadership

Rachel Terry Edwards

If asked to name off any well known leaders within one minute, how many women do you think you could name? Why is it that it is easier to name male leaders verses female leaders? Women currently hold 4.6% of the CEO positions available in the Fortune 500 companies (Women CEOs of the S&P 500, 2014). That means, there are only 21 out of 500 positions filled with women. Why are women so underrepresented in leadership positions? When leadership positions are open, women are overlooked for these spots because they, women, are considered to not display the correct characteristics and traits that leaders need. However, when women often reveal the same traits that men portray, they are considered harsh and too masculine.

This paper will review research on popular leadership theories, relating back to gender and gender differences along with social expectations of any given leader. It will also discuss the challenges that women face as they climb up corporate ladders. What is the balance that companies are looking for in leaders that will allow women to rise in their fields? What are the differences in men and women leaders, and is there evidence that men are greater then women in these positions?

UP58

The Relationship Between Activity Plan Context and Children's Physical Activity Within an After-School Program

Kayla Michelle Maness, Nelson Cooper

The Police Athletic League (PAL) is a national organization that offers after-school programming through local law enforcement agencies. Previous research suggests that less than half of children's daily physical activity comes from school physical education (PE; Brusseau et al., 2011; Tudor-Locke, Lee, Morgan, Beighle, & Pangrazi, 2006). Community-based after-school activity programs offer an ideal environment to further encourage physical activity for many children, however the activity plan context is critical to accomplish this goal. This study examines the relationship between after-school activity plan context and the proportion of time children spend in moderate-to-vigorous physical activity. The Greenville, NC PAL after-school program serves approximately 60 children ages 5-13 and served as the context for this project. Utilizing the System for Observing Fitness Instruction Time (SOFIT), direct observations were conducted over a 10-day period. Observations of physical activity and activity plan context were recorded. Linear regression was conducted to analyze how much activity plan context predicted the amount of time children spent in moderate-to-vigorous physical activity. Results from this study will contribute to effective planning and implementation of the Police Athletic League after school program.

UP59

Preschool Childrens' Familiarity with "Healthy" and "Sometimes" Foods: Influence of Parent-Reported Prior Exposure

Shannon Bolyard[1], Sarah Lisson[1], Archana Hegde, PhD[1], L. Suzanne Goodell, PhD, RD[2], and Virginia Stage, PhD, RDN, LDN[1]

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Quality assessment tools are important to aid in the development and evaluation of nutrition education programs for children. Pictorial methods of assessment are a popular approach to assessing preschool children's (3-5 years) level of nutrition knowledge and skills. However, more research is needed to support pictorial methods to assess children's ability to recognize healthy foods within this population. Therefore, the purpose of this study was to determine preschool children's ability to identify

"healthy" and "sometimes" foods commonly consumed among preschoolers in pictorial form. A researcher-developed electronic, pictorial tool assessed preschool children's (n=30) ability to identify 36 target food items. Prior to child assessment, parents completed a food frequency survey assessing child exposure to each food. Data were analyzed using basic descriptive and chi-square analyses. Participants identified banana, pizza, apple, strawberries, broccoli, popcorn, dinner roll, and French-fries correctly at 90% or higher. Grilled chicken, sliced grapes, fruit snacks, and chocolate milk were misidentified at 50% or lower. In general, prior exposure to food items showed a higher rate of correct identifications compared to foods children had not been exposed to previously, based on parent report. However, findings revealed there were no statistically significant relationships between children's ability to identify the pictured food, and the parent-reported child exposure for any of the 36 food items (p<.05). Future research should examine the influence of food exposure frequency, and the environments in which food exposure occurred (home versus school) on young childrens' ability to recognize target foods presented in pictorial form.

UP60

Effects of Emotional Symptoms on Pain and Social Functioning in Youth with Sickle Cell Disease

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Sickle cell disease (SCD) is one of the most widespread genetic blood disorders in the world, primarily occurring within African-American and Hispanic populations in the United States. It is associated with various physical complications, the most common being pain due to vaso-occlusion. Pain has been linked to poor social functioning pediatric populations; however, research on the impact of pain on social functioning in youth with SCD is limited. Pain has also been linked to poor emotional functioning in youth with SCD; however, no one has examined the possible effects of emotional functioning on pain impact. The current study aims to (1) examine the influence of pain on social functioning in youth with SCD, and (2) investigate whether emotional symptoms influence the relationship between pain and social functioning within this population. We hypothesized that worse pain would be related to poor social functioning, and that poor emotional functioning would strengthen that relationship. The guardians of 122 youth with SCD, aged 8-17 years, reported on their child's age, sex, SCD genotype, and pain experiences in the past year. Guardians and youth also completed the Behavioral Assessment System for Children, 2nd Edition, which assesses social functioning and emotional symptoms (i.e., anxiety and depression). Regression analyses indicated that over and above the influence of other factors, long pain episodes were significantly related to lower social skills based on parent report ($t = -2.93$, $p < .01$). They also indicated that the more symptoms of depression youth reported, the stronger the relationship between high pain severity and low interpersonal relations ($t = -2.40$, $p = .02$). These findings support our hypotheses that worse pain is related to poor social functioning in youth with SCD, and that poor emotional functioning strengthens that relationship. Based on these outcomes, effective interventions focused on improving social functioning in this population should address both pain and emotional functioning. Additional research is needed to identify other factors that may impact social functioning or the effect of pain on youth with SCD.

UP61

An Analysis of Dietary Habits of Young Adults Seeking Weight Loss and the Feasibility of a Modified Monitoring System Using Mobile Technology in Young Adults

Ryan Carter-Stanley, Chelsey Solar, MS/EdS, Michael Seegars, Lesley D. Lutes, PhD, & Susan McCammon, PhD

Currently, 68% of Americans are either obese or overweight. It is also expected that obese young adults will have a significantly lessened life expectancy compared to their non-obese counterparts. Young adults, however, do not adhere to traditional weight loss interventions. Furthermore, failing attempts have been made to address modality utilized by young adults, like technology. Specifically, there has been a dramatic increase in the number of mobile applications developed. However, they still utilize traditional dietary monitoring. Self-monitoring, the recording of all food consumed through out the day, is consistently linked to successful weight loss, as is reducing caloric intake. Young adults, however, do not adhere to traditional self-monitoring. Therefore, prior to addressing young adult weight loss, the lack of literature on the diet and caloric consumption of young adults must be addressed. Achieving a greater understanding of the dietary habits of young adults, therefore, is a necessary step towards developing an effective weight loss intervention. The purpose of this study was to first collect descriptive information on young adult food consumption as well as their caloric intake. Secondly, this study analyzed an innovative monitoring system that focused on the recording of 8 specific food categories related to weight gain and 5 food categories

related to weight loss and its effectiveness at capturing the caloric intake of young adults. This study is a part of a larger study comparing the modified monitoring smart phone application to a commercially available traditional monitoring app. Fifty-seven female young adults were recruited and, prior to beginning the two-arm, four-week study, completed two 24-hour recalls of all food and drink consumed (ASA-24). Data from the recalls was used to analyze the dietary consumption of young adults and the effectiveness of the modified monitoring system in capturing caloric intake. Results indicated that 81% of participants skipped at least one meal over the course of two days and that a correlation exists among stress and BMI in young adults. The caloric intake of young adults was 200 kcal higher compared to average women while they consumed more fat, carbohydrates, and protein than the national averages. Results comparing the effectiveness of the modified monitoring app, Trac It, in capturing the majority of caloric intake will be discussed along with implications and future directions.

UP62

Examining Proposed Models of Mindfulness Mechanisms

James Adam May, Ellie Kim, Christyn Dolbier

Background: Dispositional mindfulness (DM) varies across individuals, protects against psychological distress, and can be enhanced through training. While various mechanisms have been proposed to explain how mindfulness enhances health, DM and mindfulness training mechanisms may differ.

Method: Undergraduate students (N=683; majority White, female, freshmen) completed an online survey of psychometrically sound measures of DM, proposed mechanisms, and emotional distress (stress, depressive and anxiety symptoms). Structural equation modeling was used to test two published models (Coffey et al., 2010; Shapiro et al., 2006), separately and in combination to identify a parsimonious model with strong predictive utility.

Results: The Coffey [mechanisms: clarity, non-attachment, emotion regulation (ER), rumination] and Shapiro (mechanisms: reperceiving, flexibility, exposure, values clarification, self-regulation) models each accounted for large amounts of variance in distress, but neither demonstrated full mediation or met fit indices criteria. In combining the models, latent variables were formed from nonattachment and reperceiving (r=.75) and ER and flexibility (r=.71). Non-significant paths and variables not predictive of distress (values clarification, self-regulation, exposure) were removed. The final model fit the data (NFI=.98, TLI=.97, CFI=.98, RMSEA=.069), accounted for 94% of the variance in distress, and demonstrated full mediation. Direct paths in expected directions included: DM to clarity, non-attachment/reperceiving, and ER/flexibility, which each had paths to rumination; clarity, ER/flexibility and rumination to distress. There were also paths from clarity to ER/flexibility, and ER/flexibility to non-attachment/reperceiving.

Discussion: Results showed more support for Coffey's model, consistent with its basis on DM and examination in undergraduate students. The synergistic effect of combining the two models was illustrated by full mediation between DM and distress, meeting model fit criteria, and greatest predictive utility only when models were combined. Further research is needed to de-confound mindfulness from its mechanisms and methods by which it is cultivated, and determine the model with the best causal evidence and most clinical utility. To address this need, a future study will focus on prospectively assessing proposed facets of DM, proposed mechanisms, and emotional distress outcomes with clinical cut-offs.

UP63

Entrepreneurship in a Niche Service Market: Developing a Business Model for a Dog Training Enterprise

Morgan Hansen Harvey

In 2012, there were almost 70 million dogs in America, which resulted in an increase in demand for pet services, including dog training (*U.S. Pet Ownership Statistics*, 2012). Based on statistics from the U.S. Pet Market Outlook 2013-2014, consumer spending for non-medical pet services will exceed $20 billion, growing at about 6.0% annually. Dog sports such as agility have become increasingly popular, which has increased the demand for dog training facilities and instructors that offer sports training classes in addition to traditional obedience classes (Kalter & Sprung, 2013). This growth in demand has led to an increase in the number of new ventures offering specialized training services. The purpose of this study was to conduct exploratory research in order to determine the market for dog training in Raleigh, NC. By conducting industry and regional analyses that focus on the local consumer demands, how their needs are currently being met, and what the potential market is, a business model can be developed for the use of entrepreneurs in this niche service market. To help determine the market for dog training, a confidential survey was distributed to dog owners in Raleigh, NC with questions focusing on five main topics: participant demographics, dog demographics, prior training, desired future training, and limitations. By having a better understanding of the market needs in the area, entrepreneurs can develop their business services around the customer demands and limitations and increase their likeliness of success.

UP64

Vocabulary Development in Bilingual Children: Why We Assess Differently

Kristen Nicole Boretti, Dr. Lucía I. Méndez

Bilingualism is becoming widespread in our growing society, but not all bilinguals are equal (Core, Hoff, Rumiche, & Señor, 2013). The degree of bilingualism or fluency attained in each language is impacted by environmental factors, especially in preschool children developing a second language while continuing to develop their first (Hoff & Naigles, 2002, Cote & Bornstein, 2014). In particular, the amount and quality of language input and language use both impact a bilingual child's language development in each of their two languages. (Vocabulary size in one language, for example, may differ from that in the second language (Cote & Bornstein, 2014). Overlapping of vocabulary may represent about 30% of vocabulary use while the other 70% is unique to only one language or the other (Core, Hoff, Rumiche, & Señor, 2013). Hence these differences in language development have implications for vocabulary assessment approaches for the bilingual population, particularly at the preschool level. Screening and language assessment approaches for bilingual children should consider these differences to identify children with possible language delays earlier and more accurately. (Patterson, 1998).

Bilingual children cannot be expected to perform as "two monolinguals" (Collins, O'Connor, Suarez-Orozco, Nieto-Castanon, & Toppelberg, 2014) and vocabulary assessment approaches for bilingual children need to move away from traditional approaches (Bedore, Pena, Garcia, & Cortez, 2005). Current research suggests that a dual language approach may be a better strategy for assessing vocabulary skills in both languages while capturing a full representation of the child's overall lexicon (Bedore, Pena, Garcia, & Cortez, 2005).

This interactive poster session will review current research findings on bilingual vocabulary development that should be considered by Speech-Language Pathologists in choosing assessment approaches for bilingual preschoolers. Clinical implications for bilingual assessment will be presented.

Learning Outcomes:

1. Participants will become familiar with vocabulary development in bilingual preschoolers.
2. Participants will be able to identify differences in vocabulary development and its implications for assessment approaches for bilingual preschoolers.
3. Participants will understand the importance of using research findings to make informed clinical approaches to vocabulary assessment selection and assessment instruments for this population.

UP65

The Relationship Between Leadership Interaction and Children's Physical Activity Within an After-School Program Context

Kelsey Curls Newsome

Previous research suggests that less than half of children's daily physical activity comes from school physical education (PE; Brusseau et al., 2011; Tudor-Locke, Lee, Morgan, Beighle, & Pangrazi, 2006). Community-based after-school activity programs offer an ideal environment to further encourage physical activity for many children. One such program is the Police Athletic League (PAL), a national organization that offers after-school programming through local law enforcement agencies. This study contributes to after-school programming effectiveness by examining the relationship between after-school leader interaction and the proportion of time children spend in moderate-to-vigorous physical activity. The Greenville, NC PAL after-school program serves approximately 60 children ages 5-13. Utilizing the System for Observing Fitness Instruction Time (SOFIT), direct observations were conducted over a 10-day period. Observations of physical activity and leader interaction were recorded. Linear regression was conducted to analyze how much leader interaction predicted the amount of time children spent in moderate-to-vigorous physical activity. Results from this study will contribute to effective planning and implementation of the Police Athletic League after school program.

UP66

Should Post Traumatic Stress Disorder be labeled as a disorder?

Gregory E Taunton

Post Traumatic Stress Disorder, more commonly known as PTSD, is a psychological reaction occurring after experiencing a highly stressing event (as wartime combat, physical violence, or a natural disaster) that is usually characterized by depression, anxiety, flashbacks, recurrent nightmares, and avoidance of reminders of the event (Merriam-Webster, 2016). Post-Traumatic Stress Disorder is the diagnosis given to a combat veteran who experiences these characteristics; but should post-traumatic stress really be classified as a disorder? After conducting a literature review on the stigma associated with classifying post-traumatic stress as a disorder; interviewing several counselors,

social workers, psychologists, and local veterans to determine their position and stance on Post-Traumatic Stress Disorder; the research question I asked myself was **Should Post-Traumatic Stress Disorder be classified as a disorder?** Lastly, this study attempts to determine if removing the classification of disorder from post-traumatic stress, will more veterans who experience post-traumatic stress seek help in order to cope with their experiences?

UP67

Faith-Based Youth Programs And Resiliency Development: An Exploratory Study

Savannah Grace Welborn, Nelson Cooper

Department of Recreation and Leisure Studies, East Carolina University

The purpose of this study was to explore the relationship between Young Life participation and the perception of resiliency skills among middle school, high school, and college-aged students. A convenience sampling frame of 350 students was recruited from a specific Young Life Chapter in Greenville, NC, known as Pitt County Young Life. Upon securing appropriate consent, a Young Life small group leader facilitated completion of the instrument and the data collection. A 26-item survey was completed to measure perceptions of resiliency skills, participation in young Life, and additional demographic variables. Forty-five participants voluntarily completed the survey, resulting in a 12.9% return rate. Results indicated no significant relationship between any of the four resiliency factors and participation in Young Life. Recommendations for improving this study include a larger sample size, fine tuning the distribution method to include less people, using the most accurate version of thee Resiliency Attitudes and skills Profile, and including a qualitative procedure (such as a focus group) that could be analyzed alongside quantitative data.

UP68

Portable Brew Pod

Joshua Bruce Stevens, Andrew Joseph DiMeglio, Connor Allen Jones

Department of Technology Systems

Our innovation focuses on the design and development of a portable solo coffee pod machine that does not require electric power to brew coffee. We will market this product to be used in camping or wherever electricity is not available. Water can be boiled over a campfire or other heating element and poured into the device. Subsequently, an integrated hand pump injects hot water through a solo coffee pod and brew into the detachable cup. This design will be compatible with pods such as the Keurig K-Cup® and would be slightly larger compared to that of a standard thermos.

UP69

Improving Efficiency of Body Shop Distribution Center

Jarrad P Sims

My investigation project will be conducted at the Hastings Ford Dealership in Greenville, North Carolina. My study focuses on the operations of a certain facility at Hastings Ford. To be more specific, the Body Shop Distribution Center there. At Hastings, the Body Shop Distribution Center is responsible for housing all of the car parts that the Body Shop will use to fix the cars that they're working on. This includes housing current car parts as well as housing car parts ordered for upcoming clients. The goal of my project is to improve the overall efficiency of the Distribution Center which will result in increased productivity for the Body Shop. But, we must first observe why the Distribution Center is currently less efficient.

The existing problem at the Body Shop Distribution Center of Hastings Ford is that there are many car parts in the facility that are hard to access and/or hard to find. These issues stem from the current part layout and organizational system being used. For example, the facility is lacking proper walkways to access all parts and also lacks an effective organizational system. The current system of organization uses labels on each of the part boxes with a designated name and part number associated. My strategy for improvement in this facility includes several methods. First, removing waste in the facility to allow more room for car part accessibility. Next, utilize their existing numbering system by re-organizing the Distribution Center in an arrangement that facilitates ease of finding part numbers/names. Also, addition of a numbering system that tracks the total number or parts that should be present for a given car or client. The results of my efficiency improvement system will be quantified using time studies and other measures of improved efficiency/productivity.

UP70

Pre-serialization Labeler Camera

Michael Whitaker Beavans

Effective January 2017, the commercial pharmaceutical companies are required to serialize their product, meaning they need to be able to account for every bottle, in every bundle, in every box, and on every pallet that is produced. How is this possible? By installing high-tech camera systems that have the ability to register information from bar-codes, computer systems can track each bottle's location until it ultimately reaches its consumer. This regulation has led to huge expenses for companies to update and improve upon their existing equipment. 2016 marks a year of preparation in order to make sure the transition goes as smoothly as possible.

2016 at Mayne Pharma is undergoing lots of changes on top of the serialization: it has announced and begun the construction of a $65M expansion to its existing facility. If all goes as planned, the facility will be ready for operation at the beginning of 2018, and the clock is ticking. If there is one thing I have learned about being in the pharma business, it is that almost nothing can be completed immediately. Currently, Mayne is undergoing the process of determining what assets can be moved to the new facility, and what kind of machines will be needed in the new facility. This is where my role comes in, currently as an Engineering Intern.

An immediate problem that needs to be addressed is a bottleneck operation in one of the packaging lines. Because the existing labeler is only able to run 40 bpm (bottles per minute), the rest of the line is restricted to that number as well. By updating the equipment with a new Labeler that is able to run faster, the whole process becomes more efficient. In June 2015, a new Labeler was purchased and has recently been delivered. While a third party company is preparing a high-tech camera system for serialization, we have decided to be proactive and take matters into our own hands. By adding a camera to the labeler temporarily, we will be able to improve the quality of our product by ensuring the labels are applied appropriately, and we will be able to validate and use the labeler sooner.

To install this camera system, we need to look at the best place to locate it to maximize its potential, and allow the camera to be adjusted to see all of the different size labels that will be used for different products. This decision will improve the quality of our products and save the company a sizable amount of money.

UP71

An Innovative Ski Speed Regulator

Brian Pridgen, Tyler Camden, Lawson Hawkins

Department of Technology Systems

Our focus is to create a speed regulator/brake for snow skies. This product will be geared towards novice users/amateurs as they are beginning to learn to ski.

Once a user decides to control the skiing speed, he or she will engage the flap/blade of regulator. Upon engagement a spring/actuator will turn on and start to apply pressure to the blade pushing it down into the snow. This will create drag to slow the skier down to a safe speed preventing the skier from losing control. The greater the speed of the skier, the more the blade will engage into the snow, creating more drag. As the speed slows, the blades will retract and the skier may resume skiing unaided by the regulator. One product enhancement that we are contemplating for the future is to make our devise GPS compatible to track the skiers speed. Once a predetermined speed is approached, the enhanced device will begin to engage.

UP72

Open-source Analytics: A Bibliometric Literature Review

Holden Perry Jones

As a field, Analytics is rapidly expanding to meet the demands of the business sector. The McKinsey Global Institute reported that there will be a shortage of 140,000 to 190,000 analytics professionals (Chen, Chiang, Storey 1165). This deficiency is causing a rapid growth in the number of degree programs related to data analytics and business intelligence (Chen et al., 1183). A key part in creating these degree programs is determining what content and skills that must be taught within the curriculum in order to produce graduates who can be successful within industry. These programs' content not only includes data collection, storage, analysis, and modeling, but also software packages and programming languages which are used to complete these tasks (Chen et al., 1166). The rise of web-based technologies and social networks have also fueled the development of open-source analytics technologies that are also becoming more widely used (Batrinca and Treleaven 102-103).

With these different analytics options available, which technologies need to be taught within degree programs to create competitive analytics graduates? Currently, many degree programs focus heavily on large enterprise analytics platforms

like SAS, but only lightly teach the open-source technologies available (Rappa). There has been clear evidence produced from a study showing that there has been rapid growth of the volume of publications produced about analytics over a ten year period (Chen et al., 1179). This study aims to replicate the methodology of that study, but will focus on a much smaller segment of the analytics: open-source analytics technologies. The metadata sources from the eight publications in the Chen study will also be used in this study. The major difference will be the set of keywords used in the final analysis we be related to popular open-source analytics tools and technologies.

It is predicted that there will be also be an increasing amount of literature being published about these new technologies annually. If this hypothesis is correct, a conclusion can then be made that the analytics field is increasing adopting these technologies and that degree programs related to analytics should adapt their curriculum to match the change in order to produce competitive graduates. Data is currently being collected for this study. After collection takes place, it will be cleaned and analyzed.

UP73

Elimination product waste, and implement more efficent recycling method

Brian Miles Greene

In the soft drink buisness there is a large amount of waste product, either from drinks going out of date in the warehouse, on the shelves in stores, or product that gets damaged throughout the distribution process. For Research and Creative Achievment Week I am presenting proposals of ways to greatly reduce waste. First I am looking into ways to greatly reduce the amount of product that gets destroyed due to being out of date or damaged. Second I am trying to implement a new way for them to recycle their waste material.

UP74

An Innovative Ratchet Wrench

Richard Anthony Davis, Landon Caldwell, Michelle Xiong

Our innovation focuses on fundamental tools that can be found in any toolbox be at home or workshop. Our invention is a drawstring winding ratchet wrench. The basic function is to tighten or loosen bolts/nuts quickly with little fatigue. In tight spaces where a normal ratchet wrench would tighten a bolt with many small crank increments, our ratchet would tighten the slack with a pull of the drawstring. The drawstring be pulled from the end of the ratchet wrench. Inside the head of the ratchet wrench, there will be a coiled spring to give the drawstring a tension similar to that of a tape measure. Normal ratchet wrench's switch mechanism denotes whether the ratchet is turning clockwise (tightening) or counter-clockwise (loosening). We will be modifying this mechanism by offering an extra option to engage the drawstring to the drive. Once engaged, the operator can pull the drawstring thus tightening the bolt/nut to the point where it needs extra torque to properly secure the nut/bolt. The operator can then switch back to clockwise or constriction mode to complete the last couple of turns.

The objective of our innovation is time optimization and productivity enhancement by reducing hand fatigue caused from the routine operation compared to that of regular ratchet wrench available in market.

UP75

A Program Evaluation of Asthma Management in an Elementary School

Sydney Anne Howard

Asthma is a chronic disease process affecting the airways that can be controlled with lifestyle adaptations and medications. In the United States there are more than 3,600 deaths from asthma annually, which could have been prevented with proper care and treatment (Asthma and Allergy Foundation of America [AAFA], 2015). Asthma costs in the United States healthcare system encompass individual medical expenses, missed school days for children, and early mortality (AAAAI, 2015). In North Carolina public schools, asthma is a leading chronic health condition as well as the leading cause of school absenteeism in school-age children. According to the Center for Disease Control and Prevention (2013), 48.6% of children have missed one or more days of school related to their asthma annually. Kozyrskyj, Kendall, Jacoby, Sly, & Zubrick (2010) found children in lower socioeconomic classes have a higher incidence of developing persistent asthma. This factor is pertinent to North Carolina where 90% of counties in eastern North Carolina fall below the poverty level (Clayborne, 2005).

This senior honors project is being implemented at an elementary school in eastern North Carolina. The school system has a large percentage of children with asthma and different degrees of management. The purpose of this program evaluation is to compare the school asthma program for students to current best practice in management of asthma. This project will involve speaking with key informants including the school nurse, the

asthma action coalition nurse, and teachers. The first objective of this project will be to review school records to collect data and understand the processes used in managing students' asthma. A second objective of this project will be to interview three key informants using five standard questions about their critical roles in managing students' asthma. The data will be interpreted, findings reviewed for similarities and differences with best practice, and recommendations will be made in oral and written presentations to the school nurse and other pertinent staff members.

UP76

Cancer care provider's perspectives on medication adherence for cancer patients on oral chemotherapeutic agents (OCAs): A preliminary qualitative assessment

Paige Field, Alice Richman, PHD, MPH, Essie Torres, PHD, MPH

Background: In recent years, the use of oral cancer therapies to treat cancer have increased greatly and is expected to continue to increase. Oral chemotherapeutic agents (OCAs) are preferred over intravenous chemotherapy for several reasons. Oral chemotherapy is more convenient for patients, in that they can take their medication in the comfort of their own home and do not visit their doctor's office as frequently. However, according to the World Health Organization, non-adherence with oral chemotherapeutic agents is the most modifiable factor that can compromise treatment outcomes. WHO estimated that only about 50% of patients take their medications as prescribed. Although OCAs are increasingly being used and are commonly preferred by patients, adherence varies with compliance rates as low as 16% and as high as 100%. Thus, it is critical to develop and test interventions that effectively improve adherence to OCAs.

Purpose: The purpose of this study is to understand the cancer care providers' perspectives regarding challenges patients who are on oral chemotherapeutic agents (OCAs) have in adhering to their treatment plans and facilitators to adherence among the same patient population.

Methods: Qualitative focus groups with cancer care providers (N=7-12) will be conducted and will last approximately one hour. The cancer care providers will be asked to share their experiences with compliance of OCAs among their patient population, and discuss structural factors that might influence sub-optimal adherence among this population.. Participants will also be asked to discuss with effective strategies they use to help their patients with their medication adherence.

Expected Results: The results from this study will help identify and understand the unique factors that contribute to non-adherence among cancer patient population served in eastern North Carolina (ENC), which in turn will inform a tailored approach of adherence strategies that specifically address the needs of our population of interest in ENC.

UP77

Understanding Infant Feeding Practices Among Underserved Mothers: A Program Evaluation

Kimberly Denise Miskow, Mentor: Kim Larson, PhD, MPH, RN

Infant feeding practices can include exclusively breastfeeding, exclusively formula feeding, a combination of breastfeeding and formula feeding, and/or the addition of other supplements such as water or juice. The Centers for Disease Control and Prevention (CDC) endorses breastfeeding as one of the best ways that a mother can protect the health of her infant (2014). The American Academy of Pediatrics suggests exclusive breastfeeding through 6 months of age for optimal childhood development and growth (Eidelman & Schlaner, 2012). Although 79% of infants in the United States are breastfed initially, only 19% are exclusively breastfed for the first 6 months (CDC, 2014). Though breastfeeding rates overall in the US are below Healthy People 2020 goals, rates among underserved mothers (including low income, less than high school education, and minorities) are even lower (Campbell, Wan, Speck, & Hartig, 2013). Women participating in the Women Infants and Children (WIC) program, a government nutritional program for low income families, were 12% less likely to breastfeed than the general population (Hedberg, 2013). The breastfeeding rate for African American women is 58.1% (Eidelman & Schlaner, 2012). The initiation rate for Hispanic mothers is higher than average at 80.6% (Eidelman & Schlaner, 2012), however, 33% of Hispanic mothers supplement their newborns, which is higher than white (22%) or African-American mothers (28%) (Linares, Rayens, Dozier, Wiggins, & Dignan, 2015).

This honors project is a program evaluation on breastfeeding practices among underserved mothers conducted in a health department that serves a low income minority population in eastern North Carolina. In collaboration with a public health nurse preceptor, I conducted a record audit and interviewed key informants on the breast-feeding practices and policies in this region. From the women's health program, I sampled 50 records of postpartum women to assess demographic characteristics and breastfeeding practices. This program evaluation will determine barriers and facilitators toward breastfeeding among African American, Hispanic and White women in rural eastern North Carolina; describe characteristics of women who breastfeed

exclusively for 6 months; and explain breastfeeding friendly initiatives in this area. Findings will be reported in a written and oral presentation to public health staff at the location of the study.

UP78

Assessment of Occupational Exposure of Animal Facility Personnel to Mouse Urinary Aeroallergens

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Animal facility personnel are at a high risk of occupational exposure to laboratory animal allergens. These allergens include proteins excreted from mature male rodent urine. Exposure to these allergens may cause serious health risk, including laboratory animal allergy (LAA), to animal facility personnel in laboratory animal facilities, such as in research institutions. The purpose of this study was to assess the mouse urinary aeroallergen exposure of animal facility personnel working in ECU animal facilities. Specifically, this study aims to determine the differences in worker exposure by task performed, control measures used, and room types. Aeroallergens were sampled by collecting inhalable dust fraction on polytetrafluoroethylene (PTFE) filters using IOM filter cassettes at a set flow rate of 2 LPM. Each air sample was collected during 1- to 2-hour periods until a particular task (e.g., cage changing, bedding disposal) is completed. Personal samples were collected using person-carried pumps with air filter fastened in the breathing zone of the worker, while area samples were collected using stationary pumps in set locations in the room at 1 m height. Personal and area sampling were conducted to determine the amount of aeroallergens in breathing zone of employees and the surrounding area, respectively. Air samples from a variety of room types (e.g., mice transfer, cage washing) that use varying ventilation equipment (e.g. ducted or recirculating biosafety cabinet, cage changing station) were performed to compare exposures. After sampling, each filter was placed in a microcentrifuge tube with 1 mL PBS, 0.5% Tween 20 and agitated for 2 h at room temperature to elute the collected aeroallergens from the filter. The filter eluates were then collected and stored at -20°C until analysis. Mouse urinary allergen (Mus m 1) in filter eluates will be quantified using sandwich-enzyme-linked immunosorbent assay (ELISA). The findings of this study will be ultimately used to design and implement more effective control measures to reduce exposure of animal facility employees to mouse aeroallergens and, thus, decreasing worker risk to LAA.

UP79

Physical Activity Barriers in Adolescents

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Introduction

Since the 1980s, obesity has quadrupled in children ages 12-19. Physical activity (PA) is an important part of obesity and weight maintenance. Unfortunately, many barriers to PA participation exist and identifying these barriers is critical to develop approaches to overcome them. Therefore, the purpose of this study is to examine adolescent PA barriers, and to determine if parents and their children perceive the same PA barriers.

Methods

One hundred and fifteen parent-adolescent dyads (12-18 years) were recruited for the study. The adolescents' height and, weight were measured, then BMI and BMI z-scores were calculated. Adolescents completed the Barriers to PA Questionnaire. The parent was also asked to complete the same barriers questionnaire, based on what he/she perceived as PA barriers for their child. Subscale scores were calculated for: body, convenience, resource, social, and fitness. Multiple 2x2 ANCOVAs were used to determine differences in the subscale scores between healthy weight (HW), obese adolescents, parents of HW adolescents, and parents of obese adolescents controlling for adolescent sex and parental education levels.

Results

Of the 64 female and 51 male adolescents, 37% were White, 48% were African American. The mean age of the adolescents was 14.29±1.76 years with an average BMI of 31.7kg/m^2. The HW adolescents (19.81±1.81 kg/m^2) had a lower BMI compared to obese adolescents (37.99±7.25 kg/m^2).

Parents perceived higher adolescent PA barriers related to body ($p=0.0012$), resource ($p=0.0067$), social ($p=0.0016$), and fitness ($p= 0.0010$) subscales than what the adolescent perceived. Further, obese adolescents reported more body, resource, social, and fitness related barriers than the HW adolescents ($p<0.0001$). Interaction effects were also noted for body, social, and fitness related PA barriers ($p<0.05$). For the body subscale, parents of obese adolescents had a higher score compared to parents of HW adolescents, HW adolescents, and obese adolescents. Regarding the social and fitness subscales, parents of obese adolescents

had higher scores than parents of HW adolescents and obese adolescents, but the scores were similar between HW adolescents and their parents.

Conclusion

Parents and their children perceive differences in PA barriers. Obese adolescents and their parents reported more PA barriers than HW adolescents and their parents. These findings will help create programs to reduce barriers to PA.

UP80

Effects of Income Level on Food Behaviors and Nutrient Intake Among 3-5 Year Old Children

Karsyn Tall, Charisse Costin, Shannon Bolyard, Virginia Stage, PhD, RD, LDN

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As of 2012, approximately 8.4% of children in the United States, ages two to five, were classified as obese. The prevalence of obesity between 2011 to 2012 appeared to plateau, however the number of children ages three to five who are obese is still higher than what is recommended by The Center for Disease Control and Prevention (CDC) (Center for Disease Control and Prevention, 2015). The purpose of this study is to compare the relationship between income level, food availability, and nutrient intake for three to five year old children in the United States. Data was collected from the 2012 National Health and Nutrition Examination Survey (NHANES). Only children ages three to five were used as participants, income level was divided between low-income, middle-income, and high-income. One-Way ANOVAs were used to analyze the difference in nutrient intake (kilocalories, protein, carbohydrates, total sugars, dietary fiber, total fat, saturated fat, and cholesterol) and food away from home consumption between income levels. Data revealed only cholesterol intake was significantly higher [$F(2,322),=4.121$, $p=.017$] in low-income households compared to high-income households. Additionally, food not consumed at home was shown to be statistically lower [$F(2,340),=4.404$, $p=.013$] in low-income households than in high-income households. Study findings indicated low-income children may be consuming food away from home less frequently, while having higher cholesterol intakes compared to children from high-income households. Further research is needed to explore where low-income families are consuming the majority of their meals, as well as, the nutritional value of meals consumed away from home.

UP81

Examining the Musculus Uvulae Using MRI

Elizabeth Radack, Lakshmi Kollara, Jamie Perry

Background & Purpose: Improper velopharyngeal closure can cause speech problems, including hypernasal resonance, which can lead to social stigmatization and difficulties in communication (Bressmann, Anderson, Carmichale, & Mellies, 2012). The musculus uvulae is an important muscle for velopharyngeal closure. When the musculus uvulae is contracted, a bulge is produced on the nasal surface of the velum. This added mass guarantees the tight seal in velopharyngeal closure by extending the nasal surface more towards the posterior pharyngeal wall and adding stiffness to the velum (Kuehn et al., 1988; Kuehn & Moon, 2005; Perry, 2011). The musculus uvulae is an important muscle but there has been limited published research regarding its measures in individuals with normal and abnormal anatomy. The purpose of this study is to examine and measure the musculus uvulae in adults with normal anatomy.

Methods: Amira 3D software was used to measure and analyze the musculus uvulae length, thickness, diameter, vertical and lateral dimensions, and volume from MRI scans of 15 Caucasian males with normal anatomy. The volume of the velum and the intravelar and extravelar portions of the levator veli palatini were also analyzed in these 15 individuals and measured.

Results: The mean musculus uvulae length (mean =13.236mm), thickness (mean=3.2367mm), diameter (mean=2.9047mm), vertical dimensions (mean=2.8273mm), lateral dimensions (mean=2.5833mm) and volume (mean=92.6045mm^2) provide preliminary data on musculus uvulae dimensions in healthy adults with normal velopharyngeal anatomy. Data analyses are in progress and will be completed by February 2016.

Conclusion: Seeing as the musculus uvulae is crucial for closure and, therefore, intelligible speech, it is important to know what the dimensions of the muscle should be in an individual with normal anatomy. If an individual is experiencing hypernasality or other speech problems, the dimensions of the musculus uvulae in adults with normal anatomy must be known in order to determine if the problem is being caused by abnormal musculus uvulae anatomy.

UP82

Best Practices for Stroke Prevention and Rehabilitation in Eastern North Carolina

Morgan Samantha Pullium

Strokes are prevalent in the United States; in addition to being the fifth leading cause of death, they are also a major cause of disability. According to the Centers for Disease Control and Prevention (2015), more than half of stroke survivors over the age of 65 experience a reduction in mobility. Stroke prevention and rehabilitation services are designed to address the morbidity and mortality associated with stroke. There are numerous barriers and enablers regarding stroke rehabilitation. Barriers include patients' expressed concerns over a lapse in discharge coordination (Koh, Barr, & George, 2014), and communication difficulties with staff providing instructions (Blonski et al., 2014). In addition, there is a wide-range of delivery models for stroke rehabilitation services. Wang et al. (2013) found that community-based patients showed significant positive differences in self-efficacy, behavior, and knowledge and noted the importance of educational programs within the community after discharge for stroke patients.

This senior honors project is being conducted at a hospital in eastern North Carolina in collaboration with the Stroke Nurse Coordinator. The current program consists of a core stroke team: the Stroke Nurse Coordinator, the Emergency Department Stroke Advocate, and an Emergency Department physician. This group serves all stroke patients while in the hospital to ensure staff are meeting all stroke protocols, proper staff training is received, and patient education and discharge needs are met. For a rural community hospital the number of stroke cases per month averaged between 25-35 cases for 2015. The purpose of this program evaluation is to compare usual practice to best practices for stroke prevention and rehabilitation services. The three project objectives are 1) to determine the current program delivery model, 2) to identify the most prevalent barriers and enablers for patients, and 3) to identify strengths and weaknesses of the program compared to best practices. The members of the core stroke team will be key informants for the program. Data collection will include program statistics, a review of policies and procedures, and a review of communication patterns. Data will be interpreted and compared to best practices for stroke rehabilitation and prevention. Written recommendations regarding the program will be provided to the Stroke Nurse Coordinator and other pertinent staff members.

UP83

Development of a Deployable HRV Asessment and Training System

Mikayla Krystyna Paluzzi, Carmen Russoniello, Matt Fish, Laura Gremore, Christina Brown-Bochicchico, John Evans, Brenda Bart-Knauer

PTSD and TBI are debilitating psychological conditions that are difficult to diagnose and treat. These conditions have been directly correlated to depression, anxiety, and somatic complaints consistent with hyper-arousal of the autonomic nervous system (ANS). Verification of these results with quantitative phsyiological data is needed to provide an accurate assessment of PTSD and TBI. The Department of Defense (DoD) requested technologically based methods to measure physiology in remote locations and to conduct biofeedback based methods to measure physiology in remote locations and to conduct biofeedback training. Heart Rate Variability (HRV) biofeedback training has been studied and found to be efficacious in reducing symptoms associated with hyperarousal in PTSD and TBI.

Introduction: Last fall the Center for Applied Psychophysiology successfully tested a mobile tele-health system (MTS) for the Department of Defense. MTS is a HRV measuring and monitoring platform that employs a blue tooth ear sensor with remote diagnostic and biofeedback capabilities. MTS was designed to predict, prevent, and ameliorate symptoms of PTSD, TBI, and other autonomic nervous system dysfunction in military personnel at home and while deployed.

Method: Each of the ear clips and tablets will be tested prior to being given to a client by testing ourselves on the platform. Teaching of the system will be done in Cohorts of Marines and then all remaining training will be done at home. A pretest and posttest will be administered. A demo of the MTS system from the study in progress with combat Marines will be presented. In addition, a DoD funded naturalistic cognitive assessment that is housed on the same MTS platform will be demonstrated.

Discussion:Military personnel now have access to technology that can easily record physiology data in remote locations. The collected data is encrypted and sent to a HIPPA compliant cloud server where it is analyzed and sent instantaneously to military health professionals in the field and to specialists throughout the world. Collaborative treatment decisions can now be made, potentially saving lives. Moreover, military personnel now have easy access to a self-directed neurocognitive assessment and biofeedback training that can assist in preventing and ameliorating debilitating symptoms.

UP84

Interval Training Effects on Bone and Joint Loads

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High-intensity interval training (HIIT) is defined as an exercise program involving cardiorespiratory training in repeated bouts of short duration at high intensities followed by short, recovery periods of lower intensity. The positive impact of HIIT on cardiorespiratory health is well established. However, the impact of HIIT on measures of musculoskeletal health and injury is still in need of research. The incidence of running-related injuries is very high and prohibits routine participation in physical fitness activities. It is predicted that the decreased number of loading cycles relative to HIIT may reduce cumulative joint forces associated with overuse injuries, such as patellofemoral pain, that are commonly experienced during running. It is also expected that increased peak bone loads will be observed during HIIT and the resulting osteogenic response may be beneficial to long term bone health. Therefore, the aim of this study is to compare knee joint contact forces and tibial stress between different HIIT protocols that are metabolically equivalent to prolonged running. After initial screening, the participants will be enlisted into a two-part study. The first section of the study will be to determine the subjects' maximal oxygen consumption using a limited treadmill test. The participants will then partake in a 3D motion capture study as heart rate, energy expenditure, and overall lower extremity kinematics and ground reaction forces are recorded on a treadmill at running speeds corresponding to 75, 85, and 95% VO2max. Data collected will be used in musculoskeletal models to calculate tibial stress and tibiofemoral joint and patellofemoral joint contact forces at each exercise intensity. Peak and cumulative knee joint contact forces and tibial stress measured during interval training and prolonged running will be compared using separate repeated measures ANOVAs. It is our hope that the results will assist in the determination of preferred exercise modes and exercise prescriptions for prevention and alleviation of running-related injuries.

UP85

Association between Physical Activity and Dietary Patterns in Children and Adolescents ages 6-15: Research Brief

Fawziah N. Hammad, Theresa C. Callaghan, Taylor E. Davis, and Virginia Stage, PhD, RD, LDN

Objective: The purpose of this study is to explore the relationship between physical activity behaviors (sedentary vs. active) and dietary patterns among children and adolescents between the ages of 6-15 in the United States.

Methods: The National Youth Fitness Survey (NYFS) was used in conjunction with the 2012 National Health and Nutrition Examiniation Survery (NHANES) to collect data on fitness levels for children and adolescents ages 3-15 in the United States. A Pearson correlation was used to determine the relationship between participants' number of days involved in physical activity of at least 60 minutes within a week and total energy (kilocalories), sugar (grams), saturated fat (grams), and plain water intake (grams). Independent t-tests were used to determine differences between sedentary and physically active adolescents and their association with total energy, sugar, saturated fat, and plain water intake. An Analysis of Covariance (ANOVA) was used to determine the assocation between minutes per day participants believed they should be physically active for good health (up to 15 minutes, 16-45 minutes, and 46 or more minutes) with the average number of days participants actually participated in physical activity.

Results: A total of 1272 children and adolescents between the ages of 6-15 participated in the survey. There were no significant differences in the scores for sedentary and physically active individuals with regards to each individual nutrient. There was no correlation between physical activity and total energy intake, physical activity and total sugar intake, physical activity and total suturated fatty acid intake, or physical activity and total plain water intake. However, there was a significant effect of how many days participants believed they should be physically active on how many days they were actually physically active for at least 60 minutes for the three groups.

Conclusion: There were slight differences in dietary patterns between sedentary and physically active children and adolescents ages 6-15 in the United States. Data in the current study does not support a relationship between dietary patterns and physical activity. Research including in-depth interviews about usual dietary intake and physical activity of children and adolescents ages 6-15 is needed to achieve more accurate results regarding physical activity and specific nutrients.

UP86

Enhancing the self efficacy of cancer patients to cope with cancer related stress

Peace Nwanguma, Essie Torres, Rahmeka Cox, Marytza Joseph

When looking at the burden of cancer in eastern North Carolina (ENC), the total all-cancer incidence rate for ENC was 7% higher than the all-cancer incidence rate for the rest of North Carolina (718.8 per 100,000 persons compared to 671.2 per 100,000 persons). The total all-cancer mortality rate for ENC was 16% higher than the all-cancer mortality rate for the rest of North 15 Carolina (300.2 per 100,000 persons compared to 256.8 per 100,000 persons). Preliminary results from Dr. Torres's interviews with Latina and African-American breast cancer survivors demonstrate that many survivors lacked basic understanding of their breast cancer diagnosis, treatments, and side effects experienced due to treatment. Together, these factors create heightened stress on the body. The National Cancer Institute suggests that the overwhelming stress levels can create a sense of helplessness or hopelessness within the patients. This feeling may enhance behaviors that result in prolonged treatment or premature death. Thus, the best approach to tackle psychosocial stress is to help women become active participants in their cancer journey.

The goal of this research is to apply the Self-Efficacy Theory to Latina/African-American cancer patients in an effort to enhance their ability to successfully cope with cancer related stress. In applying this theory, culturally competent educational modules will be administered during chemotherapy sessions to supply information on proven strategies to manage the stressors associated with cancer based on existing cancer educational materials. The hypothesis that we wish to present at the Research and Creative Achievement Week is whether increased cultural competency and educational support for Latina/African-American women increases their self-efficacy and thus their ability to successfully cope with cancer related stress. To evaluate the hypothesis of this study, pre and post surveys will be administered to patients to measure their self-efficacy before and after the program. Finally, the long-term effect of this study aspires to use the results to develop a culturally competent program for minority women that offer a support network for active patients and survivors in ENC.

UP87

Asthma Management in Elementary Schools: A Comparison of Usual Versus Best Practice

Kathryn Marie Donato

Asthma is one of the most prevalent chronic illnesses of childhood, affecting 6.8 million children in the US, and being a major cause of school absenteeism (American Lung Association, 2014). Male children and non-Hispanic black children, as well as children from poor families are at increased risk for having asthma (U.S. Department of Health and Human Services, 2012). The total number of school days missed because of asthma related issues has increased to 13.8 million days in 2013 as compared to 12.4 million in 2003 (The Center for Disease Control and Prevention [CDC], 2015). CDC reports also show that between the years 2006 and 2010, an average of 38.4% of children with asthma in the U.S. reported having uncontrolled asthma, and in 2013 there were over 3,500 children under age 18 with asthma that reported having one or more asthma attacks that year. It was reported that fewer than 50% of children receive an asthma action plan (CDC, 2015). If asthma is not managed in children at school it can reduce academic performance rates. Because of the need for asthma to be controlled in the school setting to decrease absenteeism and promote the health and academic success of children diagnosed with asthma, it is important for school nurses to coordinate an effective asthma management program for children diagnosed with asthma.

This senior honors project is being conducted at an elementary school in rural eastern North Carolina in collaboration with a school nurse. There are 410 children total in the school, and 59 of these children have a known diagnosis of asthma. Of those with asthma, only 39 students have inhalers at the school in the health office, and only 12 students have a written asthma action plan given to them by a healthcare provider. The purpose of this program evaluation is to compare the asthma management program in place at the elementary school to best practices for management of asthma in schools. Key informants will include the school nurse, teachers, and the principal. The objectives are to identify the major components of the program and to interview key informants about the strengths and weakness of the program. Following this program evaluation, findings will be organized to identify the similarities and differences between usual and best practice. The information will then be interpreted and recommendations will be made in oral and written presentation to the nursing staff and pertinent school personnel.

UP88

Understanding baseline cancer medication adherence and health literacy among cancer of patients in the Eastern North Carolina region

Cheyenna Francis, Alice Richman, PHD, MPH, Essie Torres, PHD, MPH and Chelsey Turner

Introduction

Oral chemotherapeutic agents (OCAs) are often prescribed to cancer patients during treatment to reduce tumor size, burden of disease, and increase overall survival. Although OCAs are increasingly being used and are commonly preferred by patients, adherence varies with compliance rates as low as 16% and as high as 100%. Poor medication adherence encompasses more than patients not taking their medicines as directed. The National Council on Patient Education provided a comprehensive overview of factors that contribute to poor adherence, which include medication-, patient-, prescriber-, pharmacy-related factors. Compounding these issues is low health literacy and transportation barriers that affect timely access to follow-up care which are prominent issues among rural populations.

Purpose

This study will conduct a baseline quantitative assessment to assess baseline medical adherence among a sample of patients in Eastern North Carolina.

Methods

The baseline survey was developed using existing validated instruments that look at medication adherence (Ask 12 survey and XXX) and health literacy (Realm-SF). Specifically, constructs include inconvenience/forgetfulness, treatment beliefs and behavior. We will also administer a brief demographic survey to help contextualize the baseline data, and identify unique factors that might serve as barriers to medication adherence.

Results

The results from baseline survey will help identify and understand the unique factors that contribute to non-adherence, which will inform a tailored approach of adherence strategies that specifically address the needs of our population of interest.

UP89

The Binaural Advantage for Speech Recongition in Noise Ability

Stephanie Griffin

Pure tone threshold testing has been considered the "gold-standard" for hearing ability in the global sense. However, it has been shown that a speech recognition in noise disorder may exist in presence of a normal audiogram (Middelweerd et al, 1990; Vermiglio, 2007). Furthermore, the World Health Organization has stated that a pure tone average (for 0.5, 1.0, 2.0 and 4.0 kHz) ≤ 25 dBHL for the better ear represents "no impairment" (Mathers et al, 2000). This means that a patient with single sided deafness would show "no or very slight hearing problems."

The Hearing in Noise Test (HINT), (Nilsson, et al., 1994; Vermiglio, 2008) is a reliable test for the ability to recognize speech in quiet and noise. This test may be conducted under headphones allowing for the evaluation of monaural (or simulated single-sided deafness) vs. binaural hearing ability. Binaural advantage or binaural squelch is the improvement in speech recognition ability for two ears compared to one. The advantage is related to the head shadow effect which occurs when a sound with a frequency wavelength that is less than the size of the head is attenuated as it moves past. The goal of this study is to determine the advantage of binaural hearing for the ability to recognize speech in noisy environments for young adults with normal hearing with simulated single sided deafness.

Twenty eight young, healthy participants, with normal pure tone thresholds (≤ 25 dB HL for .5-8 kHz) were evaluated. The standard HINT conditions were tested binaurally and monaurally to determine binaural advantage. Sentences were always presented at 0°. The steady-state speech-shaped noise was presented at 65 dBA from 0°, 90° and 270° for the Noise Front, Noise Right and Noise Left conditions, respectively. The directional advantage or the improvement in speech recognition in noise threshold with spatial separation (Cord et al., 2004) was also determined for the binaural condition. A statistically significant ($p < 0.5$) binaural advantage was found for all conditions. The average binaural advantage for the Noise Front condition was 1.27 dB and 11.05 dB for the Noise Side condition. The average directional advantage for the binaural condition was 6.56 dB. Results indicate a significant binaural advantage for speech recognition especially where there is spatial separation between the speech and the noise. The implication of study results for the intervention for patients with single-sided deafness will be discussed.

UP90

United States Children/Adolescents (3-15 Years) Fall Below the Recommendations For Water Intake

Kristina Bandy, Alix Fry, Michelle Toro, and Virginia Stage, PhD, RD, LDN

Objective: The purpose of this study was to find the relationship between water intake (gm) and energy intake (kilocalories) among 3-15-year-olds in the United States.

Methods: The National Health and Nutrition Examination Survey (NHANES) National Youth Fitness Survey (NYFS), (NNYFS), used a complex, stratified, multistage probability cluster design representative of the U.S. noninstitutionalized, civilian population. NNYFS was conducted to obtain data on the health and nutrition status of the United States population. A total of 1,640 children and adolescents, aged 3-15 were interviewed. The study sample was 50.2% male, 54% Hispanics, 39% non-Hispanic white, 22.6% non-Hispanic black, and 8.2% was categorized as other. All analyses were conducted using SPSS 22.0 (IBM corp., 2011). A Pearson correlation and ANOVA test were utilized to analyze data.

Results: There was no correlation between water intake (gm) and energy intake, among children and adolescents for all age groups (3-year-olds: p= 0.863, r= .016, R= .00026, N=113; 4-8-year-olds: p=0.173, r: .056, R= .0031, N=591; 9 to 13-year-olds: p=0.994, r= .000, R= .000, N=0.000; 14 to 15-year-olds: p=0.738, r= 0.022, R= .0005, N=0.022). There was a significant effect of age on energy intake at the p<.05 level for the four age groups (female: [F(3,762)=10.42, p=.000]; male: [F(3,752) =11.99, p =.000]). There was also a significant effect of age on water intake for the four age groups (female: [F(3,762) =7.995, p =.000]; male: [F(3,752) = 8.228, p =.000). Overall, results of this study showed while there was no correlation between water intake and energy intake, there was a significant effect of age on water intake and energy intake for both males and females. Additionally, this study found that water intakes of children and adolescents, between the ages of 3 and 15, are far below the United States Department of Agriculture's (USDA's) recommended adequate intake values for water.

Discussion: Results from this study showed no significant relationship between water intake and energy intake among the sample; however, findings revealed that as age increased, water and energy intakes generally increased. These results conclude that as children grow they require greater amounts of water and energy to meet their nutritional needs. Though children and adolescents in this study increased water intake with increasing age, they did not meet the water intake recommendations established by the USDA.

UP91

Effects of an Acute Bout of Early Morning Exercise on Cognitive Function in Adolescent Athletes

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PURPOSE: To examine the effects of a single bout of exercise performed in the morning on cognitive function in adolescent athletes. METHODS: Participants (*N*=14) were competitive swimmers aged 12-17 years. Cogstate Research software was used to assess various aspects of cognitive function. The Two Back (TB) Task measures attention and working memory; the Groton Maze Learning (GML) Test measures executive function and spatial problem solving; and the Continuous Paired Associate Learning (CPAL) Task measures visual learning and memory. All tests were administered before and after two experimental conditions on separate days within the same week. The exercise condition consisted of a vigorous swim practice for 60 minutes. The sedentary comparison condition consisted of watching an instructional swimming video for 60 minutes. RESULTS: TB results indicated a borderline significant time x condition interaction (p=.06). No change from pre- to posttest was seen in the swim condition (ES=0.05); a medium improvement from pre- to posttest was seen in the sedentary condition (ES=0.49). GML results indicated a borderline significant interaction (p=.07). A small decrease from pre- to posttest was seen in the swim condition (ES=-0.16), while a small to medium improvement was seen in the sedentary condition (ES=0.39). CPAL results indicated no significant interaction (p = .30). A small decrease from pre- to posttest was seen in the swim condition (ES=-0.22), while a small to medium improvement was seen in the sedentary condition (ES=0.34). CONCLUSION: Watching an instructional video for 60 minutes resulted in small to medium improvements in several aspects of cognitive function, while no changes in cognitive function were seen after 60 minutes of swim practice. The cognitive demands of swim practice may fatigue participants so that no improvements in cognitive function result consequent to physical activity.

UP92

Effects of Adapted Tricycles on Quality of Life, Activities, and Participation in Children with Special Needs

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"AmTrykes" are adapted therapeutic tricycles that can be used by children with a wide range of special needs to improve coordination, strength, and range of motion, but most importantly to allow these children opportunities to participate in this typical childhood activity with family and friends. The increased physical activity that is expected to come from the use of AmTrykes may also improve children's health-related quality of life (HRQOL). The local chapter of AMBUCS (American Business Clubs), ENC AMBUCS, is a non-profit organization that raises funds to provide AmTrykes to children with special needs in the region. Since its inception in 2014, ENC AMBUCS has provided approximately 50 AmTrykes to children. Only anecdotal reports exist of the effects these therapeutic tricycles are having on their recipients. The purpose of this study is to determine the effects of AmTrykes on children's HRQOL, participation, function, and physical activity. The Pediatric Outcomes Questionnaire (PODCI) and the Pediatric Quality of Life Inventory Parent Report (PedsQL-PR) will be completed by parents before, and four weeks after, their child receives an AmTryke. An additional survey, the AmTryke Parent Survey-Adapted (APS-A), will be completed by parents four weeks after receipt of the bike. This APS-A will also be sent out to all previous AmTryke recipients' families to assess overall effects of AmTryke use in this larger group. We hypothesize that, after receiving an AmTryke, children will exhibit:

- Improved functional skills and participation, as measured by the Sports and Physical Functioning Core Scale and the Global Functioning Scale of the PODCI.
- Improved psychosocial, physical, and total HRQOL, as measured by the PedsQL-PR.
- Increased play time with other children, physical activity, feeling of independence, and health benefits, as measured by the APS-A.

UP93

Assessment and Prevention of Children at Risk of Abuse or Neglect

Selena R Hamilton

According to the US Department of Health and Human Services (2015), over half a million children are abused or neglected annually. Approximately 1,500 children die as a result of maltreatment. By 18 years of age, 1 in 8 children will have a substantiated report of maltreatment (Jackson et al., 2015). Considering these statistics are based only on reported cases, the full extent of the problem is underestimated. Moreover, the children most at risk for child abuse and neglect are under one year of age (Douglas, 2013). Klevens and Leeb (2010) reported the most common cause of child abuse resulting in fatality is head trauma. The most common cause of child neglect resulting in fatality is supervisory neglect (Welch & Bonner, 2013). However, intervention strategies such as risk assessments, behavioral interventions, home visits by nurses and home-based parent aides can decrease child mortality and maltreatment dramatically (Guterman et al, 2013; Nelson, Selph, Bougatsos, & Blazina, 2013; Olds et al., 2014; Schaeffer, Swenson, Tuerk, & Henggeler, 2013).

This honors project was conducted at a health department located in a rural county of eastern North Carolina in collaboration with a public health nurse. The purpose of this project was to evaluate how child abuse and neglect is prevented in this community, as well as assess for the prominent risk factors for child abuse. This project took place over seven weeks and included routine home visits with post-partum women and their infants who receive care through the health department. The objectives of this project were to: interview key informants, use an audit tool to assess records in relation to risk factors for child maltreatment, review the child fatality task force cases, and document observations during post-partum and newborn home visits. This program evaluation will identify strengths and barriers to preventing child maltreatment. Preliminary findings from the 2012-2014 child fatality case reports revealed the following risk factors contributed to cause of death: families who needed services, but didn't receive them; parental alcohol use; parental unaddressed mental health problems, and parental tobacco use during pregnancy. Data from key informants, record review, and observations will be analyzed together for use in future maternal-child programming. Findings will be presented in oral and written format to the Health Director, Nursing Supervisor, and Maternity Department Nurse Manager.

UP94

A Comparison of Usual to Best Practices in Cardiac Rehabilitation Education

Anna R Howell

Cardiac disease encompasses many types of issues with the heart, and it impacts many individuals in the United States and around the world. Cardiac medical conditions are the leading cause of death worldwide according to the World Health Organization (2015). Furthermore, the researchers at the Centers for Disease Control and Prevention (2015) report that 610,000 people die

of heart disease in the United States every year. The rising rate of heart disease in the United States is potentially linked to lifestyle choices and other comorbidities. Cardiac rehabilitation following hospitalizations for cardiac events is presently used as a means to respond to this rise. Due to the prevalence of heart conditions in the world, the United States, and North Carolina, knowledge of the best cardiac rehabilitation is needed to support implementation of best practices.

This senior honors project is being carried out in a cardiac rehabilitation center in eastern North Carolina. This center has a high influx of patients who have experienced cardiac events ranging from an acute myocardial infarction (MI) to a complete blockage of an artery requiring a coronary artery bypass graft (CABG) or a stent. The purpose of this program evaluation is to compare the rehabilitation program with best practice in regards to cardiac management and education of patients in the program. This program evaluation will involve talking with key informants including cardiac rehabilitation nurses, the facility manager, the respiratory therapist, and the recreational specialist in the office. The first objective will be to examine the educational processes used in the rehabilitation program and the second objective will be to interview key informants about their beliefs of the strengths and weaknesses of the program. Following this program evaluation, findings will be organized to identify similarities and differences. The information will then be interpreted and recommendations will be made in oral and written presentation to the cardiac rehabilitation staff.

UP95

The relationship between different foot sensations and balance performance during sensory organization test

Amanda Faye Beeler

The relationship between sensory inputs from the foot and ankle, and postural control is not well established. The purpose of this study was to investigate the relationship between somatosensation of different sites of the feet and postural control. Tactile sense and vibration thresholds at eight different sites of both feet and ankle joint position sense were measured and correlated with the normalized path length of center of pressure (COP) and center of gravity (COG) during the sensory organization test (SOT). Eleven healthy adults (21+/- years old, 4 females and 7 males) participated in the study. Study procedures consisted of measuring several somatosensory inputs (ankle joint position sense, vibration threshold, and tactile sensitivity) and performing the SOT. The results suggested that sensory inputs from several sites of the feet correlate to normalized path length of COP and COG movement during SOT and ABC, DHI and FGA in young healthy adults whom are right leg dominant. Our data suggested the right fifth metatarsal and medial malleolus appeared several times in different SOT condition and functional assessment scales. The joint position sense on the dominant foot might play a critical role during functional activities.

UP96

Changes in the Level of Velopharyngeal Closure from Birth through Five Years

Haley Dinice, Allie Colley, Kazlin Mason, MS CCC-SLP, Jamie Perry, PhD CCC-SLP

The focus of this study is to assess changes in the level of velopharyngeal closure relative to the distance between the palatal plane and the first cervical vertebrae (C1) in the infant and toddler populations. Mason et al., (2015) found that the site of velopharyngeal closure increases from childhood through adolescence (4-17 years). It was also found that the velopharyngeal closure was above the palatal plane for all ages, and the distance between C1 and the level of velopharyngeal closure varies with age. The current study presents changes in the palatal plane and location of C1 between the ages of birth through 5 years. In order to increase the understanding of velopharyngeal closure changes across the age span, measures of the distance between the palatal plane and C1, as well as cranial and velopharyngeal variables of interest, will be analyzed from midsagittal MRI scans. Amira version 6.0 will be utilized to assess two-dimensional measures from these MRI images.

UP97

A comprehensive study of the positive and negative effects of folic acid on embryonic and adult life

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Over several decades, Folic Acid has been considered an essential periconceptional and prenatal vitamin supplement because of its astounding ability to reduce the incidence of neural tube defects in-utero. However, recent studies suggest that prenatal folic acid supplementation may not be entirely beneficial. In fact, it may be pivotal in the development of many health implications embryonically and in adulthood. Although research on the multiple effects of folic acid have been explored, no systematic and synthetic analysis of its effects has been completed. We have

conducted a synthetic investigation to provide a comprehensive review of both the positive and negative effects of folic acid during critical developmental periods. In a meticulous analysis of literature, we found that the effects of folic acid exposure are can be positive or negative and are contingent upon dose and age of exposure. This knowledge fosters the synthesis of testable hypotheses regarding the mechanisms for its negative effects. We also identify several unexplored research questions regarding folic acid's role in human health and development including chronic diseases such as obesity, Type II diabetes, stroke, and cardiovascular disease. It may also be a key source for epigenetic modifications, many of which can be transgenerational, having lasting effects across generations. Therefore, even postnatal folic acid intake has significant implications for human health. By understanding the implications of insufficient or excess folic acid exposure, new avenues for research can be created to maximize the benefits and minimize the complications associated with folic acid exposure.

UP98

Cross Sectional Changes in Vocal Tract Volume from School Age through Adolescence

Emma Wells, Kelly Hauhuth, Kazlin Mason, MS CCC-SLP

The structures of the vocal tract develop and change across the age span (Subtelny, 1959). From childhood through adolescence, research has found that the vertical growth of the vocal tract causes changes in the angle of the posterior pharyngeal wall. This growth results in the vocal tract moving from an obtuse angle to an approximately right angle (Kent & Vorperian, 1995). Vocal tract length is elongated primarily from the growth of the posterior pharyngeal structures and vocal tract width is affected by growth of the oral and anterior structures. Significant changes occur in the first 18 months of age (Kent & Vorperian, 1995). The purpose of this study is to assess volumetric changes in the vocal tract across the agespan. This study focuses on creating a 3D volumetric segmentation using magnetic resonance imaging (MRI) and 3D visualization software. Two-dimensional and 3D measures of the anterior and posterior vocal tract will be analyzed across the ages of four through fifteen years. This study presents data on cross sectional changes in the vocal tract volume of twenty-four subjects. Findings provide normative data that can be used for future modeling of the vocal tract development and used for comparisons to a clinical population.

UP99

Macronutrient Intake of Pregnant Exercisers and Non-Exercisers

Kristen Fulcher, Linda May

Background: With the childhood obesity pandemic, it is vital for pregnant women to focus on healthy habits (i.e. proper nutrition, exercise) in order to ensure a positive in utero environment. Exercise during pregnancy is associated with normalizing birth weight and decreased body fat of infants. Research of maternal diet finds that increases in maternal consumption of proteins, fats, carbohydrates, and animal and vegetable proteins cause an increase in birth weight. To date, research has not investigated potential differences in nutrition among women that exercise or not during pregnancy.

Purpose: This research project aims to determine if differences exist in maternal nutrition, more specifically macronutrient intake, related to physical activity level during pregnancy.

Hypothesis: Based on previous literature, we hypothesize that pregnant exercisers will have an increased intake of macronutrients (proteins, carbohydrates, fats) compared to pregnant women who do not exercise, but similar proportion of macronutrients.

Methods: Women were randomized into either exercise training group (moderate intensity, 50 minutes, 3 times per week) or no intervention (control). All women were given a food frequency questionnaire in the first trimester prior to training and at the end of pregnancy/training period. Data from 21 uncomplicated was analyzed utilizing t-test for all measures. All women had healthy, singleton pregnancy and delivered healthy infants.

Results: Preliminary findings from this study show there are no group differences in most first trimester macronutrients (protein, carbohydrates, vegetable/fruit, fat/sweet). Pregnant women who exercised have significantly higher ($p=0.01$) intake of dairy compared to pregnant women that do not exercise during pregnancy. By third trimester, there are no group differences in macronutrient intake of protein, dairy, carbohydrate, vegetables/fruits, and fat/sweets.

Conclusion: These findings suggest all pregnant women obtain similar levels of macronutrients regardless of exercise activity, or not during pregnancy. Although this supports the impact of exercise, and not nutrition per se, on previously beneficial fetal/infant outcomes, further analysis is required regarding type/quality of macronutrients.

UP100

Discourse Analysis of Adults with Anomic and Broca's Aphasia

Allison Paige Yeager

Multilevel discourse analyses have been demonstrated to be more sensitive than some standardized language tests (Marini et al., 2011). Individuals with aphasia often present with both microlinguistic and macrolinguistic impairments (Wright, Fergadiotis, Koutsoftas, & Capilouto, 2010). The purpose of this study was to apply a multilevel discourse analysis, developed by Marini et al. (2011), to a group of English speaking individuals with anomic and Broca's aphasia. Specifically, the aim was to determine if there was a difference in the percentage of correct words used, percentage of local coherence disrupting elements, and percentage of global coherence disrupting elements. Discourse samples of 20 individuals with anomic aphasia with a mean age of 63.24 (SD = 11.71) and 20 individuals with Broca's aphasia with a mean age of 60.55 (SD = 11.39). Participants read the wordless picture book Cinderella and proceeded to retell the story. The discourse samples were coded for micro- and macrolinguistic elements as outlined by Marini et al. (2011). The analysis coded for fillers, paraphasias, repetitions, ambiguous referents, conceptually incongruent utterances, filler utterances, tangential utterances, etc. The results indicated that there was a significant difference between percent of correct words produced and the percent of local coherence disrupting elements. Global coherence did not differ between the two groups. The findings from this study extend the results to English, and also demonstrate how microlinguistic and macrolinguistic elements can be disrupted in aphasia.

UP101

Impact of Extracellular Matrix on Macrophage Polarization

Kelsey Hope Cossio

Background Hepatic fibrosis, or the buildup of excess extracellular matrix (ECM) within the liver, is a key turning point for multiple chronic liver pathologies. Macrophages drive the process of liver scarring and clearance of the excess ECM. Signaling through surface integrins and integrin linked kinase (ILK) cause a pro-fibrotic M1 macrophage phenotype, whereas without ILK, a pro-resolution M2 macrophage phenotype is seen. The current study investigated the effect of Type I collagen on macrophage polarization *in vitro*.

Hypothesis It was hypothesized that the ECM protein, Type I collagen, which is present in copious amounts in a fibrotic liver, would promote macrophage polarization towards a pro-fibrotic M1 phenotype.

Methods Macrophages derived from primary murine bone marrow were cultured in the presence or absence of Type I collagen-coated plates for 24 hours. Cells cultured on these different substrates were treated with saline, lipopolysaccharide and interferon gamma (1ug/ml and 40ng/ml respectively), or interleukin 4 (20ng/ml) for 4 or 20 hours. RNA was isolated and gene expression analyzed from each sample by quantitative polymerase chain reaction (PCR) examining levels of inducible nitric oxide synthase, interleukin 12, and C-C motif ligand 2 (produced by M1 polarized macrophages) or arginase, interferon regulatory factor 4, and mannose receptor 2 (produced by M2 polarized macrophages). Moreover, cells were examined for matrix remodeling enzyme expression, specifically MMP expression.

Results Following culture on collagen-coated plates, murine bone marrow macrophages expressed a shifted, M1 or pro-inflammatory predominated cytokine response when compared to plastic plate cultured, cytokine activated cells. Moreover, the presence of collagen suppressed matrix remodeling enzyme expression consistent with an inhibition in matrix remodeling and thus promotion of the scarring response. Secondary experiments revealed similar results in macrophages from *in vivo* liver scarring whereby ECM engagement reduced matrix remodeling enzyme production.

Conclusions Macrophage interaction with the ECM promotes an M1 phenotype and simultaneously suppresses key matrix remodeling responses thereby enhancing their ability to damage tissue while reducing their ability to remove tissue scar. Therapies directed at inhibiting macrophage matrix interactions may be useful to limit tissue damage and enhance scar healing in humans.

UP102

Managing Pediatric Chronic Illness in the School Setting: A Program Evaluation

Mallory Watson Byrum

Chronic pediatric health conditions include "long-term physical, emotional, behavioral, mental, and developmental disorders that affect a child's functional state and require prescription medications and medical or educational services" (National Association of School Nurses, 2012). Approximately twenty percent of the children and youth population in the United States are diagnosed with chronic illnesses (Rivkina, et al., 2014). These chronic illnesses create daily struggles not only for the children,

but also their families, friends, and others with whom the children spend time. Of these complications, one of the biggest struggles surrounding a chronic illness is the number of school absences. The child's inability to attend school can affect their educational success, personal readjustment, ability to form close relationships, and the potential for being a victim of bullying due to physical, mental, or emotional differences. Since education is an integral part of childhood development, it is important to understand how chronic illnesses are managed in the school setting. Best case management practice involves individualized, goal-oriented interventions such as direct nursing care, teaching, and counseling and is based upon input from the student, family, teachers, and school nurse.

This senior honors project is being conducted in an elementary school in eastern North Carolina in collaboration with a school nurse. Within the school, several students have asthma action plans, one child has type one diabetes, and four other students have chronic, autoimmune diseases. The purpose of this project is to evaluate the nursing management of student chronic illnesses at an elementary school and to identify potential barriers to effective management. The objectives of this project will be to 1) interview three key informants about their critical roles in managing students' chronic illnesses, 2) review records to identify barriers in managing students' chronic illnesses, and 3) analyze the school's chronic illness case management program and compare results to best practices. Findings will be interpreted and written recommendations will be shared with the school nurse, as well as with other key informants at the school.

UP103

Post-activation Potentiation: Increasing Power Production in the Block Power Clean

Dennis Ray Wilson, C. Dave Kemble

The effect of post-activation potentiation has been shown to increase both jumping height and sprinting over short distances (Wilson, et al., 2013).

PURPOSE: The purpose of this study was to examine if a PAP protocol could also enhance bar-velocity (m/s) in the block power clean, a movement commonly used in strength and conditioning to enhance explosive athletic attributes such as jumping and sprinting.

METHODS: ECU throwers (n=6, 67% male) participated in two session separated by three to 14 days. The first session consisted of a three-to-five repetition max of the block power clean using the Auto-regulated Progressive Resistance Exercise method, vertical jump, and a training history questionnaire. During the second session, participants performed a series of trials testing peak bar-velocity of the block power clean following a 6-second maximum voluntary isometric contraction (MVIC). Rest times were counter-balanced, varied between 15 and 120 seconds of rest between the MVIC and block power clean. Mean differences and effect sizes were calculated on the peak bar-velocities.

RESULTS: Preliminary results indicate that 15, 30, 90, and 120 seconds rest increase the peak bar-velocity. The highest effect size (ES= 1.159) and mean difference (MD= 0.123) were seen with 90 seconds of rest compared to the baseline.

CONCLUSION: These initial findings suggest that the effects of post-activation Potentiation can increase peak bar-velocity of the block power clean in collegiate athletes when given appropriate rest. These finding hold important implications for training applications, however, further analysis and testing is needed to further support our preliminary findings.

UP104

Sleep and Online TV Media

Joanna S. Paul, Jacqueline R. Curtis, Kelly M. Forbis

Across the nation, the use of online TV media such as Netflix is on the rise. At the same time, the average amount of sleep is decreasing. Both of these trends are concerning due to the potentially highly addictive quality of online TV media as well as negative health effects associated with lack of sleep. Although research has been conducted on traditional TV media and sleep, there is a lack of research on online TV media as it relates to sleep. This study sought to determine if there was a correlation between the use of online TV media and the quality of sleep in young adults. We hypothesized that online TV media would be negatively related to amount of sleep, that most online TV media would be watched at night, and that binge watching would be positively related to later bedtime and negatively related to amount of sleep. A sleep and online TV media survey was given to students at East Carolina University. Questions asked included number of hours of sleep, bedtime, number of naps, amount of time spent streaming online TV, number of back-to-back episodes watched, and amount and type of screen time in the past 24 hours. Contrary to our hypothesis, our results demonstrate that those who spent more time watching online TV also slept more. The evening time block was found to be the most popular time block for online TV media use in our sample population. We also found that "binge watching" was related to increased drowsiness

during the day, later bedtimes, and longer sleep duration.

UP105

Impact of a Parental Modeling Physical Activity Intervention on Childhood Physical Activity and Obesity Levels

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INTRODUCTION: Childhood obesity is a worldwide epidemic, caused in large part by insufficient physical activity (PA). The majority of children in the United States are not meeting PA guidelines. As PA is inversely associated with weight status, interventions aiming to increase preschoolers' individual PA levels have proven effective in reducing body mass index (BMI) and preventing the development of childhood obesity. Research suggests PA interventions in preschoolers are more effective when parents are involved.

PURPOSE: The purpose of this study was to examine the impact of a parental modeling PA intervention on children's PA levels and weight status as measured by BMI. It was hypothesized that the intervention would result in increased PA levels for children and help them to maintain or decrease their BMI.

METHODS: This study included 23 parent-child dyads, each randomly placed into either a control (n=8) or intervention (n=15) group. In the children, height and weight were measured and BMI and BMI z-scores were calculated pre- and post-intervention. The children also wore an ActiGraph activity monitor for one week pre- and post-intervention. Minutes spent in sedentary behavior, light-, moderate-, and vigorous-intensity PA was determined using ActiLife software. The control group parents were asked to maintain their PA levels for the intervention period (2 months). The intervention group parents were provided educational material, a PA logbook, and weekly motivational phone calls with an intervention coach in aims of increasing their PA alone and with their child. Data analyses were conducted on the children's data using the intention-to-treat method.

RESULTS: A 2 (group) by 2 (visit) ANCOVA found no differences between group (control vs intervention) and visit (pre vs post) for any PA level after adjusting for weartime ($p>.05$). Furthermore, no differences in BMI z-score were found by group and visit ($p>.05$). Boys had higher sedentary time than girls ($p=0.049$); no other sex-related PA differences were found ($p>0.05$).

CONCLUSION: The intervention did not change PA levels or BMI z-scores in preschool aged children, though they were going in the expected direction. Further investigation is necessary to truly assess the impact a parental modeling intervention has on child PA levels and weight status.

UP106

Breath Alcohol Concentration and Driving: The BrAC and Confidence of Drivers After Drinking in Downtown Greenville

Emma Claire Bailey Renfrow, Jennifer Matthews

Consumption of an alcoholic beverage has been proven time and time to have a negative affect on one's cognitive functioning (Phillips & Brewer, 2011). The current study attempted to explore the confidence of bar patrons' ability to drive after consuming alcohol. Two nights were selected during the Fall of 2015 for collection of data. Patrons (N=551) in the area of downtown Greenville, a college town with a plethora of bars, were interviewed and given a brief survey between the hours of 10:30 P.M. and 2:00 A.M. The survey included: demographics, alcohol behaviors, and confidence in their ability to drive. Following the survey, the breath alcohol concentration (BrAC) of the participant was recorded. Results showed those participants who were not confident in their ability to drive home had a higher BrAC than those who were confident in their ability to drive. The mean BrAC of those who did not feel confident in their ability to drive was 0.09% (SD=0.05) while the mean BrAC of participants who did feel confident in their ability to drive was 0.05% (SD=0.05). These results indicated there was a significant relationship between breath alcohol concentration and their confidence in their ability to drive after consuming alcohol ($x^2=70.383$, $p<0.001\%$) with a medium effect size (Cramer's $V=0.357$). Established by these results, bar patrons in Greenville, North Carolina are confidently deciphering if they should or should not drive after alcohol consumption; however, as indicated by previous studies, drinking and driving is still a prevalent problem.

UP107

The Effectiveness of the Alere iScreen© Urine Adulteration Test Strip at Detecting Four Common Urine Adulterants

Carrie Lenore Beard

Under President Ronald Reagan, the United States government published the first federal regulations for the testing of human samples for the presence of illegal drugs in the year 1988. These regulations produced successful techniques for detecting illegal

substances in human samples, specifically urine. However, they also caused an increase in methods used to falsify the results of these drug tests. There are many options available for causing false negatives on drug screens, but the most common method is that of *in vitro* adulteration, or adding a substance to a urine sample in order to cause a false negative test result. As a result of the rise in adulteration methods, new testing methods have been developed to assess the integrity of samples collected for drug of abuse testing. To examine the effectiveness of one such specimen validity test, the Alere iScreen© Urine Adulteration Test Strip, different concentrations of four common adulteration methods will be created and combined with synthetic human urine controls to simulate adulterated samples. Lawry's® Meat Tenderizer, zinc sulfate supplements, Visine eye drops, and bleach will be added at varying concentrations to Alere's positive iScreen© Urine Control. Each sample will then be tested for pH, specific gravity, nitrite, glutaraldehyde, creatinine, and pyridinium chlorochromate/oxidant presence by the adulteration test strip in triplicate to determine if the specimen validity test was effective at detecting the presence of the adulterants in urine samples.

UP108

A Qualitative Evaluation of Pitt County Breast Wellness Initiative Program

Gabriella Reneé Burnett, Alice Richman, PHD, MPH, Essie Torres, PHD, MPH

Background: The Pitt County Breast Wellness Initiative-Education, funded by Susan G. Komen, provides culturally tailored breast cancer education and navigation to screening services for uninsured/underinsured Black and Latina women age 25 and older in Pitt and Edgecombe Counties in eastern North Carolina. The purpose of the program is to: 1) To train and support identified community members who will serve as lay health advisors (LHA), 2) To increase breast self-awareness and knowledge of breast health, screening mammography, screening guidelines, and importance of early detection, and 3) To reduce barriers associated with access to breast screening services via navigation among our target population. The LHA training employs on evidence-based approach, which allows this program to serve as a cultural mediation between underserved communities in Pitt and Edgecombe counties and breast health care service providers to reduce structural and cultural barriers in accessing breast health services.

Purpose: The purpose of this research is to conduct a qualitative evaluation to assess how effective our lay breast health educators (BHEs) have implemented the program. We are also assessing participants' experiences with our program from education to accessing breast cancer screening services.

Methods: Out of 105 participants we have served, we expect to reach 30% of these women. We will be contacting these women via telephone and administering a 10-question interview guide. Our guide will evaluate the effectiveness of the program's BHE, participants experience with the program (i.e what they liked or did not like.) Lastly, we will ask about their experiences with the navigation component of the program.

Results: This evaluation will help us to better understand women's experience in receiving education and navigation through our program. We wish to use these results to improve women's accessibility to breast health education and breast health services in their county, while adapting our program to better meet their needs.

Conclusions: Thus far, The Pitt County Breast Wellness Initiative-Education has shown to be effective in increasing breast health education among women served and increasing access to age-appropriate breast cancer screening exams. This evaluation will provide opportunities to improve this evidence-based approach, and add sustainability efforts in replicating this program for breast health among underserved women in ENC.

UP109

Accuracy of the SenseWear Pro Armband During Acute Bouts of Bone Loading

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Due to the limitations of traditional metabolic measuring systems and other devices used to measure energy expenditure, new technologies that are more mobile and comfortable are being designed for use in the physical activity monitoring. One product in particular, developed by Body Media, is known as the SenseWear Pro Armband. The device, worn around the subject's upper arm, collects information through sensors that measure heat flux, skin temperature and response, and body temperature. Along with demographic information, this information is used to calculate the energy expenditure. The SenseWear Pro Armband is wireless, which makes energy expenditure measurements in the lab easier to obtain. However, it is still a relatively recent innovation. More testing is needed, especially during short

bouts of activity, to confirm its validity for energy expenditure measurement.

The purpose of this study is to compare the energy expenditure data obtained from the SenseWear Pro Armband to indirect calorimetry in a cross sectional cohort study during five exercise intensities: walking at preferred speed, running at preferred speed and running at speeds corresponding to 75%, 85% and 95% of predicted $VO2_{max.}$ Participants (n=10) will be fitted with the SenseWear Armband Pro and equipped for indirect calorimetry assessment. Devices will be time stamped in order to align the data for analysis. Minute-by-minute data will be exported from each device for all 10-minute exercise conditions. Total energy expenditure, including metabolic equivalents (METs), will be calculated for each participant. For all conditions, total energy expenditure obtained from the armband will be compared to indirect calorimetry using intra-class correlations and a mixed model ANOVA. We will also use Bland-Altman plots to examine device agreement across the ranges of exercise intensity.

UP110

Exploring Factors Influencing Childhood Immunization Rates: A Program Evaluation

Meghan Agnes Boop

Communicable diseases are a major public health concern, especially to the pediatric population. These patients are more vulnerable to communicable diseases due to their biologic status, developmental stage and environmental factors. Childhood immunizations were introduced to help prevent transmission of communicable diseases, and can prevent as many as twenty-one illnesses (U.S. Department of Health and Human Services, 2014). However, in 2014, coverage for multiple vaccines fell below the *Healthy People 2020* target (Hill, Elam-Evans, Yankey, Singleton, & Kolasa, 2014). Low vaccination coverage has led to recent outbreaks of highly contagious diseases, such as measles and pertussis (Majumder, Cohn, Mekaru, Huston, & Brownstein, 2015). Known barriers to consistent vaccine coverage are vaccination opposition; low parental education and low income; health systems' policies and procedures; and misinformation (Kaufman et al., 2013; Pearce, Marshall, Bedford, & Lynch, 2015; Luthy, Beckstrand, & Callister, 2012; Bhat-Schelbert et al, 2012; Weiner, Fisher, Nowak, Basket, and Gellin, 2015). Known facilitators are high parental income and education levels; clinician reminders and more convenient immunization scheduling; and vaccine information provided by healthcare providers (Bbaale, 2013; Elam-Evans, Yankey, Singleton, & Kolasa, 2014; Diekema, 2012).

This senior honors project was conducted in rural eastern North Carolina in collaboration with a registered nurse (RN) preceptor at a school-based health center. The purpose of this project was to explore the barriers and facilitators for completion of childhood immunizations among students in a rural middle school. The objectives of this project were 1) to review 50 records of school age children in 5th through 8th grade to assess demographic characteristics and health systems' issues related to vaccination coverage and 2) to interview key informants about vaccine opposition and health policy issues related to vaccine coverage. This project utilized the public health intervention of policy enforcement. Findings will be presented in oral and written presentation to the nursing and medical directors and health care staff at the school-based health center to be used for future programming.

UP111

At the Grave We Make Our Song

Erin Traister[1], Kim Larson PhD, MPH, RN[2], Dell Hagwood, MSN, MDiv, RN[2]

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Palliative care for dying persons in Guatemala has received limited research. Guatemala ranks at the bottom of the Latin American Association for Palliative Care Index (Pastrana, Torres-Vigil, & DeLima, 2014). Guatemalan culture includes the long standing practice of complementary and alternative medicine with a large percent of the terminally ill population receiving traditional care at home (Ladas et al., 2014). Guatemalans have preferred a shared decision-making role at the end-of-life (EOL) with limited patient autonomy (Cruz-Oliver et al., 2014; Kreling et al., 2010; Kwak & Haley, 2005; Yennurjalingam et al., 2013).

The purpose of this study was to understand EOL decision making, family involvement, and cultural/spiritual practices of rural Guatemalans. This project was a part of a university college of nursing study abroad program in Guatemala. In 2015, interviews with six Guatemalan families and one community leader were conducted in Spanish by a nursing student and faculty.

The main theme, "Relief from Suffering," encompassed three support systems: the priest, the family, and the community *rezadora*. The priest's role included the traditional sacraments. The family's role was one of listening, providing

love and care for the dying person. Cultural beliefs were that death enters through the feet, lemon juice expedites death, and replacing half burnt candles will protect family members. The community *rezadora,* a lay spiritual leader*,* was called upon to sing prayers and prepare the home alter. One family member noted that, she has "a skill to talk to God, as important as the priest." The family provides the nursing care and depends upon the community *rezadora* to support EOL care for family members. The continual singing of prayers through the *novenio* (9 days) comforts both the dying and the family. Literature and expert consultation recognize this ministry may supplement the role of the priest. Palliative care nurses should consider these unique support systems when caring for Guatemalans. Cultural training and education for nurses and other health care providers can further improve palliative care outcomes.

UP112

La calidad de salud por los ojos de jovenes

Natalie Malpass, Dr. Essie Torres

College of Health and Human Performance

According to an article published in *Implementation Science*, North Carolina has one of the fastest growing Latino populations in the United States, a significant percentage of which is located in the rural eastern region of the state. Much of this growth is occurring in communities that have not historically been home to large populations of Latinos. These new growth communities are often small, rural, and generally unprepared to have their health needs met by the general healthcare system. New research is continuously being conducted to analyze access to healthcare among Latino communities in an effort to understand the main issues and barriers faced by the population. It is the intent of ongoing research to determine the strengths and limitations of current healthcare conditions, and eventually improve them for members of Latino communities. Little data exists about the quality of healthcare among Latino populations in Eastern North Carolina, none of which is focused on the youth. This study will investigate the quality of healthcare among Latino populations in regards to children. The specific concerns and barriers faced by the community's youth will be identified and evaluated to add a different perspective to existing data. With this dynamic, the data will take on a new meaning and will encourage the improvement of current access to healthcare in new growth communities, and for youth.

The central questions guiding this research are "how are Latino youth in new growth communities affected by the current state of healthcare for their community? What are the barriers perceived by these youth, and how do they navigate these perceived barriers? How do Latino youth in new growth communities define a healthy lifestyle, and are their families leading such a lifestyle?"

This study will be conducted as a Community Based Participatory Research project through a local non-profit organization, the Association of Mexicans in North Carolina (AMEXCAN). The involved youth will contribute to the design of the study and will be able to provide constructive feedback to the research questions to most adequately relate to their communities and provide the most informative results. Photovoice methodology will be used to collect data. The youth will also have the opportunity to assist with data analysis and conclusions in order to ensure the pictorial representations are an accurate representation of their perspective.

UP113

The Impact of Community Health Agencies on the Prevention of Breast Cancer in Underserved Populations

Heather L Wolford

Health disparities concerning breast cancer stem from multiple determinants of health including race/ethnicity, socioeconomic status, geographic location, and age. Genetic predisposition, cultural factors, and lack of awareness also contribute to a higher risk of breast cancer (Jimenez et al., 2011). Early detection and treatment lead to more positive breast cancer outcomes. However, many women, who are already at a higher risk for breast cancer are not utilizing prevention measures, such as mammograms, to safeguard themselves against an advanced stage of cancer. There are three main categories of barriers to cancer screening: Structural (lack of financial resources or health insurance, lack of a facility in the area, and lack of transportation), clinical (patient education and provider-client communication), and personal (mistrust and health literacy). Many underserved women report experiencing all three types of barriers (Young et al., 2011). In an effort to address these barriers, federal and state funding is available for widespread breast cancer screenings and health teaching conducted with the goal of eliminating health disparities.

This honors project was conducted at a well-established federally qualified health center in a rural county in Eastern North Carolina. In collaboration with a public health nurse, the purpose of this project was to identify significant barriers that prevent women from adhering to recommended screening practices or seeking help when they have concerns about their breast health. The two objectives were: 1) to conduct a chart audit on women receiving breast cancer prevention screening through the Breast

and Cervical Cancer Control Program to gather information on demographics and past screening experiences and 2) to interview key informants about their perspective on reaching underserved populations. This program evaluation was conducted to answer these questions: 1) How are structural, clinical, and personal barriers addressed? 2) Is the BCCCP program reaching the target population in this community? The primary public health interventions used in this project are advocacy and screening. Findings will be reported in oral and written format and presented to key member of the rural and community health center.

UP114

Regiospecific acylation of cycloplatinated complexes. Scope, limitation, and mechanism.

Hannah G. Woolard, Jeffrey S. Carroll, Rob Mroz, Charles A. Nason, Shouquan Huo

Recently we have discovered a regioselective acylation of cyclometalated platinum complexes in which the cyclometalated platinum complex was selectively acylated by reacting with acetic anhydride in acetic acid. It was further discovered that the acylated complex could also be directly prepared in a cascade intramolecular cycloplatination-acylation reaction by reacting the organic ligand with potassium tetrachloroplatinate in a mixture of acetic acid and acetic anhydride. The scope, limitations and mechanism of this newly discovered reaction were investigated. This was done by designing, synthesizing, cycloplatinating and acylating a series of ligands with structural modifications. Optimization of the reaction conditions indicated that many other solvents such as acetonitrile, benzonitrile, 1,2-dichloroethane, and chlorobenzene could be used in the acylation reaction. The reaction showed great tolerance to various linker groups, as well as many electron donating/withdrawing groups. Based on the mechanistic studies conducted, the most likely mechanism of the acylation reaction involves electrophilic attack at the metalated carbon, platinum migration, and re-aromatization.

UP115

Palladium Catalyzed C-C Coupling Reaction from a Computational Quantum Mechanical Perspective

Kate E. McPherson, Andrew T. Morehead, Jr., Andrew L. Sargent

A recent study reported an innovative approach to the synthesis of the pharmaceutical drug, Clinprost. The authors found that by introducing a palladium catalyst into the reaction scheme, the overall synthesis was reduced from twenty total steps down to just nine steps, affording significant overall savings. However, unable to account for how the palladium catalyst affects the chemical transformation in this decarboxylative coupling step, the authors contacted the Sargent group for help in determining the reaction mechanism.

Work done in the Sargent laboratory utilizes a mathematical approach to investigate reaction mechanisms. This process involves the quantum mechanical modeling of atomic interactions. Established computer programs are used to perform the quantum mechanical energy calculations, but considering the number and complexity of the interactions to be evaluated, standard desktop computers lack the power, speed, and storage capacity. Instead, the work relies on multiprocessor high performance computing platforms, otherwise known as supercomputers, which run under the Unix or Linux operating systems.

In order to get a better understanding of this reaction mechanism, a well-known related system, referred to as the Trost system (Trost, B. M., Verhoeven, T. R., *J. Org. Chem.* **1976**, *41*, 3215-3216), was investigated. This reaction occurs with retention of configuration (the chemical species that is replaced during the reaction ends up on the same side of the constituent molecule) and utilizes charged species, much like the parent system. In this system, acetate detaches from a cyclohexane ring and is replaced with dimethyl malonate. The computational modeling techniques encompass procedures to generate optimized chemical geometries of the stable intermediates along the reaction pathway, isolate the transition state species that connect these local minima, and compute the Gibbs Free Energies. Critical components of the model include the use of a solvent reaction field to account for a solvent environment (albeit in an approximate way) or the explicit inclusion of molecules of solvation to more accurately account for the interactions between the charged species and the solvent.

The hope is that this study will provide better insight into the use of metal catalysis and, more specifically, help to understand and improve the synthesis of Clinprost and related compounds.

UP116

Effects of Saltwater Intrusion on Chlorophyll a Concentrations in North Carolina Coastal Wetlands

Eva A Gallardo, Tori J Goehrig, Marcelo Ardon

Increases in salinity due to climate change and sea level rise have raised a concern for estuaries along the southeastern US coast. Saltwater intrustion hinders the capability of nutrient

retention, such as nitrogen and phosphorus, from wetland soils. The decrease in retention of these commonly growth limiting nutrients can result in higher algal biomass and eutrophication. This research project seeks to investigate the effects of salinity on the concentrations of chlorophyll *a*, as a proxy for algal biomass, in sites along the Albemarle and Pamlico Sounds. We collected water samples and salinity measurements from four sites along a salinity gradient: Little Alligator River, Palmetto Peartree Preserve (PPP) and Timberlake Observatory for Wetland Restoration (TOWeR). We also conducted a field experiment in which we added artificial saltwater (control, 4 and 8 parts per thousand) to chambers in the TOWeR site. The water samples were filtered through 0.7 micrometer GF/F Whatman filters and chlorophyll *a*was analyzed via fluorometric analysis using standard techniques. Preliminary results suggest that experimental salt addition can increase chlorophyll *a* concentrations, while samples collected in sites along a salinity gradient did not show any clear patterns. As climate change models predict increases in rates of sea level rise, understanding how salinity may affect chlorophyll *a* concentrations in a vulnerable region is critical to predicting potential eutrophication events in the Southeastern US coast.

UP117

Identification and characterization of natural modifiers of miRNA-regulated pathways in maize

Jared Charles Ingle

MicroRNAs (miRNAs) are small, non-coding RNA molecules that post-transcriptionally regulate gene expression. To understand how miRNAs work in normal plants, our lab studies a maize mutant called *fuzzy tassel (fzt)*. *fzt* contains a mutation in*dicer-like1,* which encodes an enzyme required to make miRNAs. *fzt* mutants have reduced miRNA levels and are sterile dwarfs. In all inbred backgrounds, *fzt* mutants have decreased size, internode number, leaf number, and are sterile. Yet depending on the inbred background the expression of these traits varies. The goal of my project is to identify candidate genes that contribute to the different phenotypes of *fzt* when introgressed into B73 (*fzt* [B73]) and Mo17 (*fzt* [Mo17]) inbred backgrounds via quantitative trait locus (QTL) analysis. These genes likely impact miRNA-regulated pathways important in normal development. Prior to joining the lab, my mentor created a (*fzt* [B73]) and (*fzt* [Mo17]) F2 mapping population. From this population I identified 135 families segregating *fzt* and we planted 25 families for phenotypic analysis summer 2015 at the Central Crops Research Station in Clayton, NC. I collected data on several traits that vary in *fzt*[Mo17] and *fzt*[B73] from 113 individuals including leaf angle, leaf number, leaf width, leaf length, internode length internode number, and plant height. All traits varied in the mapping population and appeared continuous. Preliminary analysis suggests there are multiple natural modifiers to the *fzt* phenotype segregating in the F2 mapping population.

UP118

Enantiomeric Excess Determination for Primary Amines

Jacylin Ticatic, Dr. Brian Love

Certain organic compounds can exist in two variations, known as enantiomers. Enantiomers can exist in either R or S configurations, and the relative proportions of one configuration to another are known as enantiomeric excess. When analyzing a particular sample of a compound, determination of the enantiomeric excess is important because enantiomers can display different effects biologically, by having either harmful or beneficial effects, when used in pharmaceuticals. The types of compounds we are focusing on in this project are known as primary amines. Primary amines play a critical role in various drugs, such as in L-Dopa that is commonly used in the treatment of Parkinson's disease[1]. In the case of L-Dopa the desired enantiomer is in the S configuration, if the R configuration is in excess the patient taking the drug may experience side effects[1].

This project seeks to develop a method of determining the enantiomeric excess of chiral primary amines, while also determining what reagents are best suited for determining this value. Certain compounds containing aldehydes could be useful in determining enantiomeric excess of chiral primary amines, by means of a technique known as NMR. We are currently working on the synthesis of such reagents and will report the results of such efforts. Once prepared, this reagent will be treated with a primary amine to test if it has the ability to determine the enantiomeric excess. If successful, completion of this project will result in the development of a new reagent for determining enantiomeric excess of chiral amines. This information would be published and could be utilized by pharmaceutical companies as they synthesize new drugs.

[1]Thall, E., "When Drug Molecules Look in the Mirror," J. Chem. Educ., 1996, 73, 482.

UP119

A Pedigree Approach Tracing the Inheritance of White Egg Coloration in Eastern Bluebird (*Sialia sialis*)

Gabriella V Villalon

Despite studies that have investigated the physiological impact and evolutionary significance of egg coloration in avian populations, very little is known about the inheritance of egg color. Eastern bluebirds typically lay pale blue eggs; white eggs are uncommon but observed in most populations. This dichotomy provides a model system for investigating a simple genetic trait, possibly governed by a single locus. My research takes a pedigree approach to investigate the heritability of white egg coloration in the Eastern bluebird. This was accomplished by assembling breeding and egg color data from a 5-year field study of a population of individually-marked bluebirds. Genetic parentage of selected broods hatched from either white or blue eggs was then verified, as instances of mismatch between social and genetic parentage are common in this species. Nine published microsatellite loci isolated from congeneric and related passerine species, and selected for high allelic variability, were initially screened in order to develop a panel of microsatellite markers with sufficient exclusion probability for this population. PCR reaction conditions were then optimized, and products multiplexed for fragment analysis. The pedigree based on genetic parentage assignment will be used to survey candidate genes for the white egg trait, with the aim of gaining a better understanding of genetic egg color variation in this and other avian populations.

UP120

Sequencing and comparative analysis of the mitochondrial cytochrome b gene in the Marion Uplands Florida Sand Skink

Taylor Renae Locklear, Trip Lamb

The Florida sand skink (*Plestiodon reynoldsi*), a small lizard endemic to central Florida, is one of many species affected by habitat loss. The species is restricted to a patchy ecosystem, Florida scrub, that characterizes sandy ridges in the state's central highlands. Scrub is threatened by human development, which has severely fragmented this ecosystem through urban growth and citrus farming. Given the sand skink's limited geographic range, its populations have become vulnerable to scrub disturbance, and the species is at a risk of extinction due to habitat loss. This research will analyze genetic variation and divergence in sand skink populations from the Marion Uplands, which have not been previously studied and are geographically isolated from populations on the nearby Mt. Dora and Lake Wales ridges. I extracted genomic DNA from tail tip samples of 30 skinks, performed DNA amplification, and am sequencing the mitochondrial gene cytochrome b, a common population genetic marker that has been used in previous genetic surveys of this species. Resulting sequences from Marion Uplands skinks will be compared to those from Mt. Dora and Lake Wales ridges to determine patterns of relatedness among the three regions. The Marion Uplands genetic data should contribute significantly to the sand skink's range-wide genetic profile and assist in the future development of comprehensive conservation strategies.

UP121

Elucidating the mechanisms of Nickel as an animal mutagen

Halbert E Campbell III, Dr. David Rudel

Nickel is an essential metal for many organisms and occurs naturally from volcanism and weathering of stone. Recently anthropogenic sources such as smoking, combustion of fossil fuels, welding, metal alloy production and use, and electroplating are all human causes of nickel in the environment. Nickel is a confirmed carcinogen and exposure to nickel causes an increased risk cancers. Nickel affects DNA but it is not clear if nickel affects DNA, either directly as a genotoxic agent, indirectly as an enabler of mutagens, or both. This experiment will demonstrate whether nickel affects DNA directly or indirectly. *C. elegans* are developmental genetic model nematodes. This experiment uses chemical mutagenesis of *C. elegans* to show the effects of nickel on DNA. We will subject *C. elegans* to exposure to four treatments: a control group not subjected to mutagens, ethyl methanesulfonate (EMS), $NiCl_2$, and EMS and $NiCl_2$ together. The F_2 generation or grandkids of exposed animals will be examined for mutations. The mutations resulting from each treatment will be counted and catagorized. If nickel acts as a mutagen at all, NiCl2 treated animals will accrue mutations and maybe compared to the known mutagen EMS to determine its relative mutagenicity.If the number of mutations from the joint EMS and $NiCl_2$ treatment is significantly greater than the the sum of the mutations from EMS and $NiCl_2$ alone, then nickel is acting synergistically with EMS. Thus, nickel is indirectly affecting the DNA, perhaps as an enabler of the known mutagen. If the number of mutations from the EMS and $NiCl_2$ treatment is equal to or less than the sum of EMS and $NiCl_2$ alone, then nickel is directly affecting the DNA independent of other mutagenic agents. Our preliminary results suggest nickel is acting as a mutagen at least in part indirectly as an enabler of other mutagens. If this experiment shows how nickel affects DNA, then it would be a significant gain in our understanding of nickel as an animal mutagen. If it is discovered how nickel affects DNA, directly or indirectly, then solutions concerning how to prevent nickel from affecting DNA can be explored.

UP122

The Effects of Benzoic Acid on Fat Metabolism in *C. elegans*

Thomas Christopher Phinizy

Benzoic acid, as a food preservative, is widely consumed by humans everyday through the means of fruit juices, soft drinks, pickles, salad dressings and more. This project aims to understand the effects of benzoic acid on fatty acid metabolism, given clinical observations suggested the potential role of benzoic acid as a environmental obesogen. We hypothesize that benzoic acid enhances fat storage by regulate major components in insulin signalling pathway. The model organism Caenorhabditis elegans (C. elegans), a metazoan with homeostatic mechanismsindicative to humans were used. Glucose induced high fat animals were used as positive control. Synchronization will be used to integrate three groups of C. elegans into the same developmental stage, followed by the treatment of benzoic acids at a range of dosages. Oil red O staining will be performed to measure fat storage in control and treated animals in a temporal manner. At this point in the experiment, initial results are still being obtained for the glucose-treated positive control group.

UP123

Non-target effects of Glyphosate on growth and microbiome diversity of common pea *Pisum sativum*

Morgan Beamon, Ariane Peralta

Glyphosate is a common herbicide that has been shown to negatively affect the health and diversity of soil microorganisms by way of direct agricultural application. As glyphosate has increased in use, so has evidence that it deposits atmospherically, contaminating air and rain, distributing low concentrations of the herbicide over much wider areas than targeted. The non-target effects of glyphosate on microbes and plants that depend on them have yet to be examined. One class of microbes glyphosate has been shown to negatively impact is diazotrophic bacteria, which are a functional group capable of nitrogen fixation through converting gaseous nitrogen (N_2) into bioavailable ammonia (NH_3), which is an especially important process under nutrient-limited soil conditions. Nitrogen fixation is vital to legumes, such as *Pisum sativum*, the common pea. Our hypothesis is that low-level application of the pesticide glyphosate (modeling non-target application) will reduce soil microbial biodiversity and negatively impact N_2 fixation resulting in decreased plant productivity. Twenty pea plants are maintained, ten of which are treated with glyphosate and the other ten treated only with purified water. Productivity (root and shoot biomass, nodule number, and nodule weight) will be charted for each plant by weekly weighings. We expect the biomass and nodule number to decrease in response to glyphosate exposure compared to control, no glyphosate exposed plants. These non-target effects will have implications in the way we understand how the environment can be affected by agricultural pollutants even over long distances.

UP124

Correlates of Red Throat and Spine Coloration Within and Between Sexes in the Threespine Stickleback

Haley Kristian Overman, Jeffrey McKinnon

Male ornamentation is well studied by evolutionary biologists and known often to result from sexual selection. Though less studied, female ornamentation has lately been documented in many species and is the focus of increasing research. According to theory, sexual selection should generally act less strongly on females, so the question remains as to what processes drive the evolution of female ornamentation. In addition, while many species possess two or more signaling traits, most studies focus on single traits in isolation. The threespine stickleback, a model organism in evolutionary biology, is well suited to studies of color pattern evolution in both males and females owing to the recent discovery of populations in which both sexes exhibit conspicuous throat coloration—an extensively studied trait for males. In addition, sticklebacks possess conspicuous spine as well as throat coloration, but spine coloration is almost unstudied. We conducted a comparative study of the evolution of stickleback spine and throat coloration in both males and females, to ask if individual ornaments coevolve closely between the sexes, as predicted by some theory, and how different ornaments coevolve. We collected reflectance and photographic data, as well as visual throat, spine, and water staining scores at various sites in British Colombia and Washington State. Predator and water irradiance data were also obtained for all sites. Initial findings indicate positive correlations between males and females for each of throat and spine coloration, and between spine and throat coloration within sexes. These results suggest signaling traits coevolve between the sexes, possibly as a result of shared genetic architectures. Shared genetic architecture could also explain throat and spine correlations. Alternatively, similar selection pressures could be eliciting unexpectedly similar responses from males and females, and from throats and spines. Analysis of predator and water irradiance data is ongoing, and could provide additional insight on the role of ecology in display trait evolution. This is the first comparative study of the coevolution of male and female stickleback ornamentation. Studying the evolution of display traits is key to understanding the role of genetic, selection, and environmental pressures in determining conspicuous

phenotypic expression in animal species.

UP125

Genetic Analysis of miR319-regulated TCPs in Maize Development

Jessica Rose Wilson

Maize inflorescences are important because they are required for reproduction and produce seeds that are consumed as food. In the Thompson lab, we seek to understand the genes that function during normal inflorescence development; this information may facilitate the development of maize varieties with increased yield. One mutant we study is the maize *fuzzy tassel (fzt)* mutant. *fzt* has severe inflorescence defects including indeterminate meristems, fasciation, and alterations in sex determination. The *fzt*phenotype is caused by a mutation in the *dicer-like1* (*dcl1*) gene. *dcl1* encodes an enzyme required for microRNA (miRNA) biogenesis. miRNAs are small, non-coding RNAs that function in RNA silencing and posttranscriptional regulation of gene expression. Some miRNAs are significantly reduced in *fzt*, including miR319, which targets mRNAs that encode TCP transcription factors. TCPs are plant-specific and have known roles in floral development in other plant species. Seven miR319-regulated TCPs are expressed in tassel primordia, however these mRNAs are not significantly upregulated in *fzt* tassel primordia. To determine the function of miR319-regulated during development, we have isolated transposon insertions in or near six of seven miR319-targeted TCP genes. Currently I am working to isolate *tcp* homozygous mutants as well as *tcp;fzt* single mutants. At this time I have identified families segregating *tcptf33*; *fzt* as well as *tcptf5*;*fzt.* I am also screening for homozygous single and double mutants and observing their phenotype.

UP126

Spatiotemporal Patterns in the Fish Assemblage of the Pamlico River Estuary

Andrew C Valmassoi, Enrique Reyes, Andrew Cathey

Department of Biology, East Carolina University

Understanding the interactions between fish and their environment is crucial for fisheries management. Identifying long term trends in the abiotic properties an ecosystem and their effects on community composition through time allows for more accurate predictions of the assemblage. The Pamlico River Estuary has an important role in the lifecycles of many commercial marine species. Long term environmental data was collected by PCS Phosphate during 1988-2013. Fish data was collected by the North Carolina Department of Marine Fisheries (NCDMF) fisheries independent gill net survey during 2004-2014. The data was categorized based on the zone, upper, middle. & lower, for both data sets. The fish assemblage was quantified by finding the species richness and abundance, in addition to calculating the Shannon-Wiener diversity metric and Simpson's evenness index. Significance was determined using one way and two way analysis of variance and Fisher's least significant difference tests. Salinity and temperature were found to be the primary drivers influencing the distribution of species throughout the river. Irregular spikes and drops in salinity corresponded with shifts in the species composition at that location. Long term patterns were found to the extent that the composition of the assemblage could be differentiated between the upper and lower zones. Sporadic marginal differences occurred between the middle and lower zones such that the middle zone experienced elevated levels of diversity and evenness.

UP127

The origin of the eukayrotic tree-of-life based on mitochondrial RNA polymerases

Alistair Duncan Arthur, John Stiller

Determining the origin of the eukaryotic tree of life has remained controversial within the scientific community. This research investigates a key characteristic of mitochondria that could provide a clear root to the eukaryotic tree. It is accepted that the ancestor of eukaryotic mitochondria made a transition from an ancestral bacterial state to a highly modified organelle. In most eukaryotes, mitochondria have evolved to utilize a viral RNA polymerase (RNAP) for transcription of mitochondrial genes. One eukaryotic group in particular, the jakobid flagellates, has retained the original bacteria RNAP and has not made the transition to a viral RNA polymerase. To date, no rigorous phylogenetic study has been performed to determine whether this switch occurred once or multiple times. If this transition occurred once, it would imply that jakobids are the most ancient branch of eukaryotic evolution. In order to establish the root, mitochondrial RNA polymerases and their viral counterparts were compared to investigate whether there was a single switch to the viral RNAP implying a single evolutionary event after the divergence of jakobids. Using the protein-protein BLAST feature provided by the National Center for Biotechnology Information (NCBI), viral mitochondrial RNA polymerases were sampled from diverse eukaryotes. These sequences were later used to identify the most similar viral RNA polymerase to each mitochondrial RNAP. These amino acid sequences were

then placed into a multiple sequence alignment, and used in maximum-likelihood and Bayesian phylogenetic analyses to yield the most probable set of evolutionary relationships. The resulting tree indicates a single origin of viral RNA polymerases from diverse mitochondria, suggesting that jakobid flagellates diverged before this evolutionary transition took place. This provides the strongest evidence to date for a clear root of the eukaryotic tree.

UP128

Map-cloning of the gene respsonsible fot the *Pt1* mutation on chromosome 6 of the maize plant.

Anastasia Amoiroglou, Marquise De'Sahwn Williams-Watley

A main focus of the Thompson lab is to study genes that regulate maize development. Specifically, we are trying to identify the genes that are necessary for the development of the tassel and the ear. The *Polytypic1 (Pt1)* mutant is a gene that affects the growth of the ear and tassel of the maize plants. *Pt1* is a semi-dominant mutant with abnormal floral development that was first observed in a commercial field in the 1950s. Although the exact gene mutated by *Pt1* has not been yet identified, previous work showed that *Pt1* is located on chromosome 6. A map-based cloning approach is being used to narrow down the position of *Pt1*. We have determined that *Pt1* is located within a ~6cM interval (approximately 8,285,127 base pairs) between the SSR markers umc1352a and bnlg1922 markers. To narrow down the *Pt1*-containing interval, we have identified 22 individuals with recombinant chromosomes within the umc1352a and bnlg1922 interval from existing mapping populations. Since no additional published polymorphic markers exist within this interval, we are currently working on creating new markers that we will use to genotype recombinant individuals. These efforts will help us narrow down the location of the *Pt1* gene and ultimately identify candidate genes. We have also initiated experiments to characterize the *Pt1* phenotype in more detail, including using scanning electron microscopy to analyze development in immature inflorescences. Finally, we are growing plants to examine the genetic interactions between *Pt1* and *zag1,* which also functions in floral development.

UP129

Temporal and Spatial Gradients in phytoplankton pigments in the Tar-Pamlico River estuary

William Christopher Thaxton, Dave Kimmel, Enrique Reyes

Phytoplankton form the base of most aquatic food webs. Phytoplankton biomass and composition of their communities govern upper trophic levels. Phytoplankton chlorophyll a concentrations in aquatic environments have been long used to estimate phytoplankton biomass. Certain phytoplankton taxa possess accessory pigments in addition to chlorophyll a that can also be measured in the water. The concentration of these pigments help characterize the phytoplankton community of an area. In this study, the photopigments present in water samples collected along the Tar-Pamlico River estuary were measured using a high performance liquid chromatography (HPLC). Water samples were collected at eleven sites from September to December 2016. Pigment measurements were then used as input into the CHEMical TAXonomy (CHEMTAX) matrix-factorization program to determine the phytoplankton taxa they represented. The abundance of these taxa at each study site was estimated. These abundances characterize the phytoplankton community along the spatial gradient of the freshwater end of the Tar-Pamlico River estuary to the mouth of the Tar-Pamlico River. We expected that the phytoplankton community at the head of the estuary would differ from the community further up river. Changes in these communities, both spatially and temporally, were correlated with environmental data such as water temperature, salinity, dissolved nutrient content, and air temperature as to determine the magnitude of their influence and what these potential changes in the phytoplankton community may be.

UP130

Salinity Impacts on freshwater aquatic communities

James S Wilkinson, Jo Werba, Michael W McCoy, Ariane L Peralta

With global climate change causing rising sea-levels, saltwater intrusion is an increasingly common problem in coastal freshwater wetlands. Coastal freshwater wetlands provide many important ecological services such as filtering pollutants in water, preventing flooding, and reducing erosion. Microbial communities of coastal wetlands play critical roles in ecosystem functioning such as carbon and nutrient cycling. Wetland microbial communities are diverse and interdependent; species interactions and environmental factors influence microbially mediated processes. It is known that salinity effects microbial community structure and functionality. However, impacts of global climate change on microbial community diversity and function in the context of saltwater intrusion into freshwater habitats have yet to be fully understood. If salinity lowers microbial diversity, which leads to reduced rates of microbial processes, then saltwater intrusion is expected to reduce carbon cycling rates in coastal freshwater wetlands. Our investigation

focused on the impacts of saltwater aquatic community dispersal along a salinity gradient, and we measured (i) taxonomic diversity of microbial communities and (ii) carbon cycling related functions. We collected water samples from a replicated field experiment with varying salinities of The mesocosms housed decomposition bags of Spartina, Phragmities, and maple leaves to represent saltwater tolerant, freshwater, and upland plant species in each 567 L mesocosm. The experiment was maintained over a 46-day period, water sampling followed by dispersal treatments from high salinity tanks to low occurred every 9 days. We sampled microbial community composition and respiration rates at the beginning and end of the experiment. Using 16S rRNA gene amplicon sequencing, I will characterize the diversity and composition of aquatic bacterial communities. Based on initial decomposition data, increased salinity caused decreased rates of microbial decomposition regardless of plant litter type, suggesting reduced rates of microbial function related to carbon cycling in higher salinity tanks. The results will further the understanding of how microbial communities are affected by saltwater intrusion, and provide insight on how microbial diversity is related to carbon cycling.

UP131

Opticially Stimulated Luminescence to Detect Absorbed Radiation by Humans

Matthew H Waguespack

Optically stimulated luminescence (OSL) is a process capable of measuring the absorbed radiation within crystals. When a crystal is exposed to radiation, the atoms ionize which in turn causes electrons to be trapped within defects present in the crystal. When exposed to a stimulant light these electrons gain energy to be released from the traps. When they recombine with holes the mineral emits light, i.e. luminescence. This light can be measured and when compared to known values of dose for radiation will give the original amount of radiation present within the mineral. The final goal is to develop an instrument which will use the process of OSL to measure the absorbed radiation in human teeth. Teeth emit exceedingly dim luminescence and we present here the initial steps toward such an instrument. As a first step a rudimentary version of the device was constructed using a photomultiplier to count the emitted electrons, an optical fiber to allow for the light to be carried to the photomultiplier, a dental curing light to be used as the stimulation light, and lastly filters to eliminate the stimulation light from transmitting to the photomultiplier. First, different filter combinations were tested with bright minerals to find a filter combination that blocks the curing light, while transmitting the maximum of the ultraviolet luminescence to the photomultiplier. As a next step the instrument setup was optimized for increasingly dimmer minerals.

UP132

An investigation into the Binding Properties of Cd^{2+} to model EF-hand Protein Loops: A comparison to Ca^{2+}

Melinda Victoria Plyler

The purpose of my research is to gain insight into calcium and cadmium ion selectivity within oxygen rich binding sites in proteins. Previous research in the Spuches Lab has revealed that 3 Cd^{2+} ions bind to full length human cardiac troponin C (HcTnC), a calcium binding protein required for the regulation of muscle contraction in the heart. Two of the high affinity Cd^{2+} ions are proposed to bind to the two high affinity Ca^{2+} binding sites, while the low affinity metal is believed to bind to the regulatory domain (based on competition studies and binding to the isolated regulatory domain). A recent crystal[1] structure of the truncated regulatory domain of HcTnC ($HcTnC_{1\text{-}89}$) revealed the presence of several Cd^{2+} ions, two of which were found bound to EF hand loops I and II. It is important to note that EF hand loop I does not bind Ca^{2+} due to the presence of a cysteine residue and a substituted non-polar amino acid. We hypothesize that while Ca^{2+} is unable to bind to EF hand loop I, Cd^{2+} will bind quite strongly due to the presence of cysteine, a ligand known for its high affinity to Cd^{2+}. It is also assumed that Cd^{2+} will only bind to EF hand loop II either weakly or not at all under our set of conditions. This poster will present the thermodynamics (K_{eq}, ΔG, ΔH, and $T\Delta S$) of Cd^{2+} binding to the 12 amino acid long mimics of EF hand loop I and II by isothermal titration calorimetry (ITC).

HcTnC Loop I: LGAEDG**C**ISTKE

HcTnC Loop II: DEDGSGTVDFDE

Scheme 1. Proposed model peptides to be used in this study.

References:

1. Zhang, XL; Tibbits, GF; Paetzel, M. *Acta Crystallogr. D.* **2013**, 69(5), 722-734.

UP133

Computational and Quantum Mechanical Analysis of Catalytic Organometallic Reactions

Emily M Bolger

The project described herein involves a collaboration with experimentalists in catalytic chemistry from the University of Oxford in England. They contacted us requesting our help in applying computational tools to elucidate the mechanism of a metal-catalyzed reaction that converts an aldehyde and an alkene into two possible products, a ketone and an ester. The reaction pathways that lead to these products begin with the same set of initial steps but bifurcate at a point midway through the reaction. Our role is to utilize computational quantum chemistry techniques to discover the details of how the two pathways evolve and evaluate the energetic and structural profiles that lead to the two important chemical products. Crude reaction pathways to both the ketone and ester products have been calculated, and the bifurcation step involves the direction of hydride transfer. If it transfers to the alkene, the ketone is produced; if to a second molecule of aldehyde, forming an alkoxide, the ester is produced. The pathway to the ketone appears to be lower in energy, but additional calculations are underway to evaluate the enthalpic and entropic contributions to provide more reliable energetic comparisons. A more thorough understanding of this reaction mechanism will help our colleagues refine future reactions so that they will be more efficient and cost effective, while at the same time generating products with higher yields and greater purity.

UP134

Are Spiny Dogfish (*Squalus acanthias*) Capable of Consuming Prey Larger than Gape Size?

Kailyn A Corriher[1], Charles Bangley[2], Roger Rulifson[1,2]

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Spiny dogfish (*Squalus acanthias*) is a small, highly migratory coastal shark that inhabits all waters of the world except in the tropics. Spiny dogfish have long been suspected of being a top-level predator, dismembering and consuming fishes up to their own size. Data on relative prey size are lacking, mostly due to the high proportion of dismembered and unidentified prey in most dogfish diet studies. Using stomach contents collected from dogfish captured by trawl off of North Carolina and Virginia, we have attempted to back-calculate the total length of dismembered Atlantic Menhaden (*Brevoortia tyrannus*) and other species found in the dogfish diet. Measuring the length of partial prey remains and determining the total proportion of prey total length using whole specimens accomplished this. Back-calculated prey size was then compared to recorded dogfish total length. Relative prey size increased with increasing dogfish size. Menhaden up to 45% of the dogfish length were found in the stomach contents, and partial remains of other species suggest that dogfish may be consuming prey of even larger relative sizes. These results will allow fisheries managers to more accurately access risk of predation by dogfish for species commonly consumed by this predator.

UP135

Environmental Factors Contributing to the Development of Above-Anvil Cirrus Plumes

Joel D McAuliffe

The formation of above-anvil cirrus plumes atop deep convection is an important contributor to water vapor transfer from the troposphere to the lower stratosphere. It has been observed that these plume features have been associated with severe weather activity. However, the factors contributing to the development of these cirrus plumes are unknown. Here we show that the main ingredients required for this process are directional wind shear between cell motion and upper level detrainment and penetration of the tropopause using a combination of geostationary satellite imagery, high-resolution three-dimensional radar observations, and radiosonde observations. Temperature and vertical wind speed shear do not show consistent characteristics for environments conducive to the development of above-anvil cirrus. Some plume cases show fluctuations in cloud top heat signatures when analyzed with infrared satellite imagery, indicating mixing of the plume into the lower stratosphere. Our results demonstrate how environmental and physical characteristics affect plume formation and support assertions in previous studies on the relevance of above-anvil cirrus plumes for increases in stratospheric water vapor content, which is relevant to predictions of future climate. We also present a relationship between hail occurrence and overshooting top depth that may result in an increase in lead time for warnings of severe storms.

UP136

MCM10 Genetic Screen on *Drosophila melanogaster*

Heinz P. Dinter

Genes and the proteins they encode are responsible for virtually every aspect of life. The vast array of biological processes make

it difficult to identify genes to study that are relevant to human diseases. MCM10 (short for mini chromosome maintenance 10 replication initiation factor) is one of many genes involved with eukaryotic DNA replication. The factors that make MCM10 prime for study over others however are that it's function and roles are not yet completely understood, and that several studies have linked it to various forms of cancer. One powerful way of examining a gene is simply to see what happens to an organism that is deficient for the gene in question. Currently, we know that eukaryotic organisms who are homozygous deficient for MCM10 are still able to function (Christensen, T. 2003). This observation suggests that other genes are able to compensate for the loss of MCM10. In order to help clarify the involvement of MCM10 and associated genes in the formation of cancer cells, a genetic screen was performed to identify these associated genes. For the screen, the model organism *Drosophila melanogaster* was selected. Fly lines with deficiency regions spanning the 2nd chromosome were chosen to be crossed with flies defective for MCM10. Preliminary data from the screen has uncovered regions of the 2nd chromosome that may contain genes that genetically interact with MCM10. Some of the genes identified have previously demonstrated roles in DNA biology while others do not. Further work is aimed at validation of these individual genetic interactions with MCM10. Overall, the identification of Mcm10 associated proteins will serve as a starting point to investigate future treatment for human cancer.

UP137

Orthogonal Cas9 for Plant Genome Editing

Joseph Paul, Aimee Malzahn, and Yiping Qi

Department of Biology, East Carolina University.

The increasing burden of the world population on agriculture requires the development of more robust crops. Dissecting the basic biology that underlies plant susceptibility to pathogens and drives crop loss will inform the design of better crops. One powerful tool for studying plants at the molecular level is the RNA-programmed genome editing system comprised of a clustered regularly-interspaced short palindromic repeats (CRISPR) encoded gRNA and the nuclease Cas9. CRISPR/Cas9 evolved as form of acquired immunity in bacteria and archaea but can be re-engineered to edit and regulate eukaryotic genomes. The Cas9 nuclease encoded by Streptococcus pyogenes (SpCas9) is most commonly used for genome editing but is accompanied by strict requirements for nuclease activity. Here, we constructed Cas9 systems for genome editing in plants with Cas9 derived from Streptococcus thermophiles (StCas9) and Neisseria meningitidis (NmCas9) to expand the ability to target plant genomes by CRISPR/Cas9. In tobacco (Nicotiana benthamiana), St and Nm Cas9 can edit endogenous genomic loci with efficiencies comparable to SpCas9. Moreover, each of these Cas9 solely interact with CRISPR guide RNA containing the corresponding species specific scaffold (e.g. NmCas9 is unable to cut at the site targeted by the gRNA designed for SpCas9). These results demonstrate an orthogonal CRISPR/Cas9 system in plants that could be further utilized for simultaneous gene regulation in plants, also providing a framework for synthetic transcriptional programming. Translating this toolkit into crop species will provide increased control over plant genomes catalyzing new basic and applied discoveries to advance plant biology.

UP138

Luminescence Properties of Halite as a Surrogate for Martian Regolith

Christopher G Pridgen

The search for life on Mars is an ongoing endeavor, and although proof for life has yet to be found, the possibility of microbial life beneath the planet's surface exists. Since we do not have samples from Mars, we needed to devise a way to mimic the soil conditions on Mars. In South America, the Atacama Desert is a great model for soils that are similar to Mars. Specifically we were interested in halite from the Atacama Desert, which is also present on Mars.

Halite is a form of (NaCl) sodium chloride, and it allows us to study life that could exist in such an extreme environment. By dating the deposits of halite, it may be possible to study the evolution of these extremophile microbial populations. Optically stimulated luminescence (OSL) dating, is a method which tests minerals for accumulated radiation exposure over time. If the OSL dating of the halite works, then it would be possible to track properties over time after knowing how old the halite deposits are.

Our goal was to test the luminescence properties of halite and to determine if halite can be dated with OSL. It was determined that the halite samples have a luminescence signal. We investigated the best measurement procedure to measure the absorbed dose in the mineral. The experiments which were performed and the data which was collected will be presented.

UON1

Rooftop Gardens and Solar Energy

Tyler E Wilson

Morrsiville, North Carolina is in need of a Leadership in Energy and Environmental Design (LEED) certified high school building. Not only is it good for the environment to have energy efficient building but also it will save money and energy once constructed. Green Architecture is a term that will be used to describe the overall concept of using green building materials. This will help one understand the importance of constructing a building with green materials. Green architecture is way for a building to look pleasing to the eye, be functional, and be environmental friendly to the environment ("Green Roof, Sustainable Architecture and Rooftop Gardens."). This paper will focus on exterior green architecture. The exterior will focus on several methods. Roof top gardens and solar panels will be the main focus of this paper. Roof top gardens provide a great source of insulation from the sun. They will also provide food and educational values to the school. Grass and dirt covering a building on the roof helps keep heat out during the summer and also keeping heat in during the winter months. Rooftop gardens reduce air conditioning and heating costs. They also reduce the urban heat effect, which are materials on buildings that make an area hotter than should be. Solar panels are a great source for renewable energy. The school will use solar panels for electricity, heat, and water (Sharma). Solar panels will be on the roof of the building as well or mostly on the south facing side of the building to collect the most sunlight. There are advantages and disadvantages of solar panels. Advantages are they do not produce pollution, they do not require fuel, do not contribute to global warming, and are a renewable energy source. Some disadvantages are the initial costs can be expensive, the panels can take up a lot of room, and they depend on sunlight so if there is no sun there is no energy being made (Sharma).

"Green Roof, Sustainable Architecture and Rooftop Gardens." *Lushome*. Web. 01 Feb. 2016. <http://www.lushome.com/green-roof-sustainable-architecture-rooftop-gardens/29180>.

Sharma, Partha Das. "Solar Power – Sustainable Green Energy to Protect Our Economy and Environment." *PARTHA DAS SHARMAs Weblog on Keeping World Environment Safer and Greener*. 2009. Web. 02 Feb. 2016.

UON2

The Future of Our Children's Health

Miranda R Gooch, Mentor: Robert Chin

According the Environmental Protection Agency, indoor air quality was referred to the air quality within and around buildings and structures, especially as it related to the health and comfort of building occupants. Poor indoor air quality was dependent upon many different factors: poor building maintenance, asbestos contamination, and use of synthetic building materials and chemical products. A study done by the EPA stated that there was a major correlation between the increase in poor indoor air quality and the decrease in pupil attendance and performance. Students and teachers began to contract respiratory infections, show symptoms of asthma, and ended up being absent from school for extended periods of time. The research stated that if no one complained about their concerns of the air quality in schools, no action would be put in place to change the issues. Parents, teachers, students, and other school members were less likely to make their concerns known due to the lack of funding given to school systems for the upkeep of heating, ventilation and air conditioning (HVAC) systems. The U.S. EPA created some cost-effective guidelines that schools will follow to make the schools a safer place for staff to work and for students to learn. Implementing the suggestions would improve the health of students and teachers, increase productivity and test scores, and lead to higher attendance. The vision of USGBCNC was to educate children on the importance of "healthy buildings" and the benefits they would bring to human health. Some of the design goals of the challenge were to incorporate Environmental Education into daily learning. Lots of open space, sustainable materials, and gardens would need to be included to help the students learn how to make their planet more "green". With respect to the design of the school proposed by USGBCNC, the group was looking at creating two separate buildings with a large open breezeway in between. The back of the property would house the gardening center where students would be educated on how plants impact the cycle of air flow. The materials used in the building would abide by the guidelines presented by the EPA, and the teachers of the school would become educated and spread the knowledge to their students. The health of future generations was dependent on the changes made in this generation. If those changes were not put into action now, would they ever?

UON3

Exploring the Power of Solar Energy Through The Development of Solar Charging Stations

Sandy O Jalal

Solar energy, or energy from the sun, are identified as the cleanest and most abundant renewable energy source available. Solar energy can be converted into thermal or electrical energy, which means it can provide lighting to homes, produce hot water, and

heat homes. Given that it reduces electrical costs extensively, more resources are being used to research and expand solar energy projects. This expansion has been included in several solar charging stations, which used solar energy to charge a variety of items such as smartphones, tablets, and other electronic devices. Through the conversion of the sun's heat and light when it hit the solar panel (which was located on the top of the charging station), the charging station charged various electronics including a laptop.

With the United States having some of the richest solar resources in the world, it is essential that the benefits of solar energy, particularly through the development of solar charging stations, be explored. In order to accomplish this, research on present solar energy technologies will be presented. Additionally, the advantages and disadvantages of solar energy technologies as well as the development of solar charging stations will be presented. Furthermore, the economic and social benefits of solar energy technologies and the development of solar charging stations will be discussed. Lastly, recommendations on what additional research should be conducted and which policies and actions should be implemented to further solar energy, especially through the development and usage of solar charging stations, will be made.

UON4

Solar Students

Lukas K Zanota

Schools are relatively large and are used almost every day Monday through Friday as well as weekends. With the amount of space that schools cover and the amount of time they are used, the use of energy to light up the entire facility is large and costly. The following paper includes information on how to incorporate solar panels on schools and the application/purpose of the solar panels on the school. Three different models of solar panels will be looked at throughout this research paper; KD135GX-LP, KD180GX-LP and the KD205GX-LP model. This research is inspired and is intended to be used in a new high school to be located in Morrisville, NC. Topics covered on these solar panels are the cost of building the solar panels, time it takes to install them, the savings of energy, cost of training a maintenance crew, and a brief history of solar panels. More technical information about the solar panels as well as the data and results of how these machines have change the way energy is captured and used are also included. Throughout this paper standpoints of other large area buildings that have already made the jump to sustainable technology versus ones that have not upgraded will be compared as well. Solar panel equipment and the technology that compliments them has been advancing rapidly. This in turn has been giving companies and businesses that cover a large areas of land lower energy cost and are becoming more sustainable but does have a higher initial cost than a school built without the implication of solar panels. Applying solar panels to this school will lower the cost of electricity, provide more jobs due to maintenance, and add a unique design aspect to the school.

UON5

Building Massing and Orientation in the Passive Design Process

Nathan Andrew Mazzuca

Solar passive building is the practice of harnessing the sun's energy for the heating and cooling of living spaces. With such a powerful source of natural energy, there are several building techniques that can be incorporated in the design process to take advantage of this sunlight. Building orientation, operable windows, and thermal mass are all current components integrated in passive design. Radiation, conduction, and convection are natural processes that are used in passive solar energy. The materials of a certain structure can reflect, transmit, or absorb the solar radiation received when it is hit with direct sunlight. Furthermore, this presentation serves to explore the non-mechanical means in which building design can be employed to utilize solar energy. Understanding the different techniques used in passive building will better my knowledge in the design of sustainable building systems. I will be able to use the information I have acquired on this topic, and apply it in the design process for a real world project in my sustainable design class.

UON6

Sustainable and Solar Design

Michael Edward Jones

This paper aims to explore sustainable design techniques and ideas in building construction. Green and sustainable structures are in very high demand. The main goal of sustainable design is to reduce and become more efficient with the use of resources. A design competition being held this spring, will challenge participants to create sustainable designs in regards to an elementary school. My research consists of solar and green design techniques to implement in the design of the school. Several renewable sources of energy, such as solar power, can be used to achieve these goals. Both, active and passive solar power can

be effective and efficient. This type of renewable energy, when implemented in the design process, can help to make the school a sustainable structure. Design methods will also follow a rating system. The sustainable design rating system, Leadership in Energy and Environmental Design, is the most recognized and serves as a standard to minimize environmental impact and energy consumption. Sustainable designs will continue to gain momentum and be implemented in many future projects.

UON7

Product Placement Strategy in Film: Understanding and Implementing the Process to Increase Brand Awareness

Adriana E. Gomez-Weston

The purpose of this project was to develop a product placement proposal for a film by applying a comprehensive research and evaluation process of the film story, main character, apparel brand and image and their target consumer sectors. As a marketing strategy, produce placement has started in the early 1920s. But it is has become a big industry sector, currently about $1.5 billion (Galician, 2013). Scholars and critics have questioned the practice in regarding to ethics, story-telling realism and communication effectiveness. This product placement project is based on the principle of realistic story-telling and effective communication of the film. Furthermore, this project demonstrates a research and critical thinking process to identify and evaluate the synergy between a film and a brand image, and thus to produce an effective product placement.

To begin the process, I studied the *Intern's Handbook* (currently in development by Sony Pictures), a film that will be based on a novel of the same name. Using the elements presented in the book, I proposed a collaboration with renowned Italian menswear brand Pal Zileri. To evaluate the synergy between the two, I conducted in-depth research on the *Intern's Handbook* target market as well as the target market and image of the brand. The image of this apparel brand not only fits the film's plot, but also helps to create the main character image. I then created a detailed case for the unity of these two entities, including information of the book's content, the appeal of the proposed principal actor, the production studio's history, and the benefits of such a union. At the conclusion of this project, I created art sketches of the movie character with the proposed brand apparel, and I also developed a marketing plan for both the brand and the film.

Galician, M.L. (2004). Handbook of Product Placement in the Mass Media: New Strategies in Marketing Theory, Practice, Trends, and Ethics. New York: Best Business Books

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We look forward to seeing you again next year for RCAW 2017!

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