Delve

14th Annual
Research & Creative Achievement Week

March 30 – April 3, 2020
New Main Student Center

f @ECUGradSchool
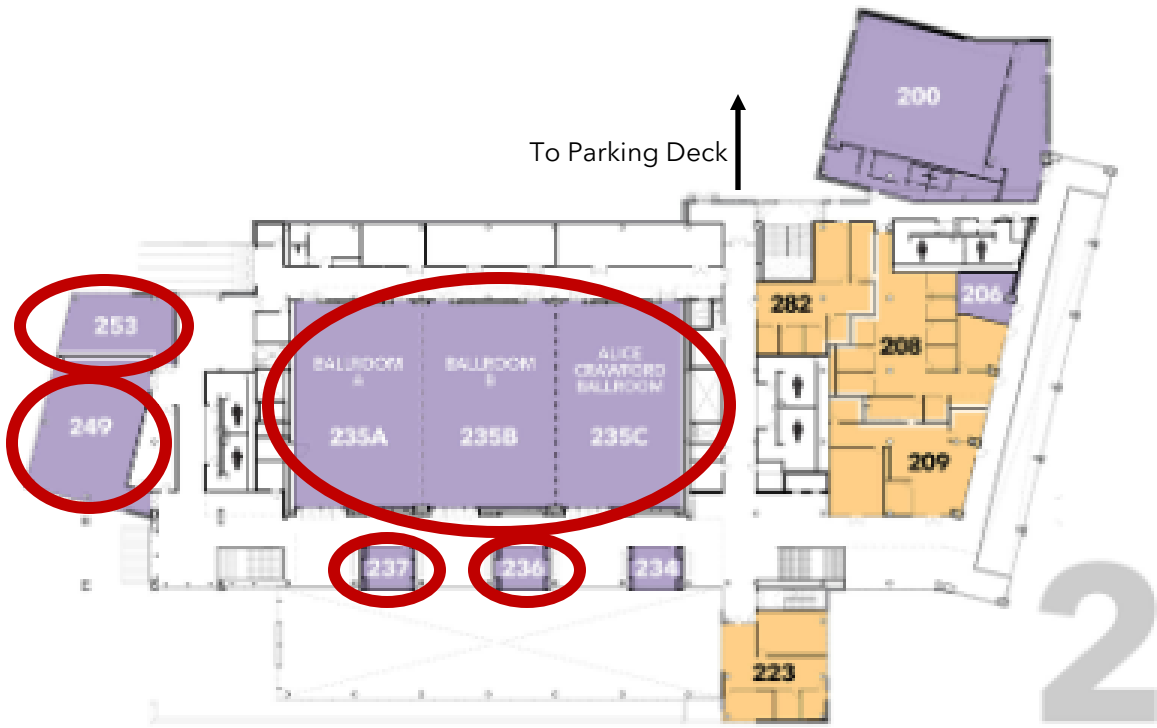
y #RCAW20

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ECU

Research & Creative Achievement Week 2020

Room 253 - Oral Presentations

Room 253 - Oral Presentations

Ballroom - Poster Presentations, Rooms 235 A,B, & C

Room 307 - Oral Presentations

337 - Judges Room

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To Parking Deck

RCAW

Delve

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Academic Council letter

Program sponsors

Planning Committee Members

Tom McConnell, Associate Dean, The Graduate School, Co-Chair RCAW

Mary Farwell, Assistant Vice Chancellor, Division of Research, Economic Development, and Engagement, Co-Chair RCAW

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Marquerite Bond, The Graduate School

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Paul DeVita, Kinesiology, College of Health and Human Performance

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Monica Moore

Mike Myles

Matthew Powell

Ginny Sconiers

John Southworth

Eric Williams

Research week daily schedule

Lectures and Symposia

7 pages of premade ads and whatnot

Mentor list

Graduate Oral Presentations

Room 249 | Education | 8:15 - 9:00

GO1	8:15-8:30	EXAMINING THE EFFECT OF IMPLEMENTING A CAREER ACADEMY WITHIN AN UNDER-PERFORMING HIGH SCHOOL, William Glaster Artis
GO2	8:30-8:45	EXAMINING THE EFFECT OF IMPLEMENTING MORNING MEETINGS AS TRAUMA-INFORMED STRATEGY ON TEACHER SELF-EFFICACY IN A LOW-PERFORMING SCHOOL, Chanda Rook Battle
GO3	8:45-9:00	How have individual, organizational & societal constraints affected women faculty in recreation-related departments in NC institutions of higher education in their career development?", Elisabeth Wilson Bengala

Room 249 | Human Health | 9:15 - 10:00

GO4	9:15-9:30	Infant mesenchymal stem cell insulin sensitivity is associated with maternal plasma free fatty acids, independent of obesity status: The Healthy Start Study, Alec Chaves, Donghai Zheng, Jonathan Johnson, Dana Dabelea, Joseph Houmard, Kristen Boyle
GO5	9:30-9:45	Identifying Predictors of Levator Veli Palatini Muscle Contraction During Speech using Dynamic MRI, Eshan Pua, Catherine Pelland, Silvia Blemker, Xiangming Fang, Charles Ellis, Stephen Leierer, David Kuehn, Bradley Sutton, Jamie L. Perry
GO6	9:45-10:00	Evaluation of the Symmetry of the Levator Veli Palatini Muscle and Velopharyngeal Closure Among a Noncleft Adult Population, Neda Tahmasebifard,Charles Ellis, Kathrin Rothermich, Xiangming Fang, Jamie L. Perry.

Room 249 Biomedical Sciences | 10:15 - 11:45

GO7	10:15-10:30	Electron Emission from Gold Nano-materials induced by Fast Ions, W.L. Hawkins, E.C. Maertz, R.A McLawhorn, and J.L. Shinpaugh
GO8	10:30:10:45	Characterization of the BfmR regulon in Acinetobacter baumannii, Samantha Palethorpe, John M. Farrow III, PhD, Morgan M. Milton, PhD, Richele J. Thompson, John Cavanagh, PhD, and Everett C. Pesci, PhD.
GO9	10:45-11:00	High fat diet induced insulin resistance in mice adversely affects ephrinA1/EphA signaling increasing susceptibility to myocardial infarction, Luke Weyrauch, Brinda Sara thy, Joseph Arledge, Carlie Baker, Celi Cooper, Erin Stanley, Uma Sharma, Carol Witczak, Jitka Virag
GO10	11:00-11:15	Development of Deep Neural Network Architectures for Hyperspectral and Cell Image Analysis, Alexander Molyneaux Pinaire
GO11	11:15-11:30	Nanoparticles and Ionizing Radiation: Unanswerd questions, Jacek Teller, Michael Dingfelder
GO12	11:30-11:45	Central α-Klotho Stimulates POMC Neuron Activity and Regulates Whole-Body Energy Metabolism in Mice, Taylor Landry, Peixin Li, Brenton Laing, Wyatt Bunner, Zhijian Rao, Anna Bass, Quincy Gilliard, Theodore Langton, Hu Huang

Graduate Oral Presentations

Room 249 | Biomedical Sciences | 1:30 - 2:45

GO13 **1:30-1:45** Cox6a2 regulates mitochondrial performance in ischemic skeletal muscle, Zoe S. Terwilliger, Emma J. Goldberg, Terence E. Ryan, Cameron A. Schmidt, Dean J. Yamaguchi, Thomas D. Green, Michael D. Tarpey, Reema Karnekar, Patricia Brophy, Tonya N. Zeczycki, P. Darrell Neufer, Espen E. Spangenburg, Joseph M. McClung.

GO14 **1:45-2:00** Distinct roles of two eIF4E isoforms in the germline of Caenorhabditis elegans, Hayden P. Huggins, Jacob S. Subash, Hamilton Stoffel, Melissa A. Henderson, Jenna L. Hoffman, David S. Buckner, Madhu S. Sengupta, Peter R. Boag, Myon-Hee Lee, and Brett D. Keiper

GO15 **2:00-2:15** Acute Uric Acid Exposure Leads to a Decrease in Bioenergetic Efficiency in Liver Mitochondria , Katherine Ann Buddo

GO16 **2:15-2:30** The Effects m6A RNA Modification on Breast Cancer Progression and EMT, Mohammed G Dorgham

GO17 **2:30-2:45** The Regulation of Choline Kinase Beta (CHKB) and Carnitine Palmitoyltransferase 1B (CPT1B): Coordinated Roles in the Emergence of Brown Adipose Tissue, Bhavin V. Patel

Room 249 | Natural Sciences | 3:00 - 5:00

GO18 **3:00-3:15** Using Parasite Diversity to Quantify the Success of Coastal Habitat Restoration, Christopher Moore, April Blakeslee

GO19 **3:15-3:30** Analysis of differential gene expression in the upper and lower meristems of maize, Hailong Yang, Kate Nukunya, Charlene Ding, Beth Thompson

GO20 **3:30-3:45** Effects of Halipegus spp. parasite infection on vocalizations and intraspecific communication in the green tree frog Hyla cinerea, Sarah R. Goodnight, Michael W. McCoy

GO21 **3:45-4:00** Olfactory gene evolution during the evolution of manakins , Robert Driver, Alice Boyle, Matthew Fuxjager, Barney Schlinger, Wes Warren, T. Brandt Ryder, Blake Jones, Bette Loiselle, Michael Braun, Rebecca Dikow, Paul Frandsen, Aleksey Zimin, Christopher Balakrishnan

GO22 **4:00-4:15**   "Surfacing" behaviors of larval zebrafish are mediated by the lateral line, Alexandra Venuto, Shannon Crowe, Timothy Erickson

GO23 **4:15-4:30** Diversity of Digenean Trematode Parasites in Non-Native Macroalgal Dominated Estuaries, Timothy S. Lee, April M.H. Blakeslee

GO24 **4:30-4:45** Post-Glacial Rebound Rates for the Antarctic Peninsula Using Optically Stimulated Luminescence, Christopher N. Garcia, Regina DeWitt, Alexander Simms

GO25 **4:45-5:00** Estimate the Initial Energy Density in Relativistic Heavy Ion Collisions, Todd Mendenhall, Dr. Zi-Wei Lin

Graduate Oral Presentations

Room 307 | Human Health | 8:15 - 9:30

GO26	8:15-8:30	The Impact of Healthcare Providers' Prescription of Physical Activity on Cancer Survivors' Physical Activity Levels, Brian Patrick Maloney
GO27	8:30-8:45	LAW ENFORCEMENT AND FIREFIGHTERS PHYSICAL ACTIVITY STUDY, Jourdyn Rae Holsinger
GO28	8:45-9:00	Impact of a conceptually based physical activity course on college students' mental health, Anna W. Gold, Susan L. Cohen, and Bhibha M. Das
GO29	9:00-9:15	Using Eye-Tracking Technology to Compare Hazard Detection on the Road Versus a Driving Simulator at Night Across Two Age Groups, Juliette L. Leonardo
GO30	9:15-9:30	Parent-Initiated Motivational Climate and Young Child Enjoyment in Year-Round Swimming, Rachel Williams, Deirdre Dlungonski, Christine Habeeb, Thomas Raedeke, Katrina DuBose

Room 307 | Fine Arts | 9:45 - 11:45

GO31	9:45-10:00	...An Obligation to be One's Best, Dana Smessaert
GO32	10:00-10:15	Frances Burney's Evelina as Social Commentary on the Status and Role of Music in Late 18th Century London, Emily Lorraine Evans
GO33	10:15-10:30	Showing Self, Katya Lee Hutchinson
GO34	10:30-10:45	Transforming Archetypes, Peter Borsay
GO35	10:45-11:00	An Examination of Natural Pattern & Texture Replication in the Ceramic Studio, Julienne Beblo
GO36	11:00-11:15	Alcoholism, Addiction, and the Path to Floating Houses, Amy Noelle Peerey Gunn
GO37	11:15-11:30	Family, Friends and Food, Lauren Nicole DelBrocco
GO38	11:30-11:45	Exploring Collective Memory and the Imaginary, Sofia Mendez Subieta

Room 307 | Fine Arts | 1:15 - 3:00

GO39	1:15-1:30	The Importance of Duck Hunting, Madison Noelani Johnson
GO40	1:30-1:45	Metempsychosis, Yichen Kerry Guan
GO41	1:45-2:00	Torch Fire Faux Fossils, Lauren Nicole Purcell
GO42	2:00-2:15	Wish You Were Here: Legends of the Great Plains, Epiphany Sandra Knedler
GO43	2:15-2:30	Modern Plant Blindness: Rediscovering of flora through printmaking, Adam Noah Berman
GO44	2:30-2:45	Twenty-Two, James Joshua Bigham
GO45	2:45-3:00	Significance of "Home", Briana Nicole Earl

Graduate Oral Presentations

Room 307 | Education | 3:15 - 4:30

GO46	3:15-3:30	Culture Shock and Adaptation: Understanding Challenges and Proposing Workshop, Nidhi Sharma
GO47	3:30-3:45	Fostering Parent and Community Relationships by Hosting an EOG/EOC Parent Night at Elm City Middle School, Tabitha Woodlief Lewis
GO48	3:45-4:00	Using Critical Literacy Practices and Social Action Discourse to Increase the Perceived Value of Literacy for High School Students, Amanda Lee Patterson
GO49	4:00-4:15	Coaching and Mentoring in Early Childhood Settings: How Does it Work?, Lyndsey Graham, Archana Hegde, Virginia Stage
GO50	4:15-4:30	"Let Positive Thoughts Lead the Way", Ashley Davis Bell

Room 307 | Engineering/Technology | 4:45 - 5:30

GO51	4:45-5:00	Development of a Cartilage-Like Composite for Cartilage Repair and Replacement, Jacob Ludwick, Michelle Oyen
GO52	5:00-5:15	Gopala-Hemachandra codes revisited, Logan Gray Childers, Krishnan Gopalakrishnan
GO53	5:15-5:30	Performance Analysis of Text Mining Algorithms for Information Retrieval on Archival Big Data, James P Philips

Room 253 | Biomedical Sciences | 8:15 - 9:15

GO54	8:15-8:30	Changing Elbow Torques Affects Tissue Stiffness, Brian Diefenbach, Anthony Kulas, Christopher Curran, Patrick Rider
GO55	8:30-8:45	THE EFFECTS OF FATIGUE IN THE SNATCH EXERCISE ON BIOMECHANICS IN A HIGH INTENSITY BOUT, Hannah E. Black, Ryann E. Womble, Robyn N. Speranza, Patrick M. Rider
GO56	8:45-9:00	Investigating the Dynamic Dopamine Neuron Phenotype in Developing Mice, Samantha Barker, Heath Partington, Makenzie Nutter, Jeffrey B. Eells
GO57	9:15-9:30	Elucidating the Mechanism of Classical Pathway Complement Inhibitory Proteins ErpQ and ErpB from Lyme Spirochetes, Ryan Garrigues, Mike Pereira, Beau Wager, John Leong, Brandon Garcia

Graduate Oral Presentations

Room 253 | Natural Sciences | 9:30 - 11:45

GO58	9:30-9:45	Egg variation in King Rails (*Rallus elegans*) and its potential uses in population monitoring, Emily Wittenberg Johnson, Susan B McRae
GO59	9:45-10:00	Crabs and 'Crobes: Impacts of Manipulating Host-Parasite Microbiomes, Kyle L Swanson, Sara Roozbehi, April MH Blakeslee, Erin K Field
GO60	10:00-10:15	Kinetic characterization of the rate-limiting C-H activation step of *M. oryzae* lipoxygenase and the effects of *N*-linked glycosylation, Christopher B Whittington, Anastasiia Kostenko, Katherine Ray, and Adam R. Offenbacher
GO61	10:15-10:30	The association of social hierarchy and gene expression in the Red Swamp Crayfish: *Procambarus Clarkii*, Emily Maegen Scott
GO62	10:30-10:45	Thermodynamic and Structural Characterization of Cd(II) binding to human cardiac troponin C: Using Mutants to Elucidate Cd(II) binding sites, Caitlin Diana Palmer
GO63	10:45-11:00	Electrochemical Analysis of the Influence of Local Protein Electrostatics on Thermodynamics of Tryptophan Oxidation in Azurin, Kristin Tyson, Amanda Davis, Jessica Norris, Libero Bartolloti, Eli Hvastkovs, and Adam Offenbacher
GO64	11:00-11:15	One flew over the pitcher plant: updating ecological associations between pitcher plant flies and their carnivorous hosts, Peter Thomas Kann
GO65	11:15-11:30	Differential gene expression in the brains of begging poison frog tadpoles, BreAnn N. Geralds and Kyle Summers
GO66	11:30-11:45	Pulsed Predation as a Determinant of Freshwater Pond Community Assembly, Ellen Titus

Room 253 | Social Sciences | 1:15 - 3:15

GO67	1:15-1:30	Detecting Vitamin D deficiency in an adult bedouin population from Hisban, Jordan using dental radiographic and histological examination, Courtney Olah, Megan Perry, Akacia Propst, Bonnie Kahlon
GO68	1:30-1:45	Insiders' perspectives of the seasonal fishery closure in the Visayan Sea, Philippines, Farisal U. Bagsit, David C. Griffith
GO69	1:45-2:00	Reconstructing Weaning Practices of an 18th to 19th century North Carolina Land-Owning Family using Stable Isotope Analysis, Corinne Taylor, Megan A. Perry, and Robert H. Tykot
GO70	2:00-2:15	The Potential Moderating Influences of Mindfulness, Physical Activity, and Vacation on Select Worker Characteristics, Brittany Nicole Meier, Shahnaz Aziz, PhD
GO71	2:15-2:30	The Effectiveness of Narrative Persuasion in the issue of Euthanasia, Brenna Nicole Barber, Caitlin Michelle Brewington
GO72	2:30-2:45	The Archaeology of the Social Safety Net at the Pitt County Poor Farm, Muriel Clair Perrin Grubb
GO73	2:45-3:00	A Sociological Analysis of the Relationship Status of Mothers Following a Nonmarital Birth, Keely Maelynn Fox
GO74	3:00-3:15	Insiders' perspectives of the seasonal fishery closure in the Visayan Sea, Philippines, Farisal U. Bagsit, David C. Griffith

Graduate Oral Presentations
Room 253 | Social Sciences | 3:30 - 5:30

GO75	**3:30-3:45**	Cross-National Variation in Aggregate Levels of Life Satsifaction of Gay Men, Hannah Rebekah Morris
GO76	**3:45-4:00**	First Aid in the Field: Creating a Conservation Protocol for the Recovery of Brunswick Town Artifacts, Brandon Eckert
GO77	**4:00-4:15**	Defining Moral Injury among Military Populations: A Systematic Review and Implications for Future Research, Natalie M. Richardson
GO78	**4:15-4:30**	The Relationships Between Identity, Child Outcomes, and Gender-Neutral Parenting Attitudes of Lesbian And Gay Parents, Brittany Alligood
GO79	**4:30-4:45**	The Impact of Senior Games Participation on the Health of Older Adults, Zackary Gage Kern
GO80	**4:45-5:00**	Vulnerability, Risk Perception, and Livelihood Strategies Among Riverside Communities of Ramgati Upazila In Bangladesh: The Role of Embankment, Mizanur Rahman
GO81	**5:00-5:15**	How well do feeding observations match fecal stable isotope values? An evaluation among Verreaux's sifaka (Propithecus verreauxi) and ring-tailed lemurs (Lemur catta), Nora W. Sawyer, James E. Loudon, Ryan Schacht, Michelle L. Sauther, and Matt Sponheimer
GO82	**5:15-5:30**	A Taste of Life: The Cultural Power of Food in the Works of Monique Truong, Brandon Daniel Jones

Graduate Poster Presentations
Ballroom | Biomedical | 8:00-10:00

GP1 Elucidating the roles of six TonB homologs in intestinal colonization and experimental intra-abdominal infection by *Bacteroides fragilis,* Nathaniel L. Seals, Anita C. Parker, Edson R. Rocha

GP2 Examination of METTL16 RNA Targets, Cellular Locations, and Proliferative Effects, Emily R. Satterwhite, Daniel J. Nance, Kristen R. Carraway, Kyle D. Mansfield

GP3 GPR65 impedes intestinal inflammation and colitis-associated colorectal cancer development in experimental murine models , Mona A. Marie, Edward J. Sanderlin, Swati Satturwar, Deepak Donthi, Heng Hong, Kvin Lertpiriyapong, Li V. Yang

GP4 The ability of a nanobioglass-doped self-etching adhesive to re-mineralize and bond to artificially demineralized dentin, Gabriel Abuna, William G Ferrell, Saulo Geraldeli

GP5 The endocannabinoid system as a regulator of excitatory synaptogenesis in a human IPSC-derived, cortical spheroid model of mid-fetal brain development, Alexis Rose Papariello

GP6 Dose-Dependent Effects of GLD-2 and GLD-1 on Germline Differentiation and Dedifferentiation in t he Absence of PUF-8, Youngyong Park, Samuel O'Rourke, Faten A. Taki, Mohammad A. Alfhili and Myon Hee Lee

GP7 Hyaluronan Regulation of Synaptic Formation and Function in Cortical Brain Development, Emily Sarah Wilson, Warren Knudson, Karen Litwa

GP8 Integrating Mindfulness Meditation into Inpatient Rehabilitation for Patients with Devastating Neurological Damage, Stephen Orr William Guiler Rita Gillis PhD Hannah Florida MD Kori Brewer PhD

GP9 A PUTATIVE UNIPOLAR POLYSACCHARIDE IS LINKED TO THE VIRULENCE OF *BRUCELLA ABORTUS* 2308 IN MICE, Dariel A. Hopersberger, Joshua E. Pitzer, R. Martin Roop II, PhD, Clay Fuqua, PhD, Xavier De Bolle, PhD

Ballroom | Biomedical | 10:00-12:00

GP10 Focal adhesion characterization during neuronal differentiation of hIPSC-derived neurons, Amanda Michelle Petritsch, Brenna Kirk, Karen Litwa

GP11 Endothelial Paracellular Gap Formation Is Regulated by G protein Coupled receptor 4 under acidic conditions, S Nik Akhtar, EA Krewson, MA Marie, LV Yang

GP12 Augmented Cardiac Mitochondrial Capacity in High Aerobic Capacity "Disease Resistant" Phenotype at Rest is Lost Following Ischemia Reperfusion, Musaad Bedah Alsahly, Zakari, Koch, Britton, Fisher-Wellman, Katwa, Lust

GP13 Role of Myoferlin in routing HTLV-1 envelope protein to viral assembly sites, Md Abu Kawsar Sarker, Nicholas Polakowski, Isabelle Lemasson

GP14 Development of novel inhibitors targeting the serine protease, C1r, of the classical complement pathway, Denise L. Rohlik, Blake R. Rushing, Brandon L. Garcia

GP15 Identification of a Skeletal Muscle that Retains Function During Ischemia, Adam J. Amorese, Michael D. Tarpey, Cameron A. Schmidt, Serena N. Mooney, Jeffrey J. Brault, Joseph M. McClung, Kelsey Fisher-Wellman, Espen E. Spangenburg

GP16 Identifying the Ideal Marker Placement for Lung Tumor Tracking, Wesley Andrew Belcher

GP17 Protection and sensitization of human cells to proton radiation by metallic nanoparticles, T. Gaddis N. Libby C. Boyd, N. Carlson, C. Putnam Evans E. Ables J.-L. Scemama, J.L. Shinpaugh

GP18 Matrix ATP Free Energy Directly Blunts Respiratory Flux in Leukemic Mitochondria, James T. Hagen, Kelsey H. Fisher-Wellman

Graduate Poster Presentations

Ballroom | Biomedical | 8:00-10:00

GP19   Dopamine Receptor Expression in the Human Spinal Cord, Sydney Elizabeth Woods, Madeleine Neuhaus, Tiana Washington, John Smith, Stefan Clemens

GP20   Optogenetic Analysis of the Effects of Nonhydrolyzable ATP Analogues and Cofilin Mimicking Peptides for Potential Alzheimer's Disease Prevention, Collin T O'Bryant, Robert M Hughes

GP21   Prenatal supplementation influences the response to the antiandrogen vinclozolin in the placenta and fetal liver, Ariel Fricke, Olivia Nieto Rickenbach, Alana Rister, Ciro Amato, Krista McCoy

GP22   A regulatory network that maintains the differentiating cell state in C. *elegans* germline, Matthew Gaddy, Zhongqiang Qiu, Myeongwoo Lee, Myon Hee Lee

GP23   The Effects of a Distracted Jump Landing Training Protocol on EEG and Lower Extremity EMG, Brittney Nicole Purcell, Callie Herman, Dylan Sampson, Ashlyn Warren, Chris, Mizelle, Nicholas Murray, Patrick Rider

GP24   Early Metabolic Syndrome (MetS) in Chronic Rhesus macaque Model of Human Allergic Asthma, Hannah G. Woolard, Kelsey H. Fisher-Wellman, Kymberly M. Gowdy, Sky Reece, David N. Collier, Robert L. Wardle

Ballroom | Education| 1:30-3:30

GP25   Treatment of Aggressive Behaviors in an Elementary School Student with Autism Spectrum Disorder, Drenée Michelle Bryant

GP26   A Critical Analysis of Picture Books About Starting School, Victoria Marie Anderson, Elizabeth Swaggerty

GP27   School-University-Community Partnerships: Examining the Impact of School-Based Mental Health Programming in Rural Communities, Jasmine L. Garland McKinney, Dr. Kristen Cuthrell, Dr. Loni Crumb, Dr. Martin Reardon

GP28   MSA Service Leadership Project - Spring in 2 Reading: Engaging the community to improve literacy at an eastern NC elementary school, Randall August Meisenhelder

GP29   The Judicialization of Student Conduct and its Impact on Practitioners, Valerie Beth Glassman

GP30   EXAMINING THE EFFECT OF A SOCIAL EMOTIONAL FRAMEWORK AT A HISPANIC MAJORITY MIDDLE SCHOOL, Ryan Jerome Ewell

Graduate Poster Presentations

Ballroom | Engineering | 8:00-10:00

GP31 Investigating the Difference between FEA on Tibial 3D Models and 2D Cross-sections, Patricia Joyce Malcolm, Mara Thompson, Dr. Ali Vahdati, Dr. Stacey Meardon, Dr. Stephanie George

GP32 Maximizing the Power Absorbed by a Oscillating Wave Surge Converter using Predictive Control Systems, Landon Spencer Sugar

GP33 THE EFFECT OF PERIVASCULAR TETHERING ON ARTERIAL WALL MECHANICS, Fatama T. Huda, Anup D. Pant, PhD, Ali Vahdati, PhD

GP34 Correlating Arteriovenous Fistula and Pulmonary Artery Hemodynamics Using MRI and Computational Fluid Dynamics, Daniel Pearce, Veeranna Maddipati, Bogdan C. Marcu, Ali Vahdati, and Stephanie George

GP35 Orthrus – Gryphon Subbase (Re-Evaluate for Cost Reduction towards Production), Nathan Quinn Godsey

Ballroom | Human Health | 1:30-3:30

GP36 Sarcoidosis and Obesity: Systematic Review and meta-analysis, David Wainaina Wambui

GP37 Collagen Supplementation in the Athletic Population, Mitchell Coles Hanks, Alexander Durland, John Willson

GP38 INJURY PREVENTION IN PRE-COLLEGIATE FEMALE GYMNASTS UTILIZING THE GFMT AND IMPAIRMENT SPECIFIC TRAINING, Faith Johnson, Shelby Muehlenthaler, Sarah Johnson

GP39 ISOKINETIC HIP ABDUCTION TO ADDUCTION STRENGTH RATIO AND FITNESS LEVEL, Richard Whitfield Leggett, Michael Jeffrey Shealy, Richard Alexander Medlin

GP40 A Case Study and Review of Literature of Eruptive Syringoma in a 6-Year-Old, Deepak Donthi, Arthur Samia, Joseph Nenow, Karyn Prenshaw, Charles Phillips

Ballroom | Human Health | 10:00-12:00

GP41 Comparison between OSHA-NIOSH Heat Safety Tool app and wet bulb globe temperature monitor as risk assessment methods for heat stress in agricultural settings in eastern North Carolina, Danielle Dillane, Jo Anne Balanay

GP42 Comparison of Hand Grip Strength Measurement Devices, Zachary B Barrett, Patricia A Hodson

GP43 Comparing Two Methods of Hip Rotation Measurement in College Dance Majors, Emma Marie Ferguson, Teal Darkenwald

GP44 Clinical Analysis of Regenerative Endodontic Procedures: Multiple or Single-Visit?, Marina Prado

GP45 Seasonal Variation in Cutaneous Melanomas from 1983-2017 in Greenville, North Carolina, Joseph M Nenow

Graduate Poster Presentations

Ballroom | Human Health | 1:30-3:30

GP46   EFFECT OF AEROBIC EXERCISE DURING PREGNANCY ON BIOMARKERS OF MATERNAL METABO-LISM, Mary-Margaret E Remchak, SAMANTHA MCDONALD, CODY STROM, CHRISTY ISLER, KELLEY HAVEN, LINDA MAY

GP47   Differences in Interleukin-6 in Response to Moderate and High Intensity Exercise Training in African American Individuals, Polina Krassovskaia, Chuck Tanner, Jonathan Johnson, Joseph Houmard, Joshua McGee, Damon Swift

GP48   Determination of Breakthrough Time for Combination Respirator Filter/Cartridges with Dimethoate Pesticide: A Methodology Study, Constantine Unanka, Dr. Sinan Sousan, Dr. Jo Anne Balanay

GP49   Association of Coach, Parent, and Peer-Initiated Motivational Climates with Sport Engagement and Burnout, Jordan W Barbee & Thomas Raedeke

GP50   Evaluation of Low-Cost Optical Particle Counters for Agricultural Exposure Measurements, Justine Olegario, Sinan Sousan

GP51   Forming New Habits: An Intervention to Decrease Sedentary Behavior in Medically Stable Older Adults, Melissa Dale, Aubrey Burgess, Alyssa Paul, Young Joo Kim

GP52   Factors associated with children not visiting a dentist after receipt of dental checkup advice, Cameron Dove

GP53   A Test of the Validity of the Short Version of the Salutogenic Wellness Promotion Scale, Austin M Odom, Craig M. Becker

GP54   Alternative Therapeutic Models for Speech Therapy in Individuals with Cleft Palate: A Literature Review,Madeline Funke, Amber Faircloth, Abigail E. Haenssler, Jaime L. Perry

Ballroom | Human Health | 10:00-12:00

GP55   A Comparison of Two Self-rating Depression Scales: Implications for Client Screening and Outcome Measurement in Recreational Therapy, John Michael Locke, Carmen Russoniello

GP56   A comparison of Commercial and Laboratory-Treated Permethrin Clothing on Total Content, Surface Content, and Repellency, Adam Vang, Dr. Stephanie Richards, Dr. Jo Anne Balanay, Dr. Robin Tutor

GP57   Evaluation of low-cost optical particle counters for environmental and occupational exposure , Swastika Regmi, Dr. Sinan Sousan

GP58   METABOLIC FLEXIBILITY IN NON-OBESE AND OBESE INDIVIDUALS, Nkaujyi Khang, Donghai Zheng, Lynis Dohm, Joseph Houmard

GP59   Utilizing Advanced Mobile Technology for Public Health Promotion and Education, Victoria Edwards, Nancy Winterbauer, Ann, Rafferty, Mary Tucker-McLaughlin

GP60   The Effects of Weight Loss on Metabolic Syndrome Z-score, John Mark Stein, Josh McGee, Anna Huff, Covey Clunan, Nicole Gniwek, Taylor Brown, Briceida Osborne, Laura Matarese, Robert Carels, Walter Pories, Joseph Houmard, Damon Swift

GP61   Establishing Baseline Skin Carotenoid Levels and Associations With Season, Age, Gender, and Race among Head Start Children (3-5 years) Living in Eastern North Carolina, Sarah E. Burkholder

GP62   Effect of Maternal Obesity on Offspring Skeletal Muscle Insulin Signaling, Jonathan A Johnson

GP63   Adenoid Development in Individuals with Cleft Palate from Infancy Through Adulthood , Katherine M. Coleman BS, Abigail E. Haenssler MS, Jamie L. Perry PhD

Graduate Poster Presentations

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

GP64 Springtime Onset of Isolated Convection in the Central and Eastern United States: Initial Results From a Ten-Year Radar Analysis, Christopher Jarrett, Thomas Rickenbach, Brian Nelson

GP65 Hickory Shad (*Alosa mediocris*) vs. American Shad (*Alosa sapidissima*): Are Aging Techniques Similar for Sympatric Species?, Samantha A. Dowiarz, Roger A. Rulifson

GP66 Determination of River Herring eDNA Shedding and Decay Rates: Working Towards a Methodology for Locating and Quantifying Spawning Populations, Seth M. Gibbons, Sara Roozbehi, Michael Brewer, Roger Rulifson, Erin Field

GP67 Testing Candidate Genes for Association with Aposematic Skin Color Pattern in the Mimic Poison Frog *Ranitomeya* imitator, Emily White, Kyle Summers

GP68 Thermodynamic and Structural Characterization of Cd(II) and Ca(II) binding to EF-hand Peptides by Isothermal Titration Calorimetry and Circular Dichroism Spectroscopy, Whitney Cameron Taylor, Akiya Wilson, Kijay Byers, Dr. Anne M. Spuches

GP69 Biological Interactions among Hosts, Parasites, and Mercury, Laura C Lukas, April MH Blakeslee

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

GP70 Immobilization of Ephrin-A1 on superparamagnetic magnetic nanoparticles via a HaloTag fusion protein for Myocardial Infarction (MI) recovery in the murine heart, Dalton Deane, Jitka Virag, Robert M. Hughes

GP71 Exploration of sensory hair cell regeneration through the use of light-initiated apoptosis, Alexandria Cedrone and Timothy Erickson

GP72 Particle Induced X-ray Emission: Calibration of GUPIX Software for Elemental Analysis, Robert Michael Seip, Jefferson L Shinpaugh

GP73 Using otolith microchemistry to characterize the life history of Hickory Shad (*Alosa mediocris),* Christopher Ryan Hill, Roger Rulifson

GP74 Benthic foraminiferal assemblage and sedimentological changes at the type locality of the Pliocene Yorktown Formation, Southeastern Virginia, Whittney E. Spivey, Stephen J. Culver, David J. Mallinson, Martin A. Buzas, and Harry J. Dowsett

GP75 WRF Simulations of Hurricanes Matthew and Nicole, Russell James, Rosana Ferreira, Christopher Acree, Christopher Jarrett, Aaron Newns, Amanda Farr, Victoria Thompson, Kinley Hunsberger

Graduate Poster Presentations

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

GP76   WRF Simulations of the 2009 Southeastern United States Convective Season Onset in a Future Climate Scenario, Matthew B. Little, Dr. Rosana Ferreira, Dr. Thomas Rickenbach

GP77   Capping a swine farm wastewater lagoon: water quality impacts in eastern North Carolina, Lauren Richardson, Dr. Stephen Moysey, Dr. Michael O'Driscoll, Dr. Guy Iverson, Dr. John Hoben, Dr. Charles Humphrey, Bobby Vaughan

GP78   A Tolerance Problem: Evaluating the Microbial Communities Attached to Aluminum Alloys 2024 and 7075, Kyra Price, Maya Budayr, Erin Field

GP79   Phenology in a Changing Environment: Ecological Forecasts of Albemarle Sound/Roanoke River Striped Bass Stock Migration, Quentin Bratkowski Nichols, Rebecca G. Asch, and Roger Rulifson

GP80   Characterizing the Transcriptome of the *Leptosiphon jepsonii* Stigma, Albert Tucci, Carol Goodwillie, John Stiller

GP81   Preparing DNA Origami Structures for Protein Binding Experiments, Nada Abu Khalaf, Nathan E. Hudson

GP82   Identification and characterization of biocatalysts for synthesis of the Wieland-Miescher Ketone, Mitul P Patel, Robert M. Hughes

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

GP83   Design and Application of an MeV Range Particle Accelerator Beamline for the Purpose of Luminescence Studies, Joel Pogue, Regina DeWitt, Jefferson Shinpaugh, Chris Bonnerup

GP84   Hogging the Groundwater: Water Quality and Economic Impacts of Concentrated Animal Feeding Operations in Eastern North Carolina, Thomas J. Vogel, Randall Etheridge, Ariane Peralta, Jacob Hochard

GP85   Ciguatoxin detection and model predictions for use in fisheries management in Puerto Rico, Henry Raab

GP86   Safe Havens and Hot spots: Radiation in Martian permafrost and its influence on the survival of ancient life, Emmanuel Osunkwor, Regina DeWitt

GP87   The Shadow Duck: Genetic Conservation in a Critically Endangered Bird, Dustin J Foote, Christopher N Balakrishnan, Peri E Bolton

GP88   Spatial and Temporal Variability of Nitrogen Concentrations in Groundwater Near Two Onsite Wastewater Systems Assessed Using Field Sensors and Laboratory Methods, Caitlin Skibiel, Dr. Charles Humphrey, Guy Iverson, Dr. Michael O'Driscoll

GP89   Evaluating how the habitat complexity of North Carolina seagrass meadows affects the faunal community composition, Stacy N. Trackenberg, Chris J. Baillie, F. Joel Fodrie, Rachel K. Gittman

Graduate Poster Presentations

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

GP90   Exposure and Magnitude of Stress in College Students, Lauren Hope Conder, M.A. Christyn Dolbier, Ph.D.

GP91   Exploring Relationships among Religious Coping, Perceived Stress, and Mental Health in a Sample of College Students, Sarah M Vanacore, Christyn L. Dolbier

GP92   Modeling Public's Preference for Solar Energy Siting in Rhode Island, Ruth Quainoo, Gregory Howard

GP93   Gender and Racial Identity Influences on Smoking Behavior of College-Aged African American Women, Shelly A. Thornton, Lisa C. Campbell

Ballroom | Social Sciences | 10:00 - 12:00

GP94   Workaholism and Well-Being: The Moderating Role of Psychological Capital, Beatrice L Demott, Shahnaz Aziz, PhD

GP95   The Effects of Weather and Climate on Tourism Businesses, Meredith Teasdale, Dr. Emily Yeager

GP96   The Post-Graduate Adventures of an MA Sociology Student, Ashley Marie Peterson

GP97   Using Functional Analysis in the School Setting to Treat Maladaptive Behaviors in a Student with Autism, Corbett Hall

GP98   Bioarchaeological Analysis of a Late Bronze Age Skeletal Assemblage from Kataret es-Samra, Michael Navarro, Megan Perry

GP99   An Investigation of Self-Efficacy, Other-Efficacy, and Collective Efficacy within an Interdependent Rope Pulling Task, Rachel Ivey Grantham

GP100   Seeking Healthcare? Perceptions and Beliefs among African Americans, Jazmin L High

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

GP101   Untold Stories: An Ethnographers Role in Telling Stories No One Knows, Kayla Jade Evans

GP102   LIFT-OFF: A SOCIAL-MEDIA DELIVERED LIFESTYLE INTERVENTION FOCUSING ON RURAL, LOW-SOCIOECONOMIC PATIENTS, Camila Calabria, Benjamin Estorge, Lauren Sastre,Bhibha Das

GP103   Students Teaching Students: The Challenges of Instructing Life-Skills Classes to Inmates, Rachel Lynn Gernert, Annelyse Iglesias

GP104   Systematic Literature Review of Medicinal Cannabis and Therapeutic Techniques, Michelle Kelli Laster

GP105   Relationship Between Self-Efficacy and Mechanical Performance in Goalkeepers on Dominant vs Non-dominant Side during a Corner Kick, Cassondra Fileccia, Tommy Molina Reyes, Patrick Rider

GP106   Exploring the Challenges of elite African American Male Athletes at Predominately White Universities, Kimberly Robin Outlaw

Graduate Poster Presentations

Ballroom | Sustainability | 10:00 - 12:00

GP107   Sustainability Efforts Needed: Keeping the "Magic" of Yellowstone Alive, Sydney T. Pons, Cynthia S. Deale

GP108   Introducing a Process to Cultivate Coastal Community Supply and Demand, Mitchell Scott Carstens

GP109   Using Building Footprint Data and Statewide Digital Elevation Models to Calculate Solar Irradiance On Residential Rooftops, Julian R Bradya, Robert Howardb, Praveen Malalic

Ballroom | Technology and Computer Sciences | 1:30 - 3:30

GP110   User Ability Reflective Player Characeters in Video Games, Harley Matthew Dickson, Dr. Nasseh Tabrizi

GP111   Visual spoofing in content-based spam detection, Mark Sokolov, Kehinde Olufowobi, Nic Herndon

GP112   Visual and Acoustic Relationships in Large-Scale Video Understanding, Kehinde T Olufowobi

GP113   A Review of current blockchain applications and research in the field of Supply Chain Management, Sumati Ravindra Kulkarni

Graduate Online Presentations

GON1   The Benefits of Establishing Community-Based Art Education Programs in Lower SES Communities, Dwayne Thomas Wilson

GON2   Retrospective Assessment of Preparedness for Mosquito Control Post-Hurricane Florence in North Carolina, Melinda Fields, Jo Anne Balanay, Brian Byrd, Stephanie Richards

GON3   Machine Learning for Predictive Maintenance: A Survey, Michael Francis Finch

GON4   Equipping Providers with Communication Skills to Effectively Discuss Childhood Obesity Prevention with Latino Parents, Maria Bruzzo

GON5   Applicababilty of Software Project Effort Estimation to Low-code Development Applications, Rhonda Renea Butler

Postdoctoral Poster Presentations

Ballroom | 1:30 - 3:30

PD1   Educator Perspectives on Suspension, Risk Factors, and the Role of a Mental Health Intervention in Reducing Suspension, R. Rosina Kilgore, Jasmine Garland McKinney, Martin Reardon, Loni Crumb, Robert Quinn, Sarabeth Broder-Fingert, Joanne Cox, Kristen Cuthrell

PD2   Loss of Carnitine Palmitoyltransferase-2 in skeletal muscle results in muscle remodeling and tissue-specific sensitivity to insulin, Andrea S. Pereyraa, Jessica M. Ellisa

PD3   Doxorubicin causes lesions in the electron transport chain of skeletal muscle mitochondria which are associated with a loss of contractile function, Michael D. Tarpey, Adam J. Amorese, Nicholas P. Balestrieri, Kelsey H. Fisher-Wellman, Espen E. Spangenburg

PD4   GLUCOSE LIMITING CONDITIONS ALTER CENTRAL CARBON METABOLISM AND SPECIFIC METABOLIC RATE OF HEPG2 CELLS, Cameron Alan Schmidt, Ilya I. Boykov, Kelsey McLaughlin, Kelsey Fisher-Wellman, P. Darrell Neufer

PD5   30-day toxicological assessment of perfluoroether acids (PFEAs), Woodlief, TL; Vance, SA; Hu, Q; DeWitt, JC

PD6   Rate Sensitive Hydrogel Characterization via Indentation Testing, Mohammad R. Islam, Michelle L. Oyen

PD7   A computational approach to study the effect of different loading conditions on the corneal cells, Anup Dev Pant, Ali Vahdati

PD8   Characterizing the role of the Zn finger protein MucR as an H-NS-like gene silencer and essential virulence determinant in Brucella abortus 2308, Ian S. Barton, Joshua Pitzer, Daniel W. Martin, and R. Martin Roop II

PD9   Structure-function studies of intrinsically disordered outer surface proteins of Lyme spirochetes, Sourav Roy, Brandon L Garcia

PD10   Tackling biofilms and drug resistance: Targeting bacterial response regulators to resensitize multi-drug resistant bacteria to antibiotics, Morgan E Milton, Danni L. Harris, Samantha Palethorpe, Richele J. Thompson, Roberta J. Melander, Christian Melander, John Cavanagh

PD11   Exposure to Vinclozolin during Pregnancy Induces Sexually Dimorphic Proteomic and Metabolomic Changes in Fetuses, Alana Rister, Ciro Amato, Joshua Mogus, Kimberly Kew, Krista McCoy

Undergraduate Oral Presentations

Room 249 | Natural Sciences | 8:30 - 9:30

UGO1	**8:30-8:45**	Impaired migration of primordial germ cells and ovarian development in Adamts9 knockout zebrafish, Jonathan Jacob Carver, Nichole Jansch Carter, Yong Zhu
UGO2	**8:45-9:00**	Attempting the Wave-Particle Duality of Gravitational Waves, Noah Matthew MacKay
UGO3	**9:00-9:15**	Comparing Siderophore Production Operons in Agrobacterium tumefaciens B6 and *Brucella abortus,* Kyle D. Weidner, Eric S. Anderson
UGO4	**9:15-9:30**	Why lay so late? The mystery behind a mid-morning laying hour in Eastern Bluebirds, Amber L. Chavis, Susan B. McRae

Room 249 | Natural Sciences | 9:45 - 10:45

UGO5	**9:45-10:00**	Investigating the Alkaline-Tolerance and Ligninolytic Potential of Microbes in Serpentinite-Hosted Subsurface Environments, Cameron M. Rushford, Nicholas R. Fay, Matthew D. Mintz, Brian M. Davis, Jacob M. Temple, Avery A. Dean, Daniel J. Maynard, Monique L. Cevallos, Eric S. Anderson
UGO6	**10:00-10:15**	The effect of social experience on neuronal number in the hypothalamic posterior tubercular dopaminergic nuclei in adult male zebrafish (*Danio rerio*), Elena I Blain, Faith H Heagy, Katie N Clements, Fadi A Issa
UGO7	**10:15-10:30**	Can qPCR be Used to Measure Telomere Length in Eastern Bluebird?, Patrick D. Maldonado, Susan B. McRae
UGO8	**10:30-10:45**	How Learning Assistants Behave During LA Prep Sessions, Marshall Adkins, Austin McCauley, Dr. Eleanor Close, Dr. Steven Wolf

Room 249 | Engineering | 1:30 - 3:15

UGO9	**1:30-1:45**	Impact on the Environment of E-Textile Waste and Heavy Metals, Casey Allison Pursifull
UGO10 Impact Dy-	**1:45-2:00**	Development of a Multi-functional Wave Tank for Studies of Coastal Wave namics Pertinent to Storm Surge Phenomena, Andrew Robert Thomas
UGO11 Bell,	**2:00-2:15**	Personalized Model Predictive Controller Design for Type 1 Diabetes, Natalie Mariah Mook, Jinkun Lee
UGO12 Byungjoon BJ	**2:15-2:30**	Virtual Reality for Engineering Laboratory Learning, Emma D Kloth, Kim, Jinkun Lee
UGO13	**2:30-2:45**	Automated Robotic Brake Press, Mario Trejo
UGO14	**2:45-3:00**	Growth Analysis and Environmental Impact of E-waste, Shelby Sloan Wiggins
UGO15 Bell,	**3:00-3:15**	Insulin Pump Control Using Reinforcement Learning, Mariah Mook, Natalie Jinkun Lee, PhD

Undergraduate Oral Presentations

Room 253 | Sustainability | 8:30 - 9:15

UGO16 Catherine	**8:30-8:45**	Fashion Research: Consumer Behavior Abstract, Shelby Alexandra Batchelor, Nie-Phan
UGO17 den,	**8:45-9:00**	Green Purchasing Training For ProCard Users, Celeste Madigan, Jason Hayden, Brady Redick, Robert Chin
UGO18	**9:00-9:15**	Idle Reduction, Brady Michael Kershner- Hanna, Torain Bullock

Room 253 | Fine Arts | 9:30 - 10:15

UGO19	**9:30-9:45**	the forest burns bright, Noah Hardee Lee
UGO20 man	**9:45-10:00**	Though the Stars Walk Backwards: An Anthology, Rieneke Hannah Ausherman
UGO21	**10:00-10:15**	Biotheatrics, Haley Sanders, Emma Myers, Victoria Workman

Room 253 | Humanities | 10:30 - 11:30

UGO22 mate Sci-	**10:30-10:45**	The Importance of Alexander von Humboldt's Conception of Nature for Climate Science, Dani Autumn-Rose Foster
UGO23 graphic	**10:45-11:00**	How to not be a woman trapped in a patriarchal society: an analysis of the novel *Divas de Diván,* Jocelyn M Bayles
UGO24 jective	**11:00-11:15**	*Pistis Christou*: An Exploration of the Pauline Subjective Genitive versus Objective Debate, Cameron Paige Dixon
UGO25 Crumpler III	**11:15-11:30**	Musical Materialism: A Defense in Several Movements, Charles Wingate

Room 253 | Community Engamement | 1:30 - 2:15

UGO26 Giles, Carly	**1:30-1:45**	Face to Face: It's Personal, Kelsey Black, Liz Lyttle, Abby Yourkavitch, Attie Jarvis, Kaki Thorell, Logan Stox
UGO27	**1:45-2:00**	Eliminating Barriers to Youth Sport in Pitt County, Emma Catherine O'Brien
UGO28 Alex	**2:00-2:15**	The Campus Voter Initative, George Carlyle Martin, Cameron William Smith, Cobb Urban, Peyton Mackenzie Paschke, Lauren Elizabeth Borsa, Olivia Leevin Thiag, Kaitlyn Leigh Spach, Avery McKenzie Bryan, Omar Sherif Hosny Taha

Room 253 | Technology and Computer Sciences | 2:30 - 3:30

UGO29 las Grego-	**2:30-2:45**	Design and Install for Vacuum Pump Machines at Grady White Boats, Nichory Chase, Tyler Crouch
UGO30	**2:45-3:00**	Gregory Poole 5S System, Cameron Judson Brown, Blake Wirhouski
UGO31	**3:00-3:15**	Wireless Infrastructure for Water Research Instrumentation, Colby Lee Sawyer
UGO32 man Bi-	**3:15-3:30**	MATRIX: Leveraging Open-Source Information to Make Better Decisions, Rolan, Jack Weber, Kyle Murphy

Undergraduate Oral Presentations

Room 307 | Social Sciences | 8:30 - 9:45

UGO33	**8:30-8:45**	Sex Trafficking in the United States, Kurt Francis Puerto
UGO34 duras, Jen-	**8:45-9:00**	A Multi Year Mixed Methods Public Health Needs Assessment in Rural Honnifer C. McMains, Stephanie B. Jilcott Pitts
UGO35 North Car-	**9:00-9:15**	Affordable Care Act and Access to Care: An Examination of Over 3 Million olina Birth Outcomes and Hospital Choices, Emma Caitlynn Plyler
UGO36 Minority Stu-	**9:15-9:30**	The Academic Achievement Discrepancies Between minority and Non-dents, Dayla Lorena Jones
UGO37	**9:30-9:45**	The Labor Impact of the 2014 War in Ukraine, Roman Vasyl Bilan

Room 307 | Social Sciences | 10:00 - 11:30

UGO38 muni-	**10:00-10:15**	Your Child is Overweight, Now What?: Understanding How Head Start Com-cates with Low-Income Families about Childhood Obesity, Dana Shefet
UGO39 ua	**10:15-10:30**	The Cost of a Vote: Examining Legislative Incentives in an Election Year, Josh-Spears
UGO40	**10:30-10:45**	Adaptive Fashion, Jessica Galloway, Keanna Hamilton, Leah Rallis
UGO41	**10:45-11:00**	LAST Study: Leisure Activity Step Tracking Study, Sarah E Kautz
UGO42	**11:00-11:15**	Game Theoretic Analysis of the North Korean Missile Crisis, Philip Jackson
UGO43 oline Eliz-	**11:15-11:30**	Quantitative Data Analysis of the Cancer Medication Adherence Project, Car-abeth Speller

Room 307 | Biomedical Sciences | 1:30 - 2:30

UGO44 complex Wellman	**1:30-1:45**	Investigating the role of glutathione depletion on pyruvate dehydrogenase supported H2O2 emission in leukemia, Naimi A. Pothiwala, Kelsey H. Fisher-
UGO45 Preference ry,Damani Fitz-	**1:45-2:00**	Transgenerational Effect of Western Diet on Offspring Mortality and Food in Drosophila Simulans, Angela E Sehres, Aaron Johnson, Imani Low-gerald, A.K. Murashov
UGO46 chemia/ Arledge	**2:00-2:15**	Potential preservation of cardiac function in the setting of post MI acute is-reprofusion injury, via the EphrinA1-EphA-STAT3 pathway, Joseph Benjamin
UGO47 Possible Adams,	**2:15-2:30**	Brain Iron Deficiency and Dopamine D3 Receptor Dysfunction modify Sleep: Animal Models for Restless Legs Syndrome, Joseph Basco, Heidi Kloefkorn-Bill Goolsby, Shawn Hochman, Stefan Clemens

Undergraduate Poster Presentations

Ballroom | Technology and Computer Sciences | 8:00-10:00

UGP1   Role of tryptophan and its derivatives in elucidating a PCET mechanism in azurin, Hanna L Kosnik, Adam R. Offenbacher, Andrew L. Sargent

UGP2   HTC Vive Tracking System Error Measurement Using VectorNav Sensor, Grayson Morgan Blankenship, Christopher Xavier Castro, Rui Wu, Andrew Ju, Zhen Zhu

UGP3   Applying Visualization Techniques on Deep Learning Models to Identify Insider Threats, Connor Lee Rhoades, Kamran Sartipi

UGP4   Overall Equipment Effectiveness (OEE) Improvement, Samuel Starr

UGP5   Sonic Plaza Repair, Lucas Bray, Tyler Goodman, Conan Dje, Arnold Perez

UGP6   Predicting sex and age using swipe-gesture data from a mobile device, Storm Pierce Davis

Ballroom | Technology and Computer Sciences | 10:00-12:00

UGP7   Screw Feeder Debris Reduction Project, Irfaan Siddiqi, Cornelius Anderson

UGP8   Hyster-Yale Fabrication Shop Process Improvement, Christopher Andrew Johnson, Cory Stallings, Merwan Mehta

UGP9   Showcasing Applications of Computer Science with Robotics Using the NAO Robot, Bryan Alejandro Holguin Herrera, Nic Herndon

UGP10   BSH Autonomous Trainable Visual System, Matthew Cameron Smith, Alex Cade

UGP11   A 2+2 Software Engineering Program Proposal for Rural North Carolina, Nathanael Xavier Fenwick, Storm Pearce Davis, James P. Philips

UGP12   Grady White Boats Waste Management Project, Austin Ray Lucas, Robert Estevez, Johnathan Koonce

Ballroom | Sustainability | 8:00-10:00

UGP13   An economical daylight harvesting sensor for the work environment, Griffin Crail-Steinbaker, Julian Brady, Praveen Malali, Faete Filho

UGP14   Psydekick, Amy Lauren Clopper, Megan M Gottlieb, Bree Alexis Tucker

UGP15   Reducing Contamination in ECU's Outdoor Recycling Bins by Altering Bin Color, Tim Christensen, Mattie High, Will Shingleton, Caroline Banzon, Macro Agostini, Emily Rubino

Undergraduate Poster Presentations

Ballroom | Social Sciences | 10:00-12:00

UGP16   Post-Occupancy Evaluation on East Carolina Universiy's Main Campus Student Center, Heather Mosesso, Brady Golden, Misun Hur

UGP17   Predictors of Drug Court Success: Evaluating Factors Among Superior Court Drug Intervention Program Participants, Megan Amanda Height

UGP18   Comparing the Effect of Community Engagement on Water Filter Usage in Rural Guatemala, Brooks Holt, Kim Larson, Carlos Melendez

UGP19   Prescription Opioid Education Provided by Dentists to Patients following Third Molar Extractions, Mahima Pandoria,

UGP20   Classification of Prehistoric Artifacts in Pitt County, Justin Bailey Brinson

UGP21   State Analysis of Social Determinants of Health and ADHD Diagnosis, Kristen Elizabeth Salyer

UGP22   The Impact of Culture on Nutrition Among African American Students at East Carolina University Abstract, Nakaya Reyhan Melvin

UGP23   Consumer Responses to Implied Motion in Advertising, Bailey Stamper

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

UGP24   Finding socioeconomic and geographic factors associated with breast cancer screening behavior in Korean immigrant women, Spencer Crawford

UGP25   Exploring an Interaction of Antidepressants and Depressive Symptoms on Health Behaviors in College Students, Celestial Jynx Pigart, Matthew C. Whited, Hunter M. Davis, Emily P. Midgette, Alexander J. Capiaghi, Jordan M. Ellis

UGP26   Examining Types of Abuse as Risk Factors for Postpartum Depression, Abigail Ware, Christyn Dolbier

UGP27   Coping and Stress: How coping mechanisms influence the real and perceived stress of law enforcement officers and their intimate partners, Leah Marie Little, Andrew Brimhall

UGP28   Who Gets the Prison Blues? A Cross-Cultural Comparison of the US-American and German Systems and Their Effects on Society, Chelsea Marie Silvia

UGP29   Evaluation of Facial Emotion Recognition in Elementary School-Aged Children with Autism Spectrum Disorder, Teleaha Kiara Dozier-Grady

UGP30   Understanding 'Blackout' Drinking Among Young Adults via Twitter, Jillian Rae Meitrodt

UGP31   Sex Secrets: Impact of Disclosure versus Non-disclosure on Relationships, Tara Martin, Keely Fox, David Knox, Lacey Ritter, Susan Milstein, Sara Fehr

Undergraduate Poster Presentations

Ballroom | Social Sciences | 10:00-12:00

UGP32   A systematic review of environmental circumstances for opioid use among youth and young adults, Samantha E Foster, M Villani

UGP33   Evaluating the Barriers to Completing a College Internship, Colin Graham Johnson

UGP34   Are Stigma and Outness Associated with Differences in Workplace Stress between Sexual Minority College Undergraduates and Their Heterosexual Peers?, Megan Anne Moomaw

UGP35   The impacts of faculty caring on nursing students' intent to graduate: A systematic literature review, Dalton Chase Henderson

UGP36   Impact of Recreation and Programming within Male Correctional Facilities, Michaela N Langley

UGP37   Addressing Public Displays of Obscene Images on East Carolina University Campus, Rosalinda Rebecca Kowalczewski

UGP38   Factors Associated with Choosing Social Work as a Major and Timely Graduation, Allison Nelson, Sarit Johnson

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

UGP39   Examining the Relationship between Aspects of Sleep and Psychological Symptoms in a College Student Sample, William Guiler, Christyn Dolbier

UGP40   Visitation Barriers for African Amercians at the National Park Service, Hunter Jamison Kossover

UGP41   Ma'am, are you lost?: An examination of the gender discrepancy in science, technology, engineering, and math fields, Grace Yatawara

UGP42   The Student Athlete Experience: Understanding how time commitments, relationships, stress, and coping mechanisms affect mental health, Christian Keith Smallwood

UGP43   Understanding College Students' Coffee Consumption Behaviors: A Focus Group Study, Kateryna Kosolapova

UGP44   Influence of Cooking Classes on Nutrition Literacy in Senior Adults, Shay Ernest, Justin Cefalu, Rafailia Vogiatzis

UGP45   Perceptions of Healthcare amongst Adolescents and Young Adults with Epilepsy, Kiara St Arnauld, Marie Rodriguez, Aimee Smith

UGP46   Investigating Relationships of Mental Health and Treatment History with Postpartum Depression, Rebecca Lynn Harrell, Christyn Dolbier

Undergraduate Poster Presentations

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

UGP47   Determination of the Binding Affinity of Cd(II) to Ca(II) Bound Human Cardiac Troponin C Using Isothermal Titration Calorimetry: A Competition Study, Amiya Cunningham, Caitlin Palmer, Katie Vang, Rachel A. Johnson

UGP48   The Impact of Gender Biases in STEM Fields, Emily Stewart

UGP49   Modeling Classroom Social Networks with Random Graphs, Aaron Michael Bain

UGP50   Copy Number Variation in Threespine Stickleback, Grant Tiger, Bhakti Vahewala

UGP51   Generation and Characterization of Mutant Zebrafish Lines with *Mgat1a/b* Genes Silenced, Theodore Andrew Blume, Kristen Mary Hall, Cody Hatchett, Ruth Schwalbe

UGP52   Codon Optimization of Genes Expressed in Venom Glands, Khaleb Levon Enoch, Timothy Jeffrey Cole

UGP53   Modeling Debris Flow Inundation in Built Environments Following Wildfires, Margaret Leonard Richardson

UGP54   Determining the membrane topology of Transmembrane O-methyltransferase in zebrafish hair cells using a split GFP system, Brock Kittle, Timothy Erickson

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

UGP55   How do increased viscous forces affect the surfacing behaviors of larval zebrafish?, Tierra Jones, Alexandra Venuto, Timothy Erickson

UGP56   Isolation and Characterization of Bacteria from Benzene-Impacted Iron Mat Communities, Michael F Glennon, Chequita N Brooks, Erin K Field

UGP57   Transgenerational Effect of Western Diet on Offspring Mortality and Food Preference in Drosophila Simulans, Angela E Sehres, Aaron Johnson, Imani Lowry,Damani Fitzgerald, A.K. Murashov

UGP58   Uncharacterized protein Mkrn2os.2 found to localize at the tips of stereocilia, implying potential role in sensory hair cell function, Darren Kensington Sanders, William Paul Biggers, Timothy Erickson

UGP59   USING COLLISIONS TO CALCULATE π IN BASE 2, Michael Joseph Kardos

UGP60   The effects of social status on the number of hypothalamic dopaminergic neurons, Faith Heagy, Elena Blain, Katie Clements, Fadi A. Issa

UGP61   Fish rely on hydrodynamic and light stimuli to inflate their swim bladder, Shannon Crowe, Alexandra Venuto, Timothy Erickson

UGP62   Effect of Coordinating Groups on Quinone Synthesis, Wesley Andres Sanchez

Undergraduate Poster Presentations

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

UGP63   Gram Positive under Aluminum Stress: *B. altitudinis* and its survival on aluminum alloys, Maya Budayr, Kyra Price, Erin Field

UGP64   Shifting Seasonality and Acidifying Oceans as a Result of Climate Change: a Meta-analysis, Peyton Jackson, Rebecca Asch

UGP65   Methods of Preparing Hickory Shad (*Alosa mediocris*) Scales for Aging, Mackenzie R. Fain, Samantha A. Dowiarz

UGP66   Using Barcoding Approaches to Identify Gammaridean Amphipods residing in Non-native macroalga *Agarophyton vermiculophyllum,* Jonathan P. Russo, Timothy S. Lee, April M.H. Blakeslee

UGP67   Cryogenic Electron Microscopy: Determining a Natural Fibrinogen Structure, Elizabeth Grace Viverette

UGP68   Variability in Morphometric Condition of Larval Atlantic Croaker and Mojarra as a Function of Temperature, Zooplankton Abundance, and Seasonality, Zachary Reece Warfel

UGP69   Determining the effects of impaired muscle fatty acid oxidation on liver metabolism, Arvind Rajan

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

UGP70   Impact of High Glucose Conditions on Macrophage Matrix Remodeling Response, Conner Alexa Mikitka

UGP71   Optimization of Lower-Extremity Injury Prevention: Influence of Dyad Training on Adherence, Ashlyn Warren, Callie Herman, Dylan Sampson, Brittney Purcell, Nicholas Murray, Christine Habeeb, Patrick Rider

UGP72   Diseased: An Artistic Depiction of Public Health Issues and Their Causes, Marian H. Robbins

UGP73   Lower extremity joint contact force symmetry across activities with varied task demands following ACL reconstruction, Emma Weis

UGP74   Project LIFT-Off: Development of Physical Activity Resources, Cameron Mitchell Prentis

UGP75   A Secondary Data Analysis on the Relationship Between Breast Cancer Survivors' Symptoms and Physical Activity Levels Measured by FITBIT® (steps/day), Alexis Rose Merritt

UGP76   The Prevalence of Cardiovascular Disease and Diabetes in Individuals with Lung Cancer, Kendall Schunk, Lee Ann Johnson

UGP77   Frequent change of address as a measure of housing insecurity predicting emergency department revisits for asthma exacerbation, Abigail Moon

UPG78   A study assessing HPV health literacy for practicing dentists in North Carolina, Yanai D Green

Undergraduate Poster Presentations

Ballroom | Human Health | 10:00-12:00

UGP79	Examining Disparities in BMI Among Working Women, Gabriella M. Boccia
UGP80	The Prevalence of Advance Care Directives for Latinos with Cancer, Kayla Danielle Neal
UGP81	Dental Utilization: Factors that Affect Income in Relation to Dental Care Utilization, Olivia Elizabeth Meyerhoffer, Kaleigh Oswald, Victoria Modlin, Ethan Norris
UGP82	HPV Vaccine Research Study with College Males at East Carolina University, Alexandria Niree Perry
UGP83	Cancer Medication Adherence Project: Patient Usability and Satisfaction Survey, Hannah McIntyre
UGP84	Documentation of drug abuse in the family or household of children admitted to the hospital for non-accidental trauma, Brooke Andrews
UGP85	"ELECTRONIC CIGARETTE USER REACTIONS TO A HYPOTHETICAL BAN OF OPEN SYSTEM ELEC-TRONIC CIGARETTE DEVICES", Shannon C. Mayne, William Snipes, Eric K. Soule
UGP86	Qualitative Anaylsis of Nurse Coach Contacts, Carmmen E Garcia
UGP87	Blue Collar Workers: Examining the Relationship between Physical Activity and Occupational Health, Christina S. Larkins

Ballroom | Human Health | 1:30-3:30

UGP88	The Effects of Dentition on Speech and Articulatory Characteristics, Elizabeth Broadway, Anna Paige Daniel, Eshan Pua, Jamie L. Perry
UGP89	Dental Utilization: How Income is Affected by Demographic Factors and Medicaid Coverage, Kaleigh Oswald, Molly Jacobs
UGP90	Effects of Interactive Vaulting for Children with Social and Behavioral Needs, Grace Theresa Vivian Lee
UGP91	Effects of Maxillary Advancements on Speech Outcomes in Individuals with Cleft Palate: A Literature Review, Emily Wolf, Gretchen Schultz, Abigail E. Haenssler, Jamie Perry
UGP92	A Comparison Study: Calculating Velar Stretch Using 2D and 3D Magnetic Resonance Imaging, Caroline E. Barnard, Abigail E. Haenssler, Jamie L. Perry
UGP93	A content analysis of social media posts related to alcohol use: 2018-2019, Hunter Hart, Beth Chaney, Ryan Martin, Jordan Cobb
UGP94	Availability of Naloxone in Retail Pharmacies and Neighborhood Inequities in Access: A Mystery Caller Assessment, North Carolina, 2019, Ashton N. Knudsen, Samantha E. Foster
UGP95	The Impact of Race and Sex on Velopharyngeal Variables and Ratios, Abigail K. Schwan, Imani R. Gilbert, Abigail E. Haenssler, Jamie L. Perry
UGP96	Features of the levator veli palatini muscle in velocardiofacial syndrome through magnetic resonance imaging: a systematic review, Alanah Miller, Mary Hannah Wilson, Neda Tahmasebifard, Jamie L. Perry

Undergraduate Poster Presentations

Ballroom | Engineering | 10:00-12:00

UGP97 High-speed schlieren imaging of blast waves, High-speed schlieren imaging of blast waves, Parker Richard Zieg, John M. Benson, Yang Liu

UGP98 Valorization of Peanut Processing Byproducts, Stephen James Sugarbaker, Kurabachew Duba

UPG99 Repeatability Testing AERO: Toward improved lymphedema assessment, Muzaffer Yigit Konu

UGP100 UAS-Based 3D Reconstruction Imagery Error Analysis, Nicholas Benjamin Hill, Chad Howard, Zhen Zhu, Shanyue Guan

UGP101 Human Hearing Threshold: A Comparison of Environmental Effects, Liam Pyle, Thomas Albanese, Natalie Bell, Mariah Mook

UGP102 Development of a Dielectric Barrier Discharge (DBD) Plasma Actuator for Studies of DropletPlasma Interactions Pertinent to Aircraft Icing Mitigation, John M. Benson, Yang Liu

UGP103 SPX Oven and Coil Process Study, William Hunter Sullivan, Justin Wayne Parker

UGP104 Effects of Surface Impedance in Long Range Acoustic Transmission Loss, Julian Alejandro Quintero-Rivera, Caleb Barber, Alyssa King, Quichawna Bryant

Ballroom | Engineering | 1:30-3:30

UGP105 Simulation of Hurricane Force Winds on Residential Homes with Various Windows Open, William Elliot McKeel, Daniel Pearce

UGP106 Keihin Overall Equipment Efficiency Improvemnet, Oscar Valdovinos, Samuel Starr

UGP107 Power Supply Variability Related to Digital Blood Pressure Monitor Output, Grace Krell, Shea Middleton, Sydney Moore, Elliot Paul, Hannah Roberson

UGP108 Sound Attenuation within Concrete Vault, Benjamin Engstrom, Hannah Sasser, Andrew Grena, Emma Kloth, Teresa Ryan, Shanyue Guan

UGP109 Mechanical Failure of Human Fetal Membrane Tissues in Premature Birth, Mackenzie Wheeler

UGP110 Solar and Blue Energy Harvesting for Desalination, Caleb Lockamy

UGP111 3D Printed Laboratory Accessories as a Vital Component of the Undergraduate Research Experience, Ethan Samuel Quinn

Ballroom | Engineering | 10:00-12:00

UGP112 Domtar Personal Care Focus Center Improvements, Michaela Ann Emory

UGP113 Lift Characteristics of Oscillating Hydrofoils, Caleb Paul, Robin Harmon, Kelsey Kennedy, Praveen Malali, Ranjeet Agarwala

UGP114 Patient-Specific 3D Printed Models for Perioperative Planning, Anuj Pranav Sanghvi, Joshua Butler, Andrew Ray

UGP115 Impedance Tube Software Upgrade Validation, Faith Ann Cobb, Jamison Tyson, Nia Wilson

UGP116 100% Hemp Skateboard: Pioneering the future of skateboarding without contributing to deforestation, Joseph Keenan Gisler, Cole Davis, Cainen Miller

UGP117 Modeling the impact of solar and ocean energy integration on the reliability and resiliency of the Eastern North Carolina power grid system, Daniel Lynn Krieger, Praveen Malali, Faete Filho

UGP118 Investigating the Flow Characteristics of Supercritical Carbon dioxide through an Elongated Pipe for Gas hydrate extraction, Melany Contreras, Caleb Paul, Praveen Malali

Undergraduate Poster Presentations

Ballroom | Engineering | 1:30-3:30

UGP119   A Water Quality Challenge of Adapting to Sea Level Rise at Lake Mattamuskeet, Zeke Holloman, Randall Etheridge

UGP120   Use of Hydrogels to Emulate Lymphedema Tissue Densities for Use in AERO Device, Savanna Marie Williams

UGP121   Design of a Measurement Apparatus for Acoustic Impedanc of Sand, Jamison Tyson, Faith Cobb, Nia Wilson

UGP122   Fly Exclusive 5S Plan and Implementation, Emma Elizabeth Joyner

UGP123   Effects of atmospheric conditions on the propagation of sound in the lower atmospheric boundary layer, Nia E Wilson, Faith A Cobb, Jamison R Tyson, Zhen Zhu, Teresa J Ryan

UGP124   Stacking Tables Project, Daniel Moore

UGP125   Designing a Sensor-Based Anxiety Monitoring System, Gunnar Scott Price, Riley Dumm, Griffin Crail-Steinbaker, Joseph Dewit Dewitt, Ricky Castles

Ballroom | Education | 8:00-10:00

UGP126   Augmented Reality Anatomy Visualization, Emmanuel Zenil Lopez, Rui Wu, Zhen Zhu, Andrew Ju, Shawn Moore

UGP127   Using a 3D Model to Teach Phylogenetics, Lauren Mackenzie Bulmer, Joseph Cole Dickerson, Kristine Callis-Duehl

UGP128   Crafting a Critical Lens with Technology and Social Studies, Millicent Womble, MacKenzie Jenkins

UGP129   Learning Functions through Vending Machines, James A Callahan

UGP130   Representation and Construction of Disabilities in Children's and Young Adult Literature, Rachel Cobb, Hannah Skaff

UGP131   Preservice Teachers' Perspective of Teaching in Rural Schools, Isaiah Gorham, Taylor Parrish

UGP132   The Effect of Comic Books on Historical Empathy in a High School Social Studies Classroom, Justin Craig Saulter

UGP133   Financial Literacy, Keyshorn Marquise Smith, Wilson Gallagher-Smith, Noah Ausherman, Lacey Ross, Chase Kimball

Ballroom | Community Engagement | 10:00-12:00

UGP134   The Questionnaire of Student Interest (QSI), Whitney Elisabeth Lee Walls, Benjamin John Estorge, Tiana Earlene Washington, Hunter Glen Whittington

UGP135   An all-inclusive park for youth: A Halifax County project, Kevin Joseph Cheruvathoor, Noah Franklin Hemmings

UGP136   THE SIGNIFICANCE OF MEALS ON WHEELS OF PITT COUNTY ON THE WELL-BEING OF HOME BOUND OLDER ADULTS, Jessica Schulte

UGP137   Building a Technology Embedded STEAM Learning Community through Mobile Group Applications, Nikita Revankar, Lyndsey Graham, Brittany Alligood

UGP138   System Dynamics for the Community of Kinston, NC, Davis Basden

UGP139   Kids Run the World: Future, Abby Renee Baukema, Emma Creech, Jake Kelly, Linnea Meletiou, Anna Vassallo, Elizabeth Martin

Undergraduate Poster Presentations

Ballroom | Community Engagement | 8:00-10:00

UGP140   How the Community Outlook Affects Pitt County Animal Services, Ashley N. French, Melanie L. Sartore

UGP141   Farm to Clinic: Perceptions, Satisfaction, and Experience of Low-Income, Rural Patients who Participated in a Produce Prescription Program Using Local, Donated Produce, Madeline Grace Tripp

UGP142   Kids Run the World: Education, Sarah Katherine Murphy, McKenzie Carolyn Whitley, Elizabeth Jean, Johnson, Eric Michael Wagner, Hannah Broughton Ragsdale

UGP143   The Effect of the SafeRide Program on the Drinking and Driving Instances Involving ECU Students, Allison S Eberwein

UGP144   Kids Run the World: The Boys & Girls Club, Jayda Bodine, Andrew Landry, Samantha Mills, Lily Redick, Timothy Christensen

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

UGP145   Characterization of Silenced *Mgat1* in a Rat Neuroblastoma Cell Line, Alexandria Fiorenza, Kristen Hall, Ruth Schwalbe

UGP146   Real-time Knee Joint Loading While Walking, Alexander S. Clark, John Willson, Ryan Wedge

UGP147   Cardiac Lipid Profile in High Fat Diet-Induced Insulin-Resistant Mice, Brinda Sarathy, Luke Weyrauch, Uma Sharma, Joe Arledge, Kimberly Kew, Jitka Virag

UGP148   EphrinA1-Fc rescues cardiac function and attenuates adverse remodeling in WT B6 but not EphA2-R-M chronically nonreperfused post-MI myocardium, Caitlin Friello, Victoria Chan, Maliha Bhuiyan, K'Shylah Whitehusrt, Heather Estes, Robert C. Chase, Smrithi Valsaraj, Uma Sharma

UGP149   Alpha-Synuclein and Transglutaminase 2 binding interactions and fluorescence resonance energy transfer findings using fluorescence spectroscopy, Alyssa Danielle Kremer

UGP150   Predicting Controlled Drug Release from Hydrogels, Jeremiah Dwayne James

UGP151   Tissue-specific characterization of mitochondrial branched-chain keto acid oxidation using a multiplexed assay platform, Emma J. Goldberg, Katherine A. Buddo, Kelsey L. McLaughlin, Regina F. Fernandez, Andrea S. Pereyra, Christine E. Psaltis, Chien-Te Lin, James T. Hagen, Ilya N. Boykov, Tiffany K. Nguyen Kymberly M. Gowdy, Jessica M. Ellis, P. Darrell Neufer, Joseph M. McClung, Kelsey H. Fisher-Wellman

UGP152   Subject-specific computational modeling of joint mechanics: From clinical images to finite element simulations, Elliot Paul

UGP153   Effect of Visual Stimulation with Concurrent Cognitive Task on Human Brain Activation, Binkai Hsu, Rui Wu, Shanyue Guan, Chia-Cheng Lin, Brian Sylcott

Undergraduate Poster Presentations

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

UGP154   Impacts of GenX (2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)-propanoate) on gene expression implycated in reproductive and neurobehavioral functions in *Caenorhabditis elegans*?, Terry Dion Pruden

UGP155   Title Viral Regulation of Immunity – Antibody, T lymphocytes and Antigen Presentation, William Willis, Ming Fan, Rachel Roper

UGP156   Electrochemical Analysis of Methylated DNA, Victoria G Preston, Eli Hvastkovs

UGP157   Effects of distracted jump training on mechanical differences in a jump-landing task, Dylan Sampson, Callie Herman, Brittney Purcell, Ashlyn Warren, Patrick Rider

UGP158   Retinoic Acid Regulates KIT Expression in Peritubular Myoid Cells in The Mammalian Testis, Taylor Nicole Malachowski, Christopher Geyer, Oleksandr Kirsanov

UGP159   Investigation of conserved cysteines on fatty acid desaturase function, Parth Dave, Patrick Jacob Horn

UGP160   Epigenetic Transgenerational Effects in Drosophila Simulans Provide Insight into the Epigenetics of Obesity in Humans, Damani Shakuur Fitzgerald, Johnson, Aaron, Sehres, Angela, Lowry, Imani, A.K. Murashov

UGP161   An investigation of the effects of collective efficacy on performance in a team rope-pulling task, James Robert Merritt

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

UGP162   Mechanism used by the HTLV-1-encoded protein, HBZ, to upregulate BATF3 expression, Mikayla Jeanette Luke, Kimson Hoang, Isabelle Lemasson, Nicholas Polakowski

UGP163   A Model for Plasmin's Role in Fibrin Digestion, Spencer Reese Lynch

UGP164   *Tnpo-SR*, a karyopherin, supports stem cell self-renewal and cell differentiation in the *Drosophila melanogaster* germline, Kaylee Ann Patterson, Alyssa Gowdy, Allison Beachum, Anna Williams, Elizabeth Ables

UGP165   Neurobehavioral Correlates of Implicit Motor Learning in Right- and Left- Hand Dominant Individuals, Sydney Rossback

UGP166   Forced differentiation in HL-60 cells increases mitochondrial spare reserve capacity, Hannah S. Coalson, Naimi A. Pothiwala, Margaret A.M. Nelson, Kelsey L. McLaughlin, Kelsey H. Fisher-Wellman

UGP167   Improved Screening for Pulmonary Hypertension Using Computer-Assisted Image Analysis-Based Approaches, Bridget Elizabeth Ward, Daniel Patterson Pearce

UGP168   Assessment of mitochondrial energetics after hypoxia exposure in skeletal muscle is influenced by the isolation approach, Serena N. Mooney, Michael D. Tarpey, Kelsey H. Fisher-Wellman, Joseph M. McClung, Espen E. Spangenburg

UGP169   The Effects of Fibrin Degradation in Tension-Free fibers, Michael M Mongoy Mikombe

Undergraduate Poster Presentations

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

UGP170   3-D Fluid-Structure Interaction Model of the Upper Airway, Robert Ocampo

UGP171   Elucidating the role of BRCA1 in skeletal muscle myogenesis and function, Ananya Koripella, Elizabeth R. LaFave2 Michael D. Tarpey, Adam J. Amorese, Eli G. Hvastkovs, Espen E. Spangenburg

UGP172   Investigating the Roles of Dimerisation and Conserved Cu^{2+} binding residues in the functionality of FtrA from Brucella bacteria, Mina Chanakira, Sambuddha Banerjee, Anne M Spuches, Ryan J Garrigues, Daniel W Martin, R. Martin Roop II

UGP173   Vinclozolin and Neurodevelopmental Disorders, Reenad Ibrahim, Ameera Afifi, Krista A. McCoy

UGP174   Intracerebroventricular *α-Klotho Treatment Suppresses Food Intake and Improves Glucose Clearance in Female DIO Mice,* A. Bass1, T. Landry, P. Li1, B. Laing, Bunner, Z. Rao, Quincy Gilliard, Theodore Langton, H. Huang

UGP175   Characterizing the Regulatory Region of the *parathyroid hormone* 2 Gene in Zebrafish, Cameron Smith, Victoria Workman, Timothy Erickson

UGP176   Rho GTPase Modulators Impact Associative Learning in a Mouse Model of Alzheimer's Disease , Matthew Bair, Harold Hui, Mychaela Brown

UGP177   Characterization of mutations in the master biofilm regulator BfmR of *Acinetobacter baumannii,* Felicia Elena Jaimes, Morgan E Milton, Samantha Pelthrope, Richele J Thompson, Everett Pesci, John Cavanagh

Ballroom | Arts and Humanities | 1:30-3:30

UGP178   The Patient Experience on Canvas, Anna Elizabeth Rain, Kim Larson, Lee Ann Jarrett

UGP179   Cyberbullying needs assessment in a rural middle school, Allison Jane Copeck

UGP180   The Process of Promotion: One group's journey to elevating local artists, Hannah Elizabeth Bolick, April Brooke McLean, Christopher Colton Embree, Joyel Stephen Puthuparampil, Anna Elizabeth Sawyer, Hali Renee Christensen

Undergraduate Online Presentations

UGON1   A Look into the Effectiveness of Traditional Therapy Methods, Mindy Ann Kovacs

UGON2   Afrocentric Initiation Rituals. The case of the Fulani of Benin and the Sateré-Mawé of Brazil, Aminata Boy Camara

UGON3   Alternate Transportation Incentives for East Carolina Faculty and staff, Erika Lynn Ramsland, Anakin HoneyCutt, Andrew Reyes

UGON4   Cost-Benefit Analysis of Occupancy Sensor Controls for Window A/C Units in ECU's Dorms, Julia Catlin, Karley Flynn. Rakeem Hines

UGON5   Non Biodegradable Confetti on Campus, Ashley Arensberg, Lauren Jones, Gerardo Rodriguez

Abstracts | Graduate Poster Presentations

GP1

Elucidating the roles of six TonB homologs in intestinal colonization and experimental intra-abdominal infection by *Bacteroides fragilis*.

Nathaniel L. Seals, Anita C. Parker, Edson R. Rocha

Department of Biomedical Sciences

Bacteroides fragilis is an intestinal commensal and opportunistic pathogen. It is the most isolated anaerobe from human infections. B. fragilis possesses 98 TonB-dependent outer membrane porin transporters (TBDTs) associated with the transport and assimilation of a myriad of dietary plant polysaccharides, host-derived glycans and essential nutrients such as heme, vitamin B12, and Fe(III)-xenosiderophores for intestinal colonization and survival in extra-intestinal infections. Transport by TBDTs of their specific substrates requires energy transduced through the periplasmic C-terminal domain of the TonB protein from the inner membrane TonB-ExbB-ExbD complex. Most Gram-negative bacteria contain one or two TonB homologs; however, analysis of the B. fragilis genome has revealed the presence of six TonB homologs (TonB1 to TonB6). To understand the role of the multiple TonB systems in this organism, we have constructed mutants of each to characterize their contribution to B. fragilis pathophysiology. tonB null mutants were constructed by the deletion of an internal DNA fragment from each ORF using the thymidine kinase (tdk) counter-selection marker in the B. fragilis 638R Δtdk parent strain. Bacterial strains were grown in a defined medium containing heme, vitamin B12, starch or mucin-glycan as essential nutrients for in vitro growth. Fe(III)-ferrichrome assimilation was assayed on medium containing protoporphyrin IX and the ferrous iron chelator bathophenanthroline disulfonic acid. Interestingly, in vitro assays showed that deletion of the tonB3 gene alone abolished in vitro growth on heme, vitamin B12, starch, mucin-glycan and ferrichrome. Genetic complementation with the native tonB3 gene restored the wild type phenotype. The in vivo mouse intestinal colonization of WT vs. mutant showed a lack of both the tonB3 and tonB6 genes have a severe cecum colonization defect. In the tissue cage model of intra-abdominal infection, a deficiency of the tonB3 gene alone completely abolished survival. These findings suggest that both TonB3 and TonB6 play a major role in providing energy transduction to TBDTs involved in the assimilation of essential nutrients in the gut while TonB3 alone seems to be essential for survival extra-intestinally. It is of interest to know the mechanism of how the presence of multiple TonB homologs, mainly TonB3 and TonB6, allow B. fragilis to rapidly adapt to the utilization of novel nutrient sources available in the host.

GP2

Examination of METTL16 RNA Targets, Cellular Locations, and Proliferative Effects

Emily R. Satterwhite, Daniel J. Nance, Kristen R. Carraway, Kyle D. Mansfield

Department of Biomedical Sciences

Recently identified Methyltransferase-like 16 (METTL16, also METTL10D) is responsible for depositing a methyl group on the N6 position of adenosine (called m6A) in several different RNA targets. However, only a few of these targets have been intensely studied, including messenger RNA MAT2A, the long noncoding RNA MALAT1, and the small nucleolar RNA U6. It has also been suggested that this methyltransferase is only found in the nucleus of the cell. Our goal was to verify these previous observations and identify additional RNA targets. Immunoprecipitation of both native and exogenously-introduced METTL16 was used to verify known targets as well as identify other novel RNA targets. The results of these experiments differed, which led us to perform biochemical fractionation of these cells to determine the cellular localization of METTL16. From this, it was revealed that METTL16 protein localized to both the cytoplasm and the nucleus. CRISPR and RNA interference studies of METTL16 resulted in differential RNA expression of identified targets, suggesting this protein is involved in RNA regulation of a number of targets including MYC. Additional studies are underway to determine where these RNA targets are modified and the long-term effects of METTL16 knock-down/knockout on targets and general cell behavior such as cell cycle and apoptosis. Finally, we are generating a number of METTL16 mutants to confirm if targets are methylated exclusively by this protein, the role of RNA binding, and the impact of cellular localization on METTL16's target preference and activity. Overall, our studies conclude METTL16 has a significantly higher effect on cell physiology than previously predicted.

GP3

GPR65 impedes intestinal inflammation and colitis-associated colorectal cancer development in experimental murine models

Mona A. Marie[1*], Edward J. Sanderlin[1*], Swati Satturwar[2], Deepak Donthi[2], Heng Hong[2], Kvin Lertpiriyapong[4,5], Li V. Yang[1,3]

Department of Internal Medicine[1], Department of Pathology[2], Department of Anatomy and Cell Biology[3], Department of Comparative Medicine[4], Brody School of Medicine, East Carolina University, USA
[5]Center for Comparative Medicine and Pathology, Memorial Sloan Kettering Cancer Center, USA

G-protein coupled receptors are the largest group of pharmacologically targeted receptors. GPR65 (also known as T-cell death-associated gene 8, TDAG8) is a proton sensing receptor predominantly expressed on immune cells. Genome-wide association study (GWAS) identified GPR65 gene polymorphisms as a potential risk factor in inflammatory bowel disease (IBD) patients. IBD patients are at a higher risk of developing colorectal can-

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cer (CRC) than the general population. To study the effect of GPR65 deficiency on IBD and colitis-associated colorectal cancer (CAC), we induced chronic colitis and CAC in GPR65 knockout (KO) and wild-type mice using dextran sodium sulfate (DSS) and Azoxymethane (AOM)/DSS, respectively. Disease activity parameters, such as diarrhea, colon shortening, fibrosis, histopathological score, and mesenteric lymph node enlargement were aggravated in GPR65 KO mice in comparison to wild-type mice treated with DSS. Leukocyte infiltration was increased and myofibroblast cells were activated in colitis tissues of GPR65 KO mice. These cellular changes represent basis of the observed exacerbation of intestinal inflammation in these mice. In line with high expression of GPR65 in infiltrated leukocytes, real-time RT-PCR revealed that GPR65 mRNA expression was increased in inflamed intestinal tissue samples of IBD patients when compared to normal intestinal tissues. Moreover, we studied the role of GPR65 in the CAC mouse model. Tumor burden represented by the number and volume of polyps in GPR65 KO mice was higher than wild-type mice treated with AOM/DSS. The total number of dysplasia, and adenocarcinoma lesions were also higher in GPR65 KO in comparison to wild-type mice. These observations were associated with increased disease activity such as body weight loss, colon shortening, spleen enlargement, mesenteric lymph node expansion and increased leukocyte infiltration in the GPR65 KO mice in comparison to wild-type mice treated with AOM/DSS. Altogether, our data demonstrate that GPR65 suppresses intestinal inflammation and colitis-associated tumor development in the mouse models suggesting that potentiation of GPR65 with agonists may have anti-inflammatory therapeutic effects in IBD and reduce the risk of developing colitis-associated colorectal cancer.

GP4

The ability of a nanobioglass-doped self-etching adhesive to re-mineralize and bond to artificially demineralized dentin.

Gabriel Abuna[1], William G Ferrel, Saulo Geraldeli[1]

1 Department of General Dentistry. East Carolina University

The aim was to evaluate the remineralizing process of a self-etch adhesive doped with bioactive nanobioglass.Experimental Si, Ca, Na and PO_4 based nanobioglass were synthesized and doped into a self-etch adhesive. Divided in 3 groups: Clearfill SE2 (CSE2), experimental (EXC) and experimental doped with 10% of nanobioglass (ExNB). It was applied on caries affected bovine dentin (chemically simulated) and evaluated after 24 h and 28 days of immersion in simulated body fluid. The remineralization process was assessed using optical coherence tomography (OCT), nanoindentation, in situ zymography, transmission electron microscopy (TEM), confocal laser scanning microscopy (CLSM), μ-tensile bond strength (μTBS) and pH buffer.

The addition of nanobioglass particles into the self-etch adhesive modified the μTBS in short term, different than the non-doped self-etch adhesive. The remineralization recovered the nanohardness, and volume lost by caries lesion (p=0.02). Moreover, reduced the enzymatic activity ($p=1.24^{E-4}$) and formed new crystals within of the hybrid layer. The use of nanobioglass was efficient to recover the properties of a caries affected dentin. Furthermore, the adhesive properties would be improved

GP5

The endocannabinoid system as a regulator of excitatory synaptogenesis in a human IPSC-derived, cortical spheroid model of mid-fetal brain development

Ken Soderstrom, David Taylor, Karen Litwa

Autism Spectrum Disorder (ASD) is a complex neurodevelopmental disorder that is characterized by social deficits, behavioral abnormalities, and disrupted sensory processing. At the cellular level, there is often an imbalance of excitatory and inhibitory neuronal synapses as well as defective synaptic pruning. Induced pluripotent stem cell (IPSC) derived neurons and cortical spheroids from ASD patient fibroblasts exhibit an increased ratio of excitatory to inhibitory synapses. Changes to the endocannabinoid system (ECS), a global regulator of synaptic plasticity, may play a role in producing the ASD phenotype during early fetal development. The ECS is present during early neurodevelopment and decreases presynaptic neurotransmitter release thru the activation of Gi-coupled CB1 receptors by the endocannabinoids 2-AG and AEA. **Our overall hypothesis is that CB1R antagonism increases excitatory synaptogenesis and is associated with dysregulation of normal excitatory-inhibitory tone.** Preliminary RT-PCR results indicate that MAGL, the enzyme that metabolizes 2-AG, has increased mRNA levels in ASD patient-derived cortical spheroids relative to controls. We are thus investigating how disruptions to the endocannabinoid system during fetal development could impact neural circuitry and synaptogenesis. Currently, we are validating our proposed model of ECS dysfunction using CB1R antagonist SR141716 in control patient IPSC-derived cortical spheroids. Confocal image analysis of SR141716 treated cortical spheroids shows increased excitatory synapse area, defined as the overlapping area of excitatory presynaptic marker VGLUT1 and postsynaptic marker PSD95. This increase in area is governed by an increase in both the number and size of excitatory synapses. We are currently compiling functional data that measures electrophysiological parameters using a Multi Electrode Array system. Additionally, we are utilizing STORM super-resolution microscopy to determine the synaptic location of CB1R receptors.

GP6

Dose-Dependent Effects of GLD-2 and GLD-1 on

Abstracts | Graduate Poster Presentations

Germline Differentiation and Dedifferentiation in the Absence of PUF-8

Youngyong Park[1], Samuel O'Rourke[1], Faten A. Taki[2], Mohammad A. Alfhili[1,3] and Myon Hee Lee[1]

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[2]Department of Pharmacology, Weill Cornell Medical College, New York, NY, United States

[3]Department of Clinical Laboratory Sciences, College of Applied Medical Sciences, King Saud University, Riyadh, Saudi Arabia

PUMILIO/FBF (PUF) proteins have a conserved function in stem cell regulation. *Caenorhabditis elegans* PUF-8 protein inhibits the translation of target mRNAs by interacting with PUF binding element (PBE) in the 3□ untranslated region (3□ UTR). In this work, an *in silico* analysis has identified *gld-2* [a poly(A) polymerase] as a putative PUF-8 target. Biochemical and reporter analyses showed that PUF-8 specifically binds to a PBE in *gld-2* 3□ UTR and represses a GFP reporter gene carrying *gld-2* 3□ UTR in the *C. elegans* mitotic germ cells. GLD-2 enhances meiotic entry at least in part by activating GLD-1 (a KH motif-containing RNA-binding protein). Our genetic analyses also demonstrated that heterozygous *gld-2(+/−) gld-1(+/−)* genes in the absence of PUF-8 are competent for meiotic entry (early differentiation), but haplo-insufficient for the meiotic division (terminal differentiation) of spermatocytes. Indeed, the arrested spermatocytes return to mitotic cells via dedifferentiation, which results in germline tumors. Since these regulators are broadly conserved, we thus suggest that similar molecular mechanisms may control differentiation, dedifferentiation, and tumorigenesis in other organisms, including humans.

GP7

Hyaluronan Regulation of Synaptic Formation and Function in Cortical Brain Development

Emily Sarah Wilson, Warren Knudson, Karen Litwa

Many neurological diseases present with changes in the ratio of excitatory to inhibitory (E/I) synaptic signaling. Increased hyperexcitability of cortical neurons is characteristic of neurodevelopmental disorders, such as epilepsy and autism spectrum disorders. Currently, we know little about how this E/I ratio is established. However, changes in the extracellular matrix (ECM) during neurodevelopment may alter synapse formation. Making up twenty percent of brain volume, the extracellular matrix is largely comprised of hyaluronan, which acts as both a scaffold of the extracellular matrix and a space filling molecule. Furthermore, hyaluronan is present at the onset of brain development, beginning with neural crest migration. Through acute perturbation of hyaluronan levels at the onset of synaptogenesis, we sought to determine how hyaluronan impacts the ratio of excitatory to inhibitory synapse formation and the resulting neural activity. Using human-derived cortical brain spheroids, we manipulated HA levels and observed the resulting effects on synapse formation and neurotransmission. Consistent with our hypothesis, enzymatic digestion of hyaluronan leads to increased excitatory synapses and decreased inhibitory synapses. The elevated excitatory synapse formation resulted in increased spontaneous neural activity. In contrast, the addition of high molecular weight hyaluronan into the environment has opposite effects, decreasing excitability and resulting in decreased spontaneous neural activity. These data support a regulatory role for the ECM at the synapse and establish a new model of ECM regulation of E/I imbalances associated with human neurodevelopmental disorders

GP8

Integrating Mindfulness Meditation into Inpatient Rehabilitation for Patients with Devastating Neurological Damage

Stephen Orr,[1] William Guiler,[2] Rita Gillis PhD,[3] Hannah Florida MD,[3] Kori Brewer PhD,[1] John Norbury MD[1]

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[2]East Carolina University Honor's College

[3]Vidant Medical Center

Mindfulness-based interventions in the form of short, regular meditation have been shown to significantly improve attention, memory, and mood in subjects with no prior meditation experience (Basso et al. 2019). Furthermore, mindfulness training has been shown to improve functioning in patients with traumatic brain injury (Hernandez et al. 2016). We predicted that smartphone-based meditations can be successfully incorporated into inpatient rehabilitation for patients with neurological damage, and that the use of guided meditations will provide measurable improvements in functional independence measures (FIM) of neurologically impaired rehab patients compared to historical controls. The patient population in rehab at Vidant Medical Center is ideal for a meditation study because it consists of non-experienced meditators, many with neurological damage. Recruitment and follow-up are greatly simplified in the setting of inpatient rehab because patients are onsite for the duration of the study. Patients matching the study criteria are approached for enrollment upon entering rehab and are given a brief overview of the study before consent is obtained. The mindfulness meditation app *Insight Timer* is then downloaded onto the patient's smartphone, which they will use for daily meditation. Patients are grouped according to their chief complaint: 1) chronic pain, 2) anxiety or depression, 3) trouble focusing. Patients fill out surveys before and after the study to gauge their perceptions regarding efficacy. We enrolled a total of 15 patients out of 43 approached. Of these, 9 were in the group for chronic pain, 3 for anxiety or depression, and 3 for focus. Survey

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questions were answered on a scale from 1 to 5 (1 = not at all; 5 = completely). We found that patients were "very" likely to continue using the app (4.2) and to recommend the app to a similar patient (4.1), and that most patients "completely" enjoyed the daily meditations (4.8). We found that patients in rehab were able and willing to meditate daily, and that the healthcare staff was accommodating and enthusiastic in the implementation of the project. Moving forward, we plan to expand our sample size as we analyze patient FIM scores to objectively determine the effects of meditation on functional recovery following neurological injury.

GP9

A PUTATIVE UNIPOLAR POLYSACCHARIDE IS LINKED TO THE VIRULENCE OF *BRUCELLA ABORTUS* 2308 IN MICE

Dariel A. Hopersberger[1], Joshua E. Pitzer[1], R. Martin Roop II, PhD[1], Clay Fuqua, PhD[2], Xavier De Bolle, PhD[3]

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Brucella abortus is an intracellular pathogen that causes spontaneous abortion in cattle and undulant fever in humans. To facilitate evasion of the host immune system, *B. abortus* colonizes macrophages and replicates within these cells; thus, the capacity of *B. abortus* to survive within the host relies on its ability to successfully infect macrophages. As a member of the alpha-proteobacteria, *B. abortus* is closely related to the bacterial species *Caulobacter crescentus* and *Agrobacterium tumefaciens*, which have been shown to produce a holdfast and unipolar polysaccharide (UPP), respectively. In both cases, a polysaccharide is generated at one pole of the bacterial cell and aids in its attachment to solid surfaces. While *Brucella* is known to produce exopolysaccharides (EPS), the function of these EPSs remains largely undetermined. Genes homologous to the *Agrobacterium upp* biosynthesis genes have been identified in *B. abortus* 2308. Moreover, production of a unipolar polysaccharide that reacts with the same lectin that recognizes the *Agrobacterium* UPP has recently been observed in this strain. A mutant derived from *B. abortus* 2308 lacking two of the putative *upp* biosynthesis genes, *uppC* and *uppE*, exhibits significant attenuation in mice. These findings indicate that an uncharacterized UPP plays a critical role in *Brucella* virulence.

GP10

Focal adhesion characterization during neuronal differentiation of hIPSC-derived neurons

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Neurons function in highly organized circuits. Neural circuit formation relies on neuronal localization and morphology, both of which are dependent on focal adhesions. Focal adhesions are points of contact between neurons and their extracellular matrix. Focal adhesions exhibit different states, characterized by their morphology and protein composition. These dynamic focal adhesion states alter cell function through localized signaling events. Nascent focal complexes are small, round, and contain proteins, such as alpha-actinin and kindlin, which mediate actin recruitment and promote actin polymerization. However, in the process of maturation, focal adhesions increase in size, elongate, and recruit proteins, such as vinculin and zyxin. These mature adhesions suppress actin polymerization. It is currently unknown how focal adhesions change in human neuronal differentiation. We use human induced pluripotent stem cells (hIPSCs) as a tractable model to study changes in focal adhesions within the first 120 hours of neuronal differentiation. In order to evaluate focal adhesion complexes, we use a novel neuronal progenitor cell line gene edited to express endogenous paxillin-GFP. Paxillin is a focal adhesion protein found throughout the stages of focal adhesion maturation. Additionally, we co-stained for α-actinin, a nascent focal adhesion complex protein, and vinculin and zyxin, which are recruited later in focal adhesion maturation. We also immunostained for the novel adhesion-protein coupled receptor, GPR98; GPR98 is mutated in Usher Syndrome and is implicated in autism spectrum disorders. We therefore wanted to address whether it is present at the onset of neuronal differentiation and how it impacts neural circuit formation. We used Total Internal Reflection Fluorescence microscopy to resolve discrete adhesion complexes. Within the first 24 hours of neuronal differentiation, we observe both neurite formation and elongation. These morphological changes correspond with increased focal adhesion area and maturation, as demonstrated by the increased expression of vinculin and zyxin in neurites. In neurites, only GPR98 expression continues to increase with neuronal differentiation. These results support a critical role for adhesion composition in the initial transition from neural progenitor cells to neurons. Future studies will also address how the novel adhesion protein, GPR98, regulates the process of neuronal differentiation and neural circuit formation.

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GP11

Endothelial Paracellular Gap Formation Is Regulated by G protein Coupled receptor 4 under acidic conditions.

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Background: Acidosis is a hallmark of many pathophysiological conditions such as tumor microenvironment, inflammatory bowel diseases and ischemic tissues. Research is undergoing to understand the molecular mechanism by which acidosis contributes towards these pathophysiological conditions. A family of acid sensing G protein Coupled Receptors have gained interest of researchers. Acid sensing G -Protein coupled Receptor 4 (GPR4), one of the members of the family, has been shown to be activated by extracellular protons. In this study we investigated the mechanism by which endothelial cells which express GPR4 endogenously regulate paracellular gap formation.We investigated the role of different inhibitors that influence G protein signaling and cytoskeleton structure. We hypothesize that activation of GPR4 by protons increases paracellular gap formation of endothelial cells.

Methods: Paracellular gap formation assay was conducted on Human Umbilical Vein Endothelial Cells (HUVEC). The cells were grown to a confluent monolayer. The day before the experiment the cells were treated with endothelial growth media adjusted at pH of 7.6. The cells then were treated with acidic and physiological pH for five hours. Every hour pictures of the confluent area were taken to assess gap formation and the percent of gap formation was analyzed. Inhibitors such as Thiazovivin (TA), Staurosporine (STA) and Cytochalasin D (Cyto D) were used to study the molecular mechanism using the same gap formation assay.

Results: HUVEC vector cells formed gaps under acidic condition. The percentage of gaps was ~4%. In HUVEC GPR4 overexpressed cells the percentage of gaps was higher around 12%. TA, STA and Cyto D inhibited gap formation of HUVEC cells under acidic conditions. More Actin stress fibers was observed in endothelial cells under acidic conditions compared to cells that were treated with physiological pH. TA, STA and Cyto D inhibited actin stress fiber formation.

Conclusion: Acidosis regulates paracellular gap formation in HUVEC cells. In HUVEC cells overexpressing GPR4, a greater percentage of gap is observed. Inhibitors such as TA, STA and Cyto D inhibited gap formation, indicating that acidosis/GPR4 increases paracellular gap formation by remodeling actin cytoskeleton through the Rho -associated kinase (ROCK) and myosin light chain kinase pathway. This research may pave the way for therapeutic opportunities for diseases in which inflammation is a characteristic.

GP12

Augmented Cardiac Mitochondrial Capacity in High Aerobic Capacity "Disease Resistant" Phenotype at Rest is Lost Following Ischemia Reperfusion

Musaad Bedah Alsahly, Zakari, Koch, Britton, Fisher-Wellman, Katwa, Lust

Rationale: Ischemic heart disease is a major cause of morbidity. Regular active exercise is therapeutic, but up to 70% of individual exercise capacity is due to an intrinsic genetic component. Intrinsic capacity can be studied using high (HCR) and low (LCR) aerobic running capacity rat strains. The HCR rats have been characterized as "disease resistant", while the LCRs are characterized as "disease prone". A consistent characteristic of the LCR is reduced metabolic capacity in several tissues, but metabolic capacity in cardiac tissue is not well studied in these phenotypes, particularly following the metabolic stress of ischemia and reperfusion.

Methods: 32 HCR and LCR rats animals were randomly assigned to either control (C, n = 8 each) or ischemia reperfusion (IR, n = 8 each). On each study day, one HCR/LCR pair was anesthetized and hearts were rapidly excised. In IR animals, the hearts were flushed with iced cardioplegia, and subjected to cold global ischemic arrest. Following arrest, the hearts underwent warm reperfusion. Following reperfusion, a mid ventricular ring was used to estimate infarction size, and part of the remaining tissue was transferred to homogenation buffer on ice. Isolated mitochondria were prepared and used to determine respiratory capacity under different metabolic conditions. MITO from control animals were prepared in similar fashion, but immediately following anesthesia and heart removal, and without IR. Citrate synthase activity was measured in each sample.

Results: In the control rats, HCR MITO showed respiratory rates 32% higher at rest and more than 40% higher under maximally stimulated conditions, compared to LCR MITO. After IR, resting MITO respiratory rates were decreased to about 10% in both strains, and the augmented capacity in HCRs was absent. Maximally stimulated rates also were decreased more than 50% from control, and were no longer different between phenotypes. Infarct size was not significantly different between HCR and LCR, nor was average coronary flow during reperfusion.

Conclusion: Cardiac MITO from HCR were significantly higher in control conditions with each substrate tested. After IR insult, the cardiac mitochondrial respiratory rates were similar between phenotypes, as was infract size. Relatively, the loss of respiratory capacity was greater in HCR than LCR. Together, these data could suggest limits in the extent to which the HCR phenotype might be "protective" against acute tissue stressors.

GP13

Role of Myoferlin in routing HTLV-1 envelope protein to

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viral assembly sites

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Human T-lymphotropic virus type 1 (HTLV-1), a human complex retrovirus, is estimated to infect 20 million people worldwide. About 5-10 % of HTLV-1-infected individuals are at risk of developing a pathology associated with this retrovirus. One of these diseases is called adult T-cell leukemia/lymphoma (ATLL). ATLL is an aggressive proliferation of T CD4$^+$ lymphocytes that can occur after period of persistent infection lasting more than twenty years. Individuals diagnosed with the most severe stages of the disease have a mean survival time of six months. Although HTLV-1 infects several cell types *in vitro*, CD4$^+$ T-cells are the preferential target for HTLV-1 infection *in vivo*. For HTLV-1, cell-free infection of CD4$^+$ T-cells is very inefficient. However, transmission is greatly improved upon establishment of cell-cell contacts. HTLV-1 enters and infects its target cell after binding of the viral envelope (Env) protein to a receptor complex composed of glucose transporter 1, heparan sulfate proteoglycans and neuropilin-1. Within the infected cell, Env needs to be transported to the viral assembly point to transmit virus particles to target cells. It is unclear how Env is trafficked inside the infected cells to the viral assembly point. Recently, our laboratory found that Myoferlin (Myof) is expressed in HTLV-1-infected T-cells. Myof is a protein that mediates intracellular vesicular trafficking. We found that WJ460, a Myof inhibitor, reduces HTLV-1 infection of new target cells. This drug appears to cause Env to be transported to the lysosome for degradation. The specificity of WJ460 was confirmed by knocking down Myof in infected T-cells. We hypothesize that Myof plays a role in redirecting Env from the lysosomal degradation pathway to the endocytic recycling pathway. We also hypothesize that this mechanism plays a role in routing Env to viral assembly points. Progress in addressing these hypotheses is presented.

GP14

Development of novel inhibitors targeting the serine protease, C1r, of the classical complement pathway

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The classical complement pathway mediates the phagocytosis and "pruning" of inappropriate synapses during early brain development, but aberrant activation of complement produced locally within the brain during adulthood has been linked to several neurodegenerative and proinflammatory diseases, such as Alzheimer's disease. Inhibition of the classical pathway of complement may ameliorate hallmarks of autoimmune and inflammatory disease. The serine protease, C1r, within the C1 complex of the classical pathway is a promising therapeutic target for drug development due to its upstream location within the cascade. We investigated the activity of a series of small-molecule compounds identified in a large-scale compound library screen, which were predicted to bind the C1r protease, to generate lead compounds for the development of small-molecule inhibitors. Additionally, we investigated the binding and inhibitory activity of murine monoclonal antibodies raised against C1r. Using surface plasmon resonance and ELISA-based pathway inhibition assays, we analyzed the binding affinities and inhibitory IC50s of several compounds and antibodies shown to bind and inhibit in a dose-dependent manner and, of these, have identified four lead small-molecule compounds, while the monoclonal antibodies require further study. The development of an inhibitor targeting the activation of C1 could provide valuable and novel insights for the mechanisms of C1 inhibition, as well as provide potential treatment options for diseases mediated by the aberrant activation of the classical pathway of the complement system.

GP15

Identification of a Skeletal Muscle that Retains Function During Ischemia

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Across the human lifespan, ischemia induces or exacerbates numerous skeletal muscle myopathies, leading to a loss of force producing capacity which directly contributes to reduced functional independence and a rise in mortality. Using a model of femoral artery occlusion, we found that one of the most distal peripheral limb muscles, the flexor digitorum brevis (FDB), retains capacity for normal force production despite the complete cessation of blood flow. In contrast, more proximal muscles (i.e. extensor digitorum longus (EDL) and soleus) that experience the same uniform loss of blood flow and O$_2$ tension exhibit a rapid and dramatic loss of force production. Consistent with *in vivo* findings, similar force decline occurs in EDL and soleus muscle during exposure to hypoxia *ex vivo* compared to EDL and soleus muscles exposed to normoxia, whereas the FDB muscle retains force production in both conditions. Preliminary work revealed that unlike the EDL or soleus muscles, the FDB was able to maintain the [ATP]/[ADP] ratio during hypoxia, suggesting the FDB uses unique biological strategies that govern ATP generation and/or ATP utilization during hypoxia. Using the *ex vivo* bath, we sought to dissect the contribution of different ATP generating pathways in each muscle during an acute hypoxic insult. EDL, soleus, and FDB muscles from male C57BL/6NJ were incubated with cyanide (KCN) in normoxic or hypoxic conditions to inhibit mitochondrial respiration. We found EDL and soleus muscles

exposed to KCN exhibit a rapid loss in force production apparent after 120 mins of exposure, and a compete loss after 180 mins. In contrast, the FDB shows minimal loss of force production after 3 hours. To assess glycolysis, we exposed EDL, soleus, and FDB muscles from male C57BL/6NJ to 3-bromopyruvate (3BP) under normoxic or hypoxic conditions. Exposure of all three muscles to 3BP accelerates force loss in hypoxic conditions with almost a complete loss in force production after 90 mins. Glycogen content was assessed in all three muscles. FDB glycogen content is 184% higher than the EDL, but not different than the soleus muscle, suggesting the FDB ATP generating capacity is largely dependent on glycogen and glycolytic flux when compared to other peripheral muscles. Collectively, the data suggest that the FDB is resistant to ischemic or hypoxic insults in part because it does not appear dependent upon mitochondrial fitness to retain function compared to muscles such as the EDL or soleus.

GP16

Identifying the Ideal Marker Placement for Lung Tumor Tracking

Wesley Andrew Belcher

Mentors: Jae Won Jung (ECU Physics) and Andrew Ju (Brody School of Medicine)

The CyberKnife Synchrony system is used to track tumor motion throughout the breathing process. This is done using gold fiducial markers and two orthogonal x-rays. The synchrony system tracks the gold fiducial markers, which are bracketing the tumor, and relates their centroid to the tumor location. This study is looking to identify the ideal location for gold fiducial marker placement to ensure the tumor is tracked properly. The tumors Gross Tumor Volume (GTV) was contoured as well as each fiducial. Once contoured, post processing was done to the objects to eliminate any noise or pixels that were not the object. This was done in MATLAB using a mask procedure and a range of values the pixels should have. Now, the center of mass was found for every fiducial marker and the GTV. These centers of masses were used to determine the distances between each fiducial and the GTV. The discrepancy between tumor motion and fiducial motion was noted. This was found by looking at the maximum and minimum distance between the fiducial and tumor. A threshold value of 2.5 mm was used for this discrepancy to determine which fiducials tracked the tumor well and which fiducials did not. If the discrepancy was less than 2.5 mm the fiducial was deemed to track the tumor well, otherwise it was considered a bad tracking fiducial.

From the preliminary data it is seen that not all fiducials accurately move with the tumor. It would appear the closer the marker is to the tumor the better it tracks. A two-mean t-test was conducted with a p-value of 0.03. Four bad fiducials were excluded from the statistical calculations because they were found to be outliers. Three of the outliers were on the lower end and one outlier on the upper end. Outliers were distinguished using the interquartile range (IQR) and the third and first quartile. $Q_{3/1} \pm 1.5*$ IQR was used to find the range of values that were not outliers. Better placement is necessary to ensure proper tracking and thus proper dose distribution. The more accurate a treatment can be the better the chances of survival are for the patients. The preliminary data would suggest that markers should be placed closer to the tumor when possible.

GP17

Protection and sensitization of human cells to proton radiation by metallic nanoparticles

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Increasing the efficacy of radiation therapy for the treatment of cancer has been widely explored using radiosensitizers to enhance tumor cell killing and reduce the effective radiation dose to healthy tissue. In our current studies, sensitization of malignant prostate and breast epithelial cells to charged particle radiation by metallic nanoparticles is investigated. In these experiments, malignant cells grown in the Cell Culture Laboratory in the Department of Biology are treated with various metallic nanoparticles, and then are irradiated in vitro with 1.5-MeV protons in the ECU Accelerator Laboratory in the Department of Physics. The sensitizing effect of the nanoparticles is subsequently assessed by metabolic and clonogenic assays on the irradiated cells.

Our studies have focused on the radiosensitization and radioprotection effects of gold and cerium oxide nanoparticles in the range of 1 to 20 nm, and current experiments explore sensitization of the tumor cells to 15-nm PEG-coated gold nanoparticles. In addition to expanding the range of nanoparticles, upgrades to the experimental system include a redesigned cell irradiation beamline with upgraded high-vacuum hardware and enhanced beam control for more precise radiation dosimetry.

GP18

Matrix ATP Free Energy Directly Blunts Respiratory Flux in Leukemic Mitochondria

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Background: Intrinsic, cancer-specific, bioenergetic signatures has been widely overlooked as a potential gateway

for the discovery of cancer-specific therapeutics. When considering these phenotypic changes, mitochondrial diagnostics is a powerful tool for unravelling the mechanisms which govern these alterations in mitochondrial function. Understanding these underlying mechanisms in cancer is important for identifying drug targets for the implementation of effective new therapeutics. Previous unpublished work from our lab has demonstrated that extramitochondrial ΔG_{ATP} is capable of blunting mitochondrial respiration in leukemic mitochondria, and additionally, in many non-leukemic cancers. The purpose of this study was to understand the mechanism behind these observed effects, and to potentially identify target proteins which may be involved.

Methods: Experiments were conducted in isolated mitochondria and permeabilized cells using leukemia cell lines (MV-4-11 and HL-60). High-resolution respirometry and fluorescence spectroscopy were employed to test multiple experimental conditions in the presence or absence of physiological ATP free energy (ΔG_{ATP}) to understand specific mitochondrial complexes and proteins affected by ATP free energy.

Results: Results revealed that physiologically relevant ΔG_{ATP} caused a dose-dependent decrease in mitochondrial respiration stimulated by the uncoupler FCCP, indicating ΔG_{ATP} is capable of blunting respiratory flux in leukemia. Inhibition of ANT with the chemical inhibitor carboxyatractyloside (CAT) rescued mitochondrial respiration in the presence of extramitochondrial ΔG_{ATP}, indicating that respiratory inhibition, caused by ATP free energy, requires ANT to establish a matrix ΔG_{ATP}, In addition, using TMPD as a complex IV substrate in the presence of ΔG_{ATP} revealed that complex IV activity is directly affected by this mechanism. Likewise, using fluorescence spectroscopy to assess JH_2O_2 emission with DHO (dihydroorotate) as a substrate in the presence of ATP free energy revealed that either DHOD (dihydroorotate dehydrogenase) was directly affected by this mechanism, or that electron transport up to complex III from the ubiquinone pool was blocked in the presence of ΔG_{ATP}.

Conclusion: The findings of this study suggest that mitochondrial matrix ATP influx is upregulated in cancer cells and that this contributes significantly to the phenotypic changes seen in cancer cell mitochondria.

GP19

Dopamine Receptor Expression in the Human Spinal Cord

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Introduction: Dopamine (DA) is a pivotal neurotransmitter and neuromodulator in the spinal cord, and a dysfunction of the DA system is thought to be implicated in in the sensory and movement disorder Restless Leg Syndrome (RLS). The actions of DA are mediated by two classes of dopamine receptors, D1-like (D1 and D5) and D2-like (D2, D3, and D4). All five DA receptor subtypes are expressed in the rodent spinal cord, but only three are found in the nonhuman primate (D2, D3, and D5). Using immunohistochemistry, we probed for all five DA receptors in the human spinal cord, particularly in motoneurons that drive leg movements, and for tyrosine hydroxylase (TH) and dopamine transporter (DAT).

Methods: Fixed spinal cord segments (lumbosacral) were obtained from the Brody Medical School Anatomy Laboratory. Tissues were embedded, sectioned at 5 μm, mounted on slides and subject to de-paraffinization, antigen retrieval, blocking and antibody exposure, including negative and peptide controls. We used the following primary antibodies: D1: (ab40653), D2: (ab150532), D3: (ab42114), D4: (bs1746r), D5: (bs1747r), Tyrosine Hydroxylase (ab112), and the dopamine transporter DAT (ab5990). Slides were imaged using the Keyence BZ-X microscope at 2x to create a full cross-section view of the tissues. A higher magnification of 40x was used to show the distinguishing features of DA receptor, DAT and TH expression in motoneurons (MNs).

Results: Contrary to the data from nonhuman primates, and in line with mouse findings, we found strong expression of all five DA receptors in the human spinal cord and in motoneurons. D1 expression was strongly expressed in the ventral horn and in MNs. Similarly, D2 and D3 were also highly expressed in the ventral horn with slight spatial differences to D1. D4 staining was weak but present, while D5 was widely expressed in the spinal grey matter.

Conclusion: This study is the first to show the presence of all five DA receptors in the human spinal cord. These findings support the concept that DA can target different receptor subtypes not only on the brain but in the spinal cord as well.

GP20

Prenatal supplementation influences the response to the antiandrogen vinclozolin in the placenta and fetal liver

Ariel Fricke, Olivia Nieto Rickenbach, Alana Rister, Ciro Amato, Krista McCoy

Endocrine disrupting chemicals (EDCs) are pollutants that alter endocrine system function which can induce tissue specific changes. For example, long term fetal exposure to vinclozolin, an antiandrogen induces histopathological changes in the placental labyrinth, the site of maternal-fetal exchange, and decreases placental weight. Preliminary data from our laboratory also suggests that the fetal liver is affected by vinclozolin exposure. Both tissues are important for protecting the fetus from contaminants so their sensitivity to endocrine disruption could lead to further systemic effects on the fetus. Yet, there is no accept-

ed prenatal supplement to protect the developing fetus from pollutants. Sulforaphane has been proposed as a trans-placental prenatal supplement that can protect the fetus from pollutants via Nrf2, a transcription factor that upregulates detoxifying and antioxidant enzymes. This project aims to investigate the protective effects of sulforaphane on placental and fetal liver function in vinclozolin exposed embryos. We tested the hypothesis that supplementing with sulforaphane changes Nrf2 responsive proteins and decreases the effects of vinclozolin exposure. We exposed wild type and Nrf2 knock out fetuses, via maternal gavage, to vinclozolin (V), vinclozolin and sulforaphane (V+S), sulforaphane alone (S), or corn oil (CO) from embryonic day (E) 13.5 to 16.5. On E16.5 we humanely euthanized the dam and embryos and collected placentas and fetal livers. Proteomics was conducted on five placentas and four livers per treatment. From the initial proteomics data set we compared KO and WT individuals within each treatment and identified Nrf2 responsive proteins across all treatments in the placenta and the liver. We then compared the quantity of these focal Nrf2 responsive proteins among WT individuals across the four treatments. Investigating these proteins will help us understand the protective mechanisms induced by prenatal supplementation with sulforaphane.

GP22

A regulatory network that maintains the differentiating cell state in *C. elegans* germline

Matthew Gaddy, Zhongqiang Qiu, Myeongwoo Lee, Myon Hee Lee

A firm grasp of how stem cells commit to an irreversible fate has long eluded the field of stem cell biology and tumorigenesis. The long-term objective of our research is to understand the molecular mechanisms of how differentiating cells maintain their state and are terminally differentiated into desired cell types *in vivo*.

Using *C. elegans* germline as a model system, we previously demonstrated that PUF-8 (a PUF RNA-binding protein) and LIP-1 (an ERK phosphatase) are required to maintain differentiating cell state and prevent the return to proliferative cells, resulting in germline tumors (Cha et al., 2012). In this study, our *in vivo* physical and molecular mapping showed that the differentiation/dedifferentiation fate is determined in the early meiotic germ cells and committed in the spermatocytes. A focused RNAi screening has identified CGH-1 (a DEAD-box RNA helicase) as a critical regulator for the maintenance of differentiating cell state in the early meiotic germ cells. Genetic analysis demonstrated that non-phosphorylated CGH-1 maintains the differentiating cell state, but active MPK-1 (an ERK homolog) promotes the dedifferentiating-mediated tumorigenesis by CGH-1 phosphorylation. These results suggest that a regulatory network including RNA regulators (PUF-8 and CGH-1) and MPK-1(ERK) controls the maintenance of differentiating cell state in the early meiotic cells.

GP23

The Effects of a Distracted Jump Landing Training Protocol on EEG and Lower Extremity EMG

Brittney Nicole Purcell, Callie Herman, Dylan Sampson, Ashlyn Warren, Chris, Mizelle, Nicholas Murray, Patrick Rider

Previous research has found that lower extremity injuries are predominant in athletes. It has been identified that poor landing mechanics are a strong contributor to the rates of knee and ankle injuries. Jump landing protocols have attempted to address these concerns pertaining to injuries caused during landing and have had some success. Electroencephalography (EEG) of motor learning has been researched through simple motor tasks, however, there is limited research on EEG of complex motor movements. The previous research has shown changes in EEG after repetition of the task. The question, however, becomes after training, will we still see an increase in landing mechanics during intense situations? During intense situations, such as during a game, the athlete's attention is typically on the goal of the game and not on things such as landing mechanics. We want to train athletes in the presence of a distraction to put them in a game-like mindset and observe changes in neural control mechanisms with response to this training. Purpose: The purpose of this study is to assess the effects of a distracted jump landing training protocol on EEG and lower extremity EMG. Methods: EEG of each participant will be taken during pre and post testing, which will occur before and after the 8-week training program and will incorporate 4 conditions, two with distractions and two without. Electromyography (EMG) of the biceps femoris, lateral gastrocnemius, tibialis anterior and the vastus lateralis will be taken of the participant's dominant leg. Force plate data and 3D motion capture will also be taken during the pre and post-testing. Results: It is expected that EEG during the focused tasks, where the participant is focused on their landing, will show higher event-related desynchronization due to the lack of distraction present. It is also expected that there will be measurable change in lower extremity EMG after the training to show better muscle activation.

GP24

Early Metabolic Syndrome (MetS) in Chronic Rhesus macaque Model of Human Allergic Asthma

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Human asthma, obesity, MetS, overt Type 2 diabetes, and

related sequelae, account for much of the mortality and morbidity worldwide. The etiology and complex physiological mechanisms underlying these pathological states intersect within the human body – and within Rhesus macaques. Much like humans, these animals (in captivity) often develop spontaneous, age-related obesity.

In 2013, 20 animals were sensitized by i.p. injection of house dust mite antigen (HDM) adsorbed to alum; airway sensitization and maintenance were accomplished by exposure to aerosolized HDM (aeroHDM) at ≥ 2-week intervals, to a dose that induced an acute asthmatic response. Periodically, we assessed the late phase asthmatic response 24 hours after aeroHDM exposure: airway hyperreactivity was assessed by aerosolized methacholine challenge; pulmonary inflammation was assessed by bronchoalveolar lavage.

In 2018, 10 animals had developed obesity and were suspected to harbor other clinical manifestations of MetS. Retrospective analyses confirmed relative hypertension in animals that had robust responsiveness to aeroHDM and were > 16 kg. Using archived frozen serum samples, we reconstructed the biochemical history of adiposity development and glucose metabolism. By age 10 years, 4/5 of the largest animals (body weight, 21 ± 2 kg; waist circumference, 68 ± 5 cm; BMI using crown-to-rump length, 53 ± 3 kg/m^2: values are mean ± SD) had insulin resistance (peak HOMA-IR, 61 ± 29) associated with leptin > 14 ng/ml and total adiponectin < 3.5 μg/ml; 3/5 animals had dyslipidemia; 1/5 animals had diabetes by age 8 years – 4 to 6 years earlier than would be expected based on non-human primate literature.

In July 2019, six months after switching to a lower carbohydrate/higher protein diet, and > 12 months since the last aeroHDM exposure: all animals lost weight coincident with larger animals resolving IR, dyslipidemia, and diabetes. As seen in some obese asthmatic humans, larger animals had higher pulmonary inflammation and higher airway hyperreactivity to aerosolized methacholine.

We concluded that chronic allergic inflammation synergized with inflammation of developing adiposity, accelerating onset of MetS in susceptible animals. We hypothesize that resumption of chronic periodic aeroHDM exposure will trigger more rapid progression/re-establishment of MetS, IR, and eventually overt Type 2 diabetes if we do not intervene.

GP25

Treatment of Aggressive Behaviors in an Elementary School Student with Autism Spectrum Disorder

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People with Autism Spectrum Disorder (ASD) can exhibit many negative behaviors that their families, teachers, and other supporters find extremely dangerous and exceptionally challenging to deal with. These negative behaviors, such as aggression and self injury, repetitive motions and obsessions, self stimulatory behavior, and the constant inability to accept change negatively affects many aspects of their daily lives. These include relationships between siblings and peers, relationships with extended family members, community participation, participation in religious activities, the quality of home routines, and accessibility to inclusive educational settings (Hart, 1995; Turnbull & Ruef, 1997). J.S. is a seven - year old, African American male student in my work environment who has been diagnosed with ASD, Attention Deficit Hyperactivity Disorder, and Mixed Receptive and Expressive Language Disorder. J.S. currently exhibits many challenging behaviors which are aggressive in nature, such as: hitting, or striking himself or another person in the face with an open hand, hair pulling (i.e. grabbing, pulling, or yanking the hair of another), and scratching (i.e. using ones' nails to dig into or puncture the skin of another). Functional assessments were used, including record reviews, direct classroom observations, and a functional analysis, to determine why these aggressive behaviors were occurring, and to determine which interventions might serve as remedies to these problem behaviors. Upon completion of the functional analysis, noncontingent reinforcement (NCR) was implemented in which J.S. received access to varied reinforcers on a fixed interval schedule. Although initially the intervention seemed to be working, the results of this study were inconclusive. J.S.'s attendance was very sporadic, and he eventually moved to another location before we were able to experimentally demonstrate that the behavior change was due to the NCR program. This study demonstrated the importance of determining the function(s) of aggressive behaviors exhibited by an elementary school student by using data retrieved from functional assessments to guide intervention solutions.

GP26

A Critical Analysis of Picture Books About Starting School

Victoria Marie Anderson & Elizabeth Swaggerty

In an attempt to distribute age-appropriate, quality picture books about starting Kindergarten to families in a predominantly Black community, two issues emerged: books about starting school very rarely featured a main character of color, and there were a large number of books that conveyed an overarching feeling of anxiety about starting school. Thus, the researchers engaged in a systematic analysis of picture books about starting school in the database NoveList Plus and available at the local public library and/or the university library. The majority of the main characters of the book selection were either White or animals; books with a Black main character were in the slim minority. About half of the books featured anxious characters. The literature shows that excluding minority main characters marginalizes them and sends the messages that school is not the place for them. Moreover, with an emphasis on anxiety, books about starting school

could potentially create a problem where there is none or reinforce a negative view about school. Starting school is an important milestone in a child's life, books that show diverse main characters and portray school as a positive experience help families prepare their children for the beginning of their formal education.

GP27

School-University-Community Partnerships: Examining the Impact of School-Based Mental Health Programming in Rural Communities

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The link between adverse childhood experiences (ACEs) and negative outcomes such as depression, unintended pregnancy, alcohol and drug abuse has been examined over decades (Centers for Disease Control and Prevention, 2019; Crouch et al., 2020). Scholars assert that preventing or reducing the recurrence of ACEs may significantly decrease physical and psychological consequences that arise in adulthood (Schofield et al., 2018). In rural communities, factors such as educational background and socioeconomic status exacerbate the occurrence of ACEs (Crouch et al., 2019). Additionally, scholars have found that exposure to one or more ACEs is more common in children who identify as Black and/or Hispanic (Slopen et al., 2016). Further, children who are impacted by ACEs may have decreased reading ability, lower grades, increased absences, and lower graduation rates (Delaney-Black et al., 2002; Hurt, Malmud, Brodsky, & Giannetta, 2001).

This poster presents a mixed-methods pilot study of a school-based mental health approach in one rural eastern NC school. In this study, researchers explore the extent to which the approach, the Matrix of Collaborative Action for Resiliency in Education (CARE), alleviates the educational impact of ACEs. The Matrix of CARE provides mental health training and services to community stakeholders and in doing so, supports the importance of student-teacher relationships for those students who have been impacted by ACEs (Forster et al., 2017; Boullier & Blair, 2018). The Matrix of CARE framework utilizes a trauma-focused cognitive-behavioral intervention program titled Bounce Back™ (BB, https://bouncebackprogram.org/). BB is designed to reduce students' symptoms of post-traumatic-stress, depression, and behavioral problems, as well as to improve students' grade attainment, school attendance, and coping skills. Through the collection of individual student outcome data, pre-post surveys, and focus groups with multiple stakeholders, researchers are examining changes in students' behavior, attendance, educational performance, and coping skills. Initial findings from focus groups indicate that there have been several positive outcomes of the Matrix of CARE among teachers, parents, and students.

GP28

MSA Service Leadership Project - Spring in 2 Reading: Engaging the community to improve literacy at an eastern NC elementary school

Randall August Meisenhelder

I glance out the window; the time is 1:15. On this unseasonably warm eastern NC January day, a few baby birds play under the protection of a well-shaped holly bush that rests beneath a crepe myrtle that lost its leaves long ago. They are too young and naïve to know the warmth and security provided them is premature; soon the youngsters will shiver in the cold of accountability: high stakes and low temperatures are equally unforgiving.

Though the meditative moment seems long, less than a minute later something catches my eye. Usually at this time of day I help a 3rd grade class, but they are testing to see if they have progressed since taking last month's test. An aging black truck, driven by a man I can only describe as a jolly grandpa, pulls in the parking lot. I figure he is coming to sign a child out to go to an appointment or to get ice cream. I am wrong.

He pulls to the cones, turns off the engine, and begins reading.

How odd. Perhaps his clock is wrong. I type an email to a kindergarten teacher; we are both concerned because students are already behind. Many of them came to school already behind. More cars catch my eye. They, like the jolly grandpa, pull into the single-file lane behind the cones and park. My mind initially muses, "Well, this is great! Parents and guardians eagerly pulling into the parking lot; they cannot wait to greet their learners!"

Then, I realize it is 1:35. Dismissal occurs at 2:40.

As moments pass, they look more like bored relics. No movement. No emotion. No engagement.

My principal walks in. I ask, "What in the world are all those people doing? They're just parked in the parking lot. Waiting." "Uh, yeah." She replies, staring at me blankly. "You've never seen the afternoon car rider line? This happens every day." I cannot respond. I'm dumbfounded.

I cannot shake the scene. Days later, I ask my principal, "What if we invite them in?"

My project aims to increase community volunteers in an eastern NC elementary school. I began by inviting the early-arrivers to come inside and read to children (after a background check). Many of them smiled sincerely, appreciative of the offer. Most were as dumbfounded as I was when I first saw them parking. I do not know whether this will flop or succeed, but I'm excited to give it a try. Our kids need help, and we have help sitting outside.

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They cannot be like the birds; swallowed up by the bitter cold they do not know is approaching. We will ensure they have the skills to make it.

GP29

The Judicialization of Student Conduct and its Impact on Practitioners

Valerie Beth Glassman

The phenomenon of stress and burnout in college student affairs administrators has been deeply studied over the last 30 years (Howard-Hamilton, Palmer, Johnson, & Kicklighter, 1988; LaVant, 1998; Marshall, Gardner, Hughes, & Lowery, 2016; Mullen, Malone, Denney, & Dietz, 2018; Rosser & Janivar, 2003). However, there is no research on how stress, specifically as a result of the encroachment of lawyers into the student disciplinary process, public scrutiny, and a return to legalistic language, impacts practitioners of student conduct.

However, the impact of concerns about litigation, particularly as it relates to medical malpractice stress, has been extensively studied in various settings around the world (see, for example, Arimany-Manso, Vizcaíno, & Gómez-Durán, 2018; Charles & Kennedy, 1985; Fileni et al., 2007; Martin et al., 1991; Wilbert & Fulero, 1988; Youngberg & Soto, 1990). These reports, both qualitative and quantitative in nature, capture important data about the reactions physicians experience when faced with a potential lawsuit and provide insight into changes they have made in their daily practice with patients in attempt to avoid such litigation in the future. In the realm of student conduct practice, no such studies have yet taken place.

The present study will consider how physicians have responded to malpractice litigation and frame the concern of critogenic harms in the realm of practitioners of the college student disciplinary process. Early data analysis from a survey of 350 student conduct administrators and interviews of 7 such practitioners show strong parallels between their emotional, psychological, and physical reactions and those of sued and non-sued doctors across various medical specialties. Using an action research plan, this study examines the self-reported experiences of student conduct practitioners and evaluates evidence-based approaches used by physicians to relieving litigation-related stress and reducing the impacts of "judicialization." A full-day workshop, modeled on a "physicians' litigation retreat," presented at the annual meeting of student conduct administrators, will address promising practices linking the medical literature to student conduct practice and connect theoretical frameworks to actionable strategies for combatting judicialization's impacts on the professional work and personal lives of these student affairs administrators.

GP30

EXAMINING THE EFFECT OF A SOCIAL EMOTIONAL FRAMEWORK AT A HISPANIC MAJORITY MIDDLE SCHOOL

Ryan Jerome Ewell

Close attention must be given to the social emotional needs of students in Hispanic majority schools to ensure positive academic achievement, thus bridging the achievement gap and creating educational equity for all students. While ideologies centered by Durlak, Weissberg, Dymnicki, Taylor, and Schellinger, (2011) around Social Emotional Learning, or SEL, have been around for nearly two decades, there seems to be a renewed interest among educators, parents, and various educational leaders in the contemporary world. Educational leaders are now interested in attempting to incorporate SEL frameworks into student learning in the hopes of producing more well-rounded students who excel both inside and outside of the classroom. SEL frameworks can be described as a system within schools that focuses on the development of the skills children need to understand and manage emotions, become self-aware and self-regulated, develop an understanding of others, create positive relationships, and problem solve (Church, 2015). The study to be conducted aims to provide evidence of the effectiveness of implementing a social emotional learning framework in a predominantly Hispanic majority school. The study is primarily based upon the notion that if implemented with fidelity, a social emotional learning framework would decrease discipline referrals and boost academic achievement for students in a predominantly Hispanic majority school. When implemented with fidelity, SEL could potentially have a positive effect in schools with a majority Hispanic population, thus boosting academic achievement while creating equity by decreasing discipline significantly in the schools in which they learn (CASEL, 2017). With this being said, for educational leaders to better meet the needs of Hispanic students under their supervision, implementation of a school-wide SEL framework may be appropriate.

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GP31

Investigating the Difference between FEA on Tibial 3D Models and 2D Cross-sections

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Patricia Joyce Malcolm, Mara Thompson, Dr. Ali Vahdati, Dr. Stacey Meardon, Dr. Stephanie George

Running is an activity that has gained popularity for its physical and mental benefits. While running, the tibia is subjected to repetitive forces which can result in bone stress injuries (BSI) [1]. Runners commonly experience BSIs in the tibia, which is the predominate site for BSIs [1]. The severity of the injury dictates how long the recovery time is, however, it is suggested that the patient waits 2-6 weeks before resuming normal exercise activities. Surgery may be required if the patient continues to experience pain or if the BSI increases in magnitude [2]. Computational methods such as finite element analysis (FEA) are used to better understand mechanisms for BSIs, and thus propose interventions. The objective of this study is to perform FEA on two-dimensional (2D) models and compare the results to three-dimensional (3D) models produced from the same subjects. FEA is a tool that is used for finding the stress caused from applied loads, how those stresses alter the mechanical properties of the bone and how the bone distributes stress [3]. FEA can be performed on a 2D cross-section of the tibia by using the program VA-BATTS within MATLAB, however, FEA is typically performed on 3D models. While 3D models are used more frequently, there are drawbacks, due to the method being time consuming and potentially computationally expensive. The focus of this study is to produce and compare the stress values collected from FEA on 3D models and 2D cross-sections and determine if the difference between the results are statistically significant. If the difference is not significant, then it is beneficial to perform tibial FEA studies on 2D cross-sections instead of on 3D models. It is expected that this study, comparing methods of FEA, will contribute to the study of tibial stress.

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GP32

Maximizing the Power Absorbed by a Oscillating Wave Surge Converter using Predictive Control Systems

Landon Spencer Sugar - Student

Dr. Tarek Abdel-Salam - Mentor

The steep surge in gas and oil prices and increased usage of harmful fossil fuels have been mitigated in the last few decades with the help of renewable energy.
An oscillating wave surge converter (OWSC) is a renewable energy device that can convert the horizontal particle motion of ocean waves into usable mechanical energy. A control system is a device that can be used to improve the performance of an OWSC. Due to its infancy, a common challenge with OWSCs can be found in the area of maximum power absorption from an incidental wave. Since the ocean consists of polychromatic waves, the need is for a device that maximizes energy absorption by optimizing ocean wave-OWSC interaction. Using a model predictive control (MPC) system, OWSCs can read and respond to real-time environmental changes, and make geometric and hydrodynamic changes, so that maximum power absorption can occur. Increasing the power absorbed by the OWSC can be completed by adjusting the angle at which the wave strikes the device, maintaining a surface piercing flap, and adjusting the width of the flap. The MPC system will be developed using MATLAB/ Simulink, with the reference input being numerical values of the current sea state. These input values will be used to determine the power available in the incoming wave as well as its approaching angle. To which, the OWSC will begin making geometric adjustments such as yaw, heave, and flap width adjustments. WEC-Sim, a MATLAB-based numerical model for solving OWSC system dynamics, will be used to model the system's performance by providing information such as flap position, velocity, acceleration, and other forces. This information will help determine the power output from the OWSC, which will be compared to the power available in that respective wave to determine the device's efficiency.

GP33

THE EFFECT OF PERIVASCULAR TETHERING ON ARTERIAL WALL MECHANICS

Fatama T. Huda , Anup D. Pant, PhD, Ali Vahdati, PhD

Blood vessels contract and expand in response to mechanical loading during each cardiac cycle. Alteration in the mechanical responses of the vessel wall is one of the indicators of cardiovascular diseases such as atherosclerosis and hypertension. Hence, it is essential to understand the mechanical environment of the vasculature for the improvement of the clinical prediction of cardiovascular disease. Recent studies [1,2] have found that the vascular mechanical environment is influenced by the tissue encompassing vascular wall. Computational models have been previously developed to study the mechanical influence of perivascular tethering [1]. However, previous studies are primarily focused on the aortic region. As the mechanical environment changes locally in the vascular system, it is important to understand the influence of perivascular tissue in other vascular regions. Therefore, in this study, using a computational approach, we investigated

the effect of the structure and the mechanical properties of the surrounding tissues on the carotid wall mechanics. A plane-strain finite element model was constructed to study how the deformation and mechanical stress of carotid artery change when encircled by the surrounding connective tissue with different mechanical properties. Besides, vein and nerve were included along with the carotid artery and surrounding tissue for the better prediction of the mechanical responses. We found that the perivascular tethering with different material properties have a unique influence on carotid wall deformation and the stress developed in it. Thus, the outcome of our model will help to predict mechanical responses of the vessel wall, which may assist in assessing vasculature function at normal or disease state.

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GP34

Correlating Arteriovenous Fistula and Pulmonary Artery Hemodynamics Using MRI and Computational Fluid Dynamics

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More than 15% of US adults suffer from chronic kidney disease. This condition leads to impaired renal function and, if unaddressed, can develop into end-stage renal disease (ESRD), which affects diabetic, African-American, Hispanic, and elderly patients at higher rates. Hemodialysis, which generally requires the creation of an arteriovenous fistula (AVF) in a patient's forearm, is one treatment currently used for ESRD patients; however, this method has recently been suggested to promote development of pulmonary hypertension (PH) in these individuals. Once an individual develops PH, they are removed from the kidney transplant list and often become totally dependent on hemodialysis. The objective of this project is to better correlate AVF and pulmonary artery (PA) hemodynamics in ESRD patients so physicians may better understand the physiological impact of AVF creation. Adult ESRD patients undergoing dialysis are currently undergoing cardiac magnetic resonance imaging (cMRI). These images are being used to create patient-specific computational fluid-structure interaction models of PAs that account for both fluid flow and vessel wall deformation. While a small number of studies have included fluid-structure interactions in their models, no existing study has accurately modeled the PA walls as a hyperelastic material. This study will utilize a 3rd order Yeoh model to predict vessel wall deformation in ANSYS Mechanical (ANSYS, Inc.). Additionally, blood is being modeled as a non-Newtonian fluid using a Carreau model and transient flow rates derived from the cMRI sets. This coupling of fluid and solid dynamics allows for a higher fidelity model to be generated, which may lead to more insightful results detailing how PA hemodynamics change in ESRD patients undergoing dialysis. These results will also shed light on the effects of certain assumptions, such as constant fluid viscosity, and simplifications, such as the omission of wall mechanics and deformation, commonly used in computational modeling. It is hoped that an enhanced understanding of AVF blood flow and its connection to eventual PH development will lead to subtle but effective changes in ESRD management. Eventually, these changes may reduce the PH incidence rate in this population and allow more individuals to remain on the kidney transplant list, promoting improved healthcare outcomes and reduced health disparities for these patients.

GP35

Orthrus – Gryphon Subbase (Re-Evaluate for Cost Reduction towards Production)

Nathan Quinn Godsey

Let's take a moment to consider some of the main priorities of all tree care and utility companies. Most would agree that safety is top priority. Efficiency and productivity are other aspects of the job considered when accepting jobs for the week, as well as the return on investment of equipment and personnel resources directly affecting a company. All of these priorities factor into the overall success of a company. With these elements in mind, Altec engineered Heartland, a unit designed to allow operators to cut limbs safely without ever having to leave the ground or touch a piece of the tree. During an analysis, it was found that a large percentage of Effer model trucks had a number of issues due to the remarkable size of the subbase that sits on the chassis of trucks. The amount of welds and complexities created obvious warpage calling for action. The action that was taken into effect was the redesign of the product. The objective of this project is to re-design the product in a manner that helps reduce the cost of product as well as mitigate warpage issues.

GP36

Sarcoidosis and Obesity: Systematic Review and meta-analysis

David Wainaina Wambui

Background: Sarcoidosis is a systemic inflammatory disease characterized by epithelioid granuloma formation in

various organs. The etiology of sarcoidosis is unknown. Several studies report an increased risk of sarcoidosis in obese patients. The purpose of this study is to conduct a systematic review to assess the risk of sarcoidosis in obese or overweight patients, and to provide a population-based estimate of the risk of sarcoidosis in obese and overweight individuals.

Methods: Using the Preferred Reporting Items for Systematic Review and Meta-analysis Protocols (PRISMA) guidelines, we conducted a comprehensive search of studies (Randomized control trial (RCT), cohort or case-control) studies that estimated the risk of sarcoidosis with body mass index (BMI) between 2009-2019 using keywords and MESH terms related to obesity and sarcoidosis. The search was conducted in MEDLINE, EBSCO, and CINAHL. Three independent investigators reviewed each article and assessed for bias. Data was extracted from each study that met inclusion criteria. Quantitative analysis was performed using Review Manager 5.3 software.

Results: An initial search yielded 77 potential articles; 73 articles did not meet inclusion criteria and 4 were included in the final analysis. The pooled risk estimate for the incidence of sarcoidosis in obese and overweight individuals was 1.68 [95% confidence interval 1.5 -1.87] with a significant statistical heterogeneity, I^2 of 92%.

Conclusion: From our systematic review, obese and overweight individuals have a 68% (RR 1.68, 95% CI 1.50 to 1.87) increased risk of developing sarcoidosis in comparison with normal or underweight individuals. More studies are needed to further evaluate the role of obesity in the etiopathogenesis of sarcoidosis.

Keywords: Sarcoidosis, Obesity, Pulmonary

GP37

Collagen Supplementation in the Athletic Population

Mitchell Coles Hanks, Alexander Durland, John Willson

Objective:

Among the various health claims surrounding Collagen supplements, research has begun to examine its potential effects regarding performance and recovery of active individuals. The purpose of this Literature Review is to examine current research regarding the effectiveness of collagen supplementation for enhancing tissue healing and reducing pain following performance or injury in the athletic population.

Methods:

An initial keyword search in PubMed database found 709 relevant articles with the search terms {"athletes" and "collagen"}. Articles were sorted by "best match" and filters of "within 5 years" and "English" were used. A second search using keywords {"activity-related" or "muscle damage" and "collagen"} and also sorted articles by "best match" and filters of "within 5 years" and

"English" to produce 29 articles. A total of 11 articles were selected from the previous results for further analysis. The following articles were grouped according to observed effects and examined for level of evidence (LOE) with the aid of the following chart. A CBEM level of recommendation was given based on the group of articles and their respective LOE.

Results:

Within the 11 articles, 436 total subjects were involved regarding the use of collagen supplements. The articles can be grossly combined into groups examining how Collagen supplementation influences; nutritional influence for injury prevention and return to play, joint related effects, resistance training, effect on synthesis and cellular processes, and surgical ideas for future research.

Conclusion:

The interest in collagen supplementation as a nutritional supplement to athletes is growing, with research presenting potential effects on injury prevention, recovery, performance, and rehabilitation associated with athletes. The effects of collagen supplementation following exercise could further apply general recovery for athletes following an event, not just following injury or pathologies. Physical performance is known to be influenced by nutritional interventions, but no evidence strongly supports use of collagen as a supplement at this time. Further research is indicated to examine the potential effects of collagen as a nutritional supplement for athletes to enhance performance and injury recovery/prevention.

GP38

INJURY PREVENTION IN PRE-COLLEGIATE FEMALE GYMNASTS UTILIZING THE GFMT AND IMPAIRMENT SPECIFIC TRAINING

Faith Johnson, SPT, Shelby Muehlenthaler, SPT, Sarah Johnson, PT, DPT, OCS, COMT, CMTPT

PURPOSE: Gymnastics is a worldwide sport that requires a sufficient balance of strength, flexibility, balance, coordination, and agility. Due to the complexity of the sport and varying events, risk of injury can be elevated. Research has been able to describe common injuries by location, events, and the athlete's level. The purpose of this study is to determine: 1) if injury history correlates with score on the Gymnastics Functional Measurement Tool (GFMT); 2) if use of the GFMT is successful at screening female gymnasts; and 3) if implementing impairment specific rehabilitation into the gymnast's individual training and conditioning regime helps prevent future injuries.

METHODS: 23 subjects on the competitive team at an Eastern North Carolina gym were asked to participate in this study. Ages range from 6-18 years old with USAG competitive levels ranging from 4-10. Participants with a current injury were excluded. Parental consent and child assent were obtained before participation. Each partici-

pant was given a questionnaire asking for their name, age, height, weight, number of years participated in gymnastics, current level of competition, current weekly training schedule, and any prior injuries within the past 3 months. Once returned, a code was assigned to each gymnast to ensure confidentiality. The GFMT was used to screen each gymnast at baseline, 4 weeks, and 8 weeks. The last screening will occur at 12 weeks. Impairment specific exercises were incorporated into their training regime after the initial screening and improvements will be assessed at the follow-up screenings.

RESULTS/CONCLUSION: We do not have conclusive data as of now. However, the baseline data collection, 4 weeks, and 8 weeks screening have been completed. The study will have the analysis of the initial screening, 4 weeks, and 8 weeks follow-up screening data to be presented at the 14th Annual Research and Creative Achievement Week in March.

CLINICAL RELEVANCE: The goal is to assess the fitness of pre-collegiate females using the GFMT to introduce individual exercises to incorporate into their conditioning and training with the hope to prevent future injuries.

GP39

ISOKINETIC HIP ABDUCTION TO ADDUCTION STRENGTH RATIO AND FITNESS LEVEL

Richard Whitfield Leggett, Michael Jeffrey Shealy, Richard Alexander Medlin

Mentors: Shellie Hodge Zsoldos, Alexander Durland

PURPOSE: Lower extremity injuries are a common occurrence in competitive and recreational athletes. The ratio of hamstring to quadriceps strength is a tool frequently used as a screening for injury prevention. Hip abduction and adduction ratios, while used less commonly have been defined for use in sport specific injury prevention screening most notably soccer, hockey, and tennis. Only a few studies have identified normative values of the hip abduction and adduction ratio in a normal healthy population, and a recent systematic review of isokinetic hip strength identified that no study has related normative hip abduction/adduction ratio in relation to level of fitness. Our study aims to establish a normative value for hip abduction-adduction ratio in the general population based on varying levels of fitness in males and females.

METHODS: The predicted VO2 max will be calculated using the Fitness Calculator, which is a non-exercise estimate of VO2 max. Fitness level will be calculated from the variables collected on the data sheet. Fitness level will be grouped into three different categories based on the predicted VO2 max of the participants, which will be compared to age/sex norms according to ACSM values (low fitness, moderate/average and good/superior fitness). The subjects dominant lower extremity will be tested in a standing position. The subjects will perform 4 different trials on their dominant lower extremity (8 in total) plus 1 practice trial for each abduction and adduction. Each direction tested will include 2 different speeds (60 deg/sec and 120 deg/sec) and data will be collected in neutral pelvic alignment respectively. Following the testing of all data points, they will be categorized based on fitness level and the correlation of hip ratio and statistical analyses will be performed.

RESULTS/CONCLUSION: We are currently processing the data to determine normative hip abduction/adduction measures based upon fitness level.

CLINICAL RELEVANCE: The goal of this study is to gather normative data on hip abduction/adduction strength ratios on a variety of populations, using HUMAC2014 Model 770 CSMi Medical Solutions system in order to gain objective data for injury prevention and various objective measures that increase injury risk based on fitness level in these populations.

GP40

A Case Study and Review of Literature of Eruptive Syringoma in a 6-Year-Old

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Eruptive Syringoma is rare, benign, adnexal neoplasm that mimics many inflammatory and malignant tumors. It originates from the intraepidermal portion of eccrine sweat ducts. It is typically seen in middle-aged patients, Caucasians, and females. Here we describe the case of a six-year-old African American female who presented with several skin lesions that began under the chin and upper neck. In the months following initial presentation to her dermatologist, she developed an expansive eruption of 2-3 mm hyperpigmented papules over the neck, upper chest, and axilla bilaterally. The lesions were non-painful, non-pruritic and did not bleed when lightly scraped. There was also an incidental finding of a Café-au-lait macule seen in the mid-back of the patient. Physical examination was otherwise unremarkable. Histopathological examination showed multiple small ducts displaying a tadpole-shaped/paisley-tie pattern. Dense, red, sclerotic, and fibrotic stroma was identified on Hematoxylin and Eosin staining. Epithelium was characterized by nests and strands of cells with basaloid appearance in two distinct, thin layers. Dilated glands filled with eosinophilic material were also identified. These histopathologic findings are typical for eruptive syringoma. The patient was reassured that her lesions were benign and treated conservatively due to her age. After follow-up, the lesions subsided with-

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out medical or surgical intervention over the years. When treatment is considered, isotretinoin is the most commonly used treatment modality. However, treatment is primarily cosmetic and a majority of patients who are treated do not see clinical improvement in their condition. This case is particularly significant due to the patient's young age, ethnicity, and clinical improvement in the absence of treatment.

GP41

Comparison between OSHA-NIOSH Heat Safety Tool app and wet bulb globe temperature monitor as risk assessment methods for heat stress in agricultural settings in eastern North Carolina

Danielle Dillane & Jo Anne Balanay

Agricultural workers are exposed to heat stress due to spending significant amount of time outdoors. Risk information from mobile apps is readily available for timely advice on risk management that is crucial in preventing severe acute illnesses and deaths, but its reliability is unknown. The purpose of this study is to determine the reliability of the OSHA-NIOSH Heat Safety Tool mobile app in providing accurate risk information to prevent heat-related illnesses among agricultural workers in eastern North Carolina. Wet bulb globe temperature (WBGT) indices were datalogged at 2 agricultural sites using heat stress monitors from April–August 2019 and were assigned to risk levels (minimal, low, moderate, high, extreme) by workload (light, moderate, heavy, very heavy) based on the ACGIH Threshold Limit Values (TLVs). Hourly heat indices (HI) and their corresponding risk levels were obtained using the app. Hourly HI-based risk level assignments were time-matched to their corresponding WBGT-based risk level assignments (682 pairs) and analyzed using cross-tabulation by determining the percentage of hourly WBGT-based risk level assignments ('gold standard') with the same hourly HI-based risk level assignments under different workloads, with a higher percentage indicating higher app reliability. Results showed that the app identified minimal risk conditions correctly as "minimal" (60-100%) or more conservatively as "low" (6-39%) or "moderate" (1%), but its reliability decreased as the heat stress risk condition and workload became more severe. The app identified the majority of low risk conditions for moderate workload (74%) and moderate risk conditions for light workload (94%) only, indicating limited use in these specific conditions. The app identified 0% of either the high risk or extreme risk conditions at any workload type. It is concluded that the performance of the OSHA-NIOSH app in assessing occupational risk to heat stress is not protective of the workers particularly for heavy and very heavy workloads, and that the use of the app for the assessment of occupational heat stress risk in agricultural setting is not recommended.

GP42

Comparison of Hand Grip Strength Measurement Devices

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Purpose

There are many useful and easy to measure indicators of general health and longevity for adults, including gait speed and grip strength. An essential component of a physical therapy examination includes muscle strength. While health care providers include vital signs in routine patient examinations, hand grip strength is not included in medical office visits nor is it routinely used clinically to predict important outcomes. Recent studies have examined hand grip strength as a predictor of future outcomes in aging adults. This study aims to compare three commercially available handheld dynamometers and to determine which of the devices is most comfortable in the hands of individuals performing a grip strength test.

Methods

Subjects were tested on their dominant hand using three different hand dynamometers: the Jamar Hand Dynamometer, the Camry Electronic Hand Dynamometer, and the Squegg Digital Hand Dynamometer. Afterwards, subjects were which device they most preferred and least preferred device for testing. Results were compared for predictive value using multinomial logistic regression via IBM's SPSS technology.

Results

Seventy-five subjects participated in the study. Participants were both male and female between the ages of 25 and 80 years old. The majority of subjects were right-handed (85.3%). Statistical analysis demonstrated significant results for gender ($p=0.001$) and age ($p=0.019$) predicting the most preferred device. No statistical significance was found for predicting the least preferred device.

Conclusion

The results of the study predict that female patients prefer the Squegg when compared with the Camry. Additionally, as patients age, they are more likely to prefer the Camry device when compared to the Squegg.

Clinical Relevance

Results may be beneficial for other health care providers in the selection more cost-effective devices to incorporate in practice as part of a clinical examination. If grip strength measurement is routinely performed in medical office visits, it may be useful for predicting longevity.

GP43

Comparing Two Methods of Hip Rotation Measurement in College Dance Majors

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Alexandra Tyson Edens, Emma Marie Ferguson, Teal Darkenwald

Many factors can contribute to injuries in athletes, including limited joint motion. Specifically, research has shown that limited hip rotation, particularly hip internal rotation, is correlated with ACL injury in other sports, such as football (Bedi et al., 2014) and soccer (Gomes, Castro, & Becker, 2008). Given the risks associated with limited hip rotation, it proves to be beneficial to gather goniometric measurements of hip rotation to prevent injury (Jenkins, Wyon, & Nevill, 2013). The amount of hip mobility a dancer has is imperative to their success and musculoskeletal health. The purpose of this study was to examine the relationship between two different methods of measuring hip mobility (internal and external rotation). The first method uses a goniometer, which is a commonly used tool in Physical Therapy practice to measure joint mobility. Research has shown that when used appropriately a goniometer provides accurate range of motion measurements (Hancock, Hepworth, & Wembridge, 2018).The second method is a Functional Footprint ® , which is a device created by a Physical Therapist to measure hip internal and external rotation. Further research is needed to support or refute the validity and accuracy of the Functional Footprints device when measuring hip mobility.

Hip internal and external rotation was measured in every East Carolina University dance major using a goniometer and a Functional Footprint ® tool during his/her annual pre-participation screen. The gathered measurements from 2018 to 2019 were then retrospectively analyzed and the two methods compared. We determined that there is no statistically significant correlation between the goniometer and Functional Footprint ® measurement between any measurement. In addition, the difference between the goniometer and functional footprint ® measurements are statistically significantly different between any measurement. Based on the comparison of the two methods, we would not recommend relying solely on the Functional Footprints ® as a method of assessing hip rotation in a dance specific population. Due to the lack of correlation between hip rotation measurements gathered using traditional goniometry and the Functional Footprints ®, we recommend measuring hip rotation as an assessment using traditional goniometry, or in conjunction with the Functional Footprint ®, but not relying solely on Functional Footprint ® to measure hip mobility in dancers.

GP44

Clinical Analysis of Regenerative Endodontic Procedures: Multiple or Single-Visit?

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Previous literature are still insufficient to reach a conclusion regarding the accomplishment of pulp regeneration procedures in single-visit. This study compared the clinical and radiographic outcomes of regenerative endodontic procedures protocols performed with inter-appointment dressing or single-visit in traumatized immature teeth with pulp necrosis.

Patients aged 7-14 years presenting traumatized immature teeth with pulp necrosis were evaluated. Then, 20 maxillary incisors presenting previously stablished criteria were selected and randomly assigned to 2 groups: inter-appointment dressing (CHP) (n=11) or single-visit (SV) (n=9). Pulp regeneration procedures were accomplished in 3 main steps: passive decontamination; blood clot stimulation; and cervical sealing. In CHP group, an inter-appointment dressing of calcium hydroxide associated with 2% chlorhexidine gel was kept into the intrarradicular space for 21 days. In SV group, an immediate stimulation of blood clot was accomplished. Clinical and radiographic findings were assessed every 3 months during 1 year. Root development (apical closure, increase of root length and/or thickness) were quantifiedusing the Image J software. All radiographic analyzes were performed by 2 previously calibrated evaluators. Results were compared using t-test,Wilcoxon test, and Mann-Whitney test for comparison between groups.For qualitative data, G-test and Fisher's exact test were applied. For ordinal qualitative data, Mann-Whitney test was used. The significance level was stablished in 5%.Demographics and dental trauma characteristics of the study population was similar between groups (p>0.05).No treatment failure was observed (0%). Clinical and radiographic preoperative and postoperative characteristics observed in the study population of both groups was similar (p>0.05). No statistical differences were observed in radiographic outcomes of groups (p>0.05).Considering the success rate of pulp regeneration procedures in multiple and single-visit, both protocols demonstrated to be clinically and radiographically effective.Therefore, a single-visit pulp regeneration procedure can be considered as treatment option for necrotic immature teeth.

GP45

A Case Study and Review of Literature of Eruptive Syringoma in a 6-Year-Old

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Eruptive Syringoma is rare, benign, adnexal neoplasm that mimics many inflammatory and malignant tumors. It originates from the intraepidermal portion of eccrine sweat ducts. It is typically seen in middle-aged patients, Caucasians, and females. Here we describe the case of a six-year-old African American female who presented with several skin lesions that began under the chin and upper neck. In the months following initial presentation to her dermatologist, she developed an expansive eruption of 2-3 mm hyperpigmented papules over the neck, upper chest, and axilla bilaterally. The lesions were non-painful, non-pruritic and did not bleed when lightly scraped. There was also an incidental finding of a Café-au-lait macule seen in the mid-back of the patient. Physical examination was otherwise unremarkable. Histopathological examination showed multiple small ducts displaying a tadpole-shaped/paisley-tie pattern. Dense, red, sclerotic, and fibrotic stroma was identified on Hematoxylin and Eosin staining. Epithelium was characterized by nests and strands of cells with basaloid appearance in two distinct, thin layers. Dilated glands filled with eosinophilic material were also identified. These histopathologic findings are typical for eruptive syringoma. The patient was reassured that her lesions were benign and treated conservatively due to her age. After follow-up, the lesions subsided without medical or surgical intervention over the years. When treatment is considered, isotretinoin is the most commonly used treatment modality. However, treatment is primarily cosmetic and a majority of patients who are treated do not see clinical improvement in their condition. This case is particularly significant due to the patient's young age, ethnicity, and clinical improvement in the absence of treatment.

GP46

EFFECT OF AEROBIC EXERCISE DURING PREGNANCY ON BIOMARKERS OF MATERNAL METABOLISM

Mary-Margaret E Remchak, SAMANTHA MCDONALD, CODY STROM, CHRISTY ISLER, KELLEY HAVEN, LINDA MAY

Purpose: Although chronic exercise results in metabolic adaptations at rest (□glucose, □lipids, □lactate) in non-pregnant population, little is known about the maternal metabolic adaptations due to aerobic exercise at recommended levels throughout pregnancy. **Methods**: To address this gap in knowledge, women were randomized to moderate intensity (40-59% VO_{2peak}) aerobic exercise (n=18) or (<40% VO_{2peak}) stretching/ breathing group (n=5). All women trained 50 minutes, 3 times per week, from 16 weeks to delivery. Fasted blood samples were collected at 16 and 36 weeks via fingerstick. Cholestech and Lactate Analyzers were used to determine maternal glucose, lactate and lipid (TC, TG, LDL, HDL) profiles. Mann-Whitney U Test were performed to compare the between-group medians, accounting for the distribution, for all maternal metabolic biomarkers. Due to the small sample size, the p-value from the Fishers Exact test was used to determine statistical significance (p<0.05). **Results**: The aerobic group has significantly decreased TG (p=0.02) at 36 wks, with trends toward lower TC:HDL Ratio (p=0.14) at 36 wks and change in TG from early to late pregnancy (p=0.20). No significance was seen for other maternal metabolic biomarkers. **Conclusion**: Aerobic exercise during pregnancy positively supports maternal metabolic normalization for TG. Lack of significant findings may be due to small sample size. These data suggest aerobic exercise during pregnancy may help normalize maternal lipids during pregnancy. Funded by AHA Grant #15GRNT24470029.

GP47

Differences in Interleukin-6 in Response to Moderate and High Intensity Exercise Training in African American Individuals

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Skeletal muscle has been found to be an endocrine organ such that it releases myokines, which are cytokines specific to muscle that can have either an autocrine, paracrine, or endocrine action. Interleukin-6 (IL-6) is considered a prototypic exercise myokine since it is one of the first myokines to be released after a single, acute bout of exercise and is considered a pro-inflammatory myokine. African American (AA) individuals have an increased prevalence of metabolic disease compared to Caucasian (C) individuals and display higher concentrations of basal plasma IL-6 (BPIL-6) than C after an identical bout of exercise. Increased systemic inflammation is connected to various metabolic diseases and increased BPIL-6 is used as a marker of systemic inflammation. By viewing skeletal muscle as a secretory organ and understanding the role that IL-6 may play in inflammatory states such as metabolic disease progression, measuring IL-6 levels will allow a deeper insight into the link between physical activity and metabolic disease prevention.

PURPOSE: The purpose of this study was to examine the relationship between BPIL-6 levels in sedentary AA individuals before and after a moderate- and high-intensity exercise training program compared to a control group. We expect to see lower BPIL-6 in individuals who complete a high-intensity exercise program than those who complete a moderate-intensity exercise program. METHODS: AA individuals with overweight and obesity and sedentary were randomized to a non-exercise (n=11), moderate-intensity (n=6), or high-intensity (n=7) group and performed 24 weeks of supervised exercise training. IVGTT samples were taken prior

and after completion of the program and analyzed for IL-6 using the Beckman Coulter Access II analyzer. RESULTS: There was no significant difference in BPIL-6 between the groups prior to training (p=0.4352).There was no significant difference in BPIL-6 pre- and post-exercise program for the control (p=0.3984), moderate-intensity (p=0.1872), and high-intensity group (p=0.3999). CONCLUSION: Previously sedentary AA with overweight and obesity had no significant response in their BPIL-6 after participating in an exercise training program. This data is not consistently with current research. Because concentrations of plasma IL-6 can vary significantly from mRNA expression of IL-6 in an individual, we believe further research with this population into IL-6 mRNA expression pre - and post-exercise training is needed.

GP48

Determination of Breakthrough Time for Combination Respirator Filter/Cartridges with Dimethoate Pesticide: A Methodology Study

Constantine Unanka

Dr. Sinan Sousan

Dr. Jo Anne Balanay

Pesticide use is frequent across agricultural occupations primarily for its use in protecting and preserving the quality of crops from weeds and pests and protecting against disease-spreading organisms. Studies conducted have demonstrated the adverse health effects associated with the use of insecticides predominantly in occupational settings. Continuous pesticide exposure is linked to respiratory illness, such as asthma and chronic bronchitis. Dimethoate is among the leading organophosphorus (OP) insecticides explicitly used in the United States, due to its low persistence and biodegradation and its ability to diminish the occurrence of common spiders. Dimethoate is considered effective against insects, mites, flies, aphids, and planthoppers. Acute toxicity to dimethoate typically demonstrates symptoms of breathing difficulties, bradycardia, diarrhea, nausea, lethargy, and blurred vision. Chronic exposure can lead to symptoms with greater severity, such as disorientation, severe depression, speech difficulties, delayed reaction times, asthma, and lung damage. Respirators are used as protective measures against the inhalation of harmful substances, such as chemicals and infectious particles, and in this case, minimize the acute and chronic effects of OP exposure. The United States Environmental Protection Agency (EPA) mandates pesticide users to replace respirator filters after 8-hours of use due to the nonexistence of respirator service life indicators. EPA's mandated service life for respirators is based on the average working hours for United State workers that does not represent the service life based on actual pesticide exposure. There are currently no published studies that determine the service life for respirators used in pesticide applications. We propose to develop a controlled laboratory method to determine the service life for respirators used for dimethoate exposure at different temperature and relative humidity conditions. The data derived from this project will have a direct impact on the protection of agricultural workers' health.

GP49

Association of Coach, Parent, and Peer-Initiated Motivational Climates with Sport Engagement and Burnout

Jordan W Barbee & Thomas Raedeke

Sport participation can be an engaging experience and result in health benefits, skill development, and social camaraderie. However, it can also result in negative outcomes such as burnout. Burnout is negatively associated with sport engagement and the quality of athlete experiences. It also contributes to the reasons why athletes discontinue sport and negatively impacts their well-being (DeFreese et al., 2015). Research has shown that burnout and engagement are impacted by social agents (e.g. parents, peers, and coaches) such as through the motivational climate they create (Curran et al., 2015; Gustafsson et al., 2016; Sarrazin et al., 2002; Smith et al., 2010). A mastery climate is one is which success is defined in terms of self-referenced standards of excellence with the focus on improvement, mistakes being viewed as a part of learning, and effort. Within a performance climate, success is defined in terms of social comparison and outperforming others. This can result in intra-team rivalries and conflict (Duda & Treasure, 2015; Gustafsson et al., 2016; Lemyre et al., 2008; Miulli & Nordin-Bates, 2011; Smith et al., 2010). Although research has shown that the motivational climate created by social agents impact athlete sport experiences, few studies have examined whether the climate created by coaches, parents, or peers has the strongest association with burnout and engagement. Therefore, this first purpose of this study is to examine the relationship of the motivational climate created by coaches, parents, and peers with engagement and burnout. The second purpose is to determine which social agent is the strongest predictor of athlete engagement and burnout. Following student activities coordinator and coach approval, 151 high school athletes completed surveys on athlete engagement (Lonsdale et al., 2007) and burnout (Raedeke & Smith, 2001; 2009) along with surveys assessing athlete perceptions of the motivational climate created by coaches (Smith et al., 2008), parents (White et al., 1992), and peers (Ntoumanis & Vazou, 2005). Correlational analysis will be used to examine the relationship of athlete engagement and burnout with motivational climate while regression analysis will be used to determine the strength of the relationships with each social agent and burnout. Understanding which social agent has the strongest relationship with burnout and engagement can potentially help in developing interventions to ensure quality sport experiences.

GP50

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Evaluation of Low-Cost Optical Particle Counters for Agricultural Exposure Measurements

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Farmworkers are exposed to dust and other respirable particulate matter from planting and harvesting crops. Prolonged exposure to dust has been shown to have negative health effects in this population, primarily with the development of respiratory diseases. There have been numerous studies which demonstrate the effectiveness of low-cost aerosol sensors to measure particulate matter in laboratory and field settings. Therefore, low-cost sensors may be cost-effective tools for farmers to use in determining when they are exposed to harmful levels of dust during their workday. The study utilized two different low-cost optical particle counters (OPCs) to collect data on dust exposure: the OPC-N3 developed by Alphasense and the AirBeam2 developed by HabitatMap. Participating farmworkers were each given a set of sensors, one OPC-N3 and one AirBeam2, to wear on their persons for the duration of their shift. One additional device, the GRIMM mini-WRAS, was used during one recording session to obtain data on the aerosol size distribution of dust particles that farmworkers had been exposed to. The data was downloaded at the end of each day and analyzed by comparing the measurements for PM2.5 and PM10 between the OPC-N3s and the AirBeam2s. Respirable particulate matter (PM4) was downloaded from the OPC-N3s and examined separately as the AirBeam2 does not report PM4 measurements. Early examination of the data suggests that the AirBeam2 may be greatly underestimating the amount of particulate matter that farmworkers are exposed to and therefore may not be suitable for occupational exposure measurements in comparison to the OPC-N3.

GP51

Forming New Habits: An Intervention to Decrease Sedentary Behavior in Medically Stable Older Adults

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Sedentary behavior is characterized by too much sitting. It is estimated that 4 out of every 10 Americans never engage in physically active behaviors, and that approximately 60% of an adult's non-sleeping hours are spent in sedentary behaviors (Owen, 2017). As sedentary behavior increases, so do diagnoses of chronic illnesses such as diabetes, hypertension, cardiovascular disease, and kidney disease. Older adults are particularly at risk for sedentary behavior and the related chronic illnesses due to the challenges they face with balancing physical and/or cognitive limitations, unstable medical conditions, and the requirements to remain physically active. Often times older adults feel that their only option for safe physical activity is low-speed walking (Markle, Attell, & Treiber, 2014). Occupational therapy intervention options that can decrease sedentary behavior in older adults in the community are scarce. The aims of this study are to investigate the effectiveness of the Everyday Meaningful Activities (EMA) Intervention in forming active lifestyle behavior habits, in decreasing sedentary time during the times for the selected active lifestyle behaviors, and in decreasing an individual's perceived sedentary time. Twelve medically stable older adults in the community were recruited. Participants are 65 years of age and older, have intact cognition, have no self-reported physical activity limitations, have a sedentary lifestyle, and have no acute illnesses or unstable medical conditions. The EMA Intervention combines concepts from Habit Formation Theory (Lally & Gardener, 2013) and the Ecology of Human Performance model. It is an individualized, client-centered intervention that aims to increase adherence to active lifestyle behaviors in older adults' lives. Participants will create new habits by attaching these new active lifestyle behaviors to currently existing daily routines. During six intervention sessions over six weeks, participants will select two new active lifestyle behaviors to make them habitual and create action plans for implementation. The results of this study may provide evidence for the occupational therapy intervention to decrease sedentary behavior in older adults in the community. The results may also broaden the scope of occupational therapy practice through demonstrating the potential for occupational therapy services in preventive health care.

GP52

Factors associated with children not visiting a dentist after receipt of dental checkup advice

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Objectives

The objective of the study was to identify factors associated with children who received dental checkup advice from their primary care provider but did not visit the dentist.

Methods

Data were from the annual, cross sectional Medical Expenditure Panels (MEPS) in 2017. The sample included 4323 children, ages 2-17 years old, who had received dental checkup advice from their primary care provider but did not visit a dentist. A multiple logistic regression model was used to assess factors associated with not visiting a dentist when given dental checkup advice: age, race/ethnicity, insurance coverage, parents' education level, family income, usual medical provider, health status, and geographic region. Data was analyzed in SAS 9.4.

Results

Overall, 41.8% of the children who received dental check-up advice did not visit a dentist in 2017 in the United States. The multiple regression results showed that children aged 2-5 were at a higher risk of not visiting a dentist compared to children ages 12-17 years old (AOR= 1.72, 95% CI: 1.33, 2.23). Non-Hispanic black children (AOR=1.67, 95% CI: 1.20, 2.32) and Asian American children (AOR=1.57, 95% CI: 1.05, 2.35) were at a higher risk of not visiting a dentist compared to Non-Hispanic white children. Children with private health insurance and dental coverage (AOR=0.33, 95% CI: 0.16, 0.66), private health insurance and no dental coverage (AOR=0.45, 95% CI: 0.21, 0.95), and public health insurance and no dental coverage (AOR=0.37, 95% CI: 0.18, 0.74) were at a lower risk of not visiting a dentist compared to children with neither health insurance nor dental coverage. Children of low income families were at a higher risk of not visiting the dentist (AORs >1). Children with a usual medical provider were at a lower risk of not visiting a dentist (AOR=0.52, 95% CI: 0.33, 0.81).

Conclusion

A substantial number of children did not visit the dentist even when they had been advised by a primary care provider to have a dental checkup. Children of minority racial/ethnic groups were at a higher risk of not visiting a dentist. Family income level and dental insurance are two key factors for dental checkup coverage among children. Continuous efforts are needed to provide children from low income families with dental coverage.

GP53

A Test of the Validity of the Short Version of the Salutogenic Wellness Promotion Scale

Austin M Odom, Craig M. Becker

The need for faster assessments has led to the development and validation of shorter versions of many existing health status assessment tools. Health status determined through the assessment of engagement in multidimensional health behaviors assessed by the 25 item Salutogenic Wellness Promotion Scale (SWPS) documented its validity and sensitivity. Statistical analysis of previously collected data led to the creation of a Short 7 item version of the SWPS. This study will use a convenience sample of students enrolled at a University in the southeastern United States to test the validity of the Short SWPS. Participants will complete validated surveys and tests will determine the relationship of the scores of the SWPS to other validated positive and negative measures. It is expected that scores from the short SWPS will replicate results obtained with the longer version of the SWPS that found it to have a significant positive relationship with health and satisfaction and a significant negative relationship with depression. Determining initial validity for the Short SWPS would enable it to be used as a quick health status screening tool for employers, universities, hospitals, and schools.

Keywords: Salutogenesis, health, wellness, health behavior, assessment

GP54

Alternative Therapeutic Models for Speech Therapy in Individuals with Cleft Palate: A Literature Review

Madeline Funke, Amber Faircloth, Abigail E. Haenssler, Jaime L. Perry

Cleft palate is a structural malformation that occurs during the first ten weeks of fetal development. Cleft palates occur when the hard and/or soft palates do not fuse together properly to form the roof of the mouth. Between nine to 12 months of age, the cleft palate is repaired with surgery; however, the child may need speech therapy to correct compensatory articulation errors. Though cleft palate can affect any child, not all families have equal access to care. Many families in rural areas of the United States have limited access to speech language pathologists, with distance and location presenting as massive barriers. Telepractice is defined by the American Speech and Hearing Association (n.d.) as the use of audio and visual technology to expand delivery options for speech language pathology consultations, interventions, and other services. It allows services to be implemented remotely by facilitating communication between patients and clinicians who are not geographically close to each other. Telepractice has been successful in providing speech therapy for school-age children (Scheideman-Miller, 2002). Alternative therapeutic models, such as telepractice, may also benefit children with articulation errors secondary to cleft palate, who do not have ample access to speech language pathologists for speech therapy services. A review of the current literature was conducted to analyze alternative therapeutic models of speech therapy for patients with cleft palate. Studies that included telepractice and distance speech therapy delivery for individuals with cleft palate were considered. Further research on telepractice for children with cleft palate can provide insight into effective and inclusive approaches to address common speech and articulation errors due to the cleft palate.

GP55

A Comparison of Two Self-rating Depression Scales: Implications for Client Screening and Outcome Measurement in Recreational Therapy

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Depression is one of the most diagnosed mental health conditions worldwide (World Health Organization, 2018). The multifaceted nature of the disorder is determined by the various symptoms, which can include persistent de-

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pressed mood, loss of interest, fatigue, thoughts of self-harm, and changes in sleep, among others. These symptoms are grouped by the Diagnostic and Statistical Manual of Mental Disorders (DSM), as Major Depressive Disorder. For clinicians to select and administer effective treatment to address the disorder, proper diagnostic assessment is essential. A preferred manner of achieving this is through the use of standardized, psychometrically sound instruments. In this retrospective study, a dataset of 59 individuals randomly assigned into intervention (n=30) or control (n=29) groups were assessed using the Patient Health Questionnaire 9 (PHQ-9) and the Quick Inventory of Depressive Symptomatology (QIDS), both screening tools for depression based on the DSM-IV. After a one-month intervention, both groups were reassessed using the same instruments. A psychometric analysis and comparison of the two instruments at baseline and post-intervention will be conducted for both groups to determine similarities and differences between the two instruments. Implications for client screening and its impact on treatment in reference to the two instruments will be discussed.

GP56

A comparison of Commercial and Laboratory-Treated Permethrin Clothing on Total Content, Surface Content, and Repellency

Adam Vang, Dr. Stephanie Richards, Dr. Jo Anne Balanay, Dr. Robin Tutor

Permethrin is a synthetic pyrethroid pesticide that has been used to treat military uniforms to protect personnel from pests such as mosquitoes, ticks, and lice. Permethrin-treated clothing (PTC) can also be used by the public and personnel in outdoor occupations such as forestry. Pests contacting the surface of PTC may experience repellency and/or mortality, depending on exposure dose and time. Hence, it is important to assess surface permethrin concentration of clothing for repellency and/or control. Fabric swatches prepared using two commercially available permethrin treatment (Insect Shield & Sawyer Repellant) and three laboratory-treatment (permethrin concentrations: 4g/L, 8g/L, 20g/L) methods were tested to compare permethrin surface and total content using a Martindale Abrasion and Pilling Tester and an Agilent Technologies 6850 Gas Chromatograph, respectively. Findings indicate surface permethrin content is significantly lower than total permethrin content and this relationship varies widely between different treatment methods. Future studies are planned to evaluate repellency/mortality of mosquitoes exposed to PTC.

GP57

Evaluation of low-cost optical particle counters for environmental and occupational exposure

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Particulate Matter (PM) poses a significant threat to human health and the environment. Exposure to PM is associated with various cardiovascular and respiratory diseases such as myocardial infarction, arrhythmia, stroke and heart failure. The overall impact of PM on the human body depends upon the particle size, concentration and chemical composition. Low-cost PM sensors such as Optical Particle Counters (OPCs) are widely used devices for counting and sizing the particles ranging from 0.2 µm to several microns. OPCs are economical, compact, easy to use and provide real-time data that can be deployed in large numbers to study personal exposure. This study evaluated the performance of low-cost OPCs in laboratory settings by comparing the results obtained from low-cost OPCs with the reference instruments at different concentrations for dust particles that represent both environmental and occupational concentrations. The low-cost sensors evaluated in this study were: OPC-N3 from Alphasense, AirBeam from HabitatMap, SPS30 from Sensirion and PMS A003 from Plantower. The reference instruments used were the Personal Data Ram (PDR 1500) from Thermo Scientific and the Mini Wide Range Spectrometer (MiniWRAS) from GRIMM. The low-cost sensors were evaluated in a controlled exposure chamber with Arizona Road Dust. The low-cost sensors were evaluated based on various factors such as accuracy, bias and precision, for both environmental and occupational settings. This study attempted to evaluate the performance of low-cost OPC sensors compared to the reference instrument to reduce the uncertainty of the quality of low-cost sensor data and to determine the best sensor for different settings.

GP58

METABOLIC FLEXIBILITY IN NON-OBESE AND OBESE INDIVIDUALS

Nkaujyi Khang, Donghai Zheng, Lynis Dohm, Joseph Houmard

Human skeletal muscle cells have been used as a tool to study and understand skeletal muscle metabolism due to their retention in characteristics from their donor. Metabolic flexibility is the ability to respond or adapt to conditional changes in metabolic or substrate availability. Metabolic inflexibility has been associated with obesity. Because obesity is rising at epidemic proportions throughout the world and is associated with metabolic diseases, it is important to study and understand metabolic flexibility. It is evident that obese individuals display metabolic inflexibility, however, there is limited information on non-obese individuals and if they too display metabolic inflexibility. In addition, there is limited information whether metabolic inflexibility is retained in muscle cells from

obese individuals.

PURPOSE: The purpose of this study was to examine the relationship between metabolic flexibility in primary human skeletal muscle cells (HSkMC) of non-obese (BMI <30 kg/m^2) and obese (BMI >35kg/m^2) Caucasian women. We expected non-obese individuals to exhibit an enhanced metabolic flexibility in response to lipid incubation compared to obese individuals. METHODS: HSkMC from non-obese (n = 7) and obese (n=6) Caucasian women were tested for metabolic flexibility by incubating the cells for 24 hours in differentiation medium supplemented with 250mM oleate:palmitate and measuring for fatty acid oxidation (FAO). Metabolic flexibility is defined as the change in FAO when stimulated with fatty acid for 24 hours. RESULTS: There was no significant correlation between basal FAO and the change in FAO from the HSkMC of non-obese group. There was a significant correlation between basal FAO and the change in FAO in the HSkMC of the obese group (r = -0.87, p<.05). Complete FAO from HSkMC of non-obese and obese subjects exhibited a 2-fold change with 24-hour fatty acid (24hFA) exposure. CONCLUSION: HSkMC from non-obese Caucasian women did not have an enhanced response to lipid incubation compared to HSkMC from obese Caucasian women. Instead, the non-obese and obese group both displayed similar responses to 24FA exposure.

GP59

Utilizing Advanced Mobile Technology for Public Health Promotion and Education

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Today's information economy presents new opportunities for health education specialists to promote health through social media. Geofencing is one such opportunity that sends banner ads to the electronic devices of those located in a restricted geographic area. The banner ads are image-based and contain a link to a website. Unique advantages of the advanced mobile technology include targeting a highly specific location (e.g. as small as a parking lot) and eliminating the need for participants to opt in. Geofencing was utilized in West Greenville, a small community in Pitt County, to direct community members to participate in Tell a Story Save a Life, a diabetes education awareness campaign. The purpose of this paper is to explain what is known about the new technology and its potential for public health impact and what needs to be further understood.

The gain-framed messaging chosen for display on the banner ad is supported by health communication theory, which asserts that gain-framed messages are more effective than fear-based messages. Furthermore, survey data collected from the target population affirmed the preference for the messaging used.

Objectives include defining key terms and metrics, describing the benefits and limitations of geofencing, and sharing lessons learned.

A virtual boundary was drawn around West Greenville, an area of approximately 2.02 square miles, and banner ads were sent to the electronic devices within the bounded area. The banner ads included a link to personally recorded diabetes narratives. Participants were instructed to listen to the stories and complete a survey for a chance to win one of ten $25 gift cards. The website also included resources for the prevention, management, and treatment of diabetes and prediabetes.

Analysis of results is ongoing. 112,454 impressions were delivered. 185 clicks were obtained, with a click-through rate (CTR) of 0.16%. The most popular apps through which a banner ad was received were Pixel Art, TextNow, and Wordscapes. Benefits include restricting a population by geographic location, obtaining responses from a hard to reach population, and leveraging a mobile application that the user already has downloaded. Limitations are what little is known about the quickly evolving technology for public health purposes and that health education specialists must have reliable communication with a tech expert to utilize the location-based marketing as a tool.

GP60

The Effects of Weight Loss on Metabolic Syndrome Z-score

John Mark Stein, Josh McGee, Anna Huff, Covey Clunan, Nicole Gniwek, Taylor Brown, Briceida Osborne, Laura Matarese, Robert Carels, Walter Pories, Joseph Houmard, Damon Swift?

BACKGROUND: Metabolic syndrome (MetS) z-score is the combined extent of MetS risk factors on a continuous scale. The present study investigates the effect of weight loss on MetS z-scores.?
METHODS: Overweight and obese adults (n=18, 34.2±3.9 BMI) participated in a 10-week weight loss program (OPTIFAST) and supervised aerobic exercise program (50-75% VO2 max 3xwk). Blood pressure, waist circumference, HDL cholesterol, glucose, and triglycerides were assessed at baseline and follow-up. Categorical determination of MetS was determined using the Adult Treatment Panel III guidelines. Continuous z-score was calculated using the mean and standard deviations of the entire cohort.?
RESULTS: Glucose(-13.2mg/dL, p<0.001), diastolic blood pressure(-7.5 mmHg, p<0.001), waist circumference(-6.6 cm, p<0.001), and triglycerides(-21.1 mg/dL, p=0.032) all significantly improved. However HDL(3.9 mg/dL) and systolic blood pressure (-10.9 mmHg) (all p>0.05) did not. There were significant changes in both MetS prevalence (-0.8, p=0.001) and continuous z-score (p<0.001). The mean MetS prevalence score was 2.12±1.36 with a mean change of -0.823±0.88 (p<0.001). The mean continuous z-score was -1.63±3.4 at baseline with a mean change of

2.82±1.59 (p<0.001), which was associated with the change in weight (p=0.029), but not BMI, fat mass, or fitness (p>0.05).?

CONCLUSIONS: Weight loss, through diet and exercise, reduces the risk factors associated with MetS.?

GP61

Establishing Baseline Skin Carotenoid Levels and Associations With Season, Age, Gender, and Race among Head Start Children (3-5 years) Living in Eastern North Carolina

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Low intake of fruits and vegetables (FV) among preschool aged children (3-5 years) is well documented. Thus, interventions and policies to promote FV intake among preschoolers are needed. In order to determine the most effective interventions, valid, objective and reliable methods are needed to assess dietary intake. A promising tool for objectively measuring FV consumption among young children is the Veggie MeterÒ (VM), a non-invasive tool that can be used to assess skin carotenoid status through reflection spectroscopy. While the tool has been validated in adults, limited research is available to describe its use in children. The purpose of this study was to use a prospective cohort design to establish baseline skin carotenoid levels and examine differences in skin carotenoids by season, age, gender and race of preschoolers enrolled in Head Start (HS) in Eastern North Carolina (NC). Researchers collected baseline and post-surveys from participating families (consent, demographic information, children's food preferences). Children's skin carotenoids were measured 3 times over a 6-month period (fall, winter, and spring, 2-month separation between). Analyses were conducted using ANOVA and Tukey post hoc tests to assess differences in skin carotenoids and changes over time by age, gender and race. A total of 112 children from 3 HS centers in NC participated in the study. On average children were 4.1 years old, African American (AA) (81.3%), and male (57%). Mean skin carotenoid levels across time were 266.0 (SE 7.8); skin carotenoids at Time 1 266 (SE 7.8), Time 2 277 (SE 8.1) and Time 3 248 (SE 7.6). Skin carotenoids varied slightly among ethnic groups with Hispanic children having the highest skin carotenoid average (297 SE 19.7, *p*= .674), followed by white (281 SE 37.4), AA (265 SE 8.8), and other races (234 SE 35.8). Significant differences were observed between ages with mean skin carotenoids (*p=.01*) 3- (241 SE 13.6), 4- (267 SE 8.3), and 5-year olds (340 SE 48.5) and between gender groups with males having higher mean skin carotenoids at 282 (SE 9.3, *p*=.01, and females 243 (SE 12.8). The VMÒ may be a promising tool for measuring FV consumption among young children,

we found differences in skin carotenoid status by season, race, age, and gender; however, future research should validate the tool using blood plasma. Research is also needed to establish baseline skin carotenoid levels among low-income preschoolers during the summer months.

GP62

Differences in Interleukin-6 in Response to Moderate and High Intensity Exercise Training in African American Individuals

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Skeletal muscle has been found to be an endocrine organ such that it releases myokines, which are cytokines specific to muscle that can have either an autocrine, paracrine, or endocrine action. Interleukin-6 (IL-6) is considered a prototypic exercise myokine since it is one of the first myokines to be released after a single, acute bout of exercise and is considered a pro-inflammatory myokine. African American (AA) individuals have an increased prevalence of metabolic disease compared to Caucasian (C) individuals and display higher concentrations of basal plasma IL-6 (BPIL-6) than C after an identical bout of exercise. Increased systemic inflammation is connected to various metabolic diseases and increased BPIL-6 is used as a marker of systemic inflammation. By viewing skeletal muscle as a secretory organ and understanding the role that IL-6 may play in inflammatory states such as metabolic disease progression, measuring IL-6 levels will allow a deeper insight into the link between physical activity and metabolic disease prevention.

PURPOSE: The purpose of this study was to examine the relationship between BPIL-6 levels in sedentary AA individuals before and after a moderate- and high-intensity exercise training program compared to a control group. We expect to see lower BPIL-6 in individuals who complete a high-intensity exercise program than those who complete a moderate-intensity exercise program. METHODS: AA individuals with overweight and obesity and sedentary were randomized to a non-exercise (n=11), moderate-intensity (n=6), or high-intensity (n=7) group and performed 24 weeks of supervised exercise training. IVGTT samples were taken prior and after completion of the program and analyzed for IL-6 using the Beckman Coulter Access II analyzer. RESULTS: There was no significant difference in BPIL-6 between the groups prior to training (p=0.4352).There was no significant difference in BPIL-6 pre- and post-exercise program for the control (p=0.3984), moderate-intensity

(p=0.1872), and high-intensity group (p=0.3999). CONCLUSION: Previously sedentary AA with overweight and obesity had no significant response in their BPIL-6 after participating in an exercise training program. This data is not consistently with current research. Because concentrations of plasma IL-6 can vary significantly from mRNA expression of IL-6 in an individual, we believe further research with this population into IL-6 mRNA expression pre - and post-exercise training is needed.

GP63

Adenoid Development in Individuals with Cleft Palate from Infancy Through Adulthood

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Background: The adenoid, a lymphoid tissue, is located on the posterior pharyngeal wall of the nasopharynx. The adenoid plays an important role in velopharyngeal (VP) closure during swallowing and speech in children. The adenoid assists in VP closure in individuals with an inactive or short soft palate, which is common in individuals with cleft palate (Subtelny & Baker, 1956). Haenssler et al. (2019) reported in individuals with non-cleft anatomy, the depth of the adenoid grows until age 4, while adenoid height and thickness grow until age 8. Involution was reported to occur in a posterior and superior direction. Irregularities of speech and resonance may develop in individuals with cleft palate due to the differences in VP closure patterns after involution of the adenoid. Previous literature has reported that the adenoid of individuals with cleft palate grow and involute in a similar pattern to individuals with non-cleft anatomy, but tend to be larger (Subtelny & Baker, 1956; Ren, 1993; Imamura et al., 2002; Mason & Perry, 2016; Gohilot et al., 2014; Sarmadi et al., 2018). However, these studies have not examined the growth and involution of the adenoids longitudinally. The purpose of this study is to examine growth trends of adenoids in individuals with cleft palate, which could affect VP closure patterns and therefore speech and resonance.

Methods: Magnetic resonance imaging (MRI) was used to analyze the VP variables among 51 individuals with cleft palate ranging in age from eight months to 66 years old. MRI data were imported into Amira 6.7.0 Visualization Modeling Software. Using a midsagittal image, the following variables were obtained: velar length, effective velar length, pharyngeal depth, adenoid height, adenoid thickness, adenoid depth, and adenoid area. ANOVAs will be used to compare variables between age groups.

Results: MRI images have been obtained from enrolled participants. Imaging analysis is ongoing and will be completed in Spring 2020.

Conclusions: The results of this study will provide insight into how adenoids grow and involute in individuals with cleft palate. This study will contribute to our knowledge of how growth trends can affect VP closure and speech in individuals with cleft palate.

GP64

Hyster-Yale Fabrication Shop Process Improvement

Christopher Andrew Johnson, Cory Stallings, Merwan Mehta

For our project we will be conducting a production line improvement working with Hyster-Yale Group. Hyster-Yale designs, engineers, manufactures, sells and services forklifts and lift trucks globally under their name Hyster and Yale.

The production line we will be analyzing and improving the efficiency of is in the fabrication department. The Fabrication department is the worst performing department and operates between 40-50% efficiency. We will be conducting time studies to calculate the ideal capacity of the line and conduct a brainstorming session to obtain input from the operators to identify the reasons for lack of adequate productivity on the line. We will prioritize those ideas to develop an action plan to implement. The goal is to increase the efficiency by at least 15%, and by creating a new layout for the process, achieve cost savings to the tune of $100,000. We will create a control plan that will include a new standard operating procedure and checklist. This will ensure that the plan we create with its improvements will be sustained.

GP65

Hickory Shad (*Alosa mediocris*) vs. American Shad (*Alosa sapidissima*): Are Aging Techniques Similar for Sympatric Species?

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Hickory Shad (*Alosa mediocris*), a member of the family Clupeidae, is an anadromous fish species on the East Coast of North America that ascends watersheds from the Susquehanna River in Maryland to the St. John's River in Florida to spawn in the spring. Although first described in 1814 by Samuel L. Mitchill, many aspects of the life history are understudied. Both the Hickory Shad and its relative, the American Shad (*Alosa sapidissima*), comprise important commercial and recreational fisheries throughout their ranges, especially in North Carolina where they represent a multi-million-dollar sport fishery. Exactly how similar these two species are in life history is unknown, but the two species are managed together federally by the Atlantic States Marine Fisheries Commission (ASMFC). American Shad and Hickory Shad are iteroparous, or have multiple spawning cycles throughout a lifetime, and to justify this life history characteristic for American Shad, a study validated spawning years through a scale aging protocol. Since an aging protocol for Hickory Shad scales

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has never been published in the primary literature, a Hickory Shad aging technique will be developed and compared to the American Shad aging protocol to determine if methodologies coincide. A sex-specific length-at-age distribution will be created based on the fork length (FL) and age, and the length data provided from the North Carolina Wildlife Resource Commission (NCWRC) will be included to create an age-length key for each North Carolina watershed. An age-length key summarizes the relationship between age and length by taking a subsample of fish and applying the key to the entire sample. If Hickory Shad life history does indeed mirror that of American Shad, then Hickory Shad could continue to be managed with American Shad in state and federal fishery management plans. However, if the life histories differ substantially, then agencies may want to consider managing these two species under separate management plans.

GP66

Determination of River Herring eDNA Shedding and Decay Rates: Working Towards a Methodology for Locating and Quantifying Spawning Populations

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River herring, (Blueback Herring [*Alosa aestivalis]* and Alewife [*A. pseudoharengus]*), were once abundant in North Carolina waters and were an economically important fishery but their populations across their ranges are smaller due in part to anthropogenic causes. A method of quantifying the spawning population sizes is needed because North Carolina's turbid and large river systems make traditional sampling difficult. By detecting trace DNA shed by river herring, the relative abundances and locations of spawning could be more easily determined. In order to obtain accurate eDNA shedding and decay rates, we performed three experiments. Two time series experiments used different quantities of herring in tanks of various size to determine how much eDNA is shed from known biomasses of fish. The third experiment was abundance sampling to discover if there could be a linear relationship between biomass of fish and amounts of eDNA in ambient water. While there was a general trend of increasing eDNA over time while the fish were in the tank, the relationship between herring abundance and eDNA amounts did not appear to be linear in the samples that have been processed at this point. Using these DNA concentrations we were able to determine a preliminary eDNA shedding rate (1.63×10^{-3} (ng/L)/h) and decay rate (2.64×10^{-6} (ng/L)/h) for river herring. These results will be compared with data from samples gathered from the Tar/Pamlico and Neuse watersheds in order to see how these trends appear in the environment. With this information, a model can be developed to quantify eDNA sampling data for river herring in NC, which has not been done previously and can be used for future monitoring projects.

GP67

Testing Candidate Genes for Association with Aposematic Skin Color Pattern in the Mimic Poison Frog *Ranitomeya imitator*

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The mimic poison frog, *Ranitomeya imitator*, has evolved to mimic three congeneric species of poison frogs, which has produced four within-species morphs (banded, striped, spotted, and varadero). There are four known transition zones where morphs with adjacent ranges are able to hybridize. Previous exome capture and divergence/admixture analysis in the striped-banded transition zone identified a set of candidate genes that show a high likelihood of association with skin color pattern phenotype in *R. imitator*. The present research is focused on testing these candidate genes for an association with banded/striped dorsal patterns as well as dorsal coloration in *R. imitator*. To do this, we set up a pedigree by crossing striped and banded individuals for two generations. We used Sanger sequencing along with the program Geneious to genotype each individual at the loci of interest. We quantified skin color pattern with the R packages PAVO and Patternize, and we performed a genetic association analysis to test the link between genotype and skin color pattern phenotypes using Merlin. We also compared gene sequences in a phylogenetic context with related species, which provides insight into the nature of selection acting on these genes. By testing the link between phenotypic and genetic variation for individuals within our striped-banded pedigree, we gain useful insights into the genetic basis of mimicry within *R. imitator*.

GP68

Thermodynamic and Structural Characterization of Cd(II) and Ca(II) binding to EF-hand Peptides by Isothermal Titration Calorimetry and Circular Dichroism Spectroscopy

Whitney Cameron Taylor, Akiya Wilson, Kijay Byers, and Dr. Anne M. Spuches

Calcium-binding EF-hand proteins are ubiquitous in the cell and are essential for many biological functions such as muscle contraction and cell signalling. Divalent cadmium, Cd(II), is a toxic metal that is known to mimic the calcium ion, Ca(II), due to their similar ionic radii (0.99 and 0.97 A respectively). While it is known that Cd(II) can interact with Ca(II) binding proteins, the affinity and structural changes that occur upon binding are not known. In this study, the following EF-hand peptides were made using solid state peptide synthesis: EF-hand V from Calbindin D_{28K} and EF-hands III and IV from human cardiac troponin C (hcTnC). The peptides were purified by reverse phase HPLC and characterized by MALDI-TOF and QTOF mass spectrometry. Ca(II) and Cd(II) binding to these peptides were studied using Circular dichroism (CD) and isothermal titration calorimetry (ITC). CD data **show that both**

Cd(II) and Ca(II) bound peptide display enhanced absorption at 220 nm, which is indicative of alpha-helical formation. ITC data reveal that Cd(II) binding to calbindin EF-hand V is thermodynamically more favored than Ca(II) binding. This confirms that Cd(II) can induce similar structural changes in these three calcium-binding EF hand peptides and that the resulting structures are more thermodynamically favored.

GP69

Biological Interactions among Hosts, Parasites, and Mercury

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Mercury is widely known as a neurotoxin. Water quality management emphasizes the importance of monitoring mercury concentration in water and animal tissues because of serious health impacts on humans. As global climate change impacts coastal ecosystems, a significant effect of those changes is that saltwater can intrude into regions that were previously fresh (like aquifers), or could elevate salinities in brackish waters of estuaries by intruding further upstream. Human surface water withdrawals and drought can magnify the situation, causing higher salinities in estuaries worldwide. Previous data have found that salinity can influence biogeochemical and microbial reactions that enhance the release of methylmercury into the water. Methylmercury is the bio-available form of mercury that can accumulate in plants and animals. Among the animals that take up methylmercury are macroparasites (for example: trematodes, cestodes, and acanthocephalans), which have been shown to passively uptake methylmercury from their host's tissue and store it, leading to lower mercury levels in some infected hosts, compared to uninfected counterparts. However, parasites can also be affected by salinity changes, thus affecting this host-parasite relationship in terms of methylmercury uptake. Our study examines these biotic and abiotic parameters along a salinity gradient, noting interactions between host, parasite, and methylmercury availability, from two North Carolina river systems. Passive sampling techniques and collapsible traps will be the primary method for collection of specimens (crustaceans and fish) from our sites. We will also collect sediment samples to compare in situ methylmercury levels in the environment with those in the sampled animals and parasites. Tissues will be analyzed for methylmercury, and parasite prevalence and richness data will be collected from our selected host species. Our data will help further understanding of the influence of methylmercury on estuarine organisms that are intermediate in both food webs and parasite life cycles, and how salinity may alter methylmercury levels in these organisms.

GP70

Immobilization of Ephrin-A1 on superparamagnetic magnetic nanoparticles via a HaloTag fusion protein for Myocardial Infarction (MI) recovery in the murine heart

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The goal of this work is to develop a novel fused-protein construct consisting of MBP-EphrinA1-HaloTag with subsequent immobilization on magnetic nanoparticles for treatment of Myocardial Infarction, commonly known as a heart attack, in mice. Using standard molecular biology and biochemistry techniques, we will verify the identity and biochemical activity of the fused protein-nanoparticle complex. After verifying that the intended complex has the desired activity, the fused protein-bead complex will be peripherally injected into mice induced with Myocardial Infarction (MI). The magnetic properties of the nanoparticles will be manipulated using magnets to selectively aggregate the nanomaterial to the designated area of the murine heart. The impacts of nanomaterial localization on MI-induced tissue damage will then be evaluated via echocardiography and immunohistochemistry. This in vivo immobilization could lead to novel therapeutic methods for human beings suffering from heart attacks. Furthermore, the methodological approach could ultimately lead to the establishment of a novel method for targeted drug delivery via magnetism that could be used for a plethora of other applications in the realm of clinical therapeutics.

GP71

Exploration of sensory hair cell regeneration through the use of light-initiated apoptosis.

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Sensory hair cells convert mechanical information into electrical signals via a collection of proteins known as the mechanotransduction (MET) complex. Mutations in MET complex genes cause deafness and can result in hair cell death in humans. Mammals cannot regenerate dead or damaged hair cells. Current research on gene replacement therapies for human deafness will not work if MET-deficient hair cells have died and cannot be regenerated. Thus, it is important to determine whether MET-mutant hair cells can regenerate. Non-mammalian vertebrates have the ability to regenerate these cells and make good models to study regeneration. Our study aims to characterize the regenerative capacity of MET-deficient hair cells in zebrafish as a step towards initiating this ability in humans.

To study regeneration in non-mammalian models, apoptosis is triggered by ototoxins that enter the hair cell

through functional MET channels. For mutants with non-functional MET channels, the use of ototoxins is impossible as toxins cannot diffuse into the cell to trigger death. Physical ablation is not a good option because damage to support cells can lead to confounding results. Thus, to study regeneration in MET-deficient hair cells, we need to develop a new ablation method that eliminates issues that come with traditional methods.

We hypothesize that targeted cell death of MET-deficient hair cells can be achieved using the OptoBAX system. OptoBAX is an optogenetic switch to induce apoptosis that exploits a light-dependent interaction between Cry2/CIB proteins naturally found in *Arabidopsis*. In the engineered OptoBAX system, CIB is tethered to the mitochondrial outer membrane via fusion with a mitochondrial-targeting transmembrane domain. The pro-apoptotic protein BAX is expressed as a fusion with Cry2 where it resides harmlessly in the cytoplasm. When cells are exposed to blue light, the CIB-Cry2 interaction is triggered. Thus, BAX is rapidly recruited to the mitochondrial outer membrane where it induces the release of cytochrome C and the initiation of apoptosis. This system has been demonstrated in *E.coli* and cultured mammalian cells but has not yet been attempted in zebrafish. OptoBAX would allow for the specific targeting of ototoxin-resistant sensory hair cells while eliminating the drawbacks associated with traditional methods. Furthermore, OptoBAX will allow us, for the first time, to study of regenerative capabilities of MET-deficient hair cells.

GP72

Particle Induced X-ray Emission: Calibration of GUPIX Software for Elemental Analysis

Robert Michael Seip, Jefferson L Shinpaugh

A material analysis system has been developed in the ECU Accelerator Laboratory in the Department of Physics using Particle-Induced X-ray Emission (PIXE) to determine trace element composition of a wide range of sample types. Samples are irradiated with protons having an energy of 2 MeV from the 2-million-volt tandem particle accelerator, and characteristic x-rays emitted from the samples are detected with a state-of-the-art silicon drift x-ray spectrometer. The emission spectrum data is imported into an analysis software program (GUPIX) in which the data is then fit using a database of known spectral line energies to determine elemental composition of the sample. Calibration of the system is performed using sample standards of known composition. Details of the PIXE beamline and GUPIX software, including the multiple-sample analysis capabilities of the system, will be presented, and proposed multidisciplinary applications for biology, archeology, and medicine will be discussed.

GP73

Using otolith microchemistry to characterize the life histo-ry of Hickory Shad (*Alosa mediocris*)

Christopher Ryan Hill and Roger Rulifson

Highly migratory fishes present an array of challenges to fisheries managers, especially when a species crosses over management borders and occupies multiple management jurisdictions. Therefore, managers need a method to separate fish populations into sub populations and spawning populations. One popular method is the use of otolith microchemistry. Otoliths are paired mechanosensory structures in the teleost fish inner ear, which help with hearing, balance, and environmental orientation. The pattern of otolith growth throughout life records the ambient water environment allowing researchers to make quantitative inferences about origin, movement, and various other aspects of life history. Here, the species of interest is the Hickory Shad (*Alosa mediocris* (Mitchell 1814)), an anadromous fish of the family Clupeidae found in Atlantic coastal systems. During the spring, Hickory Shad migrate from the coastal ocean inshore to spawn in freshwater, where they are a popular sport fish during the spawning season. It is assumed that Hickory Shad exhibit fidelity (homing) to natal rivers and return there to spawn. Yet expression of natal homing by Hickory shad has never been confirmed in the literature. We used Laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) to measure the concentrations of elements in the otolith from birth through life, which indicate the different habitats occupied and provides complete life history information. Sagittal otoliths were taken from Hickory shad caught in 27 watersheds that connect to 9 estuaries. The concentrations of seven different elements (Mg^{2+}, Mn^{2+}, Cu^{2+}, Zn^{2+}, Sr^{2+}, Ba^{2+}, and Pb^{2+}) were measured along cross sections of sagittal otoliths using the laser to ablate the otolith material. The chemistry signature along the laser tract will be compared between specimens using analysis of variance (ANOVA) and Tukey's honestly significant difference (Tukey's HSD) post-hoc test. A classifier will then be developed using machine learning algorithms to identify watersheds based on the otolith chemistry of each fish. Results will be used to recommend appropriate strategies to manage Hickory shad populations and promote their sustainability.

GP74

Benthic foraminiferal assemblage and sedimentological changes at the type locality of the Pliocene Yorktown Formation, Southeastern Virginia

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The Pliocene Yorktown Formation consists of four lithologic units that record three marine transgressive sequences along the U.S. mid-Atlantic margin; the Sunken

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Meadow Member, which corresponds to the Zanclean Stage, and the Rushmere, Morgarts Beach and Moore House members, all assigned to the Piacenzian Stage, were deposited during a time when global atmospheric CO_2 concentrations were similar to present, average sea-level and temperatures were ~25 meters and ~3°C higher than current, respectively. The largest cool to warm transition during the Piacenzian, the transition from Marine Isotope Stages (MIS) M2 and M1 (~3.30-3.24 Ma), is recorded in the Rushmere and Morgarts Beach sediments. Samples were collected at the lectotype section of the Yorktown Formation, along the James River near Rushmere, Virginia, and analyzed for benthic foraminifer community and sedimentological changes between each member. Assemblage data are compared to a high resolution alkenone record to establish age control on the Sunken Meadow Member, as well as to contrast productivity and sea surface temperature changes with reorganization of benthic foraminifer communities Preliminary results show a shift in species dominance in each member of the Yorktown Formation concurrent with changes in grain-size distribution. The most notable turnover occurs between the conformable Rushmere and Morgarts Beach members, where dominance rapidly transitions from the epifaunal species *Elphidium excavatum* to the infaunal species *Buliminella elegantissima* and the percentage of sand decreases from ~75% in the Rushmere Member to ~20% in the Morgarts Beach Member.

GP75

WRF Simulations of Hurricanes Matthew and Nicole

Russell James, Rosana Ferreira, Christopher Acree, Christopher Jarrett, Aaron Newns, Amanda Farr, Victoria Thompson, Kinley Hunsberger

On October 6th-11th 2016, Hurricane Matthew impacted the East Coast of the US. Initially brushing along the Florida and Georgia coastlines as a Category 3, Matthew made landfall as a Category 1 hurricane in Summerville, SC. Hurricane Matthew produced gusty winds and heavy rainfall in Eastern NC. Hurricane Nicole initially developed on October 4th, 2016, becoming a major hurricane on October 13th. Hurricane Nicole tracked to the northeast impacting Bermuda before moving away and transitioning into an extratropical cyclone.

While hurricane forecasting has improved in the past few decades, challenges remain, especially in intensity forecasting. This study uses the Weather Research and Forecasting Model (WRF) to simulate Matthew and Nicole's tracks and intensity. Eight WRF simulations were performed to study the sensitivity of hurricane track and intensity forecasts to differences in the parameterization of clouds and boundary layer, as well as the effect of sea surface temperatures and model resolution. Model results are compared to Matthew and Nicole's observed track and intensity. The goal of this study is to answer the following questions: 1. How did the different WRF setups affect the track and intensity of Matthew and Nicole? 2. Which simulation most closely followed the actual track? And 3. Did Hurricane Nicole influence the track of Matthew and vice-versa?

GP76

WRF Simulations of the 2009 Southeastern United States Convective Season Onset in a Future Climate Scenario

Matthew B. Little, Dr. Rosana Ferreira, Dr. Thomas Rickenbach

This work uses the Weather Research and Forecasting model to project how precipitation patterns may change under a warmer climate in the Southeast United States (SE US). Two simulations are performed using boundary conditions from the 6-hourly 0.5 degree Global Forecasting System (GFS) reanalysis data and daily 0.5 degree Real-Time Global Sea Surface Temperature High Resolution data. The first simulation, used as a control in this experiment, models weather in the SE US from March – June in 2009, and is used to represent the seasonal current climate in the region. The second simulation is performed using a pseudo-global warming method assuming an RCP8.5 future climate scenario, using Coupled Model Intercomparison Project Phase 5 multi-model mean temperature anomalies to adjust GFS reanalysis temperature variable values, to model a warmer climate estimated as the 2090 – 2100 decade. Changes in precipitation organization in the warmer climate will be analyzed within a framework which separates precipitation features into two classifications, isolated and mesoscale, depending on whether the precipitation feature is greater or less than 100 km in contiguous horizontal length. This analysis will identify projected changes in the convective season onset date, and/or in precipitation patterns according to precipitation classification, as well as identify mechanisms that influence precipitation pattern changes in the SE US.

GP77

Capping a swine farm wastewater lagoon: water quality impacts in eastern North Carolina

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Concentrated animal feeding operations (CAFOs) have been linked to degradation of water quality, especially with respect to nutrient loading and eutrophication. North

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Carolina is the second largest hog producer and is a multibillion-dollar industry. The most common method of wastewater treatment is to collect and treat swine waste in an open pit (called a lagoon). The farmer periodically extracts and treats liquid wastewater and irrigates sprayfields. One of the challenges with this method of wastewater management is odor mitigation, which have long been cited as a nuisance in communities near CAFOs. An alternative strategy has been to cover the lagoon to prevent odor and nitrogen volatilization. However, very few studies have shown how this management strategy may impact the system and nitrogen mass balance. The goal of this study is to quantify total dissolved nitrogen concentrations in groundwater and surface water upgradient and downgradient of sprayfields at a swine farm. Monthly data collection began in October 2019 and will continue through May 2020. During each sampling event grab samples were collected and analyzed for total dissolved nitrogen in the Environmental Research Laboratory at ECU. Preliminary conclusions suggest there could be water quality impacts due to capping the lagoon, but more data is needed. Specific conductance can serve as a tracer for waste and there were elevated values downgradient from the farm verses upgradient (background data) from the farm. In January 2020 the lagoon had a value of 4657 µS/cm, downgradient surface water had 155 µS/cm, downgradient groundwater had 892 µS/cm, upgradient surface water had 30 µS/cm, and upgradient groundwater had 209 µS/cm. Further nitrogen concentration data are forthcoming as samples will be continued to be collected and analyzed. If capping a lagoon introduces higher concentrations of nitrogen in the system, then additional management practices may be needed to enhance nutrient management at the site scale.

GP78

Gram Positive under Aluminum Stress: *B. altitudinis* and its survival on aluminum alloys

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Aluminum, one of the most widely used nonferrous metals, has a vast impact on the industrial economy as a versatile, lightweight, and cost-effective material. Previous research shows when aluminum is submerged in aqueous environments, the metal is more susceptible to oxidation, which leads to its subsequent deterioration. Deterioration of aluminum infrastructure in aquatic environments is influenced by many factors such as environmental conditions and the presence of certain bacteria that attach to the metal surface. Due to aluminum's toxicity, the bacteria that are capable of surviving aluminum environments have sparked the interest of many researchers. Through 16s rRNA sequencing, one of the bacterial isolates present on aluminum surfaces has been identified as *Bacillus altitudinis*. These are gram-positive, rod-shaped bacteria with the ability to produce spores to resist harsh environmental changes in temperature, pH, and salinity. To understand the growth limits of bacteria present on aluminum, *Bacillus altitudinis* was isolated from the aluminum alloy 2024 that was submerged in an estuarine environment for 6-8 weeks. *Bacillus altitudinis* was isolated through a streak for isolation and placed into nutrient broth with 0.5 mM aluminum chloride to be incubated for 48 hours at 30 ° C. The growth of the *Bacillus* isolate will be examined under a range of temperatures, pHs, and salinities in order to evaluate which conditions are optimal for the isolate. The cultures will be quantified by spot plating and calculating the colony forming units per milliliter (CFU/mL). By understanding the tolerance range of the *Bacillus* isolate to the different environmental factors, this data can be used to identify how environmental stressors affect the isolates ability to tolerate aluminum and provide further insight to which environments can limit or facilitate the deterioration of aluminum infrastructure.

GP79

Phenology in a Changing Environment: Ecological Forecasts of Albemarle Sound/Roanoke River Striped Bass Stock Migration

Quentin Bratkowski Nichols, Rebecca G. Asch, and Roger Rulifson

Climate change and climate variability are leading to shifts in the seasonal timing of fish migration and reproduction (i.e., phenology) across many ecosystems and species, with changes especially common among anadromous fishes, such as Striped Bass (*Morone saxatilis*). Understanding how Striped Bass will be affected by climate change is an important issue for stakeholders across the US East Coast given its use as a recreationally and commercially targeted species. Other spawning populations of this species vary their spawning migration timing with respect to seasonal temperatures. North Carolina hosts the Albemarle Sound/Roanoke River (A/R) stock, which is the southern most major spawning population of Striped Bass. Large A/R Striped Bass (>900 mm TL) have been shown to migrate long distances in the summer reaching Cape Cod, MA before overwintering offshore in the coastal waters of North Carolina and Virginia and then returning to their spawning grounds in early spring. This study's objective is to create an ecological forecast of the timing of the Roanoke River spawning run, which can be used to determine the best time to protect large spawning females and assess the optimal timing of water releases from dams under future climate change. The study will use historical data from a Striped Bass egg survey conducted from 1959-1992 and contemporary creel survey data to model spawning migration timing as a function of river, estuarine, and coastal temperature, regional climate indices, dissolved oxygen concentration, wind speed, river flow pulse duration timing, and Striped Bass population size structure. This ecological forecast is important since there is management in place to protect Striped

Bass by closing the fishery seasonally, during their migration, yet the timing of this closure does not change. The forecast will make the fishery and the management of the fishery more efficient by providing a predictive tool to its stake holders, which could allow them to adapt the seasonal closure, seasonal fishing effort, or water releases from dams to changing spawning times.

GP80

Characterizing the Transcriptome of the *Leptosiphon jepsonii* Stigma

Albert Tucci, Carol Goodwillie, John Stiller

Most flowering plants are hermaphroditic, containing both male and female reproductive organs on the flower. This enables many angiosperm species to undergo self-fertilization (selfing). Selfing is associated with a variety of potential selective advantages and disadvantages; consequently, many flowering plants have evolved different methods to prevent selfing, while others have lost mechanisms to prevent self-pollination. Previous theoretical models have suggested that populations evolve to be either predominantly selfing or predominantly outcrossing. In light of these proposed models, plants exhibiting intermediate forms of self-compatibility have become an area of keen interest in the research of mating systems. The angiosperm *Leptosiphon jepsonii* (Polemoniaceae) utilizes what appears to be an adaptive mixed mating system. *L. jepsonii* plants exhibit delayed selfing, whereby the stigma rejects its own pollen for the first 24-48 hours of florescence but is capable of selfing thereafter.

The molecular mechanism underlying delayed selfing in *L. jepsonii* is still not well-defined. To shed light on this important mating-system innovation and to help identify the context in which it operates, I am characterizing the transcriptome of *L. jepsonii*. Just before flower opening, RNA-Seq data was gathered from stigma, leaf, and petal tissue from three different populations of *L. jepsonii*. A global transcriptome was assembled using Trinity software, and subsequent differential expression analysis was performed with a kallisto-sleuth pipeline. From the global transcriptome assembly, a kallisto-sleuth pipeline identified 10,253 predicted transcripts identified to be differentially expressed with respect to the *L. jepsonii* stigma. These predicted transcripts were then annotated with Gene Ontology (GO) and KEGG identifiers for functional analysis. Further enrichment analysis was performed based on transcripts significantly upregulated in the stigma. This enrichment analysis found cell wall organization and cation transmembrane transport to be the biological processes most frequently associated with stigma-specific transcripts.

GP81

Preparing DNA Origami Structures for Protein Binding Experiments

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DNA molecules may strategically be folded into various nanostructures through complementary base pairing between segments on the molecule and oligonucleotides. The resulting structures may be designed to serve a particular function. In particular, self-assembled DNA nanoswitches may be used to measure protein binding strength in the Centrifuge Force Microscope (CFM). The focus of the current project is to develop appropriate DNA nanostructures from circular, single-stranded DNA molecules derived from M13mp18 that may be incorporated into the CFM. Successful implementation of these nanostructures into the CFM will allow for the characterization and manipulation of various antibody-antigen bonds. Progress towards these goals will be presented.

GP82

Identification and characterization of biocatalysts for synthesis of the Wieland-Miescher Ketone

Mitul P Patel, Robert M. Hughes

The world of synthetic chemistry has been revolutionized and dominated by transition-metal based catalysts, which allow scientists to perform complex chemical reactions with control of stereochemistry. However, these catalysts have several drawbacks including high cost, toxicity, and adverse environmental effects. As a result, chemists are currently exploring the benefits of using biocatalysts for carbon-carbon bond forming reactions. Biocatalysts are derived from biological molecules such as proteins, RNA, and DNA, and can be obtained from a wide variety of sources including plant, mammalian, fungal, and bacterial species. Lipases, a versatile class of biocatalysts, have been studied extensively over the past few decades. They have been shown to function in non-aqueous media/organic solvents, possess catalytic activity for a wide range of organic transformations, and can be recycled via various immobilization strategies. In this study, we explore the catalytic properties of commercially available lipases by screening them for catalysis of the Robinson Annulation, a synthetically important carbon-carbon bond forming reaction. Specifically, we screen our lipase library for synthesis of the Wieland-Miescher Ketone, an important intermediate in the synthesis of biologically active compounds such as steroids and terpenoids, from methyl vinyl ketone and 2-methyl-1,3-cyclohexanedione. We present an optimized procedure for Wieland-Miescher Ketone synthesis using a crude preparation of porcine pancreatic lipase (PPL), reporting on both yield and enantiomeric excess. Finally, while commercially available lipases are generally sold as crude preparations, containing many different enzymes, they are used by many researchers without further purification. Therefore, we describe methodology to isolate and characterize the active component(s) of these lipase preparations.

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Design and Application of an MeV Range Particle Accelerator Beamline for the Purpose of Luminescence Studies

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Optically Stimulated Luminescence (OSL) and Thermoluminescence (TL) are methods which allows us to determine the dose absorbed by a crystal structure. One potential method of delivering such a radiation dose would be using a particle accelerator. This presentation describes the design and application of a particle accelerator beam line that enables controlled irradiation of a variety of different samples. Post irradiation luminescence measurements allow us to determine dose and other characteristics.

There are many components that are crucial for the construction of an OSL beamline. A drift tube guides radiation from the particle accelerator to the chamber while at vacuum. A vacuum tight chamber houses several samples at a time and an actuating arm wired to an electric motor extends individual samples into the path of radiation. Multiple turbo and rough pumps evacuate the line down to the required pressure, which is monitored by ion gauges. A light tight structure surrounds the portion of the beamline which is accessible to samples to prevent the samples from being tarnished by light post-irradiation. Faraday cups allow for current measurement before collimation and inside the chamber. These currents can be used to calculate the number of particles entering a substance, and thus, the energy deposited in the crystal. A YAG scintillation crystal will allow for beam surface area measurement and a camera can use pixel analysis software to measure beam uniformity. This will allow the absorbed dose, with error, to be calculated.

The overall goal of this research is to characterize the influence of low energy ion irradiation on luminescence properties of minerals. We will irradiate multiple samples (Al_2O_3:C and high-purity quartz) with differing ions (H, Li, and C), energies (500 KeV-10 MeV), fluences (10 mGy-100 Gy), and currents (nA-mA). We will then investigate the shapes of the resulting OSL and TL curves as well as their dose response characteristics. This will further our understanding of the influence that ion, ion energy, dose, and dose-rate have on the luminescence properties of crystals (e.g. the range of natural alpha-radiation).

Hogging the Groundwater: Water Quality and Economic Impacts of Concentrated Animal Feeding Operations in Eastern North Carolina

Thomas J. Vogel, Randall Etheridge, Ariane Peralta, Jacob Hochard

Rural eastern North Carolina relies heavily on unregulated private groundwater wells for household drinking and sanitation. Currently, the eastern North Carolina counties of Duplin and Sampson lead the nation in pork production and use open-air waste storage systems that place additional sources of contamination in close proximity to shallow residential drinking water wells. During extreme rain or flood conditions, such as those occurring during Hurricane Florence, the open-air lagoons can overflow, release untreated waste, and contaminate surface and groundwater. While hog farming and processing remain critical to the local economy, the industry has created a persistent environmental burden on the region. Current literature indicates that the cost of water quality testing and the availability of accessible information about testing and contamination are significant barriers. The proposed study will be an interdisciplinary approach using both geoscientific and economic techniques to address two major questions: 1) do these communities experience greater vulnerability to flooding and well impairment from microbial and inorganic contaminants that cause gastrointestinal illness and other adverse health impacts? and 2) does locating private groundwater supplies near CAFOs increase contamination risk during flooding? Water quality implications will be examined using a combination of GIS, water quality testing, and hydrologic techniques. An economic study will examine the influence of different forms of printed notification on residential water quality testing. While several studies examine the impact of receiving a notification as well as the impacts of different messages, little work examines the impact of changes in communication format on preventative testing.

Ciguatoxin detection and model predictions for use in fisheries management in Puerto Rico

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People in tropical coastal communities rely on fishing for sustenance, tourism, and recreation. However, fishes in tropical and subtropical regions globally, can be affected by ciguatera toxin (ciguatoxin, or CTX), a potent neurotoxin. If ingested by humans in concentrations >0.1ppb, it can cause a variety of symptoms i.e. vomiting, diarrhea, paresthesia (burning of the skin), the reversal of hot and

cold sensations and occasionally death. Precursors to the toxin are produced by several strains of dinoflagellates living on coral reefs, most notably the *Gambierdiscus* spp. Once these dinoflagellates are consumed by reef animals, the precursors are metabolized into different forms of the potent neurotoxin. The toxin then biomagnifies up the food chain. There is no simple (visual inspection, smell, taste, etc.) way to determine if a fish is harboring potent levels of the toxin. Therefore, the goal of this project is to identify high CTX "hotspots" and low CTX "coldspots in Puerto Rico and St. Thomas (USVI) with the objective of modelling the biomagnification of CTX up the food web chain at each area to simulate how long it will take top predators (great barracuda, jacks, and hogfish) to become toxic (>0.1ppb). To find hotspots and coldspots we interviewed commercial fishermen along the coast of Puerto Rico to investigate their traditional ecological knowledge of CTX. We confirmed toxicity of CTX hotspot areas reported by fishermen by quantifying the toxic dinoflagellates present and testing fish samples for CTX we captured at those sites. This is done by using a fluorescence assay to detect positive samples; then those samples are further analyzed to quantify CTX concentrations with a more sensitive mouse neuroblastoma cell assay (N2a-CBA). So far, the fishermen-predicted hotspot, Guyama, has produced more confirmed toxic fish than the predicted coldspot, Fajardo. All of these data, along with dinoflagellate cell counts, fish counts taken while SCUBA diving and diet analysis of fish samples, will be used to create a food web model for the hotspot and coldspot areas. Both models will be given to Puerto Rico fisheries managers and the Caribbean Fisheries Management Council to help predict when high-trophic-level fishes may be toxic. We recommend a monitoring program of the dinoflagellate cells along the reef in hotspot areas could be used to closely monitor the reefs and keep people safe in Puerto Rico and expand fisheries exports for the territory.

GP86

Safe Havens and Hot spots: Radiation in Martian permafrost and its influence on the survival of ancient life

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Permafrost on Mars is considered a primary target for the search for life. I propose to carry out the first quantitative study of ionizing radiation in permafrost and its influence on ancient life using 3D modelling of Martian regolith based on Monte Carlo simulations to obtain information about radiation safe havens and hot spots. To validate the model results, permafrost samples from the Antarctic Dry Valleys that feature different ice contents and sediments characteristics will be used as Mars-analog samples and will be investigated through laboratory-based measurements and computer simulations. This validation step will also provide information on background radiation in terrestrial permafrost which is not currently available.

The goal is to understand how safe havens and hot spots in the radiation environment on a microscopic scale, influence the survival and preservation of DNA of microbes in Mars. The effective radiation dose absorbed by a microorganism, and thus its survival probability, depends strongly on its microscopic location and its environment. Current values for survival rates on Mars are estimates based on the average expected dose rate in the subsurface. Average values can over- and underestimate the true survival probabilities by an order of magnitude and more.

This dissertation directly addresses the question: how does variation in the radiation environment have an impact on the survival of microbes and preservation of DNA from microbes? The goal is to determine the potential for: (1) the presence of extinct or extant life on Mars and (2) the preservation of biological information in extreme environments on Mars and Earth.

GP87

The Shadow Duck: Genetic Conservation in a Critically Endangered Bird

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Endangered animals can be difficult to maintain in captivity; however, these populations are important to conserve many species. In the case of the critically endangered White-winged Duck (*Asarcornis scutulatta,* WWD), the future of the global population rests on improving their captive management. Known for their ghostly calls, efforts to conserve this species via captive breeding have been hindered because captive populations appear to be highly susceptible to *Mycobacterium avium avium* (avian tuberculosis) infection that results in the premature mortality of over 80% of these birds. Therefore, despite the fact that birds can be readily bred in captivity, long-term maintenance and release to the wild is not yet possible. The underlying basis of this susceptibility is unknown. One possible cause for increased disease susceptibility in captive populations is inbreeding. In order to characterize the genetic variation in WWD, we produced a high-quality whole genome sequence using the 10X chromium platform. This genome allowed us to assemble genomes from an additional 30 individuals. This sampled population includes ten current captive members, nine historical captive members, and eleven wild individuals. Contrary to our initial beliefs, our data suggests that genetic diversity has always been low in WWD compared to other endangered avian species. Furthermore, their decline started thousands of years prior to the anthropogenic effects blamed for their endangered status. With our sampled population, we have the ability to fully characterize polymorphisms across WWD with relation to their recent his-

tory. Differences between the wild specimens, their historical captive members, and the current captive individuals will provide important insight into the genetic architecture of a critically endangered species and its management in captivity. Given their historical decline, captive management will be paramount in the future of the WWD.

GP88

Spatial and Temporal Variability of Nitrogen Concentrations in Groundwater Near Two Onsite Wastewater Systems Assessed Using Field Sensors and Laboratory Methods

Caitlin Skibiel, ECU, Dr. Charles Humphrey, ECU, , Guy Iverson, ECU, , Dr. Michael O'Driscoll, ECU

 Onsite wastewater systems (OWS) discharge septic tank effluent to drainfield trenches installed beneath the land surface. Various physical, chemical and biological treatment processes may occur in soil beneath the drainfield trenches that reduce the concentration of pollutants in wastewater as it percolates toward groundwater. Monitoring of groundwater near some larger OWS is required to determine if water quality standards for various pollutants such as nitrogen are exceeded. Due to costs, most monitored sites have only three wells surrounding the OWS and the wells are only sampled three times a year. However, the number and location of wells and the frequency of sampling may influence findings with regards to water quality near OWS. Field sensors that measure dissolved inorganic nitrogen (DIN) species including nitrate and ammonium have been developed that may allow for an economical way to measure DIN at a higher frequency than traditional laboratory methods. The goal of this study was to gain more information with regards to the spatial (n = 669) and temporal (n = 776) variability of DIN in groundwater near two OWS with extensive networks of groundwater wells (n > 20). An objective of the project was to evaluate the spatial and temporal variability of DIN in groundwater beneath the OWSs using field sensors and traditional laboratory methods. The study was conducted over a 6-year span.

GP89

Evaluating how the habitat complexity of North Carolina seagrass meadows affects the faunal community composition

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Research has demonstrated that habitat complexity can greatly affect community composition and structure across ecosystems. However, habitat complexity can vary as a function of the species making up that habitat (foundation species). Thus, species-specific variation in complexity within a habitat likely influences how organisms within a community use that habitat. To investigate how complexity affects community composition, we compared seagrass habitat complexity and community composition across mono- and polyculture beds of three foundational seagrass species, *Zostera marina, Halodule wrightii,* and *Ruppia maritima,* in the shallow sounds of North Carolina. To quantify seagrass complexity, we measured multiple complexity metrics across three different scales: landscape (bed area, habitat fragmentation), bed (seagrass species richness, canopy height, percent cover, shoot density), and quadrat (leaf width, shoot and leaf length, and leaf and branch number). To assess community composition, we quantified the density (ind./m^2) of sessile fauna using quadrats and cores and mobile fauna using replicate otter trawl tows within the surveyed beds. We hypothesize beds with greater complexity, measured across multiple metrics, and greater complexity at larger scales (landscape and bed), will support a higher diversity and abundance of faunal species. Climate change has the potential to affect the future distribution of seagrasses in North Carolina, with the less heat tolerant *Z. marina* being replaced by *H. wrightii* and *R. maritima,* changing the composition and complexity of these habitats. Understanding how changes in seagrass bed composition affects the ecosystem services of fish communities utilizing seagrass meadows is critical for future management.

GP90

Exposure and Magnitude of Stress in College Students

Lauren Hope Conder, M.A. Christyn Dolbier, Ph.D.

College students today endorse significant levels of stress and report greater levels of distress than past generations (Pryor et al., 2010). Researchers also found significant increases in mental health symptoms and family and academic distress (Xiao et al., 2017). Developmentally, coming to college is related to an increase in independence, as well as financial, social, and academic stressors (Falsafi, 2016). While previous researchers measure stress in college students, limited research exists on the types of stressors that students find most distressing currently. Many measures of stress quantify the amount of stress that college students are experiencing without examining the most prominent domains of stress. The current study examined which domains of stress that college students most frequently experienced as well as the which domains where most frequently endorsed as stressful. Additionally, relationships between exposure and magnitude of stress were associated with depression and anxiety. Based on factor analysis, domains of stress consisted of academic, time management, concern about future career and job, finances, appearance, family, romantic part-

ner, roommate, health reliance, transportation and food, safety, and work stress.

Participants consisted of 720 students in Introductory Psychology courses who received research credit for completing an online survey measuring stress, generalized anxiety, and depression. The majority of the participants were female (65%), white (70%), continuing generation college students (68%), from NC (81%), and students in their first semester of college (65%).

College students in this sample most frequently endorsed experiencing stress due to academics, being away from home, and time management, respectively. With regard to stress magnitude, or the amount of stress that students indicated experiencing over a specific domain, students endorsed academic, time management, and being away from home, respectively. Those with clinical cutoffs for depression and anxiety had greater stress magnitude in all domains, and stress exposure was greater in all domains except being away from home.

Findings from the study provide a snapshot of the domains of stress that college students are currently experiencing and the magnitude of stress that is endorsed. These findings can provide additional information to ECU's Counseling Center and other university officials to impact campus programming and stress management groups.

GP91

Exploring Relationships among Religious Coping, Perceived Stress, and Mental Health in a Sample of College Students

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Research suggests that college students face higher levels of stress across domains, which can have a negative effect on their psychological well-being (Garett et al., 2017). With levels of stress on the rise, college students are vulnerable to mental health concerns (Zochil & Thorsteinsson, 2017).

Students also use multiple strategies to cope with stress, including using religious resources to manage stressful circumstances (Park et al., 2016). Pargament et al. (2011) defined religious coping as efforts to deal with life events in ways that related to the sacred. They also described various functions of coping, including looking to God for comfort, finding meaning in their beliefs, or gaining control through their religion or spiritual activity.

The current study examined the relationships of religious coping, stress, anxiety, and depression in a sample of college students. Participants (66% female, 68% white, 86% first-year students, 33% first-generation college students) were 474 students in Introductory Psychology courses who received research credit for completing a survey that included the Perceived Stress Scale (Cohen & Williamson, 1988), modified items from the Religious Coping Scale, or RCOPE (Pargament et al., 2011), and the Brief Coping Orientations to Problems Experienced scale (Carver, 1997), Generalized Anxiety Disorder 7 scale (GAD-7), and the Patient Health Questionnaire 9 (PHQ-9). Three functions of religious coping – finding meaning, seeking comfort, and gaining control – were assessed. Meaning and comfort had positive and negative valences.

Preliminary results showed significant positive correlations between all three functions of coping. Comfort, meaning, and control all were significantly negatively correlated with depression and perceived stress but not anxiety.

Independent samples t-tests showed differences between heterosexual and LGBTQ individuals in comfort ($p = .001$), meaning ($p=.037$), and control ($p = .004$) and between in-state and out-of-state students in control ($p=.026$) but not in meaning or comfort. There was also a significant difference in comfort between those involved in an ECU student group and those not involved ($p=.037$). An ANOVA showed differences between Black and White students in control ($p=.014$), but no differences among Black, White, and Hispanic/Latinx students in any other coping functions.

GP92

Modeling Public's Preference for Solar Energy Siting in Rhode Island

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A fundamental factor in the current expansion of utility-level solar generation in coastal US is the availability of large land area for conversion or installation of large-scale utility solar generation. This study will therefore estimate public's preference for large utility-scale solar energy production. We would also estimate respondent's willingness to pay based on their preferences for solar siting on four land types namely agricultural land, brownfields, commercial and forest land. We designed a discrete choice experiment survey to help evaluate how various attributes affect respondent choice of large utility-scale solar energy siting in Rhode Island as well as examine public's willingness to pay for a large set of solar siting decision attributes. The discrete choice experiment will test diverse attributes consisting of different levels that may affect the solar siting preferences. These attributes include size of solar installation; visibility of solar panels; change in the price of electricity; setback or a minimum distance of the solar panels from property lines; placement of transmission lines; probability of residential development. Data from Geographic Information Systems (GIS) that measure the distance from each property clos-

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est solar installations will also be used to model hedonic pricing function that estimate how structural or environmental characteristics affect prices of properties in Rhode Island.

GP93

Gender and Racial Identity Influences on Smoking Behavior of College-Aged African American Women

Shelly A. Thornton, MA & Lisa C. Campbell, PhD

African American women (AAW) smoke less than their gender and racial counterparts, yet they face higher risks for smoking-related disease development and mortality. It is therefore important to identify factors that may contribute to smoking within this population. Social Identity Theory (SIT) posits that individuals strengthen their sense of belonging with social groups by adopting sets of normative perceptions, attitudes, values, and behaviors. This study examined gender and racial social group influences on smoking behavior in a sample of African American college-aged women guided by a SIT framework. This study sought to (1) examine links between gender identity and smoking norms and links between racial identity and smoking norms, and (2) determine whether gender and racial identity predict smoking behavior.

Participants were 157 undergraduate AAW, aged 18 to 22 (M = 18.55, SD = 0.87), and 8.3% self-identified as current smokers

Results indicated that, on average, participants endorsed three elements of identity strongly across gender and race (i.e., in-group affect, centrality, and in-group ties). In contrast, they felt less strongly that they were prototypical of their gender and race (i.e., felt-typicality). This suggests that AAW's identification with female gender and African American race extends beyond self-perceived similarity to others in their gender and racial social groups. Results also indicated that there were similar patterns of positive endorsement across gender and racial identity dimensions, suggesting that gender and racial identity were similarly salient within this population of AAW. Neither gender nor racial identity predicted smoking norms, however having strong positive feelings associated with one's identity as a woman may have a marginally increased the odds of being a smoker(i.e., gender in-group affect; $Wald$ = 3.08, p = .08)..

Overall, smoking among AAW was reportedly not a common behavior, which is positive from a health promotion standpoint. However, given the low rates of smoking, the study may have been underpowered to examine gender and racial identity influences in smoking more rigorously. Further exploration of gender and racial identity influences on smoking behaviors requires a sample with a higher proportion of smokers to establish gender and racial identification as cultural and social influences in smoking initiation and/or maintenance.

GP94

Workaholism and Well-Being: The Moderating Role of Psychological Capital

Beatrice L Demott, Shahnaz Aziz, PhD

In the present study, we examined the relationships between workaholism, psychological capital (PsyCap), and components of well-being (i.e., physical health, mental health, and work stress). Workaholism is conceptualized as a compulsive need to work, and it is related to numerous negative organizational and individual consequences. For that reason, it is imperative that researchers uncover possible variables that can alleviate the effects of workaholism. Therefore, in the current study, we sought to investigate the possible moderating role of PsyCap in the workaholism–well-being relationship. The sample consisted of 337 full-time faculty and staff from a large Southeastern university. Results showed workaholism was negatively related to physical and mental health, and positively related to work stress. Additionally, PsyCap had a positive relationship with physical and mental health, and a negative relationship with work stress. Moreover, PsyCap moderated the relationship between workaholism and physical health, such that as PsyCap increased, the relationship between workaholism and physical health weakened. Future directions, organizational implications, and limitations are also discussed.

GP95

The Effects of Weather and Climate on Tourism Businesses

Meredith Teasdale & Dr. Emily Yeager

Beginning twelve years ago, The United Nations World Tourism Organization (UNWTO) recognized the vulnerability of the global tourism industry to climate change impacts including: sea level rise, desertification and the scarcity of water, deforestation and harm to biodiversity, and the melting of snow and glaciers. Climate and weather directly impact tourism businesses in multiple ways including: adequate staffing based on certain weather conditions, safety during problematic conditions, risk management plans that will aid businesses during unsatisfactory conditions, as well as future planning regarding investments, supply orders, overhead expenses, adjustment of current practices, and recognizing/adapting to current vulnerabilities (Becken, 2013). Tourists not only consider cost when deciphering between destinations, but they also consider the seasonal (climate) and weekly (weather) forecasts for a destination (Curtis, Long, & Arrigo, 2009). Similarly, tourism businesses utilize climate and weather forecasts for short-term operational, long-term operational, and financial planning purposes (Ayscue et al., 2015; Lourenço et al., 2016). Potential weather threats lead tourists to choose secondary destination options that results in economic loss to local economies (Curtis et al., 2009). Due to the dependency on its natural resources,

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the physical effects of climate change and extreme weather events (hurricanes, flooding, etc.) can affect a coastal tourism business's sales performance, which in turn, influence operations and services. This project aims to expand the data set and the scope of Ayscue et al.'s (2015) work in order to grow an understanding of the range and purpose of climate and weather forecasts used by coastal tourism businesses. Also, metadata will be collected for each business by researching existing coastal businesses and documenting the business type as classified by the 2017 US Census Bureau North American Industry Classification (NAICS) codes. This project will also result in the development of a mini proposal that can be used in the identification of at least two extramural funding sources. The results of this project will be used in a future study that includes the redistribution of a revised Climate and Weather Forecast Survey for NC Coastal Businesses (Ayscue et al., 2015). Completion of the project is expected to occur in May 2020.

GP96

The Post-Graduate Adventures of an MA Sociology Student

Ashley Marie Peterson

Given the career opportunities awaiting graduate students following graduation, what career paths do sociology MA graduates choose to pursue? The current study presents an analysis of post-graduation career attainment of East Carolina University Master of Arts Sociology alumni. The study observes patterns in alumni career paths and occupational mobility following graduation from a terminal MA program. Data is based on a sample of over 100 individuals who graduated from the MA program in sociology between 1998 and 2018. Names of graduates were obtained from the ECU alumni office. Graduates were searched by name on the career and networking website LinkedIn and their status as program graduates was verified through education affiliation as presented on their LinkedIn public profiles and in resumes uploaded to the website. Self-reported data on alumni career paths was also obtained from their public profiles. Qualitative data from LinkedIn profiles was retrieved and database constructed to describe subsequent post-secondary education, various positions held, and job responsibilities that enables their career paths since graduation to be reconstructed. Qualitative data was then categorized and coded to enable quantitative description and analysis. The presentation proposed here will present a descriptive analysis of results and discuss the methodology used, emphasizing its usefulness as an accessible program evaluation tool for other academic programs.

GP97

Using Functional Analysis in the School Setting to Treat Maladaptive Behaviors in a Student with Autism

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Functional analysis is a behavioral assessment method that manipulates environmental variables to determine the function of an individual's target behavior (Fisher, Piazza, and Roane, 2011). The present study aims to identify the function of a student with autism's maladaptive behaviors through a functional analysis conducted in the school setting. First, a literature review was conducted to explore the use of functional analysis in the school setting, as well as the different factors that can influence a student with autism's behavior. Using these findings, a hypothesis was developed as to why an elementary school student with autism is engaging in maladaptive behaviors that include being out of seat, eloping from the classroom, pulling and grasping at staff, and crying or whining. A free-operant preference assessment was conducted to determine a hierarchy of reinforcer value to the student. Next, a functional analysis was conducted in the school setting to determine the function of the student's behavior of being out of seat. Using the information from the functional analysis, interventions were developed to increase the duration of which the student could stay in his seat and attend to academic tasks. Results indicated that the interventions were effective in increasing the duration of the student staying in his seat. This study demonstrated the efficacy and practicality of using functional analysis to develop appropriate interventions for students with autism in the school setting.

GP98

Bioarchaeological Analysis of a Late Bronze Age Skeletal Assemblage from Kataret es-Samra

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Late Bronze Age (ca. 1550–1050 B.C.E.) Kataret es-Samra Tombs 1 and 2, found in the Jordan Valley and excavated in 1978 and 1985, have undergone only preliminary analysis. The Late Bronze Age signals a period of transition within the Near East, during which many Mediterranean and Levantine civilizations underwent notable political, economic, and settlement shifts. These changes are theorized to be related to a growing global trade and the impact of the Egyptian empire. Despite many Late Bronze/Early Iron Age cemetery excavations in the southern Levant, little skeletal material has been studied, and those studies that have been conducted provide only nominal descriptions rather than an interpretive and analytical perspective. Bioarchaeological data can provide a novel perspective on both the health and diet effects of social change, and the information derived could provide a new understanding of this period of Jordanian history. This paper describes skeletal lesions that provide evidence for ratios of physiological stress and malnutrition in addition

to morbidity and mortality patterns in light of the Late Bronze Age in the Jordan River Valley.

GP99

An Investigation of Self-Efficacy, Other-Efficacy, and Collective Efficacy within an Interdependent Rope Pulling Task

Rachel Ivey Grantham

This study's purpose was to examine the relative effects of self-efficacy and other-efficacy on collective efficacy during an interdependent rope pulling task. Self-efficacy is defined as confidence in one's own ability to perform a task. Other-efficacy is confidence in a partner's ability to perform a task. Collective efficacy is defined as confidence in your team or group's ability to perform a task. Lent and Lopez (2002) suggested that the sum of self- and other-efficacy may yield collective efficacy. Thus, we hypothesized that self- and other-efficacy would affect collective efficacy. Additionally, we hypothesized that self-efficacy would affect collective efficacy more compared to other-efficacy. To test these hypotheses, twenty unacquainted male pairs participated in four practice trials, each requiring pulling a rope as hard as possible for 5 seconds with the partner. In line with Dunlop, Beatty, and Beauchamp (2011), performance perceptions were manipulated, immediately following the practice trials, through the provision of randomly allocated bogus feedback from one of four conditions; (a) both persons performed well, (b) the participant performed poorly and the partner performed well, (c) the participant performed well and the partner performed poorly, or (d) both persons performed poorly. Participants then reported their self-efficacy (SE), other-efficacy (OE), and collective efficacy (CE) using a 0-100 scale. Participants then performed in four competition trials of the same pulling task. Participants reported small differences (M= -0.62) between feedback given and feedback recalled, indicating the manipulation was successful. Results supported the first hypothesis, but not the second. In condition A, levels of SE, OE, and CE were reported to be the highest (M=92.9, 93.2, 93.9). In condition B, participants reported the lowest levels of SE (M=64.4) but maintained relatively high OE and CE (M= 86.3, 83.8). In condition C, participants reported higher level of SE (M=82), however OE and CE scores were lower (M=72, 75). In condition D, SE and OE were lower (M=72, 75.5) while CE stayed relatively high (M=80.5). These results show that in condition B, SE was low (M=64.4), while CE remained relatively high (M=83.8). However, in condition C, OE (M=72) and CE (M=75) was lower. In conclusion, the results indicate that SE and OE affect CE, while OE seems to play a larger role in CE.

GP100

Seeking Healthcare? Perceptions and Beliefs among African Americans

Jazmin L High

Overview: Multiple studies have documented health and healthcare disparities between African Americans and whites in the United States. Health disparities are defined as differences in the incidence, prevalence, mortality, and burden of disease and other adverse health conditions that exist among population groups, and healthcare disparities refers to differences between groups in the availability, accessibility, utilization, and quality of healthcare services aimed at preventing, treating, and managing illness. Many studies have traced these disparities to socioeconomic barriers such as age, race, income, and level of education. However, it has been found that when variables such as income, access, and insurance are controlled, it would not eliminate health and healthcare disparities all together. A growing body of literature suggests African Americans possess certain health beliefs and perceptions regarding concepts of health, illness, and the healthcare system, which influences health and health seeking behaviors. In addition, existing literature suggests cultural factors are influential among African Americans when it comes to their health seeking behaviors. Therefore, it is very important to explore non-economic factors and the health seeking behaviors among African Americans. Using empirical generalizations and theories of medical anthropology, this research explored health seeking behavior among rural African American adults in eastern North Carolina, as well as sociocultural factors (perceptions, beliefs) to see how they contribute to health and healthcare disparities and relate to health seeking behavior. Studying health-seeking behaviors of individuals and groups of people has become a helpful tool to understand how people engage with the healthcare system, respective of their economic, social, and cultural circumstances. Using qualitative research methods, I visited two rural eastern counties in North Carolina (Halifax County and Northampton County), where I conducted 20 in-depth semi-structured interviews. Early findings support a growing body of literature suggesting African Americans possess certain health beliefs and negative perceptions of the healthcare system, which influences health seeking behavior. With this research, we can shed light on the several factors influential in African Americans' health behaviors, which may exacerbate disparities in health and healthcare.

GP101

Untold Stories: An Ethnographers Role in Telling Stories No One Knows

Kayla Jade Evans

Princeville, North Carolina is the oldest town in the United States to be chartered by freed blacks. Originally incorporated in 1885 as Freedom Hill, Princeville still stands as a beacon of history and hope. After catastrophic flooding in

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1999 by Hurricane Floyd, and again in 2016 with Hurricane Matthew, the town of Princeville has received national attention due to their story of rebuilding and strength. These stories focused on the devastation and future of Princeville but failed to address the most important piece of Princeville; its historical and social significance. Using oral life histories, the purpose of the "Examining Community Perceptions of Resilience in Princeville, NC" project was originally to understand what resilience means to the residents and how they envision a more resilient Princeville. However, after delving into their personal stories it has become clear that the information gained from interacting with communities is sometimes more important than the questions being asked. This poster will describe the methodology of oral life histories and how it is our responsibility as ethnographic researchers to tell stories that people do not know but should.

GP102

LIFT-OFF: A SOCIAL-MEDIA DELIVERED LIFESTYLE INTERVENTION FOCUSING ON RURAL, LOW-SOCIOECONOMIC PATIENTS

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Chronic diseases (CD) affect 6 out of 10 Americans and account for 90% of annual healthcare expenditures within the United States. CDs are primarily lifestyle based and are associated with poor diet and lack of physical activity (PA). Nearly 30% of rural residents reported having at least 2 or more CDs and it is even more pronounced for rural, low socioeconomic (SES) individuals. Lifestyle management is a component of most CD prevention and management guidelines; however, these clinical programs are often less accessible in rural areas. The increase in internet access and smart phones with rural, low-SES groups shown promise for addressing barriers accessing health services and programming. Two medical clinics providing healthcare to vulnerable low-SES rural patients will participate in a pilot intervention program titled LIFT-Off: A **L**ifestyle **I**ntervention focusing on **F**ood and Physical Activi**T**y. LIFT-Off is built on the evidence-based National Diabetes Prevention Program (DPP) intensive lifestyle intervention framework which includes promotion of physical activity, healthy eating and general wellness. Notably, while the DPP provides the "what" and "why", LIFT-Off will expand to include the "how" including providing exercise routines and cooking demos. LIFT-Off also expands from the DPP to include individualized coaching, goals and peer support elements. Participants will complete baseline measures including anthropometrics, clinical measures (blood pressure, A1c) as well as a survey including sociodemographics, lifestyle behaviors, confidence and perceptions followed by a 12-week intervention delivered via closed Facebook groups. Each Facebook group will contain 10 patients and be monitored by one coach. Each coach will work with the patients to develop weekly goals to be tracked via the Lose It App. Each week coaches will upload modified DPP education material, PA content, vegetable recipes/videos, and additional health promotion materials to their closed group Facebook pages. Coaches will also track patients changes and completion of required program elements for incentives (e.g. Gift-Cards). At the end of the 12-weeks, participants will repeat the initial measures. Weekly process evaluations and an overall program evaluation will be posted via a Qualtrics link to the groups. Patients will also be invited for a final program evaluation interview.

GP103

Students Teaching Students: The Challenges of Instructing Life-Skills Classes to Inmates

Rachel Lynn Gernert & Annelyse Iglesias

North Carolina's incarceration rates have been steadily rising over the past 30 years (Aiken, 2017). Within that, the pretrial jail population has drastically increased (Aiken, 2017). The substantial growth of incarcerated individuals awaiting trial in jail suggests an increased need for programs provided to these inmates. In Pitt County, the sheriff's department has started drug recovery programs for qualified male and female inmates. The purpose of these programs is to provide comprehensive services to those struggling with addiction and tools to continue recovery after release. Among these services is a weekly life-skills class where facilitators teach participants relational skills, applicable to multiple aspects of their life. As facilitators of this class, part of the experience includes identifying the needs of this specific, marginalized population. The regulations within the detention center set limitations on the class which must be accounted for. Currently, barriers include differential privileges permitted among the male vs. female inmates, along with the implementation of a curriculum that was not designed for incarcerated individuals. Facilitators recognize a need for the creation of a curriculum specific to this incarcerated population, and the need to equalize privileges across genders.

GP104

Systematic Literature Review of Medicinal Cannabis and Therapeutic Techniques

Michelle Kelli Laster

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At the beginning of the 20th century, the United States began its decision to regulate cannabis usage. Cannabis, specifically marijuana (THC), is classified as a Schedule I

drug, meaning this plant is listed as a drug with no currently accepted medical use and a high potential for abuse (DEA, 2020). This stringent classification of cannabis has led to many consequences, an important one being research limitations. Under federal law, research institutions have had difficulty obtaining cannabis for investigating potential medical applications and treatment efficacy (APIS, 2019). Despite the current cultural revolution involving the acceptance or de-stigmatization of cannabis usage, evidence-based knowledge concerning both the therapeutic and adverse effects of cannabis and cannabinoids in humans is small. There is a limited but growing research base and what exists, provides very little information about the plant or about the human endocannabinoid system.

The current study entails a systematic literature review that will examine the state of the existing research regarding the therapeutic potential of cannabis and cannabinoids. The review will focus on critical questions such as the impact of cannabis on society, policy, and law; identifying the health consequences of non-medical use, and innovative techniques for abuse and addiction. Multiple databases will be searched using various keywords based on the above and the research team will refine and rank the resulting articles. Finally, we will synthesize the results in order to provide current practice and policy implications for healthcare professionals.

GP105

Relationship Between Self-Efficacy and Mechanical Performance in Goalkeepers on Dominant vs Nondominant Side during a Corner Kick

Cassondra Fileccia, Tommy Molina Reyes, Patrick Rider

Self-efficacy, one's belief in their ability to perform a specific task, has been positively linked to performance outcomes and widely applied to athletic performance. Previous research has focused on this relationship and how to improve efficacy to see better outcomes, but not how those outcomes are being accomplished. The relationship between self-efficacy and the biomechanical factors that are utilized throughout a sport specific task is unknown.

This study will aim to determine if biomechanical factors are related to an athlete's self-efficacy about a sport specific task, specifically a goalkeeper collecting corner kicks from both their dominant and nondominant sides of the field. To test this, we plan to recruit 10 goalkeepers who have played at or above high school varsity level within the past year. During data collection participants will fill out a self-efficacy questionnaire and receive 3 good corner kicks from each side while wearing portable eye trackers and force inserts. The biomechanical factors we will measure include joint kinematics with video analysis, ground reaction forces collected from the inserts, and eye tracking data. Student's t-tests will be used to determine differences in mean values between dominant and non-

dominant sides. Pearson product correlations will be calculated between biomechanical variables and self-efficacy values to determine if any significant relationships exist. We expect to see increases in maximum jump height and better mechanics on the dominant side based on results from previous studies (Stephens, Lawson, and Reiser, 2005; Sugiyama et al., 2014). It is also expected that there will be differences in self-efficacy scores, with decreased levels of self-efficacy when faced with corner kicks on the nondominant side.

GP106

Exploring the Challenges of elite African American Male Athletes at Predominately White Universities

Kimberly Robin Outlaw

In American society, sports participation is viewed through many lenses. with both college and professional teams, sports are popular entertainment that rivets millions of people and is discussed passionately. Sports is a major revenue-producing enterprise for universities, professional sports teams, and communities that benefit in many ways from sports attendance. For many elite African American athletes male student athletes growing up in low-income urban areas and many withput job possiblities at home, sports provide a potential means to climb out of their current economic circumstances, support their families and possibly earn millions of dollars and fame. For elite collegiate athletes particularly, sports brings scholarships and a pathway to college as well as a better career. The possiblilty of attending collegewould not be open to many of these students from poor urban areas without scholarships. This study seeks to gain insight in to the challenges experienced by elite collegiate African Americna male athletes attending predominately White universities.

GP107

Sustainability Efforts Needed: Keeping the "Magic" of Yellowstone Alive

Sydney T. Pons, Cynthia S. Deale

Yellowstone National Park was the first national park in the United States (U.S.), established by the Yellowstone Act of 1872 (Benson, et al., 2013). With unique wildlife and diverse landscapes, Yellowstone is one of the most visited National Parks in America (NPS, 2017). Amid the continued increase in the numbers of international and domestic visitors, the park faces challenges regarding its sustainability. This qualitative study investigated sustainability practices within Yellowstone, specifically those connected with Xanterra Travel Collection, a park and resort management company. It involved an extensive literature review and interviews with employees working within the park regarding their roles connected to present sustainability practices and the possible future directions for sus-

tainable practices in the park. This study discusses the different sustainable management processes in place, specifically regarding the hospitality and tourism industry. Using secondary data, library databases, and semi-structured interviews; the sustainability practices implemented in Yellowstone National Park by Xanterra Travel Collection and the National Park Service were investigated and analyzed. The research questions included the following: What are the current sustainability practices within the park? What future sustainability practices are needed? What can employees, visitors, and Xanterra do to promote sustainability for the future? Five interviews were conducted, transcribed, and analyzed to provide insights into the current and needed sustainability practices at Yellowstone. While all interviewees noted that waste disposal practices are at the forefront of successful sustainable initiatives in the park, they overwhelmingly reported the need for tourist education programs to be explored, developed, and implemented. Findings also led to the conclusion that future studies could investigate projects, including educational ones, to address the carrying capacity issues that are occurring with the growing number of visitors.

GP108

Introducing a Process to Cultivate Coastal Community Supply and Demand

Mitchell Scott Carstens

Over the past decade the shellfish mariculture industry has seen tremendous growth, but the nascent industry's capacity with regard to revenue streams and public awareness has yet to be realized. Yet, the growth of the U.S. shellfish mariculture industry is restricted due to a majority of seafood consumers having scarce knowledge of product origin and aquaculture practices (Kecinski et al., 2017). By leveraging connections specifically with the food tourism economy, the shellfish mariculture industry could receive more publicity and develop a more diversified economic portfolio, thus better positioning the industry for sustained growth (Lopez & Martin, 2006). This study aims to contribute to the growing body of mariculture tourism research by offering a process that addresses knowledge gaps related to food tourists; shellfish demand and the unification of stakeholders within the mariculture supply chain. This infographic displays a process for mariculture tourism development being piloted in N.C. coastal communities to aid the creation of the North Carolina Oyster Trail (NCOT). First, appreciative inquiry workshops are being conducted with stakeholders from various N.C. coastal communities to gain insight on existing assets. Second, to measure shellfish mariculture tourism demand, a panel survey will be disseminated among N.C. coastal community tourists to measure their travel behaviors, interest in shellfish mariculture tourism, experience preferences, perceived risks of consuming cultivated shellfish, and demographics (Kim et al., 2009; Torres 2002; Lacher, Oh, Jodice, & Norman, 2013; Flaherty et al.,

2019). Third, outcomes from the appreciative inquiry workshops and the survey data will be compared to identify and develop opportunities for preliminary shellfish mariculture tourism experiences and outreach products. The final stage includes issuing the initial panel survey used to assess coastal community tourists' demand for shellfish mariculture tourist experiences among food tourists and local seafood consumers at food festivals and through N.C. seafood distributors' communication channels. The combination of data collected between the three visitor populations will then be analyzed using factor and cluster analysis to refine the profile of potential shellfish mariculture tourists. This process can serve as a template for Southeastern U.S. coastal communities to develop tailored tools for mariculture tourism products such as the NCOT.

GP109

Using Building Footprint Data and Statewide Digital Elevation Models to Calculate Solar Irradiance On Residential Rooftops

Julian R Brady[a], Robert Howard[b], Praveen Malali[c]

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In this study, statewide North Carolina building footprint data and 20ft DEM's were used to calculate incident solar irradiation on residential rooftops in 19 coastal NC counties. The building footprint data was sorted to only include residential buildings in ArcMap. ArcMap was then used to determine the directionality of the house relative to north using the minimum bounding geometry tool. Roof slope was available qualitatively in the footprint data and with information from the NC building code and a National Roofing Contractors Association (NRCA) manual, was translated to roof pitch values. These pitch values were used to calculate an estimated roof surface area for all residences. As the inputs to the formula for calculating beam solar irradiance required metric units, the 20ft Digital Elevation Model (DEM) had to be reprojected into NC stateplane with metric units using the Geospatial Data Abstracts Library (GDAL). To speed up calculations, the DEM's were resampled to have a coarser resolution of 10m per point using GDAL. The tool, ????????_????????, was then used to convert elevation values from feet to meters. GRASS GIS was used to calculate beam solar irradiance for six months out of the year using the 10m DEM's. The irradiance data, oriented building footprint data, and roof surface area could be used to estimate the amount of solar radiation present on the inclined surfaces of the residential rooves. Because of the size of the data being used a PostgreSQL database was created to store,

sort, and run calculations on the data. The database allowed the use of a SQL script which tied together python, MATLAB, and R scripts written for individual calculations in the workflow. For future work, the results from this study will be used to assess solar power generation potential from residential rooftops in the 19 coastal counties of NC. Since services such as Google's project Sunroof have virtually no information for homeowners outside of moderate or larger sized metropolitan areas, which excludes a vast majority of eastern North Carolina, these results could fill in the gaps and help promote residential solar power generation in eastern NC.

GP110

User Ability Reflective Player Characeters in Video Games

Harley Matthew Dickson, Dr. Nasseh Tabrizi

With the coming of more commercially available virtual reality products, there may also come with it a greater trend toward sedentary lifestyles associated with video game overindulgence. Immersive environments combined with the reality escapisms that video games encourage have a tremendous potential for addiction that some even caution massive distribution of virtual reality products. Herein lies not only great potential for the deterioration of the physical health of many but also their psychological wellbeing. Eventually immersive virtual reality technologies will cross the thresholds of full body haptic feedback and response, requiring users to be physically proficient in order to remain competitively relevant. Introducing a system that uses the physical fitness metrics of users to base the virtual abilities of conventional player character avatars may be a cost-effective way not only to encourage players to become physically active but also to prepare them for coming virtual reality full body interfaces in the future.

GP111

Visual spoofing in content-based spam detection

Mark Sokolov, Kehinde Olufowobi, Nic Herndon

Consider the following email.

"Subject: Please send money

Body: I am so distraught. I thought i could reach out to you to help me out. I came down to United Kingdom for a short vacation unfortunately i was mugged at the part of the hotel i stayed, all cash, credit card and cell phone was stolen from me but luckily for me i still have my passport with me. I've been to the embassy and to the police here but they're not helping issues at all end, my flight leaves in few hours time from now but. I am having problems settling the hotel bills and the hotel manager won't let me leave until i settle my hotel bills. I am freaked out at the moment."

As expected, this email, which definitely seems to be spam, ends up in the junk email folder. However, we show that visual spoofing achieved by substituting some confusables (characters that look similar) into the above email text will enable the same email to bypass the spam filter. We also propose visual spoofing in different areas such as domain name, user interface and dialog spoofing, malvertising, and email forging.

With this approach, hackers could use visual spoofing to trick users into believing that they are using the proper, legitimate service, when in truth, they are using a fraudulent service.

GP112

Visual and Acoustic Relationships in Large-Scale Video Understanding

Kehinde T Olufowobi

The world is creating and consuming a massive amount of video content. Today, people watch over 1 billion hours of video every single day on YouTube, a community of over 2 billion logged-in users accounting for almost one-third of the Internet. It is localized in over 100 countries, can be accessed in 80 different languages, and on mobile devices alone, reaches more US audience than any TV network. In essence, YouTube captures a cross-section of society, past and modern, and represents one of the richest and fastest-growing documentations of human expression. Advances in machine analysis and comprehension of video, therefore, have the potential to affect many aspects of human society. Continuous frames in videos carry rich motion and temporal information that can be exploited for learning complex temporal, visual, and acoustic relationships that humans take for granted in interacting with video. Video representation learning and modeling architectures help us navigate this complex task of human interaction with video. We utilize the publicly available YouTube-8M dataset, a large-scale video dataset with video-level features, frame-level features, and segment-rated frame-level features, and leverage state-of-the-art neural network architectures to explore the relationship between auditory tracks and visual segments in videos. This potentially allows us to match localized actions to associated auditory cues and facilitates a framework for automated sound-annotation of video.

GP113

College of Engr and Technology Computer Science Master's, MFA, and post-baccalaureate Technology and Computer Sciences Poster Presentation

A Review of current blockchain applications and research in the field of Supply Chain Management

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Mentor: Dr. Tabrizi

Abstracts | Graduate Poster Presentations

In this paper, we discuss different real world implementations of block chain technology in supply chain domain especially those that leverage smart contract. Smart contract is a computer protocol that facilitates, verifies, enforces performance of a contract digitally using Blockchain technology. Since smart contracts are trackable, irreversible and allow performance of credible transactions without third parties, it can be deployed effectively to replace existing supply chain mechanisms that require working with an intermediate entity such as a bank that often come with a price tag for their services. In this paper, we present a framework that would enable sale of goods between untrusting entities typically in different geographies. Last, we discuss effectiveness of such a system, potential issues and identify areas of improvement.

Abstracts | Postdoctoral Scholar Presentations

PD1

Educator Perspectives on Suspension, Risk Factors, and the Role of a Mental Health Intervention in Reducing Suspension

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School Suspension has long been used to deter unwanted behavior. Nevertheless, several studies demonstrate not only its ineffectiveness at deterring such behavior (Mendez, 2003; Cholewa et al 2017), many students go on to incur repetitive suspensions and expulsion (Welsh & Little, 2018). Suspension has been linked to poorer academic achievement, juvenile justice system involvement, and high school drop-out (American Academy of Pediatrics, 2013). The American Academy of Pediatrics (AAP) recommends against suspension and argues for Positive Behavior Intervention Support (PBIS), a multimodal approach to behavior modification that rewards desired behaviors and seeks to limit out of school suspension and maximize school instruction. Many models include interventions for mental health concerns that may contribute to behavior problems including ADHD, depression, and Adverse Childhood Experiences (ACEs). The AAP also recommends that children be referred to their pediatrician prior to suspension for evaluation of learning disabilities, mental health, and other modifiable risk factors; however, often this evaluation does not occur (AAP, 2003).

Limited data exists on educator attitudes towards suspension and whether these attitudes contribute to suspension rates. Additionally, very few studies have assessed the efficacy of nonconventional alternatives to suspension, including targeted behavioral interventions, in reducing suspension and none have explored whether the effect differs by sociocultural background. This study has two primary research questions. First, what are the different perspectives espoused across a spectrum of stakeholders regarding suspension from school, and its alternatives, of students attending a small rural elementary school in North Carolina? For the purpose of this study, stakeholders include the superintendent of the school district, teachers and administrators at the school, school mental health professionals, and the school counselor, as well as members of the Parent/Teacher Association, and school resource officers. Second, to what extent does the implementation of a 10-week intervention designed to alleviate the educational impact of ACEs in the same small rural elementary school coincide with fewer office referrals and suspensions among second grade students? Of particular interest is any differential impact across ethnic minority groups, individuals with disabilities, and children whose families are financially challenged

PD2

Loss of Carnitine Palmitoyltransferase-2 in skeletal muscle results in muscle remodeling and tissue-specific sensitivity to insulin.

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Dysregulated mitochondrial fatty acid oxidation (mtFAO) in skeletal muscle is a hallmark of overfeeding and obesity and it is implicated in the development of insulin resistance, thus compromising whole-body metabolic homeostasis. To assess the effects of eliminating mitochondrial fatty acid oxidation on insulin sensitivity we generated mice with a muscle-specific deficiency in Carnitine Palmitoyltransferase-2 ($Cpt2^{Sk-/-}$ mice), an irreplaceable enzyme required for mtFAO of long-chain fatty acids.

$Cpt2^{Sk-/-}$ mice have lower basal glycaemia, hypo-phosphorylation of Akt in liver and white adipose tissue during basal conditions along with preserved Akt-phosphorylation in muscle. Acute insulin stimulation increases Akt phosphorylation to similar levels in control and $Cpt2^{Sk-/-}$ liver, adipose, and muscle resulting in moderately increased sensitivity to glucose and insulin tolerance tests. However, when $Cpt2^{Sk-/-}$ mice are fed a high-fat diet for 16 weeks, only liver and adipose tissues retain insulin responsiveness, while the induction of Akt phosphorylation from no-insulin to insulin-stimulated state is abolished in the skeletal muscle.

$Cpt2^{Sk-/-}$ muscles are free of oxidative stress and do not accumulate lipotoxic ceramides or triacylglycerol. However, $Cpt2^{Sk-/-}$ muscles, compared to controls, accumulate up to 500-fold more long-chain acylcarnitines, intermediate species generated during mtFAO. Compared to control, $Cpt2^{Sk-/-}$ muscles undergo extensive remodeling characterized by an increase in mitochondrial mass and a shift on fuel source preferences specially in muscle fibers with a predominant oxidative metabolism.

Taken together these data suggest that loss of muscle CPT2, and therefore mtFAO impairment, causes adaptive muscle remodeling and modulates insulin sensitivity in a tissue-specific manner

PD3

Doxorubicin causes lesions in the electron transport chain of skeletal muscle mitochondria which are associated with a loss of contractile function

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Abstracts | Postdoctoral Scholar Presentations

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Doxorubicin is an anthracycline based chemotherapeutic that causes myotoxicity, leading to muscle pain, weakness and fatigue, atrophy, and mitochondrial dysfunction. Mitochondria regulate muscle contractile function via cellular energy charge (ΔG_{ATP}), which dictates Ca^{2+} dynamics and myosin ATPase function. Additionally, loss of mitochondrial integrity is associated with premature cell death and skeletal muscle atrophy. Mitochondrial dysfunction therefore contributes to an overall loss of skeletal muscle quality and performance that may be mitigated via appropriately targeted mitochondrial therapies. Using a novel multiplexed assay platform, we sought to diagnose alterations in mitochondrial respiratory control in skeletal muscle exposed to clinically relevant dose of doxorubicin. Adult male C57Bl6/NJ mice received doxorubicin (20mg/kg BM) or PBS in equal volume via intraperitoneal injection, and were euthanized 72 h later. Skeletal muscle force, fatigue, and contractile kinetics were measured *in vitro* in the EDL and soleus, two fiber-type divergent muscles. Respiratory control, membrane potential ($\Delta \Psi_m$), and redox state were measured simultaneously in isolated mitochondria under multiple substrate conditions, using a modified creatine kinase energetic clamp with sequential additions of phosphocreatine to manipulate ΔG_{ATP} within a physiological range. Sarcoplasmic reticulum (SR) Ca^{2+} uptake was determined using the fluorescent calcium indicator, Indo-1. Mitochondria and SR were isolated from skeletal muscle of the hindlimbs. Doxorubicin reduced muscle force and fatigue resistance, and increased soleus half-relaxation time. Muscle size was unchanged indicating functional losses precede muscle atrophy. Mitochondrial respiration and $\Delta \Psi_m$ were lower across all substrates with minor or no reduction in redox state. Mitochondrial supercomplex and ATP synthase protein content were unchanged, and mitochondrial enzyme activity rates were similar between groups. These data suggest there are primary lesions in the electron transport chain (ETC). Doxorubicin did not alter SR calcium uptake, implying the impairments in force production reside within the actin-myosin cross-bridge machinery. Collectively, doxorubicin induces muscle contractile decline prior to muscle atrophy without impairing SR calcium uptake. Muscle contractile dysfunction is associated with lesions likely spanning complexes I-IV of the ETC that may provide targets for treating doxorubicin myotoxicity.

PD4

GLUCOSE LIMITING CONDITIONS ALTER CENTRAL CARBON METABOLISM AND SPECIFIC METABOLIC RATE OF HEPG2 CELLS.

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Background: A common feature of cancer cell metabolism is the ability to obtain nutrients under sparse nutrient conditions. This task requires integration of bioenergetic pathways that are partitioned among fermentation and respiration. Control of these processes by exogenous carbon fuel source availability, as well as adaptive patterns induced by nutrient limitations, are of great interest due to the recent observation that selective nutrient conditions sensitize cancer cells to metabolic toxicants. However, few studies have explicitly measured adaptation to nutrient limiting conditions in cancer cells.

Methods: Human hepatoma (HEPG2) cells were grown in either high glucose or equimolar galactose (a glucose limiting condition) to drive adaptive variation of metabolism. Oxygen consumption and extracellular acidification rates during selective carbon fuel refeeding were measured at rest and under workload (i.e. plasma membrane potential uncoupling). Rate measurements were combined with existing knowledge of reaction stoichiometries to estimate how ATP production was apportioned among fermentative and respiratory pathways.

Results: Glucose refeeding repressed ATP coupled and uncoupled respiration in galactose grown cells. This effect was dampened in the presence of glutamine and pyruvate indicating that flux through the fermentative and respiratory systems is dynamically linked to carbon fuel substrate availability. Respiration accounted for the majority of the estimated total ATP production rates under both nutrient conditions, indicating that HEPG2 cells are not primarily fermentative as previously thought. The effect of increased ATP demand on estimated ATP production rates depended on the composition of the carbon fuel substrates. Notably, the largest rate shifts under workload were supported by glucose alone, but the highest basal rates were supported by a combination of substrates. Finally, basal and stimulated metabolic rates were substantially higher in galactose grown cells under all conditions tested, indicating that growth conditions select for specific metabolic rates.

Conclusion: Glucose limiting conditions resulted in coordinated adaptation of the entire central carbon metabolic system, including a substantial increase in basal metabolic rate. Understanding how carbon fuel substrate sources contribute to energy production, will provide better understanding of therapeutic strategies that utilize metabolic toxicants.

PD5

30-day toxicological assessment of perfluoroether acids (PFEAs)

Woodlief, TL; Vance, SA; Hu, Q; DeWitt, JC

Perfluoro-2-methoxyacetic acid (PFMOAA), perfluoro-2-methoxypropanoic acid (PFMOPrA), and perfluoro-4-methoxybutanioc acid (PFMOBA) are per- and polyfluoro-

alkyl substances (PFAS) structurally considered perfluoroether acids (PFEAs) as they contain an oxygen in between the carbon chains. Some PFEAs have replaced the longer carbon chain compounds perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). Recently, these compounds have been identified in surface waters used as drinking water sources for several communities within the state of North Carolina. While the toxicity of PFOA and PFOS have been well characterized in animal models and epidemiological studies of humans, to our knowledge, no toxicological data exist in the publicly available literature for PFMOAA, PFMOPrA, and PFMOBA. Therefore, the present studies sought to describe signs of toxicity following 30 days of exposure to various oral doses of these compounds. Adult male and female C57BL/6 mice (6-8 weeks old) were exposed by gavage once/day for 30-days to PFMOAA at 0mg/kg, 0.00025mg/kg, 0.025mg/kg, or 2.5 mg/kg, or to PFMOPrA or PFMOBA at 0 mg/kg, 0.5 mg/kg, 5 mg/kg, or 50 mg/kg. Endpoints collected included in-life observations, organ weights, immunophenotype of lymphoid organs, and liver peroxisome proliferation. At doses administered, no differences were detected in terminal body weight, liver, spleen or thymus weights. Some shifts in immune cell populations were observed within male and female spleen and thymus in response to PFMOAA and within female thymus in response to PFMOBA. Male spleen B and NK cells were increased by ~83% and ~97%, respectively in response to PFMOAA at 2.5 mg/kg. PFMOBA induced a ~50% increase in peroxisome proliferation in the females at 50 mg/kg, while PFMOAA induced a ~25% increase in peroxisome proliferation in females exposed to 2.5 mg/kg. Exposure to PFMOPrA did not affect any of the measured parameters at any of the administered doses. These results indicate that these "understudied" PFAS discovered in North Carolina have toxicological potential that require additional investigation. Ongoing studies are evaluating the ability of these compounds to affect immune function, a sensitive endpoint associated with exposure to PFAS.

PD6

Rate Sensitive Hydrogel Characterization via Indentation Testing

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Hydrogels are promising candidates as artificial tissue scaffolds due to their water-rich composition and biocompatibility. For load-bearing tissues, an engineered tissue substitute is required to reproduce the mechanical functionality of native tissue that it will replace. Design of hydrogel-based synthetic tissue therefore requires a robust knowledge of hydrogel mechanics. Mechanical behavior of hydrogels is strongly time- and rate-dependent, which is often difficult to characterize due to their high compliance and coupled poro-viscoelastic deformation. In this work, we study rate sensitivity of hydrogels through indentation testing. Spherical indentation experiments are performed for agar, alginate, gelatin and polyacrylamide gels with a range of indentation rates (i.e., ramp or rise times). As expected, faster indentation (or shorter rise time) results in stiffer gel response and more pronounced relaxation. We interpret the experimental observations within both viscoelastic and poroelastic frameworks. The theoretical analysis demonstrates that hydrogels that are largely viscoelastic by nature is more rate sensitive compared to poroelastic gels. Hydrogels become more viscid at higher indentation rates (i.e. viscoelastic ratio decreases with rise time), indicating significant polymer network reorganization at short time-scales. On the contrary, intrinsic permeability is observed to be largely indentation rate-independent, meaning solvent migration is not affected by small time-scales. Overall, the findings demonstrate that indentation testing has the capability to accurately determine the rate dependent material properties of soft hydrogels and hydrated biological materials.

PD7

A computational approach to study the effect of different loading conditions on the corneal cells

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Corneal keratocytes are affected in many pathologies such as keratoconus (KIM et al., 1999), corneal wounds (WILSON et al., 1996), and diabetic neuropathy (Kalteniece et al., 2018). Since keratocytes are critical in maintaining the normal homeostasis of the cornea, it is important to understand the micromechanical environment and the response of these cells under different mechanical loadings. One way of doing so is using multiscale computer modeling, which will allow us to understand how the macro-mechanical environment of the cornea contributes to the micro-mechanical behavior of the keratocyte. Hence, we developed a multiscale model of the cornea comprising of the keratocyte. We then used the multiscale model to study the effect of different mechanical loadings such as normal intraocular pressure (IOP), IOP spike, and eye rubbing in the cornea on the keratocyte.

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GP8

Characterizing the role of the Zn finger protein MucR as an H-NS-like gene silencer and essential virulence determinant in *Brucella abortus* 2308

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The 16 kDa Zn finger protein MucR is a global transcriptional regulator found throughout members of α-proteobacteria, regulating a diverse set of functions including virulence, symbiosis, exopolysaccharide production, motility, and cell cycle progression. Studies suggest that MucR predominantly acts as a repressor or gene silencer, preventing the expression of genes when they are not beneficial. For instance, in *Agrobacterium tumefaciens* and *Sinorhizobium meliloti*, MucR homologs repress virulence and symbiosis loci, respectively, until extracellular signals lead to their expression through the transcriptional activators VirG and ExpR. Thus, expression of costly virulence or symbiosis functions are restricted to host interaction. MucR has been demonstrated to be an essential virulence determinant in *Brucella abortus* and *Brucella melitensis*, where a *mucR* mutant exhibits decreased survival in macrophages and is severely attenuated in mice. Despite MucR homologs being well-appreciated as important transcriptional regulators, surprisingly little is known about how they function at the molecular level or how their regulatory activity is coordinated with other transcriptional regulators. We have previously shown that MucR binds with low affinity to AT-rich regions in *Brucella* promoters in a fashion reminiscent of the prototypic gene silencer H-NS. *Brucella* and related α-proteobacteria lack functional H-NS homologs, so it is tempting to speculate that MucR is performing similar regulatory roles in these systems. Here, we show that MucR binds within the promoter regions of several *Brucella* genes that have been linked to virulence (e.g. *btaE*, *babR*, and *bpdB*) and silences the expression of these genes, and present strategies for dissecting the regulatory role of MucR in the coordination of virulence functions during host interaction and pathogenesis.

GP9

Structure-function studies of intrinsically disordered outer surface proteins of Lyme spirochetes

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Predicted outer surface proteins of *Borrelia burgdorferi*, the causative agent for Lyme disease, were evaluated for the presence and absence of intrinsically disordered regions (IDRs).Based on these results, borrelial outer surface proteins were grouped into four classifications: a) IDP-Foldon b) Foldon-IDR c) IDR-foldon-IDR and d) Foldon-IDR-Foldon. We hypothesize that the intrinsic disorder in these borrelial outer surface proteins are essential for interaction with host proteins.As a result we have chosen to study Mlp (multi copy lipoproteins) of the first category which have disordered N-terminus and folded C-terminus. Mlp's are a paralogous family of proteins with nine members MlpA, MlpB, MlpC, MlpD, MlpF, MlpG, MlpH, MlpI and MlpJ.

Little is known about the structure and function of Mlp proteins, however, they are expressed during infection in the mammalian host. In order to seek potential host interaction partners and to test our hypothesis that IDPs are signatures for eukaryotic protein interactions, we have cloned Mlp's and have recombinantly expressed them in *E.coli*. We then aim to 1) screen for potential interactions with host ligands present in human blood and or in the extracellular matrix in order to test our hypothesis that IDRs are a necessary feature of these proteins for interacting with host molecules, 2) and solve high-resolution three-dimensional crystal structures of selected Mlp proteins. We believe that these studies will underpin how bacterial IDRs physically interact with eukaryotic proteins and provide a platform to quantitatively study a potentially fundamental aspect of host-pathogen interaction at the molecular level.

GP10

Tackling biofilms and drug resistance: Targeting bacterial response regulators to resensitize multidrug resistant bacteria to antibiotics.

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The 2-aminoimidazole (2-AI) class of small molecules can inhibit the formation of bacterial biofilms, disperse existing biofilms, and even resensitize multidrug resistant bacteria to antibiotics. These compounds are active against both Gram-positive and Gram-negative bacteria, making them a powerful weapon against biofilms and the increasing threat of antibiotic resistance. We have identified bac-

terial response regulator proteins as a cellular target of 2-AI compounds. Response regulators are the transcriptional regulatory component of canonical two-component systems. Two-component systems allow a bacterium to detect and respond to changes in its environment, and often trigger quorum sensing, virulence factors, and initiation of biofilm formation. As such, response regulators have been highly sought after as therapeutic targets but have yet to be successfully exploited. The dynamic nature of response regulators makes structure-based drug design challenging. Here, we explore the interaction between response regulators and 2-AI compounds as a means of addressing multidrug resistance by using 2-AI compounds as adjuvant therapies. In this work, we focus on the response regulator BfmR, the master biofilm regulator from *Acinetobacter baumannii*. Using a combination of structural, biochemical, and microbiological techniques we are investigating the structure and function of BfmR and its interactions with 2-AI compounds. Understanding the impact of 2-AI small molecules on response regulators and their mechanism of interaction will lead to the development of more potent compounds that will serve as adjuvant therapies with broad-range antibiotics.

PD10

Prenatal supplementation influences the response to the antiandrogen vinclozolin in the placenta and fetal liver

Ariel Fricke, Olivia Nieto Rickenbach, Alana Rister, Ciro Amato, Krista McCoy

Endocrine disrupting chemicals (EDCs) are pollutants that alter endocrine system function which can induce tissue specific changes. For example, long term fetal exposure to vinclozolin, an antiandrogen induces histopathological changes in the placental labyrinth, the site of maternal-fetal exchange, and decreases placental weight. Preliminary data from our laboratory also suggests that the fetal liver is affected by vinclozolin exposure. Both tissues are important for protecting the fetus from contaminants so their sensitivity to endocrine disruption could lead to further systemic effects on the fetus. Yet, there is no accepted prenatal supplement to protect the developing fetus from pollutants. Sulforaphane has been proposed as a trans-placental prenatal supplement that can protect the fetus from pollutants via Nrf2, a transcription factor that upregulates detoxifying and antioxidant enzymes. This project aims to investigate the protective effects of sulforaphane on placental and fetal liver function in vinclozolin exposed embryos. We tested the hypothesis that supplementing with sulforaphane changes Nrf2 responsive proteins and decreases the effects of vinclozolin exposure. We exposed wild type and Nrf2 knock out fetuses, via maternal gavage, to vinclozolin (V), vinclozolin and sulforaphane (V+S), sulforaphane alone (S), or corn oil (CO) from embryonic day (E) 13.5 to 16.5. On E16.5 we humanely euthanized the dam and embryos and collected placentas and fetal livers. Proteomics was conducted on five placentas and four livers per treatment. From the initial proteomics data set we compared KO and WT individuals within each treatment and identified Nrf2 responsive proteins across all treatments in the placenta and the liver. We then compared the quantity of these focal Nrf2 responsive proteins among WT individuals across the four treatments. Investigating these proteins will help us understand the protective mechanisms induced by prenatal supplementation with sulforaphane.

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GO1

EXAMINING THE EFFECT OF IMPLEMENTING A CAREER ACADEMY WITHIN AN UNDER-PERFORMING HIGH SCHOOL

William Glaster Artis

In my research study, I will be examining the effect of implementing a high school career academy in a large underperforming traditional high school setting as evidenced by student performance and achievement, student conduct and behavior, and student and staff perception of the career academy model. A number of high schools nationwide have been reconstituted or reconfigured into roughly 7,000 career academies to change the trajectory from that of under-performing to achieving (National Career Academy Coalition, 2019).

The Career Academy Model is a high school reform model grounded in Career and Technical Education philosophy that seeks to restructure large high schools into small learning communities to offer students more personalized and creative pathways to cultivate learning and prepare for college and career (Kemple & Willner, 2008). Career academies provide high school students with an opportunity to complete high school coursework while deeply exploring a potential career field concentration. Such academy models aim to improve high graduation rates and college and career readiness of students.

According to Dougherty and Lombardi (2016), students who participated in career academies had higher test scores in tenth grade math and English than their peers who participated in a traditional high school without career academies. As such, school districts across the country have been implementing career academies in an effort to help restructure schools to better prepare students to be college and career ready.

My research study will explore the perceptions of career academy teachers as they participate in the implementation, student outcome measures in the form of achievement test scores and, conduct reporting serve as indicators of the effect of implementation. The review of the literature explored topics around implementation of a career academy. The Four Keys to College and Career Readiness and the Career Readiness model introduced the theoretical foundations of college and career readiness in academics.

Finally, the scholarly practitioner will use the data outcomes to generalize a conclusion and theory that implementation of academies changes the trajectory from that of under-performing to achieving (National Career Academy Coalition, 2019). The conclusion will be recommended in the implementation of other academies with similar conditions.

GO2

EXAMINING THE EFFECT OF IMPLEMENTING MORNING

MEETINGS AS TRAUMA-INFORMED STRATEGY ON TEACHER SELF-EFFICACY IN A LOW-PERFORMING SCHOOL

Chanda Rook Battle

Beginning teachers in chronically low-performing schools experience the expected challenges of teaching along with other complicated factors that are beyond their locus of control. These factors include lack of resources, high rates of turnover among colleagues and administrators, state performance mandates, and a majority of students who experience one or more adverse childhood experiences (ACEs). Under the best circumstances, it is difficult for beginning teachers to remain confident in their ability to effectively reach students and teach content. In low-performing schools, this ability to maintain confidence, or a positive sense of self-efficacy, can be elusive for beginning teachers. This lack of confidence can drive teachers out of these schools, and the profession entirely. The present study is grounded in Victor Vroom's expectancy theory and Albert Bandura's self-efficacy theory. Both theories assert that in order for confidence in a task to remain high and job performance to increase, one must view their work as having meaningful outcomes (Bandura,1977; Vroom,1964). To create a sense of meaningfulness in an adverse environment requires building relationships, which can be an abstract construct to some. This study seeks to find what impact intentional relationship building through the use of morning meetings as a trauma-informed strategy has on beginning teacher self-efficacy in a low-performing elementary school. Using the Plan-Do- Study- Act (PDSA) cycles, the study will survey teachers on current perceptions of self-efficacy with the Teachers' Sense of Self-Efficacy Scale survey which assesses three areas: engaging students, managing the classroom environment, and delivering instruction to all students (Tschannen-Moran & Hoy, 2001). Teachers reporting negative perceptions on the survey in more than one area will receive training on ACEs, trauma, and morning meetings. Coaching will be provided to teachers throughout implementation of the morning meeting strategy. In addition, interviews and observations will be conducted throughout to support implementation and assess any changes to perceptions of self-efficacy in one or more of the three areas addressed in the survey. The study will inform teacher preparation programs, beginning teacher programs, and school leaders of the trauma-informed training, relationship building strategies, and efficacy skills needed by teachers to maintain high self-efficacy beliefs in challenging learning environments.

GO3

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Thank you