STATE OF NORTH CAROLINA
OFFICE OF THE GOVERNOR

PAT MCCRORY
GOVERNOR

November 5, 2016

Dear Friends,

It is a pleasure to welcome you to the State of North Carolina's Undergraduate Research and Creativity Symposium, hosted by North Carolina Central University. Ann and I are pleased to welcome students and guests to this exciting event and to the Bull City. In addition to this year's symposium, please make time to explore the many attractions that make Durham a great place to visit and live.

North Carolina is proud to be home to so many prestigious colleges and universities dedicated to encouraging student research and creativity. This symposium brings together students from all across North Carolina to showcase their skills and express their talents. There is nothing better than seeing how a quality education can help shape and develop everything from science and research to works of art.

Thank you for participating and best wishes for an enjoyable experience.

Kind regards,

Governor Pat McCrory
State of North Carolina

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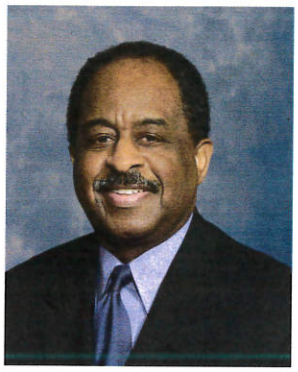


November 5, 2016

Greetings!

North Carolina Undergraduate Research and Creativity Symposium
Participants and Attendees

On behalf of the Durham City Council, I would like to extend to each of you a hearty greeting. We are indeed fortunate that North Carolina Central University (NCCU) is hosting this great symposium with colleges, universities and community colleges on November 5, 2016 in Durham, North Carolina showcasing North Carolina's undergraduate student research and creative work

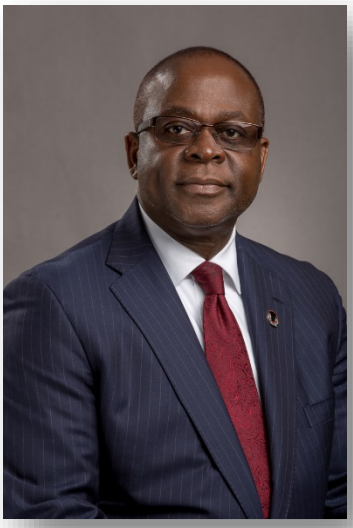
I applaud the State of North Carolina Undergraduate Research and Creativity Symposium (SNCURCS) as it provides undergraduate scholars in all fields a forum to share the results of their work through posters, presentations, performances and works of art.

I extend my gratitude to everyone who has exemplified consistent hard work and sacrifice in bringing this symposium together. I am hoping that both the participants and attendees will be inspired from this wonderful gathering.

Sincerely,

William V. "Bill" Bell
Mayor

November 5, 2016



Dear Student and Faculty Attendees and Guests of the State of North Carolina Undergraduate Research & Creativity Symposium:

Welcome to North Carolina Central University! We are honored that our campus was chosen to host the State of North Carolina Undergraduate Research & Creativity Symposium (SNCURCS) and are thrilled to have you here. SNCURCS provides a unique opportunity for undergraduate students from across North Carolina to share their research with one another and dialogue with faculty from other leading institutions of higher learning. Our nearly 6,826 undergraduate students and 1,500 faculty and staff members are part of a community that thrives in Eagle Excellence, or excellence on our campus, in our classrooms and in our service.

Along with our signature programs—liberal arts, education, business, nursing, biosciences, social sciences and law—we are increasing our investment in STEM education to train the next generation of North Carolina's skilled workers who are able to fully compete in the global marketplace. We produce some of the nation's best "techno-scholars," or students who understand how technology intersects with all disciplines—from STEM to the liberal arts, business, education and law.

Founded in 1910, we have a solid 106-year-old legacy of "Truth and Service" that is synonymous with excellence, innovation, integrity and quality. As the first public liberal arts institution for African Americans in the nation, NCCU is continually named as a top-ranked historically black university and university in the South.

Please take a moment to explore NCCU's sloping hills and verdant green and consider us for your graduate and professional studies. NCCU offers advanced degrees and professional programs in law, nursing, pharmaceutical sciences, education, library science and a Ph.D. in Integrated Biosciences.

Best wishes for a productive conference!

Sincerely,

Johnson O. Akinleye, Ph.D.
Acting Chancellor, Provost and Vice Chancellor for Academic Affairs

Center for Science, Math and Technology Education

Gail P. Hollowell, Ph.D., Director

James E. Shepard, Founder

November 5, 2016

Welcome to the 12th Annual State of North Carolina Undergraduate Research and Creativity Symposium. We are delighted to co-host this event in collaboration with the other NCCU units in addition to other NC institutions. The Center for Science Math and Technology Education is a dynamic education alliance at North Carolina Central University among several colleges and schools, collaborating to increase the number of knowledgeable and motivated students at NCCU pursuing and attaining careers in science and mathematics.

Today promises to be an exciting day as we experience dynamic presentations of scholarly and creative work from undergraduate studentswho have come from all over the state. To the student presenters, mentors, and moderators, thank you for making this event possible. We value this opportunity to participate in this annual event and look forward to hearing about future student success.

Hope to see you all again next year for SNCURCS which will be hosted at Campbell University.

In truth and service,

Gail P. Hollowell, PhD, Director

George T. Barthalmus Undergraduate Research Grants 2016 – 2017

The following students have been selected to receive a George T. Barthalmus Undergraduate Research Grant. Dr. Barthalmus was the driving force in starting the State of NC Undergraduate Research and Creativity Symposium and the Director of the Office of Undergraduate Research at NC State University. He was an advocate of students becoming engaged in research early in their academic career, so these grants are given only to sophomore students. Students selected for the award will be expected to present their research at the 2017 SNCURCS. Grants range from $100 to $500.

Awards:

Houston Cole, Campbell University, *Synthesis of Heterodisubstituted Pyridines via Cyclization of Methyl Ketones, DMSO, and Ammonium Salts*

Rachel Crawford, Meredith College, *Subjectivity, Authenticity, and the Contextualized Body*

Zakiyah R. Henry, Winston Salem State University, *A Look Inside the Codependence of NO and Insulin in Type II Diabetes*

John Drake Johnson, North Carolina State University, *Synthesis and Optimization of Ultra-bright BODIPY Fluorophores*

Ami K. Patel, University of North Carolina at Charlotte, *Metal Complexes of New Chalcogenone Ligands*

Ivana Premasinghe, Duke University, *Healthy Choices, Latina Voices: Improving Health for Interested Low-Income, Working Middle-Aged Latina Women in Durham*

Avery Salmon, Mars Hill University, *Evaluating Macrophage Production of TGF-beta Following Amphibole Asbestos Exposure*

Alexandra Sprouse, High Point University, *Relative contributions of apoptosis and necrosis in stroke models*

Kenya L. Williams, Shaw University, *Activation of the Nuclear Receptor NOR1, a Target for Type II Diabetes*

Rishita Reddy Yeduri, East Carolina University, *Poxvirus Gene and it's Role in Endosome Trafficking and Antigen Presentation: Crucial Steps in Activation of Immune Response*

SNCURCS 2016 Schedule at a Glance

8:00 am – 12:00 pm Registration – BN Duke Auditorium

9:00 am – 9:20 am Welcome – BN Duke Auditorium

9:30 am – 12:00 pm Presentations, Performances and Exhibits – Various Locations

10:00 am – 4:00 pm Vendor Exhibit – Mary Townes Science Building

12:00 pm – 1:45 pm Lunch – WG Pearson Cafeteria *(Lunch and Learn in Banquet Hall)*

Undergraduate Research Directors Meeting - 1229 Mary Townes Sciecne Building

NC Space Grant Meeting - 2221 & 2229 Mary Townes Science Building

Fab Lab Demonstrations - 3rd floor Mary Townes Science Building

Musical Interlude – 3rd floor Mary Townes Science Building

1:45 pm – 4:00 pm Presentations, Performance and Exhibits – Various Locations

4:00 pm - 4:30 pm Closing Remarks & Light Refreshments – Mary Townes Science Building

Guest Wireless Access

Guest wireless access is available for up to 8 hrs of web-only access. Select the **Eagles-WiFi** SSID and complete the self-registration portal on your web browser indicating that you are a guest. Self-registration requires having access to a mobile device capable of receiving text messages or email in order to receive your temporary username and password information.

Table of Contents

Oral Presentations

Time	Discipline	Presenter(s)/Institution	Title
Oral Presentations #1 (9:30 - 10:30 AM) - 1008 BRITE **Moderator: Corey Walker**			
9:30 AM - 9:45 AM	Mathematical Economics	**Aysha Khan** University of North Carolina - Wilmington	Signaling Models in Open-Market, Cooperative Settings: an Application of Game Theory to Islamic Finance
9:45 AM - 10:00 AM	Mathematical Economics	**Emily Ryu** Appalachian State University	A Model for Political Polarization Based on Various Economic Indicators
10:00 AM - 10:15 AM	Physics (B.S.)	**Samuel Migirditch** Appalachian State University	Computational Models of Metallic Nanoshell Particles for Enhanced Trapping with Optical Tweezers
10:15 AM - 10:30 AM	Mathematics	**David Perez-Suarez** University of North Carolina - Greensboro	Variations of the Greenberg Unrelated Question Binary Model
Oral Presentations #1 (9:30 - 10:30 AM) - 1009 BRITE **Moderator: Sambit Bhattacharya**			
9:30 AM - 9:45 AM	Computer Science (B.S.)	**Alisha Sprinkle** Appalachian State University	Programming Modern Design
9:45 AM - 10:00 AM	Computer Science (B.S.)	**Julian Morgan** Duke University	Metabolic transfer in an algal-bacterial consortium proposed for spaceflight experiments
10:00 AM - 10:15 AM	Computer Science (B.S.)	**Jesus Martinez** Appalachian State University **Grayson Fenwick** Appalachian State University	Using LittleBits for Problem Solving and Programming
10:15 AM - 10:30 AM	Computer Science (B.S.)	**Ashley Collins** Guilford College **Sarah Carr** Guilford College	Investigating RAM Technology
Oral Presentations #1 (9:30 - 10:30 AM) - 1221 MTSB **Moderator: Laura Reichenberg**			
9:30 AM - 9:45 AM	Biology (B. S.)	**Anderson Woodson** Meredith College **Jasmine Williams** Meredith College **Miranda Daughtry** Meredith College	Environmental Surveillance of Zoonotic Pathogens
9:45 AM - 10:00 AM	Biology (B. S.)	**Isaac Sluder** University of North Carolina - Charlotte	Understanding the role of Hsp70 and Hsp90 co-chaperone proteins in ribonucleotide reductase activity
10:00 AM -	Biology (B. S.)	**Ashley Edwards**	Mutational Studies on Bacillus

10:15 AM		Guilford College	subtilus Cysteine Desulfurase YrvO and Subsequent Interactions with Known Sulfur Acceptor Proteins
10:15 AM - 10:30 AM	Biology (B. S.)	**Kendra Zhong** North Carolina School of Science and Mathematics	Effects of Decitabine and UVA-irradiation on Cell Growth in Cancer and Normal Mouse Epithelial Cells

Oral Presentations #1 (9:30 - 10:30 AM) - 1223 MTSB **Moderator: Megen Culpepper**

9:30 AM - 9:45 AM	Chemistry (B. S.)	**Ihasia Parker** University of North Carolina - Pembroke	Effect of sugar concentration on the sugar utilization rate by the bacterium Lactobacillus lactis
9:45 AM - 10:00 AM	Chemistry (B. S.)	**Kaitlyn Griffith** High Point University	Construction and Alignment of a Total Internal Reflection Fluorescence Microscope
10:00 AM - 10:15 AM	Chemistry (B. S.)	**YeBon Lee** Queens University of Charlotte	Synthesis of Quaternary Ammonium Methyl Carbonate Ionic Liquids from Vanillin and Syringaldehyde
10:15 AM - 10:30 AM	Chemistry (B. S.)	**Rachel Stevens** Appalachian State University	Calibration of a Passive Sampler for Quantification of Estrogens in Natural Surface Water using High Performance Liquid Chromatography and Electrospray Ionization Mass Spectrometry

Oral Presentations #1 (9:30 - 10:30 AM) - 1233 MTSB **Moderator: Daniel Hall**

9:30 AM - 9:45 AM	History	**Robert Nowland** University of North Carolina - Asheville	Prolonging the Great War: The Game of United States Diplomacy Within the Ottoman Empire !
9:45 AM - 10:00 AM	History	**Emily Davis** High Point University	The Development of Federal Regulation
10:15 AM - 10:30 AM	History	**William Morgan** Wake Forest University	Quod Mirabilius Est: Reconsidering Cicero’s De Re Publica

Oral Presentations #1 (9:30 - 10:30 AM) - 1234 MTSB **Moderator: Elizabeth Rambo**

9:30 AM - 9:45 AM	English (Literature)	**Kelly Parker** Appalachian State University	The Intersectional Selfhood
9:45 AM - 10:00 AM	English (Literature)	**Jaimee Sharp** Campbell University	Utopia, or Nightmare? John Milton’s Paradise Lost and Joss Whedon’s Angel
10:00 AM - 10:15 AM	English (Literature)	**Margaret Baba** North Carolina Central	Culture, History, and the Value of Reading Ishiguro's The

		University	Remains of the Day
10:15 AM - 10:30 AM	English (Literature)	**Qeashaunda Johnson** Chowan University	Rhetoric of the Horrifying

Oral Presentations #1 (9:30 - 10:30 AM) - 2221 MTSB **Moderator: Carresse Gerald**

9:30 AM - 9:45 AM	Biology (B. S.)	**Joelle Fuchs** North Carolina State University	Evaluating BPA's effect on hormone-sensitive regions of the developing rat brain
9:45 AM - 10:00 AM	Biology (B. S.)	**Taylor Parker** Catawba College	Citrus extracts as natural larvicides against Culex mosquitoes
10:00 AM - 10:15 AM	Biology (B. S.)	**Tatianaide Medina Nieto** Wake Forest University	The effect of queen pheromone exposure on the growth of the worker honey bee brain
10:15 AM - 10:30 AM	Biology (B. S.)	**Monserrat Cuevas** University of North Carolina - Charlotte	Identifying novel regulators of the Hsp70 molecular chaperone

Oral Presentations #1 (9:30 - 10:30 AM) - 2225 MTSB **Moderator:Lorna Grant**

9:30 AM - 9:45 AM	Criminal Justice	**Shania Scales** North Carolina Central University	The Differential Association Theory
9:45 AM - 10:00 AM	Criminal Justice	**Renee Manzini** Western Carolina University	Indicators of Program Success and Rearrest among Adult Civil Citation Participants
10:00 AM - 10:15 AM	Criminal Justice	**Ashley Hurst** North Carolina Central University	NEW PARADIGMS IN JUVENILE PSYCHOPATHY
10:15 AM - 10:30 AM	Criminal Justice	**Shavonne Jackson** North Carolina Central University	Young Girls in the Juvenile Justice System

Oral Presentations #1 (9:30 - 10:30 AM) - 2226 MTSB **Moderator: Nathaniel Grove**

9:30 AM - 9:45 AM	Chemistry (B. S.)	**Alexander Allen** University of North Carolina - Charlotte	Copper(I) complexes with bulky thione and selone ligands
9:45 AM - 10:00 AM	Individualized Major Program	**Hannah Scanlon** University of North Carolina - Charlotte **Chelsea Fang** University of North Carolina - Charlotte	Influential Factors in STEM Learning
10:00 AM - 10:15 AM	Elementary Education	**Josephine Frith** University of North Carolina - Wilmington	Diversity in Popular Children's Literature
10:15 AM -	Health and	**Chad Springer**	An Alternative Form for

10:30 AM	Physical Education	Catawba College	Physical Education Assessment

Oral Presentations #1 (9:30 - 10:30 AM) - 2236 MTSB **Moderator: Sujaya Devarayasamudram**

9:30 AM - 9:45 AM	Religion	**Keven White** Appalachian State University	Jesus the Rebel: How the Secret Messiah in the Gospel of Mark Functions as the Ultimate Manifistation of Resistance
9:45 AM - 10:00 AM	Religion	**Rachel Crawford** Meredith College	Narrative Identity, Authenticity, and Religions in Game of Thrones
10:00 AM - 10:15 AM	Women's and Gender Studies	**Jessica Pierce** Appalachian State University	Appalachian Women: Food Insecurity As A Form Of Violence
10:15 AM - 10:30 AM	Women's and Gender Studies	**Claire Tuffey** Wake Forest University	The Cultural Politics of Libby Holman's 1932 Indictment for Murder

Oral Presentations

Time	Discipline	Presenter(s)/Institution	Title

Oral Presentations #2 (10:45 - 11:45 AM) - 1008 BRITE **Moderator: Tonya Smith-Jackson**

10:45 AM - 11:00 AM	Cyber Security	**Asante Bells** North Carolina A&T State University **Charles Henry** North Carolina A&T State University	Using Data Mining of Internet-of-Things Sensor Data to Distinguish User Personas
11:00 AM - 11:15 AM	Computer Science (B.S.)	**Elvis Kahric** Methodist University	Advanced Hotel Management Application
11:15 AM - 11:30 AM	Computer Science (B.S.)	**Preston Wilson** Appalachian State University **Christopher Smith** Appalachian State University	Monitoring Honeybee Activity with Frequency Analysis Plots
11:30 AM - 11:45 AM	Computer Science (B.S.)	**Brian Smith** Appalachian State University	Kinect 2.0 Skeleton and Face Tracking as a Math Education Tool

Oral Presentations #2 (10:45 - 11:45 AM) - 1009 BRITE **Moderator: Rachel Smith**

10:45 AM - 11:00 AM	Computer Science (B.S.)	**Jonathan Brotherton** Appalachian State University	Tracking Daily Beehive Activities Using Image Processing
11:00 AM - 11:15 AM	Computer Science (B.S.)	**Davor Pranjic** Methodist University	CoffeeTime Android Social Application
11:15 AM - 11:30 AM	Individualized Major Program	**Callum Boothman** High Point University	Intentional Game Design

11:30 AM - 11:45 AM	Computer Science (B.S.)	**Gurney Buchanan** Appalachian State University	Determining the Net Traffic at the Entrance of a Honeybee Hive

Oral Presentations #2 (10:45 - 11:45 AM) - 1221 MTSB **Moderator: Laura Reichenberg**

10:45 AM - 11:00 AM	Biology (B. S.)	**Elvira An** University of North Carolina - Charlotte	Identifying cancer drug targets using a novel Yeast small compound screen
11:00 AM - 11:15 AM	Biology (B. S.)	**Jeison Valencia** University of North Carolina - Pembroke	Heterorhabditis bacteriophora: An Ecofriendly Biological Control Agent
11:15 AM - 11:30 AM	Biology (B. S.)	**Timothy Campbell** Duke University	Investigating the interaction of Pseudomonas aeruginosa aminopeptidase (PaAP) with components of the bacterial outer membrane
11:30 AM - 11:45 AM	Biology (B. S.)	**Zachary Johannesson** University of North Carolina - Wilmington	Triclosan resistance in Staphylococcus aureus isolated from noses and throats of nursing students

Oral Presentations #2 (10:45 - 11:45 AM) - 1223 MTSB **Moderator: Alexandra Ormond**

10:45 AM - 11:00 AM	Chemistry (B. S.)	**Rebekah Hilton** Campbell University	Determination of Lead Content in Children's Lip Glosses
11:00 AM - 11:15 AM	Chemistry (B. A.)	**Olivia Tornow** High Point University	Towards Further Understanding of Kinase Activity During Oxidative Stress: Synthesis of the Highly Active ERK2 Substrates Sub-D and Sub-F
11:15 AM - 11:30 AM	Chemistry (B. S.)	**WEI WANG** University of North Carolina - Pembroke	Design and Performance of a Microscale Spectroelectrochemical Device
11:30 AM - 11:45 AM	Chemistry (B. S.)	**Eni Minerali** University of North Carolina - Greensboro	Asymmetric Synthesis of Enantioenriched Cyclic Compounds

Oral Presentations #2 (10:45 - 11:45 AM) - 1234 MTSB **Moderator:Elizabeth Rambo**

10:45 AM - 11:00 AM	English (Literature)	**Hannah Anderson** University of North Carolina - Pembroke	A Survey of Nuclear Fiction
11:00 AM - 11:15 AM	English (Writing)	**Minnie Lane** Elon University	Words that Move: The Confluence of Creative Writing and Dance Criticism
11:15 AM - 11:30 AM	English (Literature)	**Kyra Gladden** Appalachian State University	Conflict in Casablanca: Rick vs Ilsa
11:30 AM - 11:45 AM	English (Literature)	**Samantha Pulliam** Chowan University	Kept in the Dark

Oral Presentations #2 (10:45 - 11:45 AM) - 2221 MTSB **Moderator: Carressa Gerald**

10:45 AM - 11:00 AM	Botany	**Greg Sheets** North Carolina State University	Supplemental LED lighting as a potential alternative to chemical plant growth regulators in ornamental plug production
11:00 AM - 11:15 AM	Biology (B.A.)	**Joel Schlaudt** Catawba College	Ecological interactions between yellow-bellied sliders (Trachemys scripta scripta) and red-eared sliders (T. s. elegans)
11:15 AM - 11:30 AM	Biology (B. S.)	**Kaitlin Soden** East Carolina University	The Effect of Pesticides on Honeybee Gut Flora and Implications on Antimicrobial Properties of Honey
11:30 AM - 11:45 AM	Environmental Science	**Johanna Schoenecker** Queens University of Charlotte	Spatial Evaluation of Trees Planted by TreesCharlotte from 2012-2015 Presented as ArcGIS Storymap

Oral Presentations #2 (10:45 - 11:45 AM) - 2225 MTSB **Moderator: Josiah Baker**

10:45 AM - 11:00 AM	Economics	**Eleanor Albert** High Point University	Coffee: A Wake Up Call on Climate Change
11:00 AM - 11:15 AM	Economics	**Daniel Sasfy** Methodist University	China`s Dual System: How is Communism Compatible with a Free Market Economy?
11:15 AM - 11:30 AM	Economics	**Allison Holland** High Point University	Green Washing: Rethinking Sustainability and Environmental Myths
11:30 AM - 11:45 AM	Economics	**Gabriel Rowell** High Point University	Desertification In China: An Environmental and Economic Hazard.

Oral Presentations #2 (10:45 - 11:45 AM) - 2226 MTSB **Moderator: Peter Summers**

10:45 AM - 11:00 AM	Economics	**Emily Diaz-Loar** University of North Carolina - Asheville	What do UNC Asheville Alumni Think About Their Undergraduate Research Experiences?
11:00 AM - 11:15 AM	Economics	**Peyton Ellis** Salem College	The Microeconomic Benefits of Profamilia in Colombia
11:15 AM - 11:30 AM	Economics	**Jordy Farrier Mora** Methodist University	What Are the Impacts of Remittances on Economic Growth in Central America's Northern Triangle Region
11:30 AM - 11:45 AM	Economics	**Waceline Cius** Salem College	Monopolistic Pricing in a College Campus: The Limitations of the United States Antitrust Law

Oral Presentations #2 (10:45 - 11:45 AM) - 2236 MTSB **Moderator: Victoria Clegg**

10:45 AM - 11:00 AM	English (Writing)	**Jacob Stubbs** Appalachian State University	Man is Really a Stick in the Judd
11:00 AM - 11:15 AM	English (Writing)	**Alex Hubbell** Appalachian State University	Rick Blaine: An Introspective Focus
11:15 AM - 11:30 AM	English (Writing)	**Connor Warren** Appalachian State University	Gender Dynamics in Billy Elliot
11:30 AM - 11:45 AM	English (Writing)	**Courtney Morrison** Appalachian State University	Ever Absent: The Mystery and Suspense in Alfred Hitchcock's Rebecca (1940)

Oral Presentations

Time	Discipline	Presenter(s)/Institution	Title

Oral Presentations #3 (1:45 - 2:45 PM) - 1008 BRITE **Moderator: Yaw Chang**

2:00 PM - 2:15 PM	Mathematics	**Christine Craib** University of North Carolina - Wilmington	A Mathematical Analysis on the Transmission Dynamics of Neisseria gonorrhoeae
2:15 PM - 2:30 PM	Physics (B.S.)	**Steven Gibbs** Appalachian State University **Michael Marand** Appalachian State University	Optimal Glider Launch Angle
2:30 PM - 2:45 PM	Mathematics	**Gareth Johnson** North Carolina State University	Resistance of Vascular Trees and Stability to Random Topological Changes

Oral Presentations #3 (1:45 - 2:45 PM) - 1009 BRITE **Moderator: Greg Buhrman**

1:45 PM - 2:00 PM	Engineering - Biomedical	**Christine Nienhuis** North Carolina A&T State University	Non Playable Character Behavioral Script Execution using Opensimulator
2:00 PM - 2:15 PM	Pharmacy	**Chiagozie Agbai** North Carolina Central University	Application of Electric Cell-Substrate Impedance Sensing (ECIS) toward Personalized Medicine.
2:15 PM - 2:30 PM	Chemistry (B. S.)	**Rebecca Ulrich** High Point University	Probing the structure-activity relationship of Escherichia coli extracellular death factor
2:30 PM - 2:45 PM	Engineering - Industrial & Systems	**Cedric Watlington** North Carolina A&T State University **Lashondra Butler** North Carolina A&T State University	Augmented Cognitive Classroom Agents: Next-Generation Teaching and Learning

Oral Presentations #3 (1:45 - 2:45 PM) - 1221 MTSB **Moderator: John Whitehead**

1:45 PM - 2:00 PM		**Crystal Sarnor** Chowan University	Effects of handling stress on the physiology and behavior in mudminnows
2:00 PM - 2:15 PM	Biology (B. S.)	**Sachit Kumar** Appalachian State University **Alexa Langley** Appalachian State University	The River Continuum Concept as Related to Cataloochee Creek, GSMNP
2:15 PM - 2:30 PM	Biology (B. S.)	**Melyssa Minto** Meredith College	Cray Cray Morphometrics
2:30 PM - 2:45 PM	Environmental Science	**Pamela Casdorph** Catawba College	Investigating Habitat Influence on Adult Female Mosquito Species Richness in a Small Ecological Preserve

Oral Presentations #3 (1:45 - 2:45 PM) - 1233 MTSB **Moderator: Chris Ashwell**

2:00 PM - 2:15 PM	Biology (B. S.)	**Jenna Dafgek** Elon University	Effect of long-term exposure of Rapamycin on T cell proliferation and survival
2:30 PM - 2:45 PM	Biology (B. S.)	**Carrisa Womble** North Carolina State University	Characterization of milk cellular response to intramammary phytoceutical administration in cows with mastitis
3:15 PM - 3:30 PM	Environmental Science	**Zachary Jones** Catawba College	Analysis of a feral hog population in Rowan County North Carolina

Oral Presentations #3 (1:45 - 2:45 PM) - 1234 MTSB **Moderator: Candace Parrish**

1:45 PM - 2:00 PM	Individualized Major Program	**Anna Phillips** East Carolina University	Social Media and Democracy: How do Facebook Videos Affect Individuals' Political Values?
2:00 PM - 2:15 PM	Individualized Major Program	**Sofia Sedergren** Greensboro College	Framing Political Debates Based on Women's Suffrage: The Case of Great Britain, 1916-1930
2:15 PM - 2:30 PM	Liberal Studies	**Marissa Duff** Johnson C. Smith University	The representation of African Americans during the Civil Rights Movement through dance: An examination of Stormy Weather and Cabin in the Sky
2:30 PM - 2:45 PM	Liberal Studies	**Alana Seldon** Johnson C. Smith University	Painting a portrait of women-flashbacks in time: Scandal Season One

Oral Presentations #3 (1:45 - 2:45 PM) - 2225 MTSB **Moderator: Darren Beneby**

2:00 PM - 2:15	History	**Joshua Strayhorn**	This Ain't Our Church: An

PM		North Carolina Central University	Analysis of Intra-Racial Tension in Chicago
2:15 PM - 2:30 PM	History	**Erika Harris** Salem College	Gender and Sex in the Winston-Salem Black Panther Party
2:30 PM - 2:45 PM	Individualized Major Program	**Indrani Saha** Duke University	Being Within: Carlos Cruz-Diez's Chromosaturation, a Site of Perceptual Disruption and Action

Oral Presentations #3 (1:45 - 2:45 PM) - 2226 MTSB **Moderator: Seronda Robinson**

1:45 PM - 2:00 PM	Graphic Design and Digital Imaging	**Colton Courtney** Appalachian State University	Fighting Boxing with Dancing
2:00 PM - 2:15 PM	Public Health	**Noah Coates** High Point University	The Effects of Narrative Medicine on the Mental and Emotional Health of Geriatric and Pediatric Populations
2:15 PM - 2:30 PM	Public Health	**Chetan Singalreddy** East Carolina University	Designing Sustainable Housing for Low Income Households in Nigeria Using 3-D Printing Technology
2:30 PM - 2:45 PM	Public Health	**Megan Haase** Summer Ventures in Science and Mathmatics	To Screen or Not to Screen: A Comparison of Percentages of Spinal Fusion Surgeries in States with Mandated Scoliosis Screenings in Schools versus Those Without

Oral Presentations #3 (1:45 - 2:45 PM) - 2235 MTSB **Moderator: Mildred Pointer**

1:45 PM - 2:00 PM	Biology (B. S.)	**Abdul-khaliq Abdul-matin** Central Piedmont Community College	The Battle for A Better Human: Development of Gene Editing
2:00 PM - 2:15 PM	Biology (B. S.)	**Lucas Piedrahita** Appalachian State University	Phenology and Reproductive Success of Silene acualis
2:15 PM - 2:30 PM	Biology (B. S.)	**Brianna Morris** Elizabeth City State University	Targeting Gli2 in Tumor-Induced Bone Disease
2:30 PM - 2:45 PM	Biology (B. S.)	**Reena Debray** Duke University	Social stress induces changes in mitochondrial copy number and gene regulation

Oral Presentations #3 (1:45 - 2:45 PM) - 2236 MTSB **Moderator: Frank Rodriguez**

1:45 PM - 2:00 PM	Spanish	**Elisa Alfonso** East Carolina University	Depictions of Musico-Cultural Syncretism in the Film "Chico & Rita" (2010)
2:00 PM - 2:15 PM	Spanish	**Meghan Ingold** Campbell University	"El Medio Pollito", or "The Half Little Chicken"

2:15 PM - 2:30 PM	French and Francophone Studies	**Danika Gottbrecht** Guilford College	Les Trois Mousquetaires: A Post-Colonial Analysis and Glimpse into French Culture

Oral Presentations

Time	Discipline	Presenter(s)/Institution	Title

Oral Presentations #4 (3:00 - 4:00 PM) - 1008 BRITE **Moderator: Tonya Gerald-Goins**

3:00 PM - 3:15 PM	Biology (B. S.)	**Lewis Woodard** Chowan University	Effects of Salinity On Tadpole Growth and Development
3:15 PM - 3:30 PM	Biology (B. S.)	**Dina Ibrahim** North Carolina State University	Chloride Channel ClC-2 Regulates Intestinal Epithelial Homeostasis and Tumorigenicity in Colorectal Cancer
3:30 PM - 3:45 PM	Biology (B. S.)	**Elesa Poteres** High Point University	Use of Power Line Corridors By Flower Visiting Beetles and Bees
3:45 PM - 4:00 PM		**Elizabeth Zarzar** Cedar Ridge High School **Aarushi Ahuja** Early College at Guilford	Water as a Filter: An Evaluation of the Efficiency of Local Best Management Practices in Preventing Water Quality Degradation

Oral Presentations #4 (3:00 - 4:00 PM) - 1009 BRITE **Moderator: Ansel Brown**

3:00 PM - 3:15 PM	Biology (B. S.)	**Shannon Conroy** North Carolina State University	Structural Characterization of Heat-activated Transcriptional Coactivator MBF1c
3:15 PM - 3:30 PM	Biology (B. S.)	**Bryant Maldonado** University of North Carolina - Charlotte	Effect of molecular chaperones on efficacy of oncolytic vesicular stomatitis virus against pancreatic cancer cells
3:30 PM - 3:45 PM	Environmental Science	**Kshitij Kumar** North Carolina Central University	Development of a Novel Quantitative Technique for SapoSgenins by GC-MS/MS
3:45 PM - 4:00 PM	Physics (B.A.)	**Nathan Kirse** University of North Carolina - Asheville	Multi-Filter Photometry of KOIs

Oral Presentations #4 (3:00 - 4:00 PM) - 1221 MTSB **Moderator: Langston Harrison**

3:00 PM - 3:15 PM	Biology (B. S.)	**Gabrielle Adams** North Carolina School of Science and Mathematics	The Efficacy of Melatonin as an Anxiolytic Treatment in Stressed Zebrafish

3:15 PM - 3:30 PM	Biology (B. S.)	**Shima Idries** North Carolina State University	Diethylstilbestrol, (DES) brain, and behavior: interaction of exposure and strain on behavior
3:30 PM - 3:45 PM	Biology (B. S.)	**Darby Kozan** Guilford College	Identification of Gene Expression Within the Interpeduncular Nucleus
3:45 PM - 4:00 PM	Biology (B. S.)	**Audrey Hoffman** Catawba College	A Study of Host Selection by the Parasitic Plant Cuscuta gronovii

Oral Presentations #4 (3:00 - 4:00 PM) - 1233 MTSB **Moderator: Clark Maddux**

3:00 PM - 3:15 PM		**Ena Prskalo** University of North Carolina - Greensboro	Examining Deviants of Classical Athens
3:15 PM - 3:30 PM	Sociology and Anthropology	**Tierney Marey** Duke University	I'm Not Sure But...Women's Confidence in the Elite University Setting
3:30 PM - 3:45 PM	Sociology and Anthropology	**Cory Henderson** University of North Carolina - Greensboro	Patterns of hominin landuse and raw material procurement in the paleo-Olduvai Basin, Tanzania
3:45 PM - 4:00 PM	Individualized Major Program	**Melanie Smith** Greensboro College	Tudor Queens 1509-1603: The Manipulation of Sexuality in the Pursuit of Power

Oral Presentations #4 (3:00 - 4:00 PM) - 1234 MTSB **Moderator: W. Russell Robinson**

3:00 PM - 3:15 PM	Liberal Studies	**Gabrielle Saygbe** Johnson C. Smith University	Exploring the Image of Black Characters in the Science Fiction Films Beloved and the Book of Eli.
3:15 PM - 3:30 PM	Liberal Studies	**Ryan Dovel** Appalachian State University	Islam in Stereo: Muslim musicians and their fight against Islamophobia in the West
3:30 PM - 3:45 PM	International Studies	**Arvind Vallabhaneni** North Carolina Central University	A "Democratic Peace" in South Asia? Divergent Trajectories and the Re-Direction Toward Democracy
3:45 PM - 4:00 PM	Liberal Studies	**David Ellis** Johnson C. Smith University	For the love of money or the game: The framing of pay-for-play among college athletes-Schooled: The Price of College Sports and The Business of Amateurs

Oral Presentations #4 (3:00 - 4:00 PM) - 2221 MTSB **Moderator: Chris Ashwell**

3:00 PM - 3:15	Biology (B. S.)	**Justine Galliou**	Evaluating the accuracy of a

PM		North Carolina State University	new commercial genetic test for response to fescue toxicosis in cattle.
3:15 PM - 3:30 PM	Biology (B. S.)	**Neveen Issa** University of North Carolina - Pembroke	Elementary Kinetic Analysis of Beef Liver Lactate Dehydrogenase
3:30 PM - 3:45 PM	Mathematical Economics	**Kelsey Brown** High Point University	Impact of the Renewable Fuel Standard on Feeder Cattle Prices
3:30 PM - 3:45 PM	Mathematical Economics	**Kelsey Brown** High Point University	Impact of the Renewable Fuel Standard on Feeder Cattle Prices

Oral Presentations #4 (3:00 - 4:00 PM) - 2225 MTSB **Moderator: Sandra Rogers**

3:00 PM - 3:15 PM	Sociology and Anthropology	**Anastasia Shymanovich** University of North Carolina - Greensboro	Social Media for Community Impact: A Case Study on Affordable Housing
3:15 PM - 3:30 PM	Sociology and Anthropology	**Melissa Roberts** University of North Carolina - Greensboro	Intolerance and Inequality in LGBTQ Housing: A Fair Housing study
3:30 PM - 3:45 PM	Sociology and Anthropology	**Phillip Sheldon** University of North Carolina - Greensboro	Is Mortgage Loan Discrimination Present in Guilford County? An Analysis of Available Data
3:45 PM - 4:00 PM	Special Education	**Christina Honeycutt** High Point University	Intervention Embedded Assessments in a Sample of Struggling Middle School Readers

Oral Presentations #4 (3:00 - 4:00 PM) - 2226 MTSB **Moderator: Georgia Martin**

3:00 PM - 3:15 PM	Theatre	**Tara Baran** University of North Carolina - Wilmington	Shakespeare and Autism
3:15 PM - 3:30 PM		**Brandon Kassab** Western Carolina University	The History of Germanic Notation and Shostakovich's Tenth Symphony
3:30 PM - 3:45 PM	Music	**Paige Zalman** University of North Carolina - Wilmington	Stephen Sondheim's _Sweeney Todd_: An American Anti-Opera
3:45 PM - 4:00 PM	Psychology	**Makaela Jones** University of North Carolina - Chapel Hill	Psychosocial Antecedents of Athlete Burnout in Black Student-athletes

Oral Presentations #4 (3:00 - 4:00 PM) - 2236 MTSB **Moderator: Philliph Mutisya**

3:15 PM - 3:30	Psychology	**Natalie Suchy**	Differences between Tablet

PM		University of North Carolina - Greensboro	Learning and Traditional Learning in Elementary School Children
3:30 PM - 3:45 PM	Psychology	**Deja Young** NC Central University **Anneliese Samples** NC Central University **Stephen Gibson** NC Central University	Environmental and Contextual Factors Influencing Academic Success Among African Americans
3:45 PM - 4:00 PM	Psychology	**Enzo Codella** Appalachian State University	Assessing the Correctability of Psychopathic Personalities

Poster Presentation Session #1

Discipline	Poster	Presenter(s)/Institution	Title
Poster Presentations #1 (9:45 - 10:45 AM) 1st Floor Mary Townes			
Animal Genetics	1	**Sarah Miller** University of North Carolina - Chapel Hill	lincRNA Cyrano's Role in the Maintenance of Embryonic Stem Cell Pluripotency
Animal Science	2	**Christina Bradshaw** North Carolina A&T State University	Detecting Segmented Filamentous Bacteria in Swine Using Gram's Stain
Biology (B. S.)	4	**Leah Cashwell** Campbell University	Assessing the Performance of Abdominal Muscles during Prone Bridge Exercise in Older and Younger Adults
Biology (B. S.)	28	**Erin Stiers** Pfeiffer University	Isolation of Agrobacterium tumefaciens Bacteriophage Using a Microplate Reader
Biology (B. S.)	3	**Mario Augustinovic** University of North Carolina - Greensboro	The role of evolutionary and selective forces on the development of genetic architecture
Business Administration	5	**Artem Avtandilov** High Point University	Investment and Development: A Look at Solar Photovoltaic Technology
Economics	6	**William Blackwood** Appalachian State University	Economic Impact of Prerace Training Rides for Blood, Sweat and Gears
Economics	7	**Rachel Hill** University of North Carolina - Chapel Hill	Modeling Dental Care Demand
Economics	8	**Brittany Ramsey** Appalachian State University	Travel Cost and Consumer Surplus Analysis of 2016 Blood Sweat and Gears Bike Race
Engineering - Nuclear	39	**Jasmin Alsaied** North Carolina State University	Radiation Shielding of Mortars with Fine Aggregate Additives from Mine Waste
Environmental Science	40	**Evan Montpellier** Appalachian State University	Understanding spatial parameters for study sites in tree-ring science: divergent growth rates of alpine larch trees in response to microenvironmental variability.
Environmental Science	34	**Lauren Blackwell** North Carolina A&T State University	Search For Segmented Filamentous Bacteria In The Swine Unit Dust
Environmental Science	33	**Cristan Zdanski** North Carolina Central University	Correlation of Ground Level Aerosol Optical Depth and Particulate Matter
Environmental Science	35	**Maya Brooks** North Carolina A&T State University	Deviating From the Protocol: Determining If Smaller Fecal Samples Can Be Used For DNA Isolation and PCR
Environmental	36	**Alexander Xiong**	Studying Cleaning Methods to

Science		North Carolina School of Science and Mathematics	Maximize Solar Energy in Underdeveloped Regions
Environmental Science	32	**Joel McAuliffe** East Carolina University	The Effect of the Gulf Stream on Precipitation Rates in the Southeast United States Atlantic Region
History	12	**Ashley McGhee** University of North Carolina - Asheville	The Wilderness Act of 1964: The Rise and Fall of Wilderness in Western North Carolina
History	10	**Smiti Kaul** Wake Forest University	The Potential of Mind-Body Medicine to Address Pain Management in Resource-Poor Regions
History	11	**Patricia Pinckombe** Duke University	Postmortem Racism and the Eugenics Movement: a Politic of Double Death
History	9	**Thomas Stirrat** Wake Forest University	Rethinking Power in Colonial Congo: Boundaries, Contestation, and Acknowledgement
Human Relations	14	**Kayla Young** Appalachian State University	Willingness to Co-produce Public Environmental Goods
Human Relations	13	**Lloyd Mitchell** Fayetteville State University	Robots and Human Interaction Involving Relaxation
Individualized Major Program	15	**Sarina Madhavan** Duke University	Genome editing using CRISPR-Cpf1 in vitro for a Duchenne Muscular Dystrophy gene therapy
Pre-Medicine	16	**Ryan Booth** Gaston College	Bacteria and Neurotransmitters: Effects and Implications of Psychosis
Pre-Medicine	17	**Nicholas Biondo** North Carolina State University	Is lipophilicity a valid predictor of drug sequestration? An investigation in support of lipid resuscitation.
Psychology	38	**Jennifer Beach** Catawba College	Do Twitter Posts of Public Figures Reveal Private Selves?
Public Health	18	**Lorenna Garcia-Bochas** Fayetteville State University	Tailoring The Montagnard Hypertension Survey Process For The Bunong Community
Public Health	37	**Kyara Carr** Fayetteville State University	Are Urology Providers Confronting Bias from Patients Due to Gender Preference?
Public Health Education	31	**Michelle Robinson** North Carolina Central University	Sex Difference in Coping May Explain Biological Response to Environmental Stress in a Cohort of African Americans
Public Health Education	30	**Brianah Williams** North Carolina Central University	Three Evidence Based Public Health Trainings: Evaluating Pre-Post Competency Assessment Data
Sociology and Anthropology	23	**Gabrielle Henriksen** Wake Forest University	Shifting Contours of the Built Environment: How Events Impact the Movement of People
Sociology and Anthropology	21	**Jordan Crowell** University of North Carolina - Greensboro	A Geometric Morphometric Analysis of the Shoulder of Homo naledi

Sociology and Anthropology	22	**Alexis Wilkerson** University of North Carolina - Pembroke	Ebony Faces: Exploring African Americans' Sentiments of Identity and Belonging
University Studies	24	**Deja Finch** North Carolina Central University	Athlete Behavior: Bias in Media Commentary
Urban Ecology	25	**Kelly Harris** North Carolina State University	Assessing the ecological benefits of stormwater biocells
Women's and Gender Studies	26	**Victoria Jackson** Pfeiffer University	Fourth Wave Feminism
Zoology	27	**Kelly Kosco** North Carolina State University **Ashley Le** North Carolina State University	Observations of captive western lowland gorilla behavior: Does placement of diet items in enrichment increase its effectiveness?

Poster Presentations #1 (9:45 - 10:45 AM) 2nd Floor Mary Townes

Biology (B. S.)	46	**Christopher Lile** Gardner-Webb University	Small Mammal Survey of Broad River Greenway and the surrounding area, North Carolina
Biology (B. S.)	7	**Jacobo Rozo Posso** North Carolina State University	Vacuole morphology might contribute to tentacle movement of the carnivorous plant Drosera capensis
Biology (B. S.)	48	**Katelyn DeZego** Catawba College	Broccoli glucosinolate profile is critical for its anticancer activity in human colon cancer cells
Biology (B. S.)	49	**Mike Dole** Gaston College **David Palmer II** Gaston College	Glowing Evolution
Biology (B. S.)	41	**Cameron Dixon** St. Andrews University	Biochemical characterization of wasp venom
Biology (B. S.)	42	**Georgi Krastev** St. Andrews University	Characterization of Amoeba-parasitized Mycobacteria
Biology (B. S.)	65	**Rohan Patel** North Carolina School of Science and Mathematics	Protein-Specific Inhibition on the Multixenobiotic Resistance Mechanism of Daphnia magna
Biology (B. S.)	44	**Elizabeth Gerdes** University of North Carolina - Pembroke	Fermentation Study of Photorhabdus luminescens in a bioreactor
Biology (B. S.)	45	**Andrew Murdock II** East Carolina University	Comparison of Strawberry DNA Isolation Techniques for Potential Use in the Polymerase Chain Reaction to Enhance Learning in Secondary Education
Biology (B. S.)	50	**Ebony Watson** North Carolina State University	A new virus found in a native shrub may be an ancestral geminivirus involved in

			the cassava mosaic disease in East Africa.
Biology (B. S.)	51	**Ryan Sacchere** Gaston College	Analysis of Soil Isolates from Antibiotic Producing Bacteria
Biology (B. S.)	52	**Aiperi Iusupova** Duke University	Does MERTK Modulate Glial Synaptogenic Function?
Biology (B. S.)	53	**Travis Haysley** East Carolina University **Dalton Chapman** East Carolina University	Investigating the Role of Antimicrobial Peptides on Biofilm Formation in Streptococcus mutans
Elementary Education	78	**Kayla Barbour** High Point University	The Impact of a Summer Reading Program on Reader Motivation
Engineering - Electrical & Computer	63	**Lauren Johnson** University of North Carolina - Charlotte	A Comparative Analysis of Trilateration Localization Techniques using RSSI-Distance Estimation
Engineering - Materials	61	**Matthew Powell** North Carolina State University	BaCO3 Infiltration on La2NiO4 Cathode for Improved Performance of Solid Oxide Fuel Cells
Engineering - Mechanical & Aerospace	64	**Corbin Grohol** University of North Carolina - Charlotte	Electrostatic Detainment Unit for Automated Removal of Debris in Orbit
Engineering - Mechanical & Aerospace	62	**Nicholas Mazzoleni** North Carolina State University	Fabrication and Testing of Multifunctional Compliant Solar-Wind Hybrid Energy Harvesting Structures
Engineering Cooperative Program	71	**Luis Roldan** North Carolina State University	Developing non--growth conditions for Methylomicrobium alcaliphilum
Environmental Science	54	**Martin Fenn** Appalachian State University	Terpene induction as a chemical response in Solidago altissima via exposure to Eurosta solidaginis
Environmental Science	55	**William Connor** Appalachian State University	Refining our understanding of urbanization effects on a mountain stream in Boone, NC
Environmental Science	60	**Tamara Wells** North Carolina State University	Estimation of Harvest for an Artisanal Post-Larvae Goby Fishery in Puerto Rico
Environmental Science	56	**Cory Walker** North Carolina State University **Alex Johnson** North Carolina State University	What are the effects of MAHs and PAHs on the growth of poplar tree clones?
Environmental Science	57	**Dipatrimarki Farkas** North Carolina Central University	Exploring AOD-PM2.5 Correlation for PM2.5 Monitoring
Environmental Science	59	**Brittany Carson** North Carolina Central University	Mapping the Importance of Arts Education in US Schools
Environmental Science	58	**Dustin Travels** North Carolina State University	Impact of Beaver Impoundments on Urban Stream Storm Events
Pharmacy	77	**Taylor Felton** University of North Carolina -	HPLC Determination Of Amoxicillin From African Drug Samples

		Pembroke	
Physics (B.S.)	66	**John Martin** University of North Carolina - Chapel Hill	Robust Chauvenet Rejection Implementation into Radio Skynet
Physics (B.S.)	67	**Andres Ponce Romero** North Carolina State University	Low-energy Event Detection Efficiency in P-Type Point Contact Germanium Detectors
Physics (B.S.)	65	**Gibson Bennett** University of North Carolina - Chapel Hill	Smoothing Techniques for Radiative Transfer in Hydrodynamic Simulations
Physics (B.S.)	68	**Callie Hood** University of North Carolina - Chapel Hill	Detecting and Interpreting Faint Tidal Features Around RESOLVE Galaxies
Physics (B.S.)	69	**Michael Paolino** Appalachian State University	Measuring Muscle Contraction with Automated Optical Tweezers
Psychology	70	**Joshua Edwards** Catawba College	Effects of Glucose in Chewing Gum on Memory Performance
Psychology	41	**Shannon Wright** Catawba College	Effects of Background Color Presentation and Word Emotionality on Recall of Text
Psychology	75	**Carina Tudela** North Carolina State University	Utilizing Heart Rate Variability to Assess the Link Between Student Learning and Intelligent Tutoring Systems
Psychology	72	**Madison Morrow** North Carolina State University **Caroline Gainey** North Carolina State University	Analysis of quantitative and qualitative data on the acceptability of a web-based HIV/STI prevention program for adolescent girls
Psychology	73	**Jeremiah Thompson** Fayetteville State University	Implicit Bias in Heterosexual African-American Mate Selection
Psychology	74	**Aenia Amin** East Carolina University	The Effects of Prenatal Hormone Exposure on Associative Learning in a Rodent Model of Autism Spectrum Disorder
Psychology	76	**Rachel Lerner** University of North Carolina - Chapel Hill	Links Among Infant Sleep Location, Bed-Sharing Intent, and Parent-Child Relationship Quality
Public Health	80	**April Alston** Fayetteville State University	The Effects of Racial Pride and Religiosity on Depression in African Americans

Poster Presentation Session #2

Discipline	Poster	Presenter(s)/Institution	Title
Poster Presentations #2 (11:00 - 12:00 PM) 1st Floor Mary Townes			

Biology (B. S.)	4	**Jasmine Perry** North Carolina Central University	Identifying the Most Effective Activation Method of T-Lymphocyte for Immunotherapy Approaches
Biology (B. S.)	7	**Carmen Mesa** Guilford College **Evan Poag** Guilford College	Eastern Bluebird Nest Sanitation
Biology (B. S.)	9	**Lorreen Agandi** East Carolina University	Color Patterns of Divergent Stickleback Populations in a Common Garden Study
Biology (B. S.)	11	**Jesse O'Campo** University of North Carolina - Pembroke	Fermentation Study of Xenorhabdus nematophilus in a bioreactor
Biology (B. S.)	13	**Yakema Marquez** Robeson Community College	Restoration of Robeson Community College's
Biology (B. S.)	15	**Dawn Stancil** North Carolina Central University	Identifying Microbial Life On Human Skin
Biology (B. S.)	17	**Ismael Gomez** Nash Community College	Diversification of Seepage Salamanders (Desmognathus aeneus) as Revealed Through Mitochondrial and Nuclear Sequence Data
Biology (B. S.)	19	**Manal Ahmidouch** Wake Forest University	MD Simulations and CD Spectroscopies: rDNA G-Quadruplex Complexes
Biology (B. S.)	24	**Steve Nwanguma** North Carolina Central University	Relative Sodium to Potassium Excretion Correlates with Age in African American Females but not in African American Males
Biology (B. S.)	20	**Dawit Sima** North Carolina Central University	Modeling siRNA Gene Silencing Potency Using the Partial Least Square (PLS) Regression Method
Biology (B. S.)	21	**Lindsay Davenport** East Carolina University	Investigating the molecular control of the ecdysone response gene, E74, in the Drosophila ovary.
Biology (B. S.)	22	**Jaylin Grant** Campbell University	The Identification of Environmental Microorganisms that utilize Bifenthrin
Biology (B. S.)	27	**Breann Zeches** Campbell University **Zachary Flaccavento** Campbell University	Binding Studies of Pbx1-Pdx1 Fusion Transcription Factors on Human Somatostatin Promoter
Biology (B. S.)	33	**Catrina Peaks** North Carolina Central University	Novel Pharmacological Mechanism for Parkinson's Treatment
Biology (B. S.)	29	**Elizabeth Dustin** North Carolina State University **Kelly Thompson** North Carolina State University	Characterizing the differential neuronal expression of aromatase cyp19A1b mRNA in the sexual phenotypes of the sex-changing fish, Thalassoma bifasciatum
Biology (B. S.)	31	**Kirsten Woolpert**	Antibiotic-Producing Bacteria

		University of North Carolina - Wilmington	Discovered at Local Anne McCrary Park
Chemistry (B. S.)	35	**Gabriel Autry** North Carolina State University	Estimation of ssDNA Viral Evolution Rate in Plants
Interior Design	70	**Madeleine McKenzie** Appalachian State University	Visual Environmental Attributes/ Elements of Wayfinding in Unfamiliar Healthcare Environments
Liberal Studies	66	**Amber Young** Fayetteville State University	Multiple Deployments and Their Impact on Army Wives with Different Levels of Military Exposure
Liberal Studies	64	**Arvind Krishnamurthy** University of North Carolina - Chapel Hill	The Effect of Personally Solicited Campaign Finance on Judicial Legitimacy
Mass Communications	55	**Davelle Heath** North Carolina Central University **Anthony Rodgers-Williams** North Carolina Central University **Terri King** North Carolina Central University	Status of Public Relations Curriculum at Historically Black Colleges and Universities
Mathematics	39	**Suzanne Zeid** University of North Carolina - Wilmington	Predicting Outcomes of Incoming Shelter Animals
Mathematics	37	**Blake Atkinson** University of North Carolina - Charlotte **Kyriakos Vontas** University of North Carolina - Charlotte **Renesha Rodriguez** University of North Carolina - Charlotte	Bridge Designing for the Worst of Days
Middle Grades Education	68	**Zachary Burroughs** Catawba College	Which is affected more from alcohol exposure: boys or girls?
Music	61	**Briana Fonseca** Greensboro College	No Strings Attached: Applying Beethoven's String Quartet Model to the Saxophone Quartet
Music	63	**Kelsey Sexton** University of North Carolina - Charlotte	German School of Cello Playing: Providing an Anthology of Georg Goltermann's Works for Student Cellists
Music	60	**Billie Feather** North Carolina Central University	The Effect of Parental Involvement on Long-Term Musical Success
Music	57	**Autumn Rainey** North Carolina Central University	Jacquel Brel: The inspiration behind No Me Quitte Pas
Physics (B.S.)	5	**Quinlin Riggs** Appalachian State University	Spectroscopic Discovery of Lambda Bootis stars and Infrared Excess Detection using Archival Data
Psychology	45	**Kiana Perez-Jimenez** University of North Carolina -	The Relationship between Self-Compassion, Post-traumatic Stress

		Pembroke	Disorder, Coping, and Acceptance in a Military Population
Psychology	72	**Katelyn Hunt** Campbell University **Ashley Thomason** Campbell University	The Role of Birth Order in Attachment, Attraction, and Jealousy in Romantic Relationships
Psychology	49	**Jordan Izzo** High Point University	Self-Conceptualization in Rekindled Relationships: How One's Ideal and Actual Self Perceptions Relate to On-Again/Off-Again Relationships
Psychology	51	**Alexa de Jongh** Appalachian State University	Allergies Correlation with Behavior
Psychology	41	**Minnie McMillian** East Carolina University	The Presence and Perception of Technology: Does Mobile Device Use Enhance Students' Reading Comprehension?
Psychology	43	**Jaime Wright** Guilford College	In Pursuit of Happiness: The Influence of Happiness-Increasing Activities on Stress and Happiness
Psychology	58	**Melissa Mayfield** University of North Carolina - Greensboro	The Effects of Impulsivity and Neighborhood Safety on Risky Behavior
Psychology	53	**Michael Tyler** North Carolina Central University **Brianna Jones** North Carolina Central University	The Politics of Culture Identity and Self Presentation: Micro-Aggression Experienced by African Americans in the United States

Poster Presentations #2 (11:00 - 12:00 PM) 2nd Floor Mary Townes

Biology (B. S.)	14	**Alison Bonner** University of North Carolina - Chapel Hill	Defining Roles for the Oncogenic Kinase Abl and its Substrate Crk in Embryonic Development
Biology (B. S.)	6	**Itaevia Curry-Chisolm** North Carolina Central University	Loperamide Inhibits Spontaneous Network Activity
Biology (B. S.)	8	**Jordan Jackson** Campbell University	Cloning of Promoter Region of Human CHMP3 Gene
Biology (B. S.)	16	**Evan Brooks** North Carolina State University	The molecular mechanisms establishing left-right asymmetry in the developing heart
Biology (B. S.)	18	**Brandon Beaty** North Carolina Central University	The Effects of E. coli Strains on Human Colon Cancer Cell Line Caco2
Biology (B. S.)	44	**Whitney Bell** Meredith College	Validation of novel p53 transcriptional targets involved in DNA Damage Response and DNA repair signaling
Engineering Cooperative Program	77	**Benjamin Peterson** North Carolina State University	Using MRI to Evaluate Norepinephrine's Role in the Development of Brain Structure

Biology (B. S.)	12	**Cody Postich** University of North Carolina - Wilmington	Actinomycete Isolation and Antibiotic Discovery of Freshwater and Anthill Sediments
Biology (B. S.)	10	**Kristen Bagley** North Carolina State University	Determining molecular mechanisms establishing left-right asymmetry in the developing stomach
Chemistry (B. A.)	30	**Lauren Bou-Ghazale** University of North Carolina - Charlotte	Synthesis of 1,3,5,7-tetrasila-adamantane
Chemistry (B. S.)	40	**Natalie Smith** Appalachian State University	An Investigation of the Chemical and Optical Properties of Aerosols in the Southeastern U.S.
Chemistry (B. S.)	32	**Hannah Przelomski** Catawba College **Pamela Casdorph** Catawba College	Method Development for Sediment Analysis using DMA80 Mercury Analyzer
Chemistry (B. S.)	34	**Nathaniel Laughner** North Carolina State University	Using Metabolomics and Transcriptomic Networks to Understand Nutraceutical Metabolite Production
Chemistry (B. S.)	38	**Alex Wilson** Appalachian State University	Development of Extraction Methods for the Analysis of Secretions of the Plethodon yonahlossee salamander
Chemistry (B. S.)	28	**Jasmin Tindal** Queens University of Charlotte **Sanam Fazilova** Queens University of Charlotte **Juan Carrillo** Queens University of Charlotte	Identification and Quantification of Bisphenol-A and Bisphenol-S in Thermal Receipt Paper in the Greater Charlotte Area
Chemistry (B. S.)	36	**Hakeem Oufkir** Wake Forest University	Isolation of SufU sulfurtransferase from Bacillus subtilis
Chemistry (B. S.)	25	**Marissa Baccas** Fayetteville State University	The Effects of CK2 Inhibition on Cardiac Marker Expression in Xenopus laevis Embryos
Chemistry (B. S.)	47	**Victoria Acosta** North Carolina Central University	An Approach to Graphene-Based Semiconductors
Chemistry (B. S.)	75	**Jamara Amerson** Fayetteville State University	Determining the Sugar Content of Strawberries, Watermelon, Granny Smith Green Apples, White Grapes and Pineapples via Direct Weight, Carbon Dioxide and Ethanol Production
Chemistry (B. S.)	26	**Blake Seaton** Appalachian State University	Indirect determination of enzyme kinetics using capillary electrophoresis with chemiluminescence detection
Chemistry (B. S.)	23	**Tanquez Willis** Elizabeth City State University	Expressing and Purifying Recombinant Opa Proteins
Computer Science (B.S.)	71	**Matthew Bennison** North Carolina State University	Collaborative Botnet Detection Through Distributed Security Architecture
Engineering -	76	**Srujan Bhagwat**	Near Field Electrospinning Method for

Biomedical		North Carolina State University	the Continuous Fabrication of Structured Polymeric Tissue Engineering Scaffolds
Engineering - Biomedical	73	**Erin Sherrill** South Iredell High School	Utilizing EEG to Isolate Light Sensitivity Induced Brain Activity
Engineering - Biomedical	56	**Narendra Banerjee** Elizabeth City State University	A study to investigate the differential expression of noncoding MiRNA and their target genes in the transcriptome of prostate cancer derived from African American and Caucasian Patients
Engineering - Biomedical	59	**Nadia Kirmani** Duke University	Genetically Engineered Zwitterionic Peptide Polymers for Drug Delivery
Engineering - Biomedical	50	**Gurnoor Sangha** East Carolina University	Improving Cell Culture with a Rapid Prototyping Technique
Engineering - Biomedical	67	**Temilade Aladeniyi** North Carolina Central University	Neural Networks and Hand Dominance
Engineering - Chemical & Biomolecular	54	**Ashle Page** North Carolina State University	Investigation of the Public Perception of Science and Technology Policy
Engineering - Chemical & Biomolecular	48	**Yash Patil** Enloe High School	Characterizing the Actuation of Liquid Metal Droplets within Microfluidic Channels
Engineering - Chemical & Biomolecular	46	**Christian Rust** North Carolina State University	Photocatalytic Mesoporous Titania Thin Films on Porous Substrate through the Evaporation-Induced Self-Assembly Method
Engineering - Electrical & Computer	52	**Christopher Bollinger** North Carolina State University	A Beacon Based Approach for Stochastic Robotic Swarm Herding
Physics (B.S.)	69	**Kendall Jackson** North Carolina Central University	Surface Plasmon Biosensor Applications
Physics (B.S.)	74	**Job Derilus** North Carolina Central University	Development of Unmanned Aerial Vehicle with microprocessor
Physics (B.S.)	62	**Mizrain Ramirez** North Carolina Central University	The Characterization and Assembly of VO2 Nanostructures
Physics (B.S.)	33	**Ravi Patel** Appalachian State University	Optimization of imaging in an optical tweezers system using a tunable field lens
Physics (B.S.)	1	**William Dulaney** Appalachian State University	Analytic Solution to a Three Level Optical Pumping System with Constant Coefficients
Physics (B.S.)	12	**Nykesha Fyffe** Appalachian State University	Fluorescence Imaging of Actin Coated Microspheres
Physics (B.S.)	18	**Silver Frank** Appalachian State University	Designing and Programming a High-altitude Ultraviolet Camera to Study Young Solar Analogs
Pre-Medicine	42	**Shweta Lodha** Duke University	Towards a Novel Mechanism Through Which an Olfactory Receptor Regulates Prostate Cancer

Poster Presentation Session #3

Discipline	Poster	Presenter(s)/Institution	Title
Poster Presentations #3 (1:45 - 2:45 PM) 1st Floor Mary Townes			
Biology (B. S.)	22	**Robert Gordon** University of North Carolina - Wilmington	The Use Of Soil Extraction Agar To Cultivate Antibiotic-Producing Bacteria Under Environment-Like Conditions
Biology (B. S.)	24	**Jessica Speckman** Gaston College **Elizabeth Capps** Gaston College	Cattle Field Soil versus Unused Field Soil in Antibiotic Resistance
Biology (B. S.)	20	**Cheyenne Wilson** Catawba College **Emily Hoffler** Catawba College **Jonathan Rife** Catawba College	Diet Analysis of an Honors First Year Seminar Class at Catawba College using Stable Isotope Analysis
Biology (B.A.)	32	**Kristen Adams** University of North Carolina - Wilmington	Effects of Marine Media on the Growth of Antibiotic Producing Soil Bateria from Masonboro Sound
Biology (B.A.)	35	**Kaela Payne** North Carolina State University	A single amino acid substitution in the ligand binding domain of the teleost estrogen receptor ER alpha alters its binding affinity to the estrogenic mycotoxin, zearalenone
Biology (B.A.)	36	**Xavier Anderson** North Carolina A&T State University	Impact of Redox Modification on the substrate selectivity of PKC-B
Biology (B.A.)	19	**Emilee Isenhour** Catawba College	Measuring Chlorophyll in Coral
Biology (B.A.)	27	**Taylor Nguyen** North Carolina State University	A Preliminary Comparison of Morphological Features of the Extinct Giant Aye-Aye (Daubentonia robusta) and Extant Aye-Aye (Daubentonia madagascariensis).
Botany	28	**Elizabeth Parker** High Point University **Sarah Forget** High Point University	Effects of Summer Leaf Angle on Polystichum acrostichoides Stress Physiology

Chemistry (B. S.)	21	**Tre'Sean Hutchison** Fayetteville State University	Identification of Bovine Sperm Acrosomal Matrix Proteins that Interact with a 32 kDa Acrosomal Matrix Protein
Chemistry (B. S.)	6	**Kristen Brokaw** High Point University	Elucidation of the Efficacy of the Antitumor Quinone, Beta-Lapachone in a BRCA1 Mutant Breast Cancer Cell Line Expressing Elevated NQO1 Levels
Chemistry (B. S.)	7	**Brennan Johnson** Appalachian State University **Jackson Gordon** Appalachian State University	Purification and initial characterization, including divalent metal binding studies, on a putative monooxygenase from Hyphomicrobia sulfonivorans.
Chemistry (B. S.)	8	**Mitul Patel** East Carolina University **Jahmil James** East Carolina University	Impact of Sugars on fluorescence of DPH in liposomes.
Chemistry (B. S.)	10	**Grace Gable** University of North Carolina - Charlotte	Reactivity of new chalcogenone ligands towards elemental halogens
Chemistry (B. S.)	11	**Ami Patel** University of North Carolina - Charlotte	Mercury(II) complexes of new chalcogenone ligands
Chemistry (B. S.)	13	**Kara Lugli** University of North Carolina - Charlotte	Reactivity of dialkylbenzimidazole chalcogenones
Chemistry (B. S.)	15	**Alexander Li** University of North Carolina - Chapel Hill	Visualization of the Tertiary Structure of the RNA Genome within Satellite Tobacco Mosaic Virus (STMV) Using Native Gel Electrophoresis
Criminal Justice	2	**Karnella Fobbs** Fayetteville State University	Perceptions and Preventions of Expulsion Rates of African-American/ Minority Teens in the Public School System from Parents, Teachers, and Administration
Criminal Justice	3	**Braedon Jewett** Greensboro College	The Disparity of Race In Traffic Stops Made By Greensboro Police Department
Criminal Justice	30	**Mireya Colin** North Carolina Central University	Undocumented Immigrants in the Mid-Atlantic Region: A Qualitative Study/work in progress
Criminal Justice	31	**Jamiceia Willoughby** North Carolina Central University	The Developmental Strategies of Troubled Youth
Criminal Justice	33	**Natalie Udoye** North Carolina Central University	Psychological Theory and Juvenile Gangs
Criminal Justice	34	**Shepeara Williams** North Carolina Central University	Socioeconomic Status and Color of Gang Membership
Exercise Science	29	**Abigail Leonard** North Carolina Wesleyan College	Relationship between physical fitness and stress-related sleep disturbances
Exercise Science	4	**Jordan Mullins** Campbell University	Failed Accessory Navicular Resection in Female Collegiate Soccer Player

Exercise Science	9	**Caleb Jones** Campbell University	The Effect Of A 6-Week Training Program On Heart Rate Acceleration As A Parameter For Measuring Fitness
Exercise Science	23	**Haley Norris** University of North Carolina - Wilmington **Austin Smith** University of North Carolina - Wilmington **Elizabeth Seldomridge** University of North Carolina - Wilmington	A Longitudinal Retrospective Study of Body Composition Trends in Police Recruits
Exercise Science	25	**Hollie Champion** University of North Carolina - Wilmington **Susanna Ek** University of North Carolina - Wilmington **Rolf Frazier** University of North Carolina - Wilmington **Anna Kinslow** University of North Carolina - Wilmington **Caroline McClain** University of North Carolina - Wilmington	Effectiveness of Neuromuscular Electrical Stimulation During Rest and Exercise
Physics (B.S.)	1	**Katherine Matchunis** Appalachian State University	Analysis of [12C18O]/[12C17O] Abundance Ratios of Young Stellar Objects in the Local Solar Neighborhood
Physics (B.S.)	16	**Daniel Gallimore** University of North Carolina - Asheville	Electrostatics of the Growth and Formation of Silver Nanoparticles on a Ferroelectric Template
Physics (B.S.)	14	**Xuechun Wang** North Carolina State University	Fluorescent labeling of telomere binding proteins for single-molecule studies
Physics (B.S.)	17	**Andy Bae** North Carolina State University	Design, Construction & Commissioning of a Muon Veto for the COHERENT Experiment
Physics (B.S.)	5	**Quinlin Riggs** Appalachian State University	Spectroscopic Discovery of Lambda Bootis stars and Infrared Excess Detection using Archival Data

Poster Presentations #3 (1:45 - 2:45 PM) 2nd Floor Mary Townes

Biology (B. S.)	63	**Gabrielle Robbins** North Carolina State University	Investigating the Role of nitr9 in Zebrafish Immunity
Biology	64	**Brian Darst**	Elucidating the Genes Involved in

(B. S.)		North Carolina State University	Arabidopsis Root Development
Biology B. S.)	67	**Megha Ganatra** North Carolina State University	A Preliminary Analysis of the Effects of Dominance on Ring-tailed Lemurs (Lemur catta): Responses to Novel Objects
Biology (B. S.)	65	**Emily Linton** Campbell University	Taxonomic Characterization of a Novel Kistimonas Species and Detection of Biosurfactant Production Using Multiple Screening Methods
Biology (B. S.)	66	**Zakiyah Henry** Winston-Salem State University	Double the Fun: Using Heat Acclimation to Combat Insulin Resistance in Type II Diabetes
Biology (B. S.)	61	**Andrea Prestemon** North Carolina State University	Manipulating pest behavior: documenting tobacco thrips antixenosis to imidacloprid-treated cotton
Biology (B. S.)	58	**Helen Barker** High Point University	Captive Ocelot Behavior in a New Exhibit
Biology (B. S.)	56	**Asya Butner** East Carolina University	Obesity in late-term pregnant rats reduced aortic smooth muscle contractions via enhanced nitric oxide signaling
Biology (B. S.)	57	**Robbie Juel** University of North Carolina - Pembroke	Defining Plant Communities and the Vascular Flora of Sampson's Landing, Robeson County, North Carolina.
Computer Science (B.S.)	52	**Cami Czejdo** Fayetteville State University	Machine Learning Methods for Human-Like Locomotion from Position States
Computer Science (B.S.)	49	**Julia Furey** Guilford College **Damian Hinton** Guilford College	Investigating Hard-Drive Technologies and Software Tools
Computer Science (B.S.)	50	**Michael Crewes, Jr.** Guilford College **Yazan Khalaf** Guilford College	Investigating CPU Technologies and Software Tools
Computer Science (B.S.)	45	**Earl Alexander Jr** Central Carolina Community College	Disaster Recovery: Physical Security
Computer Science (B.S.)	43	**Jahdiel Couchman** Central Piedmont Community College **Henrique Weh** Central Piedmont Community College	Disaster Recovery: Data Loss and Recovery
Computer Science (B.S.)	42	**Catherine Spooner** Fayetteville State University **John Futrell** Fayetteville State University **Lee Gibson** Fayetteville State University **Samuel Cooper** Fayetteville State University	Automated Abnormal Behavior Detection in Crowds from Multi-camera Videos
Criminal	44	**Deja Jeter**	Delinquents vs Criminals

Justice		North Carolina Central University	
Criminal Justice	46	**Alexia Edmunds** North Carolina Central University	Treatment vs. Punishment for Juveniles
Environmental Science	47	**Tara Early** Appalachian State University	Modeling the variable effects of low-head dams on freshwater mussel populations
Environmental Science	59	**Danielle Thornton** Appalachian State University	An Analysis of Stream Water Quality in the Upper Little Tennessee River Watershed in Rabun County, Georgia
Environmental Science	60	**Brendan Joyce** North Carolina State University **Emory Quillian** North Carolina State University	Fertilizer, Planting Density, and Weed Management methods that optimize Poplar Productivity in Coastal North Carolina
Environmental Science	53	**Andrew Burgess** Appalachian State University	Climate impact on linkage between land use and water quality in a Southern Appalachian watershed.
Environmental Science	54	**A.J. Golding** Appalachian State University	Relating detrended fluctuation analysis techniques to standard methods for determining urbanization impacts on mountain streams
Environmental Science	55	**Michael Yanik** Appalachian State University	Quantifying ground-surface water fluxes and heterogeneity in an urbanized mountain stream
Game Design/ Interactive Media	48	**Kira Foglesong** High Point University **Alfred Bozzo** High Point University **Benjamin Rolison** High Point University	AINA: An App for Testing the Cognitive Functions of Non-Human Animals
Health and Physical Education	51	**Shauntera Copeland** North Carolina Central University	Effect of a Two-month Fitness Class on College Students
Health and Physical Education	62	**Kenya Smith** Catawba College	Player Susceptibility to Cognitive Deficits Based on Playing Position and Frequency of Headers Made
Physics (B.S.)	18	**Silver Frank** Appalachian State University	Designing and Programming a High-altitude Ultraviolet Camera to Study Young Solar Analogs
Physics (B.S.)	1	**William Dulaney** Appalachian State University	Analytic Solution to a Three Level Optical Pumping System with Constant Coefficients
Physics (B.S.)	12	**Nykesha Fyffe** Appalachian State University	Fluorescence Imaging of Actin Coated Microspheres

Poster Presentation Session #4

Discipline	Poster	Presenter(s)/Institution	Title

Poster Presentations #4 (3:00 - 4:00 PM) 1st Floor Mary Townes			
Biology (B. S.)	4	**Aishwarya Sriraman** North Carolina State University	Growth in cold temperature of Salmonella Typhimurium
Biology (B. S.)	5	**Kendall Tavares** Appalachian State University	Analysis of the methods by which Mitochondria-targeted antioxidants prime adipocyte differentiation through qPCR analysis of relative expression of genes related to adipocyte differentiation
Biology (B. S.)	6	**Prince Neequaye** North Carolina Central University	Effect of Sorafenib With Or Without Carboplatin Treatment in Triple Negative Breast Cancer.
Biology (B. S.)	7	**Elissa Teran** Meredith College	Activity of Effector Proteins Inside Pseudomonas syringae
Biology (B. S.)	8	**Charles Camp** East Carolina University **Kenneth Bridges** East Carolina University	Soil microbial respiration from coastal forested wetlands
Biology (B. S.)	9	**Jana Lu** Duke University	Identification of key residues in a human scaffold protein that are phosphorylated by a kinase effector from Legionella pneumophila
Biology (B. S.)	10	**Nicholas Payne** East Carolina University	Stick of Truth: Creating and using an inexpensive Basal Area Scoping Tool for rapid assessment of tree biomass in coastal forested wetlands
Biology (B. S.)	11	**Sarah Edmark** High Point University	Methylglyoxal sensitizes Bacillus oleronius to topical antibiotics
Biology (B. S.)	12	**Alexandra Sprouse** High Point University	Relative Contributions of Apoptosis and Necrosis in Stroke Model
Chemistry (B. S.)	33	**Emily Featherston** Appalachian State University	Preliminary expression and purification of a putative flavin reductase from Hyphomicrobium sulfonivorans
Chemistry (B. S.)	21	**Mathilde Meyenberg** Warren Wilson College	SNP assay of the Gb-Rbp-1 gene in G. pallida populations across the UK and the relation to pathogenicity and pathotype
Chemistry (B. S.)	22	**Josh Goheen** Campbell University	Modification of a Finnigan TSQ7000 Mass Spectrometer for Carbon 14 Dating of Indigenous People's Artifacts
Chemistry (B. S.)	25	**Sanam Fazilova** Queens University of Charlotte	Synthesis of Quaternary Ammonium Ionic Liquids for Biomass Pretreatment Studies
Chemistry (B. S.)	26	**Maryah Wright** North Carolina Central University	Role of Mutant NRF2 in Cell Proliferation
Chemistry (B. S.)	27	**Nadjali Chung** University of North Carolina - Greensboro	Identification of New Quorum Sensing Peptide from Staphylococcus caprae
Chemistry	28	**Robert Monroe**	Purification and Structure Identification of

(B. S.)		North Carolina State University	the Replication Enhancer Protein in Cabbage Leaf Curl Virus
Chemistry (B. S.)	20	**Melinda Schueneman** University of North Carolina - Asheville	Investigation of Periodic Trends in Catalytic Activity for O-H and C-H Bond Cleavage of Ethanol by Periodic Density Functional Theory
Chemistry (B. S.)	30	**Amanda Capen** East Carolina University	The protective role of CD163 in pulmonary inflammation induced by ozone
Chemistry (B. S.)	32	**Aleaha Schenck** North Carolina Central University	The Effects of Plasma Treatment on Pristine Graphene
Computer Science (B.S.)	19	**Daphne Faircloth** Fayetteville State University **Joshua Cohenour** Fayetteville State University **Casey Lorenzen** Fayetteville State University **Donny Lopera** Fayetteville State University **Brittany Jennette** Fayetteville State University **Ashlee Gaskins** Fayetteville State University	Object Detection for Target Search in Cooperative Robotics
Computer Science (B.S.)	3	**Matthew Peek** University of North Carolina - Asheville	Astronomical Imaging at Lookout Observatory
Computer Science (B.S.)	35	**Yves Dusenge** Guilford College	Applying Machine Learning to Enrollment
Computer Science (B.S.)	36	**James Fisher** Fayetteville State University **Philip Whiting** Fayetteville State University	Automated Tracking of Human Movement with Computer Vision
Computer Science (B.S.)	18	**Hengxuan Li** North Carolina State University	Applying machine learning model to predict students' performance by log files
Computer Science (B.S.)	67	**Aaron Arthur** North Carolina State University	Text Mining Witness Reports to Better Understand Migrant Deaths
Computer Science (B.S.)	2	**Olivia Wright** North Carolina State University	Development of SAS Studio Custom Tasks for Data Science
Exercise Science	13	**Mandy Szymanski** High Point University	Dietary Curcumin Supplementation Reduces Gastrointestinal Barrier Permeability During Exertinal Heat Stress
Exercise Science	14	**Sarah Davis** Campbell University	Bilateral Cubital Tunnel Syndrome In A Division I Collegiate Female Swimmer
Exercise Science	15	**Holly Price** Campbell University	Scaphoid Fracture In A Division I Collegiate Baseball Player
Exercise Science	16	**Rae Freeman** Campbell University	Xertional Rhabdomyolysis In A High School Football Player
Exercise Science	17	**Tiffany Sears** Campbell University	Wrist-Worn Physical Activity Trackers Progressively Underestimate Steps With

			Increasing Walking Speeds
Exercise Science	34	**Meghan Patton** High Point University	Repeated Thermal Stress Sensitizes C2C12 Myotubes To Subsequent LPS Exposure
Exercise Science	29	**Elizabeth Seldomridge** University of North Carolina - Wilmington **Austin Smith** University of North Carolina - Wilmington **Haley Norris** University of North Carolina - Wilmington	Bench Press Strength Changes Over 23 Years In Police Recruits With Gender Comparisons
Exercise Science	24	**David Giordano** University of North Carolina - Wilmington **Savannah Knight** University of North Carolina - Wilmington	Exploring Treatment Options for Chronic Obstructive Pulmonary Disease
Exercise Science	23	**Austin Smith** University of North Carolina - Wilmington **Haley Norris** University of North Carolina - Wilmington **Elizabeth Seldomridge** University of North Carolina - Wilmington	Longitudinal Study on Changes in 1.5 Mile Run Times of Police Recruits Over 18 Years
Exercise Science	31	**Sean Cochran** University of North Carolina - Greensboro **Morgan Luther** University of North Carolina - Greensboro	A simple method for improving jump performance in patients with chronic ankle instability
Physics (B.S.)	1	**Katherine Matchunis** Appalachian State University	Analysis of [12C18O]/[12C17O] Abundance Ratios of Young Stellar Objects in the Local Solar Neighborhood

Poster Presentations #4 (3:00 - 4:00 PM) 2nd Floor Mary Townes

Biology (B. S.)	46	**Katherine Cochran** Queens University of Charlotte	The use of bacteriophage in preventing infection of Caenorhabditis elegans by Bacillus thuringiensis Kurstaki
Biology (B. S.)	47	**Michael Hopkins** North Carolina Central University	Determining how Ubiquitin Signaling Regulates Cell Fate Determination during Human Stem-Cell Differentiation
Biology (B. S.)	48	**Elizabeth Carter** North Carolina State University	Functional characterization of the putative effector protein, MGG_09842 in the rice blast fungus, Magnaporthe

			oryzae.
Biology (B. S.)	64	**Thomas Cardona** Fayetteville State University	Effect of Audible Nest Defense on the Success Rate of a Songbird Clutch
Biology (B. S.)	65	**Brandon Murphy** Fayetteville State University	Identification of Genes Involved in Vancomycin Resistance in Acinetobacter baumannii 5075
Biology (B. S.)	66	**Gerry Woodland** Fayetteville State University	Effects of Downhill Running Exercise On Toll-Like Receptor 4 (TLR4) Gene
Biology (B. S.)	67	**Arshay Grant** Fayetteville State University **Ismael Hernandezvillasuso** Fayetteville State University	Generation of an Antioxidant-deficient Strain of Escherichia coli
Biology (B. S.)	68	**Shaaron Ochoa-Rios** Fayetteville State University	Controlling Stem Cell Aggregate Differentiation Using Microfluidic Devices Optimization of a Microfluidic Platform for Culture of Stem Cell Aggregates
Biology (B. S.)	50	**Charity Baldwin** Fayetteville State University	Surveying the abundance and diversity of insect communities in fresh parsley fields of Ohio
Biology (B. S.)	51	**Julia Horiates** East Carolina University	Conservation Genetics of the Brook Trout Salvelinus fontinalis
Biology (B. S.)	52	**Justin Safin** East Carolina University	The Role of Pre-Replication Complex Proteins in Drosophila Ovarian Stem Cell Maintenance
Biology (B. S.)	53	**Elizabeth Reardon** High Point University	Phylogeographic analysis of mitogenomes of five tropical Asian birds
Biology (B. S.)	54	**Desiree Moore** Fayetteville State University	Canine Appendicular Osteosarcoma Treatment Comparison
Biology (B. S.)	55	**Kiera Weathers** Fayetteville State University	Isolation, Identification, and Time Course Human DNA Typing from Cimex lectularius L. (Bed Bugs) Fed on Human Blood
Biology (B. S.)	56	**Jancie Brown** Fayetteville State University	Acute Exposure to Hemp Seed Formulations and Effect On Mortality and Acetylcholinesterase Activity of Zebra Fish
Biology (B. S.)	57	**Martina Azoro** Fayetteville State University	Survival and Infection of Root Knot Nematodes (Meloidogyne spp.) on Kale Plant Following Exposure to Hemp Seed Formulations
Biology (B. S.)	58	**Miranda Garrett** Queens University of Charlotte	Development of a consistent protocol for the genetic sexing of raptors found in the Southeastern United States
Biology (B. S.)	59	**Millie Hair** North Carolina State University	The effects of males on female responses to novel objects in Coquerel's sifakas (Propithecus coquereli)

Biology (B. S.)	60	**Viridiana Mandujano** Catawba College **Morgan Elder** Catawba College **Karina Noyola- Alonso** Catawba College	Identification of mycorrhizae associated with the aquatic plant Isoetes (Isoeteaceae)
Biology (B. S.)	61	**Kendal Carter** East Carolina University	Chamber Specific Kinetic Analysis of Monoamine Oxidase (MAO) in Pig Hearts
Biology (B. S.)	62	**Nicole Denaeyer** Meredith College	Combating Bacterial Resistance to Antibiotics: Synthesis and Analysis of Ciprofloxacin Derivatives to Improve Antibacterial Properties
Biology (B. S.)	63	**Tiffany Nguyen** North Carolina Central University	Optimization and validation of a high throughput screen for identifying Nrf2 inhibitors
Chemistry (B. S.)	49	**Evan Grimm** University of North Carolina - Charlotte	New reactivity of caffeine sulfide and selenide
Chemistry (B. S.)	45	**Ciera Cipriani** North Carolina State University	A First Principles Study on the Photodegradation of Azo Disperse Dyes
Chemistry (B. S.)	44	**Caroline Donaghy** Appalachian State University	A Fluorescence Anisotropy Instrument to Study Ligand Binding Events
Chemistry (B. S.)	41	**Khatijah Amir Hakim** University of North Carolina - Wilmington **Andrew Bishop** University of North Carolina - Wilmington **Jordan Nogle** University of North Carolina - Wilmington	The use of heart rate and electroencephalography (EEG) to measure changes in chemistry students' cognitive load
Chemistry (B. S.)	42	**Rachel Cancel** University of North Carolina - Wilmington	Molecular Basis and Medicinal Remedies of Hereditary Cataracts
Chemistry (B. S.)	43	**Jeffrey Penley** University of North Carolina - Chapel Hill	Cell-Free Expression of Cytochrome P450 Oxidoreductase for Studies in Drug Metabolism
Chemistry (B. S.)	39	**Lawrence Willis** Appalachian State University	Synthesis and Characterization of Novel o-Phenylenediamine Glyoxime Derivatives
Chemistry (B. S.)	40	**Nathalie Batista** North Carolina Central University	Designing Probes to Detect Amyloid Plaques in Patients with Alzheimer's Disease
Physics (B.A.)	38	**Nicholas Hall** Appalachian State University	Variability in the Radiative Effects of Aerosols over Boone NC
Physics (B.S.)	37	**Kleyser Agueda Lopez** North Carolina Central University	Characterization of TiO2@VO2 and Assembly using Fabricated Gold Interdigitated Electrodes

Performance Presentations

Time	Discipline	Presenter(s)/Institution	Title
Performances (9:30 - 10:30 AM) - BN Duke Auditorium **Moderator: Lenora Helms-Hammonds**			
9:45 AM - 10:00 AM	Music	**Tyra Scott** North Carolina Central University	Agathe: Emotional Expression in Carl Maria von Weber's "Der Freischütz"
10:00 AM - 10:15 AM	Theatre	**Caitlin Branen** Campbell University	Heartbeat
10:15 AM - 10:30 AM	Theatre	**Marisa Fernandez** Appalachian State University **Liv Winnicki** Appalachian State University	The Body & Soul When They Intersect: A Cross-Disciplinary Exploration

Exhibit Presentations

Time	Discipline	Presenter(s)/Institution	Title
Exhibits (10:45 - 12:00 PM) - 1225 MTSB **Moderator: DaKysha Moore**			
10:45 AM - 11:00 AM	Studio Art	**Megan Mahalik** Campbell University	The Tiger
11:00 AM - 11:15 AM	Studio Art	**Katharine Gunther** North Carolina Central University	A Study of Cezanne's Style and Subjects
11:15 AM - 11:30 AM	Studio Art	**Kaela McCoy** Campbell University	Rose
11:30 AM - 11:45 AM	Liberal Studies	**Mariah Lowry** Appalachian State University	Reflection on Billy Elliot and the Film's Presentation of Societal Constructs
11:45 AM - 12:00 PM	Biology (B. S.)	**Georgina Ruiz** University of North Carolina - Wilmington **Katy Nickel** University of North Carolina - Wilmington **Kelcie Hall** University of North Carolina - Wilmington	Impacts of marine plastics on a mid-trophic level estuarine fish (Menidia species)

Abstracts

Student Author(s): Abdul-khaliq Abdul-matin, Sophomore, Microbiology Central Piedmont

Community College

Mentor(s): Lauren Jackson, Central Piedmont Community College

Presentation: Biology (B. S.), Oral Presentations #3 (1:45 - 2:45 PM) 2235 MTSB

The Battle for A Better Human: Development of Gene Editing

The Human Genome Project is a scientific revolution that is rapidly impacting the daily lives of the human population. The recently developed CRISPR Cas-9 technology has the ability to edit the genome of any living organism. If this biotechnology is left unchecked, it may cause irreversible effects that prove to be harmful to this society as well as future generations. Recently, many articles have been published that discredit the scientific breakthrough and instill fear within the public. It is essential to the scientific community and the general public to engage in this topic. This dialogue should address any misconceptions about the biotechnology. It should also help guide scientists in identifying the barrier which humanity is not willing to cross for their own potential "betterment". The CRISPR System is the leading gene editing tool in biotechnology, and is continually being developed. The tool is still in its infancy, but will soon be used on humans in clinical trials. As a society we can establish boundaries with this gene altering technology. We must view the use of gene editing from multiple perspectives, so we can create a better future for ourselves and the generations to come.

Student Author(s): Victoria Acosta, Junior, Chemistry North Carolina Central University

Mentor(s): Shawn Sendlinger, North Carolina Central University

Presentation: Chemistry (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 47 2nd Floor Mary Townes

An Approach to Graphene-Based Semiconductors

Graphene is a single sheet of the material graphite and consists of a two-dimensional array of hexagonally arranged carbon atoms. Graphene is an electrical conductor, and research is underway to chemically modify the structure of graphene in hopes of changing it into a semiconductor. Semiconducting graphene could potentially be used to build electronic devices that are currently being built from silicon. Theoretical studies indicate that changes to the graphene structure using chromium compounds could indeed transform it into a semiconductor, where $?^6$-bound $M(CO)_3$ units (where M = Cr, Mo, or W) distributed on the surface bring about the desired change. Our current research aims to replicate the recent graphene experimental work using graphene oxide. Graphene oxide is easier to produce and handle than graphene itself. The approach involves reflux of a mixture that consists of graphene oxide and $M(CO)_6$ (M = Cr, Mo, or W) in a tetrahydrofuran/n-butyl ether mixture for 3 days, in hopes to attach a covalently bound "$M(CO)_3$" unit to the graphene oxide surface. The results of these experiments where the products were characterized by infrared spectroscopy, scanning electron microscopy, Raman spectroscopy, transmission electron microscopy, and x-ray photoelectron spectroscopy will be discussed.

Student Author(s): Gabrielle Adams, Freshman, Biology North Carolina School of Science and Mathematics

Mentor(s): Amy Sheck, North Carolina School of Science and Mathematics

Presentation: Biology (B. S.), Oral Presentations #4 (3:00 - 4:00 PM) 1221 MTSB

The Efficacy of Melatonin as an Anxiolytic Treatment in Stressed Zebrafish

Anti-anxiety medications come with debilitating side effects, such as tremors and addiction. Nearly 20% of the population of the United States suffers from some form of anxiety, and nearly a third of the United States Mental Healthcare Budget is devoted to treating anxiety. Therefore, finding an alternative to popular anxiety medications is desirable. Melatonin is a naturally

occurring sleep-promoting hormone with anxiolytic (anti-anxiety) effects in some vertebrate organisms, such as mice and fish and few side effects. The purpose of this study was to test the efficacy of melatonin as a treatment for stress in zebrafish, compared to buspirone, another anxiolytic drug. This was assayed through scoring swimming depth; that is inversely correlated with stress levels in zebrafish, with higher levels of stress being associated with lower levels in the tank. Through the course of the study, it was found that zebrafish treated with buspirone were located significantly higher in the tank ($p<0.0001$), relative to control, confirming buspirone's efficacy as a stress reducing pharmacological treatment. In addition, it was found that melatonin tended to cause zebrafish to be located slightly higher in the tank, compared to control, however, this was not statistically significant ($p=0.28$). The fish patterns of movement were analyzed, and the fish treated with melatonin were much more localized in their position, whereas the fish treated with control and buspirone had larger swimming ranges. While melatonin is not as effective as buspirone, it appears to be a mild anxiolytic with few side effects, and warrants further research.

Student Author(s): Kristen Adams, Junior, Biology University of North Carolina - Wilmington

Mentor(s): Kevin Kiser, University of North Carolina - Wilmington

Presentation: Biology (B.A.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 32 1st Floor Mary Townes

Effects of Marine Media on the Growth of Antibiotic Producing Soil Bateria from Masonboro Sound

The discovery of metabolites from marine resources has recently proven to be a new source for novel antibiotics used to treat bacteria infections. Marine ecosystems such as Masonboro Sound, generate an evolutionary pressure on microorganisms that allow for a difference metabolically and genetically from their terrestrial counterparts. Culturing Streptomyces on media similar to their natural environment such as Marine agar 1622 or a manipulated ISP-2 media could result in more diverse isolates. In this study, soil samples were taken from the Masonboro sound, diluted with sterile H2O and cultured on Marine 1622 and ISP-2 media. After culturing, isolates were tested for antibiotic producers by a TSB overlay inoculated with Staphylococcus epidermis. The marine media exhibited 3 zones of inhibition and the ISP-2 media produced two zones of inhibition. Further testing includes a cross streak test against the "ESKAPE" pathogens, as well as Gram staining and 16S rRNA sequencing to identify the species of the antibiotic producers.

Student Author(s): Lorreen Agandi, Senior, Biology and Chemistry East Carolina University

Mentor(s): Jeff McKinnon, East Carolina University

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 9 1st Floor Mary Townes

Color Patterns of Divergent Stickleback Populations in a Common Garden Study

The threespine stickleback fish (*Gasteosteus aculeatus*) is a key model species in evolutionary biology. Post-glacial independent colonization of North America, together with replicated environments and selection regimes, have led to diverse but often replicated character states across modern stickleback populations. Among the most intensely studied characters has been color pattern. We have studied color pattern evolution between divergent populations from the Pacific coast of North America. The Matadero population exhibits an intense red hue in the throat, while the Bonsall population expresses a dull hue, and the Little Campbell population is typically intermediate. The Bonsall population is of particular interest for some genetic experiments owing to its relative absence of red color; here we conduct an initial investigation to ask if Bonsall color differences persist in a common garden experiment and thus likely have a genetic basis. To encourage strong expression of throat color, lab-raised males were held in ten gallon tanks for up to seven days to allow for nest building, while gravid females were exposed to a male in a holding tank, twice per day for up to fifteen minutes. Male throat coloration was measured using a

spectrophotometer and photographed once nest building was completed. Our results confirm that lab raised Matadero fish continued to express a bright red hue, Bonsall sticklebacks a dull hue, and Little Campbell fish an intermediate hue. Spectrophotometric data from marine populations were previously collected and compared to this study. This work sets the stage for molecular genetic investigation of inter-population differences in coloration.

Student Author(s): Chiagozie Agbai, Senior, Pharmaceutical Sciences North Carolina Central University

Mentor(s): Liju Yang, North Carolina Central University

Presentation: Pharmacy, Oral Presentations #3 (1:45 - 2:45 PM) 1009 BRITE

Application of Electric Cell-Substrate Impedance Sensing (ECIS) toward Personalized Medicine.

Electric cell-substrate impedance sensing (ECIS) is an in vitro impedance measuring system used to monitor the behavior of adherent cells on microelectrodes. It can detect the physiological and functional changes caused by external stimuli in living cells or tissues, and measure various cellular events, including changes in cell number, cell adhesion, cell viability, cell morphology, and cell motility in a dynamic, real-time, label-free, and non-invasive manner. It has been recognized as a very useful tool in the drug development process, providing a simple, reliable, fast, and cost-effective means to improve large-scale and cost-intensive methods currently employed in biological research. This study aimed to demonstrate the application of ECIS technology towards the screening of personalized medicine by examining the efficacy of multiple anticancer drugs currently used to treat prostate cancer patients on four different prostate cell lines. At the same time, two types of End-point assays (Resazurin and MTT assay) were used to compare and validate the results obtained by ECIS. Three human metastatic castration resistant prostate cancer (mCRPC) cell lines; DU145, LNCap, PC-3, and a normal prostate cell-line were used in this research. Also, five chemotherapy drugs; Docetaxel, Abiraterone Acetate, Carboplatin, Mitoxantrone and Sunitinib Malate were used, with the main emphasis on Docetaxel, which is currently the approved gold standard for treating mCRPC. Cellular adhesion, proliferation and drug induced apoptosis were measured using both the ECIS system and one of the two types of end-point assay methods. The results showed that ECIS measurement curve could differentiate the response of a cell line to different drugs, each with a clear dose response, which demonstrated the possibility of this technique for rapid screening of effective personalized medicine if a patient-derived cell sample is used. Further, such real-time monitoring of cellular response during the entire experiment period could provide information that those end-point assays are unable to provide. For example, the PC-3 cell lines showed temporary response to docetaxel with increased dosage, and afterwards started to exhibit resistance to docetaxel using the ECIS technique, compared to endpoint assay.

Student Author(s): Kleyser Agueda Lopez, Senior, Physics North Carolina Central University

Mentor(s): Marvin Wu, North Carolina Central University

Presentation: Physics (B.S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 37 2nd Floor Mary Townes

Characterization of TiO2@VO2 and Assembly using Fabricated Gold Interdigitated Electrodes

Research has been focused on electric field assisted assembly to enable organization of nanowires, for applications in electronics and solar cells. Vanadium oxide (VO_2) is the subject of investigation because of its distinctive electronic structure, shown in its metal-insulator transition (MIT) property near room temperature. Therefore, with the collaboration of two distinct groups, VO_2 synthesis and nanoparticle assembly were brought together for a novel solution process to

coat Titanium Dioxide (TiO_2) onto vanadium oxide (VO_2), to use for assembly. Before the assembly, $TiO_2@VO_2$ was characterized by x-ray powder diffraction (XRD) for crystal structure, energy disperse spectroscopy (EDS) for elemental analysis, transmission electron microscopy (TEM) for its composition and morphology, and differential scanning calorimetry for its transition phase. The mechanism of the assembly consists of a photolithography patterned gold interdigitated electrodes placed in an optical microscope. The nanowires were placed in the electrodes, and were controlled by different frequency and voltage. The assembly shows the interaction of $TiO_2@VO_2$ with the electric field, caused by generated alternating current (AC). The AC electric field produced across the gaps of the electrodes assemble the nanowires to form chains in the direction of the field. The results of this assembly demonstrated the movement of $TiO_2@VO_2$ nanowires to areas of high field strength were caused by positive dielectrophoretic force.

Student Author(s): Manal Ahmidouch, Junior, Biophysics Wake Forest University

Mentor(s): Samuel Cho, Wake Forest University

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 19 1st Floor Mary Townes

MD Simulations and CD Spectroscopies: rDNA G-Quadruplex Complexes

In both prokaryotic and eukaryotic cells, guanine-rich stretches of DNA sequences are found in gene regulatory regions and telomeric DNAs to form G-quadruplexes, and they are involved in many fundamental biological processes and have been implicated in a number of diseases including cancer. While most previous G-quadruplex studies have focused on telomeric G-quadruplexes for validating targets for anticancer therapy, the nucleolar G-quadruplexes may be an even more promising target for chemotherapeutic intervention. The nucleolus plays a central role in tumor pathology because it controls the high level of ribosomal RNA (rRNA) synthesis necessary to sustain ribosome biogenesis during rapid cancer cell growth. Ribosome biogenesis occurs in the nucleolus and is tightly regulated by many cell signaling pathways that converge on the RNA polymerase I complex (Pol I). Using small molecules (drugs) to disrupt ribosome biogenesis represents an attractive strategy for selectively killing cancer cells. Aromatic acridines that sit on top of a G-quadruplex tetrad via ?-? stacking interactions have been extensively explored as scaffolds for developing G-quadruplex-specific binders. In this present study, we performed MD simulations of 13 putative rDNA G-quadruplexes that have been characterized via CD spectra to form G-quadruplexes. In addition, we simulated their interactions with designed acridines and benzacridines and analyzed them using a set of novel order parameters to quantify their binding selectivities. We are currently validating our computational predictions via CD spectra. In one G-quadruplex we studied, NUC 23, CD spectra shows that it adopts a parallel topology structure that is further stabilized upon interactions with benzacridine. In excellent agreement, we also observe the same phenomenon using our order parameters.

Student Author(s): Temilade Aladeniyi, Junior, Biology North Carolina Central University

Mentor(s): Chris Mizelle, East Carolina University

Presentation: Engineering - Biomedical, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 67 2nd Floor Mary Townes

Neural Networks and Hand Dominance

The involvement of left handed people in sensory motor neuroscience has been insignificant when compared to participation of right handers. As a result, the neural networks of left-handers is often believed to be a mirror image of right-handers. Coherence, the linear dependency of two signals at a specific frequency, can be calculated to see the networks and the parts of the brain which are in communication with each other as motor tasks are performed. This pilot study looked to determine if coherence was a feasible option to map and build a model of the different networks in dominant

and non-dominant hand use. Using a 128 electrode electroencephalogram (EEG) system, five subjects participated in an experiment which involved using their dominant and non-dominant hands to move small round objects with tweezers into bowls. The averaged data of the subjects were analyzed in Matlab to calculate coherence, with a threshold of .8, to estimate brain networks in the alpha and beta frequency bands between dominant and non-dominant hand use. It was observed that there is less coherence when subjects use their dominant, right hand, and non-dominant, left hand. There was seemingly less coherence when subjects used their dominant hand which can could possibly be attributed to the familiarity of movements with the hand. All though still in the initial stages of development, coherence appears to be a viable choice to assess the different neural networks between left and right-handers. These measures will be extended into a larger population to verify our preliminary findings and to complete our model of neural networks relating to hand dominance.

Student Author(s): Eleanor Albert, Junior, Visual Merchandising Design High Point University

Mentor(s): Daniel Hall, High Point University

Presentation: Economics, Oral Presentations #2 (10:45 - 11:45 AM) 2225 MTSB

Coffee: A Wake Up Call on Climate Change

The effects of climate change are happening today, and some are tasting it for the first time in their morning coffee. Coffee bean production can be observed to understand both the long and short term effects climate change is having on the world. The shocks to coffee bean prices and quality may also have people wake up to the issue of climate change and stimulate consensus on policy actions today. When a person's daily life is affected by them not being able to get their morning coffee or having to pay a higher price for it they will want to either find alternatives or learn what is happening to their beloved commodity. Due to the rise in temperatures, coffee production has greatly decreased causing the price to increase. The Arabica bean is most greatly affected by these rises in temperatures. If coffee prices are the major driver of change, producer efforts to dampen these price changes by lowering costs and weakening quality, in effect weaken new support for climate change policies. One negative way producers have kept prices low is by using cheap labor. The best way for people to realize climate change is an issue is for it to affect their lives and especially their paychecks. If price or shortage does not make them understand the effects of the warming planet then climate change can be promoted in alternative ways. People never like to hear about others suffering. If coffee drinkers learn about the poor farmers having to produce their coffee they will see change is in order. The consumers have the money and the resources to figure out ways to slow climate change and improve technology that would both benefit the production of coffee beans as well as the farmers growing them.

Student Author(s): Earl Alexander Jr, Sophomore, Computer Science Central Carolina Community College

Mentor(s): Joseph Little, Central Piedmont Community College

Presentation: Computer Science (B.S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 45 2nd Floor Mary Townes

Disaster Recovery: Physical Security

A Disaster Recovery Plan is a series of backup options that are available when an malicious act or natural has occurred resulting in the loss of data. Malicious acts such as stealing, vandalism, and/or abuse of any computer related equipment result in what is called a "Physical Breach". Most physical breaches are caused by piggybacking, inside users with malicious intent, and/or heating & cooling malfunctions. The result of such acts are data loss, violations of FERPA and HIPPA rights, and access to personal/financial information. Ways to mitigate or prevent these events from happening would be the use of "tie downs" to prevent stealing, biometric scanners such as retina scans and palm readers to prevent piggybacking, and proper training of inside workers to prevent

any hacking from phishing emails. Another type of breach is named a Catastrophic Breach which is caused mainly by natural disasters such as thunderstorms and floods. Lightning striking a building may be rare, however, it is possible for an occurrence. The mitigation of such horrendous occasions is preparation. Proper grounding of equipment and lightning rods for thunderstorms allow the current of electricity to flow through the building into the ground without any harm to the computer servers and equipment. Avoid building facilities in valleys or near a body of water to keep the event of a flood from happening. Physical Security is the first wave of defense and also the most easily accessible to many who are using the equipment. Without such actions taking place to make sure safety from such breaches many companies could be highly susceptible to multiple acts of theft and disasters.

Student Author(s): Elisa Alfonso, Senior, Hispanic Studies; Music Performance East Carolina University

Mentor(s): Jennifer Valko, East Carolina University

Presentation: Spanish, Oral Presentations #3 (1:45 - 2:45 PM) 2236 MTSB

Depictions of Musico-Cultural Syncretism in the Film "Chico & Rita" (2010)

The present study examines the musico-cultural syncretism of Cuban and American popular music as depicted both aurally and visually in Francisco Mariscal and Fernando Trueba's animated film *Chico & Rita* (2010). On the surface, the film portrays the romance and travels of two Cuban musicians, while on a deeper level it demonstrates the process of syncretism in Afro-Cuban, Latin American, and American cultures through music after the Cuban Revolution. While the film is set primarily in Havana, Cuba, it remains important to understand that the film itself was constructed through the European perspective of the cultures and events being depicted in the film. In contrast, the music for the film was composed, arranged, and performed by the well-established Cuban composer and pianist, Bebo Valdés. My paper analyzes *Chico & Rita* by discussing elements of mise-en-scène, the juxtaposition and convergence of different musical styles, and the use of the Bolero (a form of Latin American popular music) to reveal for spectators the formation of a new musico-cultural identity that transcends geopolitical borders.

Student Author(s): Alexander Allen, Senior, Chemistry University of North Carolina - Charlotte

Mentor(s): Daniel Rabinovich, University of North Carolina - Charlotte

Presentation: Chemistry (B. S.), Oral Presentations #1 (9:30 - 10:30 AM) 2226 MTSB

Copper(I) complexes with bulky thione and selone ligands

This presentation describes the synthesis and characterization of a series of unusual two-coordinate copper(I) coordination complexes supported by sterically-demanding N-heterocyclic thione (NHT) and selone (NHSe) ligands. More specifically, 16 complexes of the general formula (IArE)CuX (E = S, Se; Ar = Xy, Mes, Dipp; X = Cl, Br, I) have been prepared and fully characterized, and the molecular structures of 10 of them have been determined by X-ray crystallography. Significantly, unlike the ionic compounds [Cu(IArE)2]X (E = S, Se; Ar = Mes, Dipp; X = BF4, ClO4) recently reported by Prabusankar and coworkers (*Dalton Trans.***2015**, *44*, 15636), most of the new complexes described herein are neutral heteroleptic species (IArE)CuX in the solid state. The role of the nucleophilicity of the counterions (or lack thereof) in the observed molecular structures will also be discussed in this presentation.

Student Author(s): Jasmin Alsaied, Senior, Nuclear Engineering North Carolina State University

Mentor(s): Mohamed Bourham, North Carolina State University

Presentation: Engineering - Nuclear, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 39 1st Floor Mary Townes

Radiation Shielding of Mortars with Fine Aggregate Additives from Mine Waste

Enhanced radiation shielding for nuclear high-level waste packages can be achieved by using fine aggregates as additives in the cement mortar for the dry-cask overpack. Mine waste with barite-fluorspar composition extracted from North-Eastern Tunisia was used to make mortar mixtures with up to 30% of barite-fluorspar in the cementation mix. Samples were evaluated for gamma ray attenuation using stacked radiation sources Ba-133 (0.356MeV), Cs-137 (0.662MeV), and Co-60 (1.173 and 1.333MeV). Samples attenuation was also computationally calculated using Grove Software MicroShield 2012 v9.05 package to compare to experimental results. Experimental and computational results have shown 20% higher attenuation as compared to samples without addition of barite-fluorspar mine waste. The half-value layer (HVL) decreases with the increase in the additive, indicating effectiveness of reducing radiation intensity to half its values at lesser thicknesses. Addition of such fine aggregates is useful in providing better radiation shielding for nuclear waste packages, as well as mortar use in several nuclear environments and x-ray systems.

Student Author(s): April Alston, Junior, Psychology Fayetteville State University

Mentor(s): Pius Nyutu, Fayetteville State University

Presentation: Public Health, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 80 2nd Floor Mary Townes

The Effects of Racial Pride and Religiosity on Depression in African Americans

Depression in African American has remained but at the same time ignored or misinterpreted as weakness. This research therefore investigated the relationship between racial pride, ethnic identity, and religiosity with depression among African Americans. A multiple regression was used to re-analyze data that had been collected for a past study. Racial pride, ethnic identity and religiosity were as the predictor variables, and depression was the outcome variable. A linear relationship was found between depression along with racial pride, ethnic identity and& religiosity at a (R = .039). The results indicated that Racial pride, Ethnic Identity, and Religiosity did not have a significant effect on depression. The findings suggests that profession clinical counselors should be careful when utilizing aspects of racial pride, religiosity, and ethnic identity in treatment of depression.

Student Author(s): Jamara Amerson, Senior, Forensic Science Fayetteville State University

Mentor(s): Darren Pearson, Fayetteville State University

Presentation: Chemistry (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 75 2nd Floor Mary Townes

Determining the Sugar Content of Strawberries, Watermelon, Granny Smith Green Apples, White Grapes and Pineapples via Direct Weight, Carbon Dioxide and Ethanol Production

This proposal describes a research study to determine which fruit between strawberries, Granny Smith green apples, oranges, grapefruits, lemons and pineapple will have the greatest amount of sugar content. The sugar content of the fruits will be determined via direct weight and liquid ethanol produced. The direct determination of sugar content was performed by weighting the sugar residue left behind after the removal of water. The amount of carbon dioxide gas produced will be determined by water displacement. The amount of ethanol would be determined by micro distillation, density measurement and stoichiometry calculations. The average of four experiments for each determination method will be used to determine the average amount of sugar content. The results of the experiment showed that pineapple had the highest average amount of sugar content and lemons had the lowest average amount of sugar content via direct weight calculation. The results of the experiment from the ethanol fermentation study also showed pineapple to have the greatest and lemons to have the lowest. The sugar content of the fruits was obtained by averaging out the sugar values between the direct weight and the ethanol fermentation calculation weight. From the research study the daily portion size of whole fruits were based upon three cups

of peaches per day. The daily portion size ranged from 1.5 cups of pineapple per day to 4 cups of lemon per day.

Student Author(s): Aenia Amin, Senior, Neuroscience (BS), Psychology (BA) & Hispanic Studies (BA) East Carolina University

Mentor(s): Tuan Tran, East Carolina University

Presentation: Psychology, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 74 2nd Floor Mary Townes

The Effects of Prenatal Hormone Exposure on Associative Learning in a Rodent Model of Autism Spectrum Disorder

Approximately 1 in 68 children are diagnosed with an autism spectrum disorder (ASD) and lifetime costs in the U.S. per child are estimated at $2.3 million. While the precise causes for abnormal brain development in ASD are not known, environmental contributions from endocrine disrupting chemicals (EDCs) – particularly androgens and estrogens - may play an adverse role. Prenatal hormone exposure (PHE) may affect hippocampal and cerebellar function, but the underlying mechanisms of disruption are not well-understood. In this study, we examined whether PHE affected two variations of eyeblink classical conditioning (ECC), each of which is mediated by the hippocampus or cerebellum. Because neuron number is an important indicator of behavioral function, the possible link between changes in neuron number and alterations in associative learning were correlated. Pregnant Sprague-Dawley rats received daily injections of either dihydrotestosterone propionate (8 mg/kg), estradiol benzoate (50 μg/kg), or corn oil (vehicle) from embryonic days 15-19. Their offspring were tested as adults (postnatal day 90+) using trace or delay ECC. Neuron number was quantified using unbiased stereology within hippocampal cell layer CA1 (which supports trace ECC) and cerebellar regions that support delay ECC (interpositus nucleus and Purkinje cells). Preliminary results indicate altered learning in PHE rats. Learning was enhanced in animals that received trace ECC and impaired in those that received delay ECC, providing support for the idea that the hippocampus undergoes reorganization to mediate cellular activities that improve hippocampal function in humans with ASD (e.g., greater spatial reasoning) but at the cost of simple motor-related function served by the cerebellum. EDCs may produce organizational brain changes that underlie certain forms of ASD, as evidenced by neurobehavioral alterations in associative learning. Findings from this study may help elucidate the link between cellular changes and ASDs, so that treatments targeted at enhancing cellular function can be implemented.

Student Author(s): Khatijah Amir Hakim, Sophomore, Chemistry University of North Carolina - Wilmington

Andrew Bishop, Sophomore, Public Health , University of North Carolina - Wilmington

Jordan Nogle, Sophomore, Public Health , University of North Carolina - Wilmington

Mentor(s): Nathaniel Grove, University of North Carolina - Wilmington

Presentation: Chemistry (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 41 2nd Floor Mary Townes

The use of heart rate and electroencephalography (EEG) to measure changes in chemistry students' cognitive load

Chemistry is often described as the central science, the nexus through which mathematics and physical sciences are connected to the biological, environmental, and geological sciences. Because of this, many students are required to take chemistry courses, although the reasons for this are often not entirely clear. A prime justification is the assumption that a robust understanding of the discipline provides the framework through which learners can begin to develop one of the most important and fundamental scientific skills: the ability to connect underlying atomic and molecular structure with the chemical and physical properties these materials exhibit in the

macroscopic world. This process is complex, requiring students to construct a series of representations of chemical structure and to use them to extract vital information. Unfortunately, many find this process to be quite difficult and we hypothesize hindered by issues associated with cognitive load. This poster will present our preliminary efforts to measure changes in cognitive load using physiological metrics such as heart rate and electroencephalography (EEG).

Student Author(s): Elvira An, Senior, Biology University of North Carolina - Charlotte

Mentor(s): Richard Chi, University of North Carolina - Charlotte

Presentation: Biology (B. S.), Oral Presentations #2 (10:45 - 11:45 AM) 1221 MTSB

Identifying cancer drug targets using a novel Yeast small compound screen

Currently, there are billions of theoretical combinations of small molecules. Many of these small molecules have been shown to possess potent medicinal properties such as stimulating neuronal growth or combating cancer. However, understanding the underlying biological targets of these compounds continuously hampers their pharmaceutical development. Studies in mammalian cells have proven too complex and unreliable to elucidate these pathways. To aid in drug development, we have focused our work to use a simpler model system, Saccharomyces cerevisiae. Yeast, have 4 times fewer genes than humans and many of the pathways are conserved, making it an ideal model organism for drug discovery. Our lab has constructed a drug sensitive yeast strain with mutations to multiple chemical transporters and lipid homeostasis genes. When presented with a toxic compound, the compound will accumulate within the strain, resulting in reduced fitness and eventual cell death. A collection of ultra-drug sensitive yeast containing 136 tiled arrayed pools of overexpression plasmids was constructed in order to identify fitness rescuing genes. We validated our yeast collection by using hydroxyurea (HU), a well-studied anti-cancer drug with known targets. Using our novel yeast screen we optimized HU sensitivity to our query yeast strain and found over-expression of the subunits of the ribonucleotide-diphosphate reductase (RNR) rescued fitness. Additionally, we screened the National Cancer Institute Mechanistic III library of anti-cancer compounds and have identified novel compounds that show growth inhibition.

Student Author(s): Hannah Anderson, Senior, English University of North Carolina - Pembroke

Mentor(s): Scott Hicks, University of North Carolina - Pembroke

Presentation: English (Literature), Oral Presentations #2 (10:45 - 11:45 AM) 1234 MTSB

A Survey of Nuclear Fiction

With this project, I look to examine how nuclear fiction - defined as fiction centered on nuclear war, nuclear apocalypse, or other nuclear-related events - affected popular culture during the 1950-1970s, the height of U.S.-Soviet tensions during the Cold War and the peak of what is often referred to as the Atomic Age. I want to extract the themes from four prominent fiction novels written between 1950-1970 and analyze popular culture sentiments at the time to determine the influence nuclear fiction had on everyday American life. I then would like to compare these themes to those found in nuclear fiction during the 2000s and 2010s, mostly through the new medium of video games with the *Fallout* franchise, to understand how current popular culture has been influenced by the depiction of nuclear warfare or nuclear apocalypse. Understanding the link between past and present cultural anxieties can explain certain trends in fiction writing and why topics such as nuclear danger reoccur throughout popular history, even during times when the current danger is not necessarily "nuclear" in origin.

Student Author(s): Xavier Anderson, Junior, Biology North Carolina A&T State University

Mentor(s): Robert Newman, North Carolina Agricultural and Technical State Univeristy

Presentation: Biology (B.A.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 36 1st Floor Mary Townes

Impact of Redox Modification on the substrate selectivity of PKC-B

Protein Kinase C (PKC) family members control the phosphorylation status of select cellular proteins, regulate many key metabolic processes, for example, cellular proliferation, apoptosis and cell motility. The activity of PKC of family members must be tightly regulated inside the cell. An irregular activity of PKC has been related in many pervasive diseases, including cancer, diabetes and heart diseases. Studies have shown that several PKC family members undergo oxidation on a conserved cystine residue within their activation loop. It has been proven that redox modification of PKC decreases its activity toward the model peptide substrate,CREBtide.It is not clear if the observed redox-dependent changes in PKC activity are dependent on the specific substrate being examined. In this study we are interested in understanding the impact that redox modification of the b isoform of PKC, PKCb has on its substrate selectivity. A hexahistidine tagged variant of human PKC b was expressed in yeast and purified using the Ni-NTA immobilized metal affinity chromatography. To determine the impact of redox modification had on PKC b substrate selectivity, active PKC b fractions were then treated with oxidizing agents, such as hydrogen peroxide or diamide, to promote sulfenylation, followed by treatment with or without glutathione to promote glutathionylation. The activity of the redox modified PKC b toward a panel of peptide and full length native substrates was then measured using a coupled trans-phosphorylation assay. In the future, we will asses the impact of redox modification on the global substrate selectivity of PKC b using functional protein microarrays composed of 20,000 unique human proteins. These studies will provide insights in how PKC pathways are involved as well as how the pathways are regulated.

Student Author(s): Aaron Arthur, Senior, Computer Engineering North Carolina State University

Mentor(s): Elliot Inman, SAS Institute

Presentation: Computer Science (B.S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 67 1st Floor Mary Townes

Text Mining Witness Reports to Better Understand Migrant Deaths

The International Organization for Migration (IOM) collects data on missing and dead migrants from around the world. One historical dataset from the Migrants Files Project contains 2,275 reports on deadly incidents involving migrants. Each of these reports includes a narrative description of an event, but only half include a summary cause of death. In response to these missing data, a question arises: Can the cause of death in such incidents be estimated using the extant narrative? To answer this, a variety of statistical methods were evaluated including both supervised and unsupervised machine learning models. These methods include: a keyword analysis for relevant terms in the description; a text topic analysis of the description; factor analysis on the polychoric correlations between words in the description string; a classification tree; and a text mining model in SAS Enterprise Miner. Of these, the text mining model performed the best, achieving a misclassification rate of 11% on validation data. Results from these analyses were also compared graphically using SAS Visual Analytics. The scoring of previously uncategorized data was evaluated by human review.

Student Author(s): Blake Atkinson, Junior, Mechanical Engineering concentration Motorsports University of North Carolina - Charlotte

Kyriakos Vontas, Junior, Undeclared, University of North Carolina - Charlotte

Renesha Rodriguez, Senior, Mathematics, University of North Carolina - Charlotte

Mentor(s): Xingjie Li, University of North Carolina at Charlotte

Presentation: Mathematics, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 37 1st Floor Mary Townes

Bridge Designing for the Worst of Days

Older existing bridges usually are not designed specifically for natural disasters such as earthquake or hurricanes. Using MATLAB, different bridge designs of existing bridges are modeled in 2D, and natural disasters are simulated using vertical and horizontal forces to understand how those bridges might handle the extreme conditions. From the simulation we can observe deflection within the design and the relative error between the simulation and realistic bridges. These theoretical results will shed light on how different bridge designs handle the different forces. These results will be used to determine how specific material, designs, and amount of material used for building bridges affects how well the bridge does in a natural disaster. Using this research future bridges can be better designed in areas of the world that are often exposed to natural disasters such as Japan or Florida. The goal of the research is to gain a better understand of what happens to different bridge designs under these extreme conditions, and how we can design better bridges or reinforce existing bridges to overcome natural disasters. The results determined that how effective the truss designs transferred loads to supporting columns, the bridge could handle larger earthquake magnitudes. Not only this, but often bridge designs that used overall smaller beam lengths handled earthquakes of larger proportion than designs that favored longer beams.

Student Author(s): Mario Augustinovic, Senior, Biology University of North Carolina - Greensboro

Mentor(s): David Remington, University of North Carolina - Greensboro

Presentation: Biology (B. S.), Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 3 1st Floor Mary Townes

The role of evolutionary and selective forces on the development of genetic architecture

Genetic variation within a population can potentially affect the genetic architecture of a population which in turn may lead to the development of isolated populations. Mutations can lead to variation at quantitative trait loci (QTL), which are loci that contribute to variation in a complex trait. Genetic architecture refers to how the molecular variation in individual QTL contributes to the overall genetic variation. Studies in the past have not examined the effects of multiple polymorphisms as well as recombination within a gene and how this plays a role in the development of QTL. In particular, there may be evidence of selection of certain QTL through differing environments, especially when once such QTL is selected for in the first place. We hypothesize that divergent selection will favor large-effect QTL under certain circumstances and recombination within genes tend to generate large-effect QTL at loci that have substantial genetic variation. These hypotheses are tested through use of a genetic architecture simulation program, and ongoing results have been promising in terms of our hypotheses. We hope to advance our studies to include other variables that will attempt to mimic more accurately the characteristics of natural selection.

Student Author(s): Gabriel Autry, Senior, Biochemistry North Carolina State University

Mentor(s): Jose Ascencio-Ibanez, North Carolina State University

Presentation: Chemistry (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 35 1st Floor Mary Townes

Estimation of ssDNA Viral Evolution Rate in Plants

Geminiviruses are single-stranded DNA viruses transmitted by insects. Geminiviruses rely on compatible infection of host cells in order to replicate in the nuclei through the host's machinery and infect adjacent cells. Geminiviruses are a good example of why viral diversity is an ever-growing problem. These viruses can contain either mono or bipartite circular DNA genomes and are transmitted through insects. The large amount of diversity within this single family of viruses is one of the reasons they have become a problem for crops. We sought to better understand the

mutation rate of geminiviruses by using a low replication mutant of the Cabbage Leaf Curl Virus (CaLCuV). This mutant has an L145A mutation in the Helix 4 of the replication protein sequence (Rep or AL1). Over time, this mutation produces symptoms that are delayed when compared to the wild type. We inoculated 18 Arabidopsis thaliana Col-0 and 18 Nicotiana benthamiana plants with the mutant virus and observed symptoms over time. We found four distinct plant phenotypes in the Arabidopsis thaliana, each showing the viral reversion, and selected one plant from each group. We used samples taken at 30 days post inoculation to purify total DNA and amplify by PCR the Rep gene to help us look for the reversions. Since we collected samples at different times during infection, we will look at more than the four samples mentioned to determine if the groups reverted to a different amino acid or in a second site (not in helix 4). After Sanger sequencing of the PCR amplified Rep region we will attempt a deep sequencing experiment to look for a general mutation signature in selected plants. Our ultimate goal is to determine the ssDNA plant viruses rate of mutation.

Student Author(s): Artem Avtandilov, Senior, Business Administration High Point University

Mentor(s): Daniel Hall, High Point University

Presentation: Business Administration, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 5 1st Floor Mary Townes

Investment and Development: A Look at Solar Photovoltaic Technology

How much should the United States invest in the development and adoption of solar panel technology? What influences investment decisions in the technology? This paper lists the general social benefits and costs of solar photovoltaic technology, using our conventional fossil fuel technology for comparison. These include benefits of reduced CO2, reusable energy source, and decreased electricity bills. The costs include marketable costs of materials needed to produce the solar panels and environmental costs of displaced animal species and habitat. The differences in benefits and costs are affected by natural, economic, and political factors at the federal level and by factors unique to each location. This paper further narrows its focus to how these differences in benefits and costs influence solar PV investment by location or region.

Student Author(s): Martina Azoro, Senior, Biology Fayetteville State University

Mentor(s): Shirley Chao , Fayetteville State University

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 57 2nd Floor Mary Townes

Survival and Infection of Root Knot Nematodes (*Meloidogyne spp*.) on Kale Plant Following Exposure to Hemp Seed Formulations

Root knot nematodes (*Meloidogyne incognita*) are obligate asexual endoparasite of plants, and has become a huge pest problem to plants. They are small microscopic round worms that infect the root of plants. These worms are called nematodes. These nematodes are known to cause disease in roots and they produce root galling that can be seen on the roots once it is uprooted. Nematicides can stop or slow down the spread of nematodes but they are often too toxic to animals and humans. As a result, formulations composed of hemp seeds were tested to determine nematicidal activity due to previous studies demonstrating terpenoids present with fungicidal activity in the hemp plant. In the current study kale plants were planted in soil and sand treated with hemp seed formulations. Plants were then infected by nematode eggs. Findings show an increase in nematode infection as hemp seed amounts increased. As a result, hemp seeds exacerbate nematode problems by increasing hatching and infection of nematodes in kale plants.

Student Author(s): Margaret Baba, Junior, English North Carolina Central University

Mentor(s): Kuldip Kuwahara, North Carolina Central University

Presentation: English (Literature), Oral Presentations #1 (9:30 - 10:30 AM) 1234 MTSB

Culture, History, and the Value of Reading Ishiguro's The Remains of the Day

The value in reading Kazuo Ishiguro's The Remains of the Day is found within the cultural and historical context of the novel. The characters, locations, and time periods paint a vivid picture of life in England both before and after World War II. Ishiguro focuses specifically on the life of the servant, Stevens, and how he views his role as butler in a great house. Stevens spends the entire novel trying to work out and express what it means to be a "great" butler, in a "great" house, in Great Britain. He also explores what it means to live a life of 'dignity.' In addition to Stevens' role as butler, there is also his relationship with Miss Kenton, the housekeeper. Their relationship is made complex by Stevens' staunch views of social propriety and professionalism. Stevens's ideals are a hindrance to his own happiness due to his inability to relate to Miss Kenton on a personal level. Historically and culturally, Ishiguro uses Stevens to give the reader a snapshot into the life of an English servant during the interim war period (between WWI and WWII) and post-World War II. Ishiguro also gives the reader food for thought with regards to what it means to live with dignity, to serve humanity, and to be true to something more than the dictates of society. His style of writing helps the reader examine themes of blind faith and obedience, dignity, and love in the context of Stevens coming to terms with his own past and learning the value of love.

Student Author(s): Marissa Baccas, Senior, Chemistry Fayetteville State University

Mentor(s): M. Isabel Dominguez, Boston University, Boston Medical Center

Presentation: Chemistry (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 25 2nd Floor Mary Townes

The Effects of CK2 Inhibition on Cardiac Marker Expression in Xenopus laevis Embryos

CK2 is a positive component of Wnt signaling. *CK2alpha* knockout mice die in utero with uncharacterized morphological defects in the heart. We can reproduce these morphological defects in *Xenopuslaevis* frog embryos by treating them with the CK2 inhibitor, TBB (4,5,6,7-tetrabromobenzotriazole). Here, we used treated *Xenopus* embryos to analyze genes that are fundamental in heart development (*Nkx2.5, Islet1, CK2beta, Tbx1, Tbx5* and *Mef2c*). We hypothesize that *Islet1* and *Tbx1* will be decreased in TBB treated *Xenopus* embryos. *Xenopus* embryos were treated or not with different concentrations of TBB at stage 12 for 5 hours. Embryos were photographed at different stages (12, 13-14, 20, 23-24, 28, 33-34, 37-38) to observe overall phenotype. In addition, at these stages two embryos were stopped for Reverse Transcription PCR (RT-PCR) to analyze changes in expression of the cardiac genes. At stage 46, embryos were fixed for whole-mount immunofluorescence with anti-cardiac troponin to assess morphological heart defects. *Mef2c* and *Tbx5* were upregulated at stages 13-14 (2.5 hours post treatment) in a dose dependent manner. Our results show that there were no changes in the expression of *Nkx2.5, Islet1, CK2beta* and *Tbx1* at any stage or drug concentration. We conclude that CK2 inhibition in *Xenopus* leads to an increase in the expression of *Mef2c* and *Tbx5* but has no effect on *Nkx2.5, Islet1,CK2beta* and *Tbx1*. Future studies include repeating this protocol in frog embryos, and to compare whether the same genes will be affected in mouse embryos.

Student Author(s): Andy Bae, Sophomore, Physics North Carolina State University

Mentor(s): Matthew Green, North Carolina State University

Presentation: Physics (B.S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 17 1st Floor Mary Townes

Design, Construction & Commissioning of a Muon Veto for the COHERENT Experiment

The purpose of this project is to make a layer around the COHERENT experiment's germanium detector array that can detect muons so that data from events when a muon is present can be disregared. This muon veto will be made of two main parts: inorganic scintillator panels and photo multiplier tubes (PMT). When a muon (or any charged particle) passes through the scintillator

panel, it causes the electrons in the scintillator to release photons. These photons then travel across the scintillator until it hits a photocathode on a PMT. This releases electrons which are next multiplied and read as a DC signal which indicates whenever there is a muon present within the experiment. Our results on the effectiveness of the muon veto will come from simulations as well as data from experiments after building the panels. The effectiveness of the muon veto is very important because it will affect the data that is recorded from the COHERENT experiment's germanium detector array.

Student Author(s): Kristen Bagley, Senior, Biological Sciences - Integrative Physiology and Neurobiology Concentration North Carolina State University

Mentor(s): Nanette Nascone-Yoder, North Carolina State University and Nirav Amin, North Carolina State University

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 10 2nd Floor Mary Townes

Determining molecular mechanisms establishing left-right asymmetry in the developing stomach

The establishment of left-right (LR) asymmetries in organs such as the heart and stomach during embryonic development is crucial; approximately 1 in every 10,000 newborns exhibit Heterotaxy syndrome, a disorder in which multiple organs, including the stomach, fail to establish proper shape and orientation with respect to the LR axis. To understand the root of these defects, we must first understand the molecular mechanisms that determine organ asymmetry. We have used the frog embryo as a model to identify the cellular basis by which the stomach develops proper LR positioning in the adult. We have determined that the primitive stomach initially develops as a straight tube that then establishes its proper curvature by a predominant expansion of the left wall, which lengthens relative to the right stomach wall. We hypothesize that there are genes expressed in an asymmetric manner within the developing stomach that are responsible for this cellular-level difference. To identify such genes, we used RNA sequencing to screen the left and right halves of the developing stomach for genes with quantitative LR differences in expression. This approach revealed hundreds of differentially expressed genes, including *Pitx2*, the only factor already known to be localized asymmetrically during organ development. I have used *in situ* hybridization to qualitatively define the spatial and temporal expression of a subset of these genes within the left and right walls of the developing stomach. The resultant expression patterns have revealed proteins and signaling pathways that might be functioning to create asymmetry, potentially aiding in the future identification and treatment of developmental disorders such as Heterotaxy syndrome.

Student Author(s): Charity Baldwin, Senior, Biology Fayetteville State University

Mentor(s): Elizabeth Long, Ohio State University

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 50 2nd Floor Mary Townes

Surveying the abundance and diversity of insect communities in fresh parsley fields of Ohio

Insecticide use effectively reduces pests, but it also reduces predatory insect populations that may provide pest suppression. Cover crops that are not sprayed may offset negative impacts on beneficial insects by providing them with shelter and food when focal crops are sprayed. We surveyed insect communities in two parsley fields that differed in insecticide use and presence of a barley cover crop to determine if these factors influence insect abundance and diversity. We sampled insect communities once a week from June 14 through July 5 using a DVac suction sampler and pitfall traps. We collected 1,756 insects from both parsley fields, representing 10 insect orders. Overall, we found that the diversity of insect families in the two fields was very similar, despite the difference in cover crop and insecticide use. The most abundant insects

belonged to the orders Hemiptera (true bugs), Diptera (flies), and Hymenoptera (bees, ants & wasps). The majority of Hemipterans collected were leafhoppers and aphids (pests); however, several families in the orders Diptera, Hymenoptera, and Coleoptera (beetles) included beneficial insects that attack pests. These results help us understand how pest management strategies impact insect populations and can guide efforts to maintain beneficial insects in vegetable systems.

Student Author(s): Narendra Banerjee, Sophomore, Engineering Technology Elizabeth City State University

Mentor(s): Hirendra Banerjee, Elizabeth City State University

Presentation: Engineering - Biomedical, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 56 2nd Floor Mary Townes

A study to investigate the differential expression of noncoding MiRNA and their target genes in the transcriptome of prostate cancer derived from African American and Caucasian Patients

African-American men (AA) have the highest rate of prostate cancer, develop prostate cancer at an early age, present with a higher tumor grade at time of diagnosis, and have a higher rate of metastasis and mortality than Caucasian American men (CA). The genetic mechanism(s) underlying this racial diversity in prostate cancer is not well understood. Prostate cancer (PCa)-related deaths are caused by the emergence of castrate-resistant prostate cancer (CRPC) and subsequent metastasis, suggesting the need for better mechanistic understanding of tumor aggressiveness in order to advance the development of novel therapies. Emerging evidence suggests that acquisition of the epithelial-to-mesenchymal transition (EMT), a process that resembles the genesis of cancer stem-like cells, contributes to tumor aggressiveness and is mediated by deregulated expression of microRNAs (miRNAs), such as miR-200 and let-7 family. In this study, we did transcriptional profiling and biological pathway analysis of two PCa cell lines derived from CA and AA patients and samples collected from CA and AA patients of Wayne State University cancer center.. The microarray studies of global gene expression were conducted on the Affymetrix platform along with Ingenuity Pathway Analysis (IPA) to associate the affected genes with their mechanistic pathways. Our results showed definite changes in the pattern of MiRNA expression and their target genes in the transcriptomes of these two PCa cell lines and prostate cancer patients confirming that distinct differential gene expression patterns and pathways are probably responsible for increased morbidity and mortality of AA prostate cancer patients than CA ethnicity.

Student Author(s): Tara Baran, Senior, Theatre and Exercise Science University of North Carolina - Wilmington

Mentor(s): Robin Root, University of North Carolina - Wilmington

Presentation: Theatre, Oral Presentations #4 (3:00 - 4:00 PM) 2225 MTSB

Shakespeare and Autism

Shakespeare and Autism is theatre-based programming that employs the Hunter Heartbeat Method created by Kelly Hunter. The Hunter Heartbeat Method uses the text and rhythm of Shakespeare's plays to address the communicative challenges of children on the autism spectrum. Shakespeare and Autism sessions took place at the University of North Carolina Wilmington from January to May 2016. Nine participants completed a total of eight Shakespeare and Autism sessions. The participants played games based on Shakespeare's *The Tempest*. Many of the games targeted eye contact, turn taking, imitation, and communication. One of the areas of measurement in the previous research of Shakespeare and Autism focused on facial expression recognition in children on the spectrum whereas this study analyzed the change in facial expression production. Facial expressions are essential for conveying or responding to a message. Videos were taken of the nine participants after being prompted to make six different emotional expressions. The videos were

taken during the beginning, middle, and end of the sessions. The Emotient Facial Expression Analysis module was used to determine the change in facial expression production over time. The videos were uploaded to the module, which analyzed the intensity of each facial expression using action units; units correlate to different muscles in the face specific to certain emotional expressions. Using Emotient technology to measure change in facial expression proficiency after participating in Shakespeare and Autism, is the first research study of its kind in America. The Shakespeare and Autism programming shows great promise for addressing difficulties with producing facial expression for those on the autism spectrum and the Emotient technology is an innovative tool for measuring facial expression. Shakespeare and Autism and Emotient technology, used in tandem, have great potential to contribute to the advancement of autism spectrum research.

Student Author(s): Kayla Barbour, Senior, Elementary Education High Point University

Mentor(s): Leslie Cavendish, High Point University

Presentation: Elementary Education, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 78 2nd Floor Mary Townes

The Impact of a Summer Reading Program on Reader Motivation

The will to read and instructional practices are equally essential for a reader's success. In the summer of 2015, 21 rising third graders attended a summer reading program at a local university. The program was held four days a week for five weeks, and lasted two and a half hours each day. Children worked with tutors both individually and in groups. The program was largely designed to prevent a summer reading "slide" that often impacts children in low income families. All 21 children qualified for free or reduced lunch at their school. The goal of this research is to examine how students' participation in a summer reading program influenced their motivation to read. Pre and post surveys as well as narrative reports were analyzed to triangulate three different perspectives: the reading tutors, the children, and the parents. Patterns in the qualitative data were identified and analyzed for frequency. It was found involvement in the program allowed for students to develop a greater drive for reading, and certain qualities of the program fostered motivation in the students. Three main themes identified are increased interest in reading independently, improved confidence as a reader, and stronger comprehension skills.

Student Author(s): Helen Barker, Junior, Biology High Point University

Mentor(s): Joanne Altman, High Point University

Presentation: Biology (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 58 2nd Floor Mary Townes

Captive Ocelot Behavior in a New Exhibit

How do zoos ensure the welfare of their animals? Zookeepers and staff have a commitment to monitor the physical and psychological well being of their animals. A large part of this is tracking how well animals adapt to their exhibits. The North Carolina Zoo invests a lot of time in watching the behavior of their animals to make sure that they are receiving the best care possible. They recruited undergraduate research assistants to monitor the behavior of a female ocelot as she was integrated into a new environment this summer. This research focuses on tracking her behavior to assess if it reflected natural patterns. In the wild, ocelots are nocturnal and their activity rates vary with the seasons, so long periods of activity are often seen during hot, summer days. This ocelot's behavior was consistent with the expected behavior. Over 70% of the recorded observations this summer showed her resting and the majority of her resting was done in the shade of the cave. She also spent 10% of her time walking and 5% foraging. There were no stereotypical behaviors exhibited, such as pacing. The ocelot appeared to make a smooth transition into her captive habitat.

Student Author(s): Nathalie Batista, Junior, Biology and Chemistry North Carolina Central University

Mentor(s): Nathan Wymer, North Carolina Central University

Presentation: Chemistry (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 40 2nd Floor Mary Townes

Designing Probes to Detect Amyloid Plaques in Patients with Alzheimer's Disease

Each day, every 66 seconds someone in the Unites States develops Alzheimer's disease, making the development of an effective cure one of the world's top public health priorities. Prof. Nathan Wymer's laboratory is attempting to design probes that can get through the Blood Brain Barrier (BBB) and can also detect amyloid plaques in patients with Alzheimer's disease. A major component of the probe is the carrier protein CRM197. This carrier protein is thought to play an important role in the active transport of molecules across the BBB. The BBB prevents the entrance to our brain of most hydrophilic molecules, proteins, and chemical probes, such as antibodies, limiting our understanding of most of the functions of our brain and delaying the development of effective cures to brain related diseases and disorders. To address this, Prof. Wymer and his students are engineering a probe that will be able to get through the BBB, bind to the amyloid plaques, and help detect amyloid plaques earlier in the progression of the disease. Early detection can help slow the development of Alzheimer's disease and impact the design of future treatment options for Alzheimer's disease patients.

Student Author(s): Jennifer Beach, Senior, Psychology Catawba College

Mentor(s): Sheila Brownlow, Catawba College

Presentation: Psychology, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 38 1st Floor Mary Townes

Do Twitter Posts of Public Figures Reveal Private Selves?

We examined first-person pronoun use among the Tweets (N = 4010) of famous persons, using age, sex, and social status (by number of followers) as variables of study. "I" use signals self referent focus and was seen among older famous people, those with more followers, and athletes. Given the patterns observed have only mixed support in previous LIWC literature, it is likely that pronoun use along with other linguistic categories (relating to, for example, social processes, cognitive mechanisms, or personal concerns) is needed to provide a more complete understanding of how very-public Tweets reflect private, individualized concerns.

Student Author(s): Brandon Beaty, Senior, Biology North Carolina Central University

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 18 2nd Floor Mary Townes

The Effects of *E. coli* Strains on Human Colon Cancer Cell Line Caco2

Alterations in the gut microbial composition have been associated with colorectal cancer (CRC), a leading cause of cancer death in the United States. However, the precise mechanism by which gut bacteria contribute to CRC is not clearly defined. In this study we investigated the effects of bacteria (*E. coli*) on the Caco2 human colon cancer cell line. Using antibiotic free media we seeded 2 million Caco2 cells in 6-well plates, and cultured for 24 hours to allow monolayer formation. Then Caco2 cells were exposed to three different *E. coli* strains (3BB-001; isolated from an adenoma patient, K12; non-pathogenic, NC101; which is a pathogenic murine strain) for 8 hours co-culture. Bacteria were removed by aspiration of supernatant, followed by two washes with DPBS. The *E. coli* exposed vs. control Caco2 unexposed cells were maintained for additional culture for 24, 36, 48 hours on antibiotic media, in order to calculate the cell viability over time. Viability was determined using trypan blue; viable and non-viable cells were counted at 56, 68,

and 80 hours' time points. Collected data of the cell viability over the time period was analyzed. *E. coli* co-culture with Caco2 demonstrated significantly increased viability at 56, 68 and 80 hours compared to control Caco2 cells only. The Caco-2 cells alone had a viability much lower than when co-cultured with bacteria... Additional studies will examine the effects of bacteria on Caco2 cell proliferation, apoptosis, and secretion of inflammatory mediators. In these studies we demonstrate that Caco2 human cancer cells demonstrate enhanced growth when exposed to the potential pathogenic bacteria E.Coli 3BB-001, K12, and NC 101.

Student Author(s): Whitney Bell, Senior, Biology Meredith College

Mentor(s): Daniel Menendez, National Institute of Environmental Health Sciences

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 44 2nd Floor Mary Townes

Validation of novel p53 transcriptional targets involved in DNA Damage Response and DNA repair signaling

The p53 tumor suppressor protein is a sequence-specific transcription factor that regulates the expression of >200 genes in response to various cellular stresses including DNA damage. Using genome-wide analyses (chromatin immunoprecipitation (ChIP) followed by next generation DNA sequencing) and expression analysis, we previously identified potential p53 targeted genes involved in DNA Damage Responses in various human cancer cell lines following treatment with DNA damaging agent Doxorubicin. Here we used a qPCR approach to validate the p53 dependent responsiveness of the following targets: *APTX, ATR, ATRIP, DDX5, LIG1, MSH4, POLD1, POLH* and *REV3L* after 24h of treatment with various p53 activating agents. Expressions of eight out of nine of those genes were confirmed to be induced by Doxorubicin in a p53-dependent manner, while Nutlin-3 and Etoposide treatments resulted in drug and cell-type specific responses of the evaluated genes that were p53 dependent. We confirmed that p53 binds p53 responsive sequences in the transcriptional regulatory regions of several of these genes after DXR treatment. In summary, we identified new p53 targets involved in DNA repair and DNA damage signaling. These findings advance our understanding of how p53 can influence these processes in response to stress in human cells.

Student Author(s): Asante Bells, Senior, College of Engineering North Carolina A&T State University

Charles Henry, Senior, Industrial and Systems Engineering, North Carolina A&T State University

Mentor(s): Tonya Smith-Jackson , North Carolina Agricultural & Technical State University Shatara Tarte North Carolina A&T State University; Matt McCullough North Carolina A&T State University; Christopher Doss North Carolina A & T State University

Presentation: Cyber Security, Oral Presentations #2 (10:45 - 11:45 AM) 1008 BRITE

Using Data Mining of Internet-of-Things Sensor Data to Distinguish User Personas

Hackers are known for finding loopholes within software structure to perform activities that have potential to be highly detrimental to anyone registered with the software. This research focuses on the use of data mining methods such as clustering, structural modeling, and neural nets to identify patterns in data from sensors. The goal is to make devices running on the Internet of Things more secure and trustworthy for registered users. But, human-system interaction is key to advancing this capability. Our team is using behavioral scripts to develop an augmented cognitive persona to help create computational models that will eventually be able to recognize each unique persona. In addition to recognizing unique personas, our team is aiming to have the ability to recognize any intruders that enter the system. Our analysis model will consist of data from multiple sensors that will be programmed to capture any motion that's unique to each individual persona. These sensors will be able to measure the angles and amount of force used in each unique movement. The data that is to be collected from each sensor will create a persona's motion profile. Eventually, this

development process will produce a cognitive agent that will be able to recognize an individual's unique motion and help protect them from harming themselves, others with ill intent, and secure the private data from the various sensors throughout the system. The presentation will focus on behavioral script development, preliminary conceptual models, and initial system requirements.

Student Author(s): Gibson Bennett, Junior, Astrophysics and Computer Science University of North Carolina - Chapel Hill

Mentor(s): Fabian Heitsch, University of North Carolina - Chapel Hill

Presentation: Physics (B.S.), Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 65 2nd Floor Mary Townes

Smoothing Techniques for Radiative Transfer in Hydrodynamic Simulations

Interactions between interstellar gases and stellar radiation are an integral part of astronomy; however, including radiation in hydrodynamic simulations can be difficult to model due to exhaustive computational cost. As a result, our ability to simulate processes such as star formation is limited. We have developed an extension to the grid-based hydrodynamics code Athena, using a HEALPix-based ray tree to solve the equation of radiative transfer. With this additional tool, we can aptly model heating due to photo absorption and the ionization of atomic Hydrogen. To minimize computational cost and reduce interpolation effects due to projecting a spherical ray tree onto a Cartesian grid, we implemented an interpolation method based on the triangular-shaped cloud (TSC) method. The interpolation is used in two forms: reverse TSC (rTSC) that builds an interpolated ionization fraction and hydrogen density, and forward TSC (fTSC) that smooths energy deposition. We find that the current implementation of fTSC interpolation does not conserve the photon number, but that the rTSC interpolation can be used to more accurately approximate the resulting ionization fractions.

Student Author(s): Matthew Bennison, Sophomore, Computer Science North Carolina State University

Mentor(s): Rudra Dutta, North Carolina State University

Presentation: Computer Science (B.S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 71 2nd Floor Mary Townes

Collaborative Botnet Detection Through Distributed Security Architecture

Modern botnets have begun to employ decentralized, peer to peer structures in order to evade traditional methods of detection. These networks of virus infected computers are controlled by malicious masters for harmful purposes. The ability to quickly identify and respond to a botnet is important because their coordinated attacks can be costly. A recently proposed algorithm is intended to identify the members of decentralized botnets by analyzing network communication data from a perspective that is not typical of monitoring systems. This solution examines the aggregated communication graphs of multiple ISP's to find the signature patterns of structured P2P networks. However, applications of this solution may prove to be impractical due to the constraints of ISP network data. The purpose of this research is to assess the effectiveness of the security algorithm and determine potential improvements to accuracy or performance. We expect to be able to characterize the accuracy of the algorithm by the observable response to changes in botnet size and sample size. We also expect to gain insights into how the performance of existing algorithms can be improved when provided with partial or incomplete network information.

Student Author(s): Srujan Bhagwat, Senior, Materials Science Engineering North Carolina State University

Mentor(s): Matthew Fisher, North Carolina State University

Presentation: Engineering - Biomedical, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 76 2nd Floor Mary Townes

Near Field Electrospinning Method for the Continuous Fabrication of Structured Polymeric Tissue Engineering Scaffolds

Previous experimentation has demonstrated that electrospinning aligned fibers is possible using a rotating mandrel to draw polymers into thin sheets for use in tissue engineering scaffolds. However, this method cannot produce more complex structures with physiological dimensions. It has been shown that near field electrospinning (NFES) using a spinneret tip, dipped in polymer solution, combined with a computer-controlled translating stage, can produce organized, fibrous structures. However, immersing a spinneret in polymer solution limits the amount of polymer that can be electrospun continuously. Therefore, The objectives of this study were to propose a design for a continuous direct-write syringe pump NFES system including a CAD model of the design and a cost/benefit analysis. First the feasibility of this modified NFES method was evaluated by electrospinning with varying parameters onto both a static collector and a rotating mandrel to produce fibrous poly-caprolactone. Scanning electron microscopy (SEM) images of the structures suggest stacking of nanofibrous features up to several centimeters in height is possible, which indicates the potential of continuous, controllable NFES to create scaffolds with physiologically relevant dimensions.

Student Author(s): Nicholas Biondo, Junior, Animal Science North Carolina State University

Mentor(s): Belinda Akpa, North Carolina State University

Presentation: Pre-Medicine, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 17 1st Floor Mary Townes

Is lipophilicity a valid predictor of drug sequestration? An investigation in support of lipid resuscitation.

In the 18 years since lipid therapy was first revealed as a potential intervention for drug-induced heart failure, clinical reports have detailed a range of outcomes - including some rapid and dramatic resuscitation successes when all conventional life support efforts have failed. In anesthesiology in particular, physicians have begun to generally accept this method as part of the toolkit for addressing local anesthetic toxicity. However, the question of whether this approach should be used as even a last resort in other drug poisonings remains controversial. Data surrounding the practice is anecdotal, scarce, and heterogeneous. Furthermore, our understanding of the therapeutic agent reveals a complex, multifunctional method of action. In this work, we focus on what is likely a highly variable element of the proposed therapeutic activity - sequestration of drugs in the blood. Through coarse grained molecular dynamic simulations of a selection of drug molecules with differing physicochemical properties, our research aims to interrogate the determinants of drug partitioning into lipid emulsions.

Coarse-grained molecular topologies were developed for 5 drugs and their free energy of partitioning was evaluated for both their ionized and neutral form in octanol/water and triglyceride/water systems. Partition coefficients evaluated on this basis were used to assess the predictive value of logP, the neutral-state octanol/water partition coefficient. With this information, we have proposed which properties of a given drug dictate its likely susceptibility to scavenging in vivo. This work contributes to a rational framework clarifying the appropriate uses of lipid resuscitation.

Student Author(s): Lauren Blackwell, Junior, Laboratory Animal Science North Carolina A&T State University

Mentor(s): Radiah Minor , North Carolina A&T State University

Presentation: Environmental Science, Poster Presentations #1 (9:45 - 10:45 AM) , Poster

Number 34 1st Floor Mary Townes

Search For Segmented Filamentous Bacteria In The Swine Unit Dust

Pork is the No. 1 consumed meat in the world. Maintaining and growing healthy hogs is important to the pork industry, consumers, and the economy. Early weaning of piglets is a common practice used by the swine industry to increase production. But early weaning has a negative effect, leaving piglets more susceptible for gastrointestinal (GI) issues such as post weaning diarrhea (PWD). PWD negatively affects growth can be associated with morbidity and mortality. Currently in the US farmers use low levels (sub-therapeutic) of in feed antibiotics to prevent PWD, but this practice contributes to the development of antibiotic resistant bacteria. Because this is a significant public health issue the US is placing restrictions on sub-therapeutic antibiotic use in livestock production. Therefore, antibiotic alternatives that promote health and immunity are being sought. Segmented filamentous bacteria (SFB) (*Candidatus* savagella) are gram positive, non-pathogenic bacteria that promote maturation of the immune system. SFB have been detected in the intestine and fecal samples of piglets and other mammals, including humans, generally during weaning; not at birth or in adulthood. We asked where does SFB come from? Can SFB be detected in the environment of the swine unit? Dust from the NC A&T swine unit was collected and evaluated for the presence of SFB using Gram's staining and PCR. For PCR, DNA was isolated using two methods; MoBio (method 1) and MP biomedical Fast Prep 24 protocol (method 2) and 16S rRNA genes amplified with SFB and EUB (universal bacteria) specific primers. Gram's stain showed a bacteria of segmented morphology; however PCR was SFB negative for both DNA isolation methods suggesting that the dust samples did not contain *Candidatus* savagella. Furthermore, only method 1 was positive for general bacteria (EUB) suggesting that there was a technical problem with DNA isolation method

Student Author(s): William Blackwood, Senior, Economics Appalachian State University

Mentor(s): John Whitehead, Appalachian State University

Presentation: Economics, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 6 1st Floor Mary Townes

Economic Impact of Prerace Training Rides for Blood, Sweat and Gears

This paper uses the travel cost method (TCM) to estimate demand for training rides for the "Blood, Sweat and Gears" bike race in Boone, NC. Blood, Sweat and Gears is "a grueling 90 mile bike race through the Blue Ridge Mountains, in and around the Boone area." This bike race routinely has over 1,000 participants and has a very large, positive economic impact on Watauga and surrounding counties. This study is unique in that it addresses the economic value associated with training trips associated with an annual sports tourism event. TCM is a method used to estimate the value of non-market goods. This method uses travel distance and cost to estimate the price to consumers of access to a park or participating in sports tourism event. This can then be used to estimate consumer surplus based on the number of trips they will take at different distances, or travel costs. An online survey was conducted after the 2011 to 2016 races, where participants were sent email invitations. Of the 418 riders who completed the 2016 survey, 73 also participated in training rides prior to the race. On average, those who did training rides took 3 trips. Using regression analysis I find that, as expected, the number of trips decreases with the number of miles that participants had to travel for their training rides. Preliminary estimates of consumer surplus were calculated to be $26 per person. The paper will include data from the earlier surveys and use other measures of travel and time cost to provide more robust estimates.

Student Author(s): Christopher Bollinger, Senior, Computer Engineering North Carolina State University

Mentor(s): Edgar Lobaton, North Carolina State University

Presentation: Engineering - Electrical & Computer, Poster Presentations #2 (11:00 - 12:00 PM) ,

Poster Number 52 2nd Floor Mary Townes

A Beacon Based Approach for Stochastic Robotic Swarm Herding

Robotic swarms are highly effective at exploring unknown spaces, and have the potential to be excellent tools for search and rescue operations. Researchers in the field have developed an approach for mapping out environments using a swarm of cyborg insects, also known as biobots. However, for this approach to be effective the biobots must be herded through the environment as a group. Our solution to this challenge confines the biobots by taking signal strength readings from an overhead antenna. As a biobot moves away from this antenna, the strength of the radio signal will decrease. Using a biologically inspired method for moving along a gradient, chemotaxis, the biobot's motion can be biased back towards the radio beacon. To test this approach, we simulated the swarm's motion in MATLAB and implemented this behavior on a Mindstorms EV3 robot equipped with a USB radio board. Initial simulations showed the approach is effective at restricting the robot's motion. Testing in our experimental setup gave mixed results due to the lack of a localized signal strength from our antenna. To resolve these issues, we have constructed a new experiment using a directional antenna with motion tracking to better characterize the behavior of our test robot. With these improvements, we expect our algorithm will confine the robot more effectively, while also providing us with a better understanding of which antennas are best suited for localization beacons.

Student Author(s): Alison Bonner, Junior, Biology University of North Carolina - Chapel Hill

Mentor(s): Mark Peifer, University of North Carolina - Chapel Hill
Andrew Spracklen University of North Carolina - Chapel Hill

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 14 2nd Floor Mary Townes

Defining Roles for the Oncogenic Kinase Abl and its Substrate Crk in Embryonic Development

Development and tissue homeostasis require tight coordination of cell adhesion with actin remodeling to allow cells to change shape and migrate. Both processes are controlled by regulatory proteins like Abelson tyrosine kinase (Abl), a highly conserved developmental regulator. Abl has multiple functional domains, including a kinase domain, F-actin binding domain, and domains involved in the assembly of signaling complexes. Mutations that dysregulate Abl's kinase activity contribute to human cancers, including >90% of Chronic Myelogenous Leukemias and ~20-30% of Acute Lymphocytic Leukemias. The majority of Abl research has focused on the effect of complete loss of Abl or its kinase activity, leaving the role of other functional domains in development and disease largely unexplored. To address this question, we began dissecting the roles of different Abl functional domains during embryonic morphogenesis in Drosophila. We found that a short, conserved motif (PXXP) in the linker region of Abl plays a more critical role in morphogenesis than *both* kinase activity and F-actin binding. In mammals, this motif is a binding site for three SH3-containing proteins: Abelson interacting protein (Abi), Crk, and Nck. We found that knockdown of Crk and Abi, but not Nck, produced phenotypes mimicking some aspects of mutants lacking Abl or Abl's PXXP motif. I am currently working on characterizing how loss of Crk disrupts embryonic morphogenesis and how varying Crk levels modifies *abl* mutant phenotypes, to reveal how Crk and Abl regulate morphogenesis both together and independently. To do so, we generated a *crk* mutant using CRISPR and are generating a series of rescue constructs to restore *crk* expression in this mutant. We are also characterizing phenotypes caused by loss of Crk using *crk* RNAi to determine the role of Crk during specific processes that require coordination of cell adhesion and the cytoskeleton, including cellularization, CNS patterning, dorsal closure.

Student Author(s): Ryan Booth, Sophomore, Neuroscience Gaston College

Mentor(s): Anat Lev, Gaston College

Presentation: Pre-Medicine, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 16 1st Floor Mary Townes

Bacteria and Neurotransmitters: Effects and Implications of Psychosis

Bacteria and the topics of mood and psychosis are generally considered to be exclusive to their dichotomous fields of biology and psychology; however, a closer look at the human microbiome shows that there is a possible link between bacterial presence and neurotransmitter communication. This study focused on 2 bacteria species: Staphylococcus Aureus (gram-positive), and Escherichia Coli (gram-negative). The effects of the neurotransmitters Dopamine and Serotonin on the bacteria were tested/measured to determine whether the chemicals inhibited or sparked growth in the bacteria. The application of this was primarily in the scope of determining whether or not the production of certain neurotransmitters by bacterial species was actually viable. In order to fully understand a potential connection between the chemicals produced by bacteria and the hormones that construct the operation and mentality of a human being, a direct association between the chemicals and the organism must be analyzed and determined.

Student Author(s): Callum Boothman, Senior, GAME AND INTERACTIVE MEDIA DESIGN High Point University

Mentor(s): Brian Heagney , High Point University

Presentation: Individualized Major Program, Oral Presentations #2 (10:45 - 11:45 AM) 1009 BRITE

Intentional Game Design

My colleagues and I aimed to develop an aesthetically and narrative-rich platformer video game that focused on and added to the lore of the character Guinevere, while delivering a fun and easy to use combat-system (ideally for mobile devices). In order to ensure that our game would be effective, we examined both classic and modern games for inspiration while also carefully reweaving the narrative and lore of *Le Morte d'Arthur* by Sir Thomas Mallory. The gameplay was heavily influenced by 'old school' video game such as *Castlevania* and *Zelda II: The Adventure of Link*. We sought to bring to life a new kind of art style mixed between hand-drawn and pixel art styles that isn't commonly seen in most games, particular on a mobile market. Games such as *Dark Souls* and *Diablo* brought us inspriation that helped us weave our own lore in a meaningful way that would make the player care and actively pay attention to their surroundings. It was important to not only redefine Guinevere as a strong and independent individual, but to also pay respect to the original text of such a well known and influential work without straying too far away from it. We found that our game was ultimately successful, being invited to the E3 College Game Competition as one of the five national finalists. Various members of the video game industry (including a few employees of Blizzard Entertainment, Ubisoft, and Bethesda) were enticed by our detailed narrative and artwork, complimenting the fun and simple slasher mechanics implemented as well.

Student Author(s): Lauren Bou-Ghazale, Senior, Chemistry University of North Carolina - Charlotte

Mentor(s): Thomas Schmedake, University of North Carolina at Charlotte

Presentation: Chemistry (B. A.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 30 2nd Floor Mary Townes

Synthesis of 1,3,5,7-tetrasila-adamantane

Adamantane is a cage-like compound consisting of carbon atoms arranged in the same bonding pattern found in the diamond crystal lattice. This very stable building block has been incorporated into a wide variety of molecular catalysts and also pharmaceutical compounds. The silicon-

incorporated cage-like analog, 1,3,5,7-tetrasilaadamantane, **5**, should still possess the stability and functionality of adamantane. However, the increased size and electron richness provided by the silicon could improve its catalytic and pharmaceutical properties. To test this hypothesis, a five step synthesis of 1,3,5,7-tetrasilaadamantane has been explored following procedures from the literature,[1] and the first four steps have been optimized. The products from each step were purified by distillation, filtration and/or evaporation. GC/MS was used to characterize the products in each step as well as possible byproducts. The percent yield for each product was calculated to measure the effectiveness of each synthesis technique. The final step in the procedure involves an acid-catalyzed rearrangement to convert **4** to the sila-adamantane, **5**. Efforts to optimize this step are underway. Future work will focus on incorporating **5** into analogs of adamantane-containing molecular catalysts and pharmaceutical compounds and testing their effectiveness compared to the all carbon adamantane system.

Student Author(s): Christina Bradshaw, Senior, Animal Science North Carolina A&T State University

Mentor(s): Radiah Minor , North Carolina A&T State University

Presentation: Animal Science, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 2 1st Floor Mary Townes

Detecting Segmented Filamentous Bacteria in Swine Using Gram's Stain

This study will examine if there was a difference in media reporting and reaction on social media involving the incidents of athletes Ryan Lochte and Colin Kaepernick. Content Analysis will be used as method for findings. The coding sheet will critique the following: race, age, gender, stance, and themes in both facets. The outlets that will be in use are, NBC, Fox News, and CNN. The very way outlets circulate images, thoughts, along with wording will be used to determine a bias. Furthermore depending on themes in the news report and commentary; how did it influence the views of the audience. What is more, the line between news outlets and social media has been blurred. This has changed the very way we exchange information from many news organizations. Social Media is a prevalent platform where individuals can post their thoughts in a matter of seconds in response to any sensational topic covered by news outlets. User commentary from social media heavyweights such as, Twitter and Facebook will be taken into account. By analyzing responses from users, a gauge may reveal a sheer difference of treatment depending on the athletes. Such as if many dismissed Lochte's fabrications or acknowledge them. In contrast to posts that were in support of whether Kaepernick is exercising a 1st Amendment Freedom or simply being "unpatriotic". The study will showcase how behavior can be excused as the norm and accountability is nonexistent. Additionally how actions that may be justified can be demeaned. This is the very premise that has revealed a tolerance for actions that brings the subject's character into question. Such as the Lochte and his teammates being hailed as "just kids"and Kaepernick jersey being burned. However, this reveals our society's view in race relations and addressing problematic conduct from many athletes.

Student Author(s): Caitlin Branen, Senior, Theatre Arts Campbell University

Mentor(s): Georgia Martin, Campbell University

Presentation: Theatre, Performances (9:30 - 10:30 AM) BN Duke Auditorium

Heartbeat

The heartaches, the realites of life, are all reflected in your heartbeat. Your heartbeat pushes you through and gives you motivation to succeed. Heartbeat is a performance art dance and monolouge that explores the difficulties we must push through to succeed.

Student Author(s): Kristen Brokaw, Sophomore, Biochemistry High Point University

Mentor(s): Melissa Srougi, High Point University

Presentation: Chemistry (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 6 1st Floor Mary Townes

Elucidation of the Efficacy of the Antitumor Quinone, Beta-Lapachone in a BRCA1 Mutant Breast Cancer Cell Line Expressing Elevated NQO1 Levels

Breast cancer affects 1 in every 8 U.S. women and it is, therefore, important to find specialized treatments since many current approaches kill normal tissues in addition to cancerous tissues. NAD(P)H:quinone oxidoreductase 1(NQO1) is present in normal cell tissues where it functions as a detoxification enzyme. However, breast cancer cell lines commonly contain elevated levels of NQO1. The ortho-naphthoquinone beta-lapachone (beta-lap) has been found to be toxic in cells with elevated NQO1. NQO1 reduces beta-lap to a highly unstable hydroquinone, which then oxidizes back to the parent form via a semiquinone intermediate, thus creating a futile redox cycle and generating reactive oxygen species (ROS). ROS-induced DNA damage hyperactivates poly(ADP-ribose) polymerase 1(PARP-1) –a protein involved in DNA repair– resulting in the loss of NAD^+ and ATP leading to cell death. A subset of breast tumors have mutations in the *BRCA1/2* tumor suppressor genes. Tissues with these mutations have more difficulty repairing damaged DNA. Therefore, we hypothesize that *BRCA1* mutant cell lines expressing NQO1 will be more susceptible to beta-lap-induced cytotoxicity. To test this hypothesis, the NQO1 expressing *BRCA1* mutant breast cancer cell line HCC1937 was used. These cells were transfected with the wild-type *BRCA1* gene. Survival assays were performed to test the sensitivity of beta-lap and IB-DNQ (a beta-lap derivative)–on HCC1937 cell survival. The results from our studies will provide information on the effectiveness of beta-lap as a selective therapy for NQO1 expressing, *BRCA1* mutant cancers.

Student Author(s): Evan Brooks, Junior, Biological Sciences - Molecular, Cellular, and Developmental Biology Concentration North Carolina State University

Mentor(s): Nanette Nascone-Yoder, North Carolina State University
Martha Alonzo-Johnsen North Carolina State University

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 16 2nd Floor Mary Townes

The molecular mechanisms establishing left-right asymmetry in the developing heart

The heart is a left-right asymmetric organ. It develops from a straight heart tube that undergoes rightward looping to form a four chambered structure situated left of the midline. Although heart function is dependent on the proper placement and formation of its left and right chambers, we understand very little about the molecular networks that underlie cardiac left-right asymmetry. We hypothesized that the genes required for this process would be differentially expressed on the left versus right sides of the developing heart. RNA-sequencing was performed using left and right cardiac tissue dissected from the large embryos of the non-model frog, *Lepidobatrachus laevis*. Four genes (*Fzd5, Gata1, Fgf8* and *Gatm*) with highly significant ($p < .05$) differential expression were selected for validation by *in situ* hybridization in the related laboratory frog *Xenopus laevis*. *Fzd5* and *Gata1* were not found to be asymmetrically expressed. *Fgf8* has higher expression in the left myocardium than in the right, while *Gatm* is expressed only in the right pericardium. Future functional experimentation will reveal the roles of these molecules in the development of cardiac asymmetry. The results of this study are anticipated to lead to greater understanding of cardiac development and insight into genes involved in congenital heart defects.

Student Author(s): Maya Brooks, Junior, Animal Science and Laboratory Animal Science North Carolina A&T State University

Mentor(s): Radiah Minor , North Carolina A&T State University

Presentation: Environmental Science, Poster Presentations #1 (9:45 - 10:45 AM) , Poster

Number 35 1st Floor Mary Townes

Deviating From the Protocol: Determining If Smaller Fecal Samples Can Be Used For DNA Isolation and PCR

Early weaning is frequently used in the swine industry, but it is unhealthy for piglets. It can cause lethal gastrointestinal issues such as post weaning diarrhea. Many farmers have used antibiotics to prevent the health problems caused from early weaning but that solution contributes to the problem of antibiotic resistance. Segmented filamentous bacteria (SFB) (*Candidatus* savagella) are beneficial bacteria that promote healthy guts and immune systems, and have been detected in the intestine and fecal samples of piglets and other mammals during weaning. The overall focus of the lab is to investigate when SFB colonizes the small intestine of piglets and determine whether colonization of the gut with SFB influences the development of intestinal immunity and lessens the incidence of post-weaning diarrhea. SFB is not culturable and one of the main ways to determine its presence is through the use of Polymerase Chain Reaction (PCR). The current protocol for isolating DNA from fecal samples requires 500 mg of the sample. ***The goal of this experiment was to determine if PCR quality DNA could be isolated from smaller fecal samples.*** DNA from 500mg, 250mg, 50mg, and 25mg fecal samples was isolated as per protocol. The quantity of the DNA isolated, ranged from (4.5 – 31.7 ng/ml) with the 250 mg sample having the highest quantity and 50 mg having the lowest. The DNA purity of the samples also varied with the A260/280 ratios of 2.42 for both 250 and 25 mg samples, indicating pure DNA. But the DNA isolated from the 500 and 50 mg samples were less pure, with A260/280 ratios of -4.69 and -3.13 respectively. Most importantly however, the DNA integrity was similar between all samples and we were successful in detecting SFB by PCR. Further optimization is needed to ensure cleaner DNA isolation and PCR.

Student Author(s): Jonathan Brotherton, Junior, Computer Science Appalachian State University

Mentor(s): Rahman Tashakkori, Appalachian State University
Mitchell Parry Appalachian State University

Presentation: Computer Science (B.S.), Oral Presentations #2 (10:45 - 11:45 AM) 1009 BRITE

Tracking Daily Beehive Activities Using Image Processing

The decline in the number of honeybees can cause devastating loss of crops, vegetables, and fruits. There have been many efforts to track the honeybee activities and learn about their behavior and health. This project deals with estimating the number of honeybees in front of the hives using image processing. This number is very significant as every hive starts slowly in the morning, gets to a peak at some point during the day with large number of departures and arrivals, and then slows down at the end of the day. The normal behavior of a hive provides a good indication of their health. An abnormal behavior or unusual pattern in the number of bees in front of the hive, can signify a problem. For example a hive might be robbed by the bees from another hive, the hive can swarm, and the weather condition can change drastically. All of these can affect the number of bees in front of the hive. In this project we use image processing to compute values such as entropy and signal-to-noise ratio of the videos recorded at the entrance of the hives to estimate the number of honeybees. We plan to use these values to develop a system that can identify normal behavior. A program is written in Python that uses the Scipy package to compute the average entropy and signal-to-noise ratio of a single or whole day video recordings at the entrance of a beehive. We have visualized the data in form of different graphs for better understanding to determine possible correlations among the data at different times of the day. Examining the results shows a definite correlation between these three values and the number of bees, which can provide users with information extrapolated from the graph. Our preliminary results indicate that the higher the entropy, the more activity there is in front of the beehives. Conversely, the signal-to-noise ratio decreases the more bees there are around the beehive because the bees provide more noise to the calculation. There are exceptions to these which makes automating the process challenging. Having an automated system, helps beekeepers monitor their

hives to determine their health status. Being able to monitor the hives at a time of crisis could help in the prediction of the collapse of the hives. In this presentation, we will present some of our findings and results.

Student Author(s): Jancie Brown, Senior, Biology Fayetteville State University

Mentor(s): Shirley Chao , Fayetteville State University

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 56 2nd Floor Mary Townes

Acute Exposure to Hemp Seed Formulations and Effect On Mortality and Acetylcholinesterase Activity of Zebra Fish

Common insect pests cost the agricultural industry upwards of three billion dollars annually due to destruction and infestations. Pesticides are widely used in agriculture throughout the world, to protect crops and in public health to control diseases transmitted by insect vectors. Unfortunately, some of the current synthetic pesticides on the market are toxic to humans. As a result, consumers are demanding safer alternatives. CannaMix is a patent-pending natural pesticide comprised of hemp and other natural additives that have been found to control insect pests that plague the agricultural and poultry industries. The purpose of the current study is to determine the effect that CannaMix, has on zebrafish mortality rates and acetylcholinesterase activity. Tests were conducted following a 24hr exposure period to CannaMix treatments. Following exposure, zebrafish adults were sacrificed and measured for changes in acetylcholinesterase (AChE) activity. Mortality rates were recorded. Preliminary data suggests CannaMix treatment has no effect on the rate of mortality or AChE activity of fish compared to controls.

Student Author(s): Kelsey Brown, Senior, Mathematical Economics High Point University

Mentor(s): Peter Summers, High Point University

Presentation: Mathematical Economics, Oral Presentations #4 (3:00 - 4:00 PM) 2221 MTSB

Impact of the Renewable Fuel Standard on Feeder Cattle Prices

In 2007, Congress passed the Renewable Fuel Standard increasing the amount of corn-based ethanol to be blended with gasoline. In this paper, I investigate the effect of this change on feeder cattle prices. I present and analyze a vector autoregression model of feeder cattle prices in the United States. The model describes the effects of corn prices, supply of corn, and percentage of corn delegated to ethanol production on the closing CME price of feeder cattle. Upon testing the series for cointegration, I found none, and ran a vector autoregression analysis on the first differences of the series. I also analyze the effects of the ethanol mandate and how it has affected these prices.

Student Author(s): Gurney Buchanan, Sophomore, Computer Science Appalachian State University

Mentor(s): Rahman Tashakkori, Appalachian State University

Presentation: Computer Science (B.S.), Oral Presentations #2 (10:45 - 11:45 AM) 1009 BRITE

Determining the Net Traffic at the Entrance of a Honeybee Hive

One of the primary projects in the Visual and Image Processing (VIP) lab in the Department of Computer Science at Appalachian State University is Bee Monitoring (BeeMon). This project is partially funded by the Lowe's Distinguished Professor Endowment in the department. The project studies honeybee behavior using video recordings obtained at the entrance of hives. The goal is to detect the collapse of honeybee hives by studying the traffic at the entrance. As part of the project, we collect live video from a number of beehives using the BeeMon system consisting of a Raspberry Pi 3 and a Raspberry Pi Camera 2. Once the data is collected, we manually

analyze the video recordings to make observations on honeybee activities. In order to supplement or replace this time-consuming manual analysis, we are developing a learning tool that utilizes computer vision to count the incoming and outgoing bees and determine the net traffic. Our goal is to create a user friendly command line and GUI utility to interact with and analyze videos. We implemented a utility in Python that would identify bees in video frames and track their vectors and locations to determine whether they had entered or departed a set entrance boundary allowing us to keep a real-time count of bee arrivals and departures. We have successfully completed version 1.1 of our utilities and have begun to collect data and analyze the accuracy of our tracking methods. We have seen promising results. Using this utility, we have been able to identify some general patterns in the behavior of the bees throughout the day and track their growth and development. Eventually, we hope to increase the accuracy of this utility and use the collected data to identify weak honeybee populations. In this presentation, we will share some of our recent findings.

Student Author(s): Andrew Burgess, Senior, Geology BS Appalachian State University

Mentor(s): Chuahui Gu, Appalachian State University

Presentation: Environmental Science, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 53 2nd Floor Mary Townes

Climate impact on linkage between land use and water quality in a Southern Appalachian watershed.

The water quality of mountain streams and their tributaries vary largely due to landscape characteristics such as watershed attributes and land use and land cover (LULC). Water quality parameters were consistently correlated with percentage of impervious surface coverage based on the data collected at the Upper South Fork of the New River Watershed over a 5-year period, from 2010 till 2015. The correlation varied over time and primarily controlled by climate. The LULC has stronger control on water quality during wet months/years. Results show clearly that climatic variability influences the linkage of water quality and LULC, which could be used by local conservation efforts to better understand how land development affects water quality in the Southern Appalachian headwaters.

Student Author(s): Zachary Burroughs, Senior, Middle School Education Catawba College

Mentor(s): Constance Rogers Lowery, Catawba College
Philip May University of North Carolina at Chapel Hill

Presentation: Middle Grades Education, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 68 1st Floor Mary Townes

Which is affected more from alcohol exposure: boys or girls?

The purpose of this research is to examine difference between boys and girls in birth defect outcomes from prenatal alcohol exposure. Children were assessed by a dysmorphology and neurobehavioral testing, and maternal interview by their mothers, where data was gathered about drinking and demographic/family information. Diagnosis of FASD was made using the 2005 revision of the Institute of Medicine criteria.When physical traits were effected by alcohol exposure were compared between cases/controls within each sex by diagnostic category, all physical traits were different across exposure groups. Females had more total dysmorphology than males. Females performed more poorly on non-verbal IQ tests than males. Partial correlation analyses indicated bingeing 3+ standard drinks per occasion and the average number of drinking days per week influenced physical, cognitive, and behavioral outcomes on both sexes. The correlations indicate the number of drinks per week during pregnancy and drinks per drinking day during pregnancy was linked to an increase in behavior problems among girls. Boys and girls had similar outcomes when exposure was linked to multiple traits of physical, social, and mental development. Girls also suffered more behavior problems and working memory problems from

the alcohol exposure, whereas boys were affected in their verbal IQ.

Student Author(s): Asya Butner, Senior, Neuroscience East Carolina University

Mentor(s): Johanna Hannan, East Carolina University

Presentation: Biology (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 56 2nd Floor Mary Townes

Obesity in late-term pregnant rats reduced aortic smooth muscle contractions via enhanced nitric oxide signaling

Pre-existing obesity increases the risk of maternal and fetal complications during gestation and is associated with systemic vascular dysfunction. We hypothesized that diet-induced obesity would impair aortic artery contractile responses and endothelium-mediated relaxation in pregnant rats. Female rats were fed for 3 weeks prior to pregnancy and throughout gestation either normal chow (Lean-Preg, n=8) or normal chow plus lard and 30% sucrose drinking solution (Obese-Preg, n=8). Contractile responses to phenylephrine (PE, 10-9 – 10-5 M) were measured in isolated thoracic aortic segments in late pregnancy, in the presence and absence of inhibitors of extracellular signal–regulated kinases 1 and 2 (ERK1/2; PD98059, 10-5 M), nitric oxide synthase (NOS, L-NAME: 10-4 M) and cyclooxygenase inhibitor indomethacin (10-5 M). Endothelium-mediated relaxation to acetylcholine (10-9 – 10-5 M) was also measured in the presence and absence of indomethacin and L-NAME. Obese-Preg aortic rings had reduced sensitivity to PE compared to Lean-Preg arteries (%Contraction, Obese-Preg: 86.4±6.78; Lean-Preg: 137.0±7.80, $p<0.005$). NOS inhibition increased contractile responses to PE in Obese-Preg arteries to a greater extent as compared to Lean-Preg vessels and abolished the differences between groups (%Contraction, Obese-Preg: 165.9±8.03; Lean-Preg: 154.3±6.40). Contraction to PE in the presence of NOS and cyclooxygenase inhibition or ERK1/2 inhibition did not further increase contractile responses in either group. Endothelium-dependent relaxation to acetylcholine showed increased sensitivity in obese and pregnant rats compared to lean controls but no change in overall maximal relaxation. Additionally, obesity enhanced and pregnancy reduced the relaxation caused by the release of endothelium derived hyperpolarizing factor. In contrast to our hypothesis, pre-existing obesity reduces aortic artery contractile responses to alpha 1-adrenergic stimulation in late pregnancy and this response appears to be mediated by nitric oxide signaling mechanisms. These data provide important insight into the mechanisms of the vascular compensatory changes that occur during pregnancy.

Student Author(s): Charles Camp, Senior, Biology East Carolina University

Kenneth Bridges , Junior, Biology, East Carolina University

Mentor(s): Marcelo Ardon, North Carolina State University

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 8 1st Floor Mary Townes

Soil microbial respiration from coastal forested wetlands

Microbes play important roles in nutrient availability and carbon sequestration in coastal wetlands. Many wetlands in the coastal plain of North Carolina are experiencing saltwater intrusion, due to ditching, dredging, and increasing droughts. We studied microbial respiration from soils collected from eight different locations from three wetlands in the Albemarle-Pamlico peninsula. We measured microbial respiration by measuring the oxygen consumption in soil slurries over 48 hours at room temperature. We found 3 fold difference in oxygen consumption across the eight sites (from 0.01 to 0.03 mg O2 / hr). We are currently comparing microbial respiration to other soil parameters to look for possible explanations of the wide range in respiration. Our results could prove useful to local farmers, and give residents a better understanding of how the soils they are standing on are changing due to saltwater intrusion.

Student Author(s): Timothy Campbell, Senior, Biology Duke University

Mentor(s): Meta Kuehn, Duke University

Presentation: Biology (B. S.), Oral Presentations #2 (10:45 - 11:45 AM) 1221 MTSB

Investigating the interaction of Pseudomonas aeruginosa aminopeptidase (PaAP) with components of the bacterial outer membrane

Pseudomonas aeruginosa is a Gram-negative, opportunistic pathogen that inhabits a diverse range of environmental niches. *P. aeruginosa* aminopeptidase (PaAP) is one of the most highly expressed proteins in biofilms, and chronic *Pseudomonas* infections are often biofilm-based. During prior investigations using a murine model of *P. aeruginosa* infections, the Kuehn lab found that PaAP may have an immunomodulatory effect. Furthermore, they obtained preliminary data that indicated that PaAP might associate with lipopolysaccharide (LPS). LPS is a primary constituent of the Pseudomonas outer membrane, and is highly immunogenic and toxic. Given the harmful effects of LPS in Pseudomonas infections, the putative link between PaAP, biofilms, and chronic Pseudomonas infections, and the apparent binding of PaAP to LPS, it is possible that PaAP influences the *Pseudomonas* infection phenotype and that this link may be due to the interaction of PaAP with LPS. Due to the high clinical incidence of *Pseudomonas* infections, this question is clinically significant and warrants further research. I hypothesize that PaAP binds directly to LPS, and that this interaction is involved with the PaAP-associated phenotype and modulate host immune responses to bacterial infection. I have been investigating this interaction using a variety of biological and biochemical assays. Direct binding of PaAP to LPS is probed using co-precipitation protocols and Far Western blotting. To assess whether proteins participate in this interaction, proteinase treatments are used. To assess whether PaAP's interactions with LPS are mediated by its enzymatic activity, an enzymatic mutant of PaAP is available. Finally, the specificity of PaAP's binding to LPS the LPS constituents involved in the interaction will be characterized using a library of LPS-mutant P. aeruginosa strains and purified membrane lipids.

Student Author(s): Rachel Cancel, Junior, Chemistry University of North Carolina - Wilmington

Mentor(s): Ying Wang, University of North Carolina - Wilmington

Presentation: Chemistry (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 42 2nd Floor Mary Townes

Molecular Basis and Medicinal Remedies of Hereditary Cataracts

Human eye lenses contain highly concentrated protein molecules called eye lens crystallins. In a healthy eye, these proteins are soluble and the eye lens is transparent. Occasionally, some newborn children carry hereditary mutants of eye lens proteins. These mutants can easily form aggregates or crystals that strongly scatter light. In this project, we studied phase behavior and inter-protein interactions of recombinant human eye lens proteins. Using the recombinant native eye lens proteins and their cataract-associated mutants, we were able to reconstruct both homozygous and heterozygous cataracts in test tubes. This in-vitro model not only reveals the molecular mechanisms of formation of hereditary cataract, also provides a platform for accelerating discovery of pharmaceutical interventions for these early-age acute cataracts.

Student Author(s): Amanda Capen, Senior, BS Chemistry East Carolina University

Mentor(s): Kym Gowdy, East Carolina University

Presentation: Chemistry (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 30 1st Floor Mary Townes

The protective role of CD163 in pulmonary inflammation induced by ozone

Emissions produced by industrial facilities, motor vehicles, and chemical solvents are primary

sources of outdoor air pollution and have been associated with decreased pulmonary and cardiovascular function. Ambient ozone, a main component of air pollution, causes adverse health effects, however, the biological mechanisms mediating ozone-induced damage is unknown. CD163 receptor, expressed exclusively on the surfaces of monocyte/macrophage cells, scavenges hemoglobin (Hb); in circulation, cell-free Hb causes tissue damage. When patients were exposed to ozone, increased CD163 plasma levels were detected but the underlying mechanism by which CD163 orchestrates pulmonary repair following ozone exposure remains unknown. The goal of this project is to investigate ozone-induced pulmonary inflammation through the CD163 receptor pathway. Alveolar macrophages will be cultured *in vitro* and then be exposedtobronchoalveolar lavage fluid (BALF) collected from ozone-exposed (1ppm ozone, 3h) wild type mice and CD163 deficient (CD163KO) mice. We've hypothesized data collected using RT-PCR and ELISA will show elevated cell-free Hb levels in CD163KO mice BALF and less CD163 gene expression compared to wild type mice. Following CD163KO BALF stimulation, the alveolar macrophages will produce increased amounts of inflammatory cytokines (IL-10, TNF alpha, HO-1, NRF2). My project will be concentrating on understanding how alveolar macrophage-produced cytokines through cell-free Hb stimulation exacerbate lung disease. Specifically, the methodology includes RAW 264.7 cell culture, alveolar macrophage stimulation with BALF from ozone-exposed mice, RNA isolation, cell counts, RT-PCR and ELISA.

Student Author(s): Thomas Cardona, Senior, Biology Fayetteville State University

Mentor(s): Paige Warren, University of Mass.

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 64 2nd Floor Mary Townes

Effect of Audible Nest Defense on the Success Rate of a Songbird Clutch

The purpose of this study is to examine whether there is a correlation between auditory parental nest defense and nest success. Stress signals from an animal are an invitation for a predator. For example, Wood Thrush (*Hylocichla mustelina*) have been shown to defend its nest through active monitoring and auditory response to predators. However, recent studies have shown that these actions may have an inverse effect on the survival of the nest. This data suggest there is a positive correlation between 0 parental behavior at nest sites and nest success. We tested the hypothesis that there will be an inverse correlation in Wood Thrush between parents who defend their clutch by chirping and nest success. We used data collected from nests surveyed in suburban areas and the Quabbin reservoir, information that includes the reaction the pair had to the research team upon approach, and the fate of the nest. The differential between survivability rates of a nest that used auditory signals and those that did not was 0.03/1.0. The nests that used no auditory reaction to predators had a .5/1.0 survival rate while the nests that actively defended the nest with auditory responses had a .47/1.0. In conclusion, our study does not show any definite correlation. In future studies, we plan to use a larger sample of birds that do not use auditory defense to determine if the method of protection has any statistical significance.

Student Author(s): Kyara Carr, Senior, Chemistry Fayetteville State University

Mentor(s): Teresa Danforth, University at Buffalo

Presentation: Public Health, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 37 1st Floor Mary Townes

Are Urology Providers Confronting Bias from Patients Due to Gender Preference?

There have been many studies focused on patients' gender preference for a health provider in many areas of medical care; however, there is limited data about gender preference in urology. The objective of this study is to evaluate if the gender of the urology physician or midlevel practitioner influences patient-doctor interactions. Our hypothesis is that patients prefer providers of the same gender in urology. We also hypothesize that patients prefer treatment from attending

physicians rather than by residents or midlevel providers. Anonymous surveys were administered to new and returning patients at 7 different clinical sites. Data regarding demographics and patient preferences were collected by anonymous surveys. Results: Of 61 participants, 43 (70%) are female patients and 18 (30%) are male patients. Overall, 64% of female patients are comfortable with female providers compared to 54% whom are uncomfortable with male providers. Approximately 12% of male patients are uncomfortable with male providers while 12% are uncomfortable with female providers. The majority of patients are neutral toward nurse practitioners and resident physicians. Conclusion: female patients prefer to be seen by female providers. However, male patients do not show a significant gender preference. Most patients felt neutral in being treated by residents and midlevel providers. Future studies will focus on completion of the goal of 200 subjects. Then we will specifically look at why there is a gender preference based on the patient's reason for visit such as prostate cancer, incontinence, etc.

Student Author(s): Brittany Carson, Senior, Environmental, Earth and Geospatial Sciences North Carolina Central University

Mentor(s): Timothy Mulrooney, North Carolina Central University

Presentation: Environmental Science, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 59 2nd Floor Mary Townes

Mapping the Importance of Arts Education in US Schools

Arts education refers to education in disciplines of music, dance, theatre, and visual arts. Each year, arts education in U.S. schools are becoming a less important part of the curriculum, and are being replaced by programs with a stronger emphasis in science and engineering fields. For example,federal funding for the arts and humanities is about $250 million a year, while the National Science Foundation is funded for $5 billion each year. The arts cannot be learned through occasional or random exposure any more than math or science can. The arts develop neural systems that produce a broad spectrum of benefits ranging from fine motor skills to creativity and improved emotional balance. One of the most fundamental elements to consider in education is the manner in which we will perceive and make sense of the world. An effective education in the fine arts helps students' process abstract versions of what they look at, hear, listen to, and feel. Engagement in the fine arts encourages students to expand their minds beyond the boundaries of the printed text or irrefutable rules. The arts liberate the mind from this rigid certainty. The benefits of this would not only be critical thinking skills and development of the individual, but also a society of people who have the ability to find and develop multiple solutions to the myriad of problems facing our society today. Using GIS software this research proposal will attempt to correlate schools/areas by school achievement measures with best arts programs in the U.S. Arts programs have proven to aid in developing skills in math and reading and they also promote creativity, social development, personality adjustment, and self-worth, which in turn influence other areas of a students' academic experience.

Student Author(s): Elizabeth Carter, Senior, Microbiology North Carolina State University

Mentor(s): Yeonyee Oh, North Carolina State University

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 48 2nd Floor Mary Townes

Functional characterization of the putative effector protein, MGG_09842 in the rice blast fungus, Magnaporthe oryzae.

Fungi have evolved to cause devastating diseases of plants and animals that frequently result in huge economic losses and human suffering. The rice blast disease, caused by *Magnaporthe oryzae,* is the most destructive disease of rice worldwide. This disease also infects other agricultural cereals, such as barley. To understand the mechanism of pathogenicity and to develop an effective way to control this disease, we functionally characterized the putative effector protein,

MGG_09842, using direct gene knock out. As a small secreted protein, MGG_09842 was highly expressed during fungal infection, and the protein expression was only detected under nutrient stress. A MGG_09842 knock out mutant was generated by performing fungal transformation using a hygromycin resistance gene-containing knock out construct. We tested the fungal growth, sporulation, and pathogenicity of the MGG_09842 knock out mutant and compared them to those of wild type and ectopic strains. Currently, we have not identified significant differences among these strains during vegetative growth, sporulation, and infection into barley plants. This suggests the MGG_09842 protein may not have an important role in fungal infection, or it may work as an avirulent factor to resistant host plants. We will continue to investigate the role of this protein, including cellular localization and pathogenicity in diverse rice varieties.

Student Author(s): Kendal Carter, Senior, Biochemistry East Carolina University

Mentor(s): Jacques Robidoux, East Carolina University

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 61 2nd Floor Mary Townes

Chamber Specific Kinetic Analysis of Monoamine Oxidase (MAO) in Pig Hearts

Monoamine Oxidase-A and –B are mitochondrial enzymes responsible for the oxidation of primary amines, which produce reactive catechol aldehydes and H_2O_2. High levels of MAO derived reactive metabolites have been associated with various cardiac disorders, yet the regional location and activity of MAO within the heart is unknown. Therefore, we characterized the regional enzymatic activity of MAO-A and -B with the hypothesis that the right atria would have the highest MAO activity due to local sympathetic nerve innervation. Due to their close physiological resemblance of the human heart, the four chambers of porcine hearts were isolated from domestic pigs sacrificed at seven months. Three MAO substrates and two isoform-selective inhibitors were used to characterize MAO activities. MAO-A and -B enzymatic content were measured using enzyme-linked immunosorbent assays and confirmed with immunoblots. Kinetic analysis showed that the right ventricle has the highest MAO-A and –B activity across all substrates, while the other three chambers do not show significant differences in MAO activity for any of the substrates used. These studies suggest that the right ventricle has the highest rates of activity, which could be due to the innervation of the nervous system in this region of the heart.

Student Author(s): Pamela Casdorph, Senior, Biology and Environmental Science Catawba College

Mentor(s): Carmony Hartwig, Catawba College

Presentation: Environmental Science, Oral Presentations #3 (1:45 - 2:45 PM) 1221 MTSB

Investigating Habitat Influence on Adult Female Mosquito Species Richness in a Small Ecological Preserve

The Catawba College Fred Stanback Jr. Ecological Preserve (FSJEP) is a small, 189-acre preserve located in the central piedmont of NC. Since its establishment in 1999 large areas of the FSJEP have proceeded through plant succession from an old field community to a seasonally inundated wetland forest. Prior to 2013, mosquito species diversity in the FSJEP was largely unknown, primarily due to a lapse in surveillance for over 20 years. Although small in size the preserve has several distinct habitat types that may support a diversity of mosquito species based on the local flora and site-specific environmental conditions. We therefore conducted surveys using a standard CDC light trap and BG® Sentinel trap to sample adult female mosquitoes beginning in 2013. Currently we report that the FSJEP has 36 documented mosquito species, which is 54% of the richness of NC, and 95% of the diversity in Rowan County. To investigate environmental influence on species richness we selected eight locations within the preserve that represented distinct habitat types. Here we report the species diversity of adult female mosquitoes at these eight sites over the span of four seasons (2013-2016) using Simpson's Diversity Index.

Differences in adult female selection of oviposition-larval habitats can provide useful information toward further understanding mosquito species-specific reproduction, blood meal and resting choices, as well as population dynamics and competitive niches in adult mosquito populations.

Student Author(s): Leah Cashwell, Senior, Biology Campbell University

Mentor(s): Jennifer Bunn, Campbell University

Presentation: Biology (B. S.), Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 4 1st Floor Mary Townes

Assessing the Performance of Abdominal Muscles during Prone Bridge Exercise in Older and Younger Adults

The purpose of this study was to assess the performance of abdominal muscles during prone bridge exercise, as a safer alternative to curl-ups, among older and younger adults. Eleven young adults (6 male and 5 female; 26.5 ± 4.2 years, 177.4 ± 8.9 cm, 90.4 ± 32.5 kg), and five older adults (4 male and 1 female; 70 ± 5.2 years, 170.0 ± 5.3 cm, 84.8 ± 11.8 kg), were asked to maintain a proper prone bridge for as long as possible. The time was recorded and participants were asked to return five to nine days later to perform the prone bridge again. Comparisons between groups revealed a trend for a difference in initial plank time (young group = 136.3 ± 70.9 s, older group = 83.2 ± 37.7 s, p =.073). Reliability between testing sessions was assessed with each group. The younger group's second prone bridge session averaged 142.4 ± 99.0 s, r =.969. The older group's second prone bridge session averaged 93.9 ± 40.76 s, r =.858. Both groups improved performance in the second session, but correlations were still high. These data suggest that repeating testing may improve prone bridge performance, and there is a likely trend to a decrease in performance with age. Increasing the n-size of both populations would be useful to help disseminate if this trend truly exists.

Student Author(s): Hollie Champion, Senior, Exercise Science University of North Carolina - Wilmington

Susanna Ek, Junior, Exercise Science, University of North Carolina - Wilmington

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Caroline McClain, Senior, Exercise Science, University of North Carolina - Wilmington

Mentor(s): Wayland Tseh, University of North Carolina - Wilmington

Presentation: Exercise Science, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 25 1st Floor Mary Townes

Effectiveness of Neuromuscular Electrical Stimulation During Rest and Exercise

This study was conducted to determine the effectiveness of neuromuscular electrical stimulation (NMES) as an aid to enhance venous blood return during rest and submaximal exercise. Twenty apparently healthy males (Age = 35.0 ± 15.0 yrs; Height = 179.9 ± 8.5 cm; Body Mass = 85.4 ± 12.0 kg) provided informed consent prior to participation. In Session 1, participants were familiarized with all equipment. Sessions 2-4 were randomly selected and included the following 5-min trials: a) Rest and Rest+NMES, b) Rest, Arms-Only, Arms+NMES, and c) Rest, Arms+Legs, Arms+Legs+NMES. Physiological variables collected during rest and submaximal exercise were volume of oxygen (VO_2), heart rate (HR), systolic and diastolic blood pressure (SBP and DBP), respiratory exchange ratio (RER), and rate pressure product (RPP). Paired sample t-test was used to determine if there were significant mean differences between the NMES and non-NMES trials. Bonferroni post-hoc analysis established alpha level at 0.008. From the 18 paired t-tests, the only observed significant mean difference ($t(19)=-6.4$, $p<0.001$) was RER values between the Arms-Only trial compared to the Arms+NMES trial (0.94 and 1.00, respectively). While RER displayed a significant difference, collectively, NMES did not elicit

consistent physiological alterations during rest and submaximal exercises within an apparently healthy population.
Supported and funded by UNCW Undergraduate Research Fellowship Award.

Student Author(s): Nadjali Chung, Senior, Biochemistry University of North Carolina - Greensboro

Mentor(s): Nadja Cech, University of North Carolina - Greensboro

Presentation: Chemistry (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 27 1st Floor Mary Townes

Identification of New Quorum Sensing Peptide from Staphylococcus caprae

Many Gram-positive bacteria contain an accessory gene regulator (agr) system, which is a quorum sensing system regulated by a small cyclic peptide called the auto-inducing peptide, or AIP. Although the structure of each AIP is similar across species, each has a different sequence, which can allow AIPs to act as quorum sensing inhibitors when introduced to another species. This has been shown in previous studies. To continue exploring such cross communications of quorum sensing systems—and the agr system in general—the sequence and structure of each AIP must be known. It was the goal of this study to use high-resolution mass spectrometry to identify the AIP produced by *Staphylococcus caprae* and explore its potential to inhibit the production of AIP by *Staphylococcus aureus*. A synthetic peptide of the same structure predicted for the *S. caprae* AIP caused potent inhibition of the *S. aureus* quorum sensing system.

Student Author(s): Ciera Cipriani, Junior, Polymer and Color Chemistry North Carolina State University

Mentor(s): Melissa Pasquinelli, North Carolina State University
Nelson Vinueza North Carolina State University

Presentation: Chemistry (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 45 2nd Floor Mary Townes

A First Principles Study on the Photodegradation of Azo Disperse Dyes

Azo compounds, which possess the structure R-N=N-R', are commonly used to dye textiles. Trans isomers of azo dyes (meaning the R groups are on opposite sides of the double bond) are more thermodynamically stable in the ground state. However, many azo dyes can undergo fast and reversible photoisomerization between cis and trans structures by photoexcitation, where the cis structures are thermodynamically more stable in the excited state. Previous studies have indicated that azo dyes generally break down at their azo bonds by photodegradation. A recent study by the Vinueza laboratory demonstrated that the azo dye Disperse Red 1 (chemical formula N-ethyl-N-(2-hydroxyethyl)-4-(4-nitrophenylazo)aniline)), photodegraded near its ethyl and hydroxyethyl groups. The major photodegradation products that were identified by high resolution mass spectrometry were not based on the azo bond breaking, but rather were (E)-N-ethyl-4-((4-nitrophenyl)diazenyl)aniline and (E)-4-((4-nitrophenyl)diazenyl)aniline.
In this study, the photodegradation mechanisms proposed by others for Disperse Red 1, Disperse Black 9, and Disperse Oranges 3, 25, and 37 are investigated using density functional theory computations with the Gaussian09 software for both the ground and excited states as well as the cis-to-trans transition. A trend exists in the reactivity of the studied azo dyes; the trans isomers are generally most susceptible to radical attack at their amino end groups, while the cis isomers are more reactive at their azo bonds.The molecular structure of end groups and pendant side chains and the reduction of the azo bonds were observed to change the reactivity of the azo center and ethyl and hydroxyethyl groups, thus changing the expected location of photodegradation within azo dye structures as seen in the original experimental results.

Student Author(s): Waceline Cius, Senior, Economics Salem College

Mentor(s): Megan Regan, Salem College

Presentation: Economics, Oral Presentations #2 (10:45 - 11:45 AM) 2226 MTSB

Monopolistic Pricing in a College Campus: The Limitations of the United States Antitrust Law

For profit maximizing firms, monopoly status is a very attractive outcome. Yet for society it can be very inefficient. In the United States, monopoly is often prevented or sanctioned by antitrust laws and policies. To display one of the limitations to antitrust legislation, this research uses primary data to model a small residential liberal arts college as a market with barriers to enter; preliminary results find evidence of monopolistic pricing.

Student Author(s): Noah Coates, Junior, Biology High Point University

Mentor(s): Allison Walker, High Point University

Presentation: Public Health, Oral Presentations #3 (1:45 - 2:45 PM) 2226 MTSB

The Effects of Narrative Medicine on the Mental and Emotional Health of Geriatric and Pediatric Populations

Modern medicine has made great technological strides that have allowed humans to live longer and healthier lives, but technology in the healthcare system has degraded the human qualities that medicine should possess. This study examines the effects of Narrative Medicine, a revolutionary method in modern medicine that focuses on listening to each patient to hear and empathize with their story. This study of pediatric and geriatric populations sheds light onto the quality of life before and after Narrative Medicine techniques are applied in a creative writing workshop setting to see the direct effects of Narrative Medicine on these populations. Medical services in this country tend to only focus on the physical health of patients when there are two other aspects that should not be ignored: mental and emotional health. Focusing the healthcare system on all three forms of health when a patient is in need of help will greatly impact and transform modern medicine. In this study, data has been collected through the form of a survey presented to participants in Narrative Medicine workshops. Currently, the data shows a trend towards significance for the pediatric population and statistical significance for the geriatric population. After all the data is collected and the appropriate statistical analysis is performed, the results will be translated and interpreted for application in a healthcare setting.

Student Author(s): Katherine Cochran, Senior, Biology Queens University of Charlotte

Mentor(s): Patricia Koplas, Queens University of Charlotte

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 46 2nd Floor Mary Townes

The use of bacteriophage in preventing infection of Caenorhabditis elegans by Bacillus thuringiensis Kurstaki

According to the CDC, 2 million people in the United States alone become infected with antibiotic resistant bacteria every year. At least 23,000 of them die due to these infections with many more deaths associated with complications. Bacteriophages are currently being studied as an alternative to antibiotics. This study will evaluate the efficacy of using a bacteriophage to target *Bacillus thuringiensis kuristaki* (Btk) after being ingested by *Caenorhabditis elegans*. Btk causes reproductive issues and death in *C. elegans* within 36 hours of ingestion. The ingestion of the bacteriophage should cause the lysis of Btk within *C. elegans*, allowing them to survive and reproduce. The biomass of the control groups and the experimental groups will be recorded to determine whether or not the bacteriophage prevented the death of populations of *C. elegans*. The group that was exposed to the bacteriophage will also undergo a plaque analysis to verify that the bacteriophage was ingested and working from within the *C. elegans*. Ideally, the group that

survives better will be the group that was exposed to the bacteriophage, and this group will test positive for bacteriophage presence within the *C. elegans*. These results would indicate that the bacteriophage is effective in killing bacteria from within a living creature.

Student Author(s): Sean Cochran, Senior, Kinesiology University of North Carolina - Greensboro

Morgan Luther, Senior, Kinesiology, University of North Carolina - Greensboro

Mentor(s): Louisa Raisbeck, University of North Carolina - Greensboro

Presentation: Exercise Science, Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 31 1st Floor Mary Townes

A simple method for improving jump performance in patients with chronic ankle instability

Following a physical injury, a primary goal of clinical practitioners is to improve motor performance so functional ability can be regained, which can be enhanced by directing the patient's attention during a task. An external focus of attention directs a performer's attention towards the effects of one's movement, whereas an internal focus directs attention towards movement execution. Adopting an external focus of attention improves jump performance in healthy populations, but has yet to be explored in clinical populations. The purpose of this study was to determine if an external focus of attention could improve motor performance in a jump task in those with chronic ankle instability. Eight young adults (23.9 ± 3.4 years) with chronic ankle instability participated in this study by completing a series of single-leg jumps. Participants were randomly assigned to an internal or external focus of attention condition and completed three baseline jumps on each leg. During the practice session, participants completed four blocks of five jumps while alternating limbs to measure jump performance. An orange cone was placed 4.57 meters from the start line for the external focus condition only. The external focus group was asked to focus on the cone during the jumping task, while the internal focus group focused on their knee extension. After controlling for baseline performance, no main effects or interaction was present for the injured limb. For the healthy limb, however, those in the external focus condition (M = 142.81, SE = 2.34 cm)produced significantly greater jump distances than the internal focus condition (M = 130.52, SE = 3.02 cm)during the practice session, $F(1, 5) = 10.32$, $p = .02$. In sum, we provided a simple method for improving jump distance in those with chronic ankle instability using an external focus of attention.

Student Author(s): Enzo Codella, Junior, Psychology Appalachian State University

Mentor(s): Mark Zrull, Appalachian State University

Presentation: Psychology, Oral Presentations #4 (3:00 - 4:00 PM) 2236 MTSB

Assessing the Correctability of Psychopathic Personalities

In the United States, current treatments for psychopathic personalities typically fail to procure psychopathic individuals' adoption of prosocial behaviors, a fact that urges the application of more efficient approaches in correcting the antisocial tendencies of the nation's psychopathic population. The author of this presentation shall clarify points regarding the competency of these alternative approaches by comparing different techniques employed in treating psychopathic personalities, determining which treatments have most successfully directed psychopathic individuals onto prosocial lifestyles, and promoting awareness on the best potential treatments. Nearly 1% of the U.S. general population is psychopathic, and 15% to 25% of the U.S. prison population displays psychopathic tendencies. However, these rates are often disregarded by a prison model that omits mental health care as a means to correct psychopathic personalities. Such a negligent model not only fails to provide proper psychological treatment to psychopathic criminals but even risks the safety of the general population, vulnerable to the antisocial actions of these psychopathic individuals. Hence the need to reevaluate the current model of behavioral correction in order to elaborate a more favorable one. For this purpose, the author of this

presentation has conducted a review of the existing literature on the strategies used within and outside of the U.S. to effectively rehabilitate psychopathic personalities. Due to probable disorder in psychopathic individuals' limbic systems, their behaviors cannot be significantly corrected through punishment (the hallmark method of behavioral correction in U.S. prisons). Various alternatives, including decompression of antisocial behavior, comprehensive cognitive-behavioral therapies, and positive resocialization techniques, focus on particular subpopulations of psychopathic individuals. Overall, the prison environment hinders more than aids the development of prosocial attitudes in psychopathic individuals. The model for behavioral correction of psychopathic criminals must be restructured to ensure the successful rehabilitation of said criminals as prosocial members of the community.

Student Author(s): Mireya Colin, Junior, Criminal Justice North Carolina Central University

Mentor(s): Frank Anthony Rodriguez, North Carolina Central University

Presentation: Criminal Justice, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 30 1st Floor Mary Townes

Undocumented Immigrants in the Mid-Atlantic Region: A Qualitative Study/work in progress

Undocumented immigrants in the US have been viewed by popular politicians, "as problems who only bring drugs and crime while at the same time depleting social services." In-depth interviews with undocumented immigrants will be conducted in order to extract primary data. Undocumented individuals that reside near the Mid-Atlantic region will be interviewed, and semi-structured interviews will be employed to extract life experiences and migration towards the Mid-Atlantic region. It is expected that many undocumented individuals who crossed the US/Mexican border without proper documentation will unveil that human smugglers (coyotes) were acquired in order to assist them to cross into US territory without detection.

Student Author(s): Ashley Collins, Senior, Computing Technology and Information Systems Guilford College

Sarah Carr, Junior, Computing Technology and Information Systems, Guilford College

Mentor(s): Chafic Bou-Saba, Guilford College

Presentation: Computer Science (B.S.), Oral Presentations #1 (9:30 - 10:30 AM) 1009 BRITE

Investigating RAM Technology

Random Access Memory (RAM) is a temporary storage location in a computing device that can be accessed randomly (without accessing the previous RAM address). The device's Central Processing Unit (CPU) runs the Operating System (OS), application program, and data being currently used in the RAM for faster access. RAM is volatile and loses its content when the device is powered off. There are two primary forms of RAM, Dynamic Random Access Memory (DRAM) which is the typical memory in a computing device and requires constant power to hold the data content, and Static Random Access Memory (SRAM) that is faster, larger in size, more expensive than DRAM, and is mainly used in small amounts as Cache memory inside the CPU. The goal of our research project is to explore the various RAM technologies and to perform a market analysis to compare RAM manufacturers, specifications, and prices. We will use CleanMem, a Windows tool that is used to clean up memory leaks. A memory leak is a bug in an application in which the memory allocated to a process does not get released after the process is terminated, resulting in less available memory and slower RAM performance. CleanMem can improve RAM performance by finding and removing these leaks and freeing up memory. Additionally, we will use MemTest86, another Windows tool that is used to test a computer's RAM for any faults. A symptom of bad RAM in a computer is unusual and random behavior, such as system crashes. This behavior is often difficult to trace to a specific problem, and MemTest86 is a tool that can be used to diagnose a commonly frustrating issue. The combined use of both of

these tools will give us the insight necessary to discover the best memory products currently available.

Student Author(s): William Connor, Senior, Environmental Science Appalachian State University

Mentor(s): Chris Thaxton, Appalachian State University

Presentation: Environmental Science, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 55 2nd Floor Mary Townes

Refining our understanding of urbanization effects on a mountain stream in Boone, NC

Boone Creek, located in the Appalachian Mountains of Western NC, is a headwater stream in the New River watershed impacted by increasingly dense urbanization. Impervious surfaces, culverting, outfall pipes, road salts, and other anthropogenic forcings are measurable as deviations in the time series of select physical parameters such as temperature, pH, conductivity, and total dissolved solids as compared to those at unimpacted reference sites. We present the data and analysis from daily monitoring of Boone Creek over a three-month period. These data are supplementary to previous, episodic samples and to automated high-resolution stream temperature data, and serve to fill in gaps in our previous understanding of the dynamic response of Boone Creek to urban forcing. Correlating these data to in situ measurements of air temperature, relative humidity and solar irradiance and local weather data from a fixed station allow the analysis of urbanization effects within the context of established methods. Insights gained from this research can potentially be utilized to improve best management practices for urban planning and remediation efforts in urbanized mountain streams.

Student Author(s): Shannon Conroy, Senior, Biochemistry North Carolina State University

Mentor(s): Colleen Doherty, North Carolina State University

Presentation: Biology (B. S.), Oral Presentations #4 (3:00 - 4:00 PM) 1009 BRITE

Structural Characterization of Heat-activated Transcriptional Coactivator MBF1c

Heat stress on plants plays a large role in crop yields and agricultural productivity. Due to global temperatures rising 1 degree Celsius in the past 30-40 years, there has been a significant decrease in crop yields. For example, in rice, a 1 degree Celsius increase in nighttime temperatures can cause a 10% decrease in yield. With a rapidly growing population, understanding a plant's response to heat stress is essential for supporting the food supply for future generations. Multiprotein bridging factor 1, or MBF1c, is a transcriptional coactivator that is involved in regulating gene expression levels in response to heat. Overexpression of MBF1c in *Arabidopsis* results in an increased heat tolerance while MBF1c plants knockout show heat sensitivity. MBF1c is known to interact with the TATA box binding protein, or TBP, which is an important protein involved in the transcription initiating complex. The interaction of MBF1c with TBP, as well as other binding factors is still not fully understood. Understanding the role of MBF1c in the transcription initiation complex will give us insight into its function as a transcriptional regulator in response to heat stress. I will be using X-ray crystallography to determine the structure of MBF1c.

Student Author(s): Shauntera Copeland, Senior, Physical Education North Carolina Central University

Mentor(s): Hsin-yi Liu, North Carolina Central University

Presentation: Health and Physical Education, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 51 2nd Floor Mary Townes

Effect of a Two-month Fitness Class on College Students

About 5.2 million college students are obese in the United States. It is well-documented that obesity is associated with diabetes, cardiovascular disease, depression, and sleep apnea. In addition, lack of education on the importance of physical activity and regular exercise seemed to be one of the major causes for African-American college students. Therefore, the purpose of our study is to examine whether a college fitness course is effective on increasing students' muscular strength, cardiovascular fitness, and flexibility and reducing body fat%. Thirty-two students (12 males and 20 females) were recruited in this class. Students participated regular physical exercise twice per week for 50 minutes each class. The class is broken down into 3 sessions, including warm up (includes running a lap around the gym and group stretches for around 10 minutes), followed by a structured cardio- exercise, and weight training supervised by instructor (~30 minutes), and then, cool-down (~10 minutes) at the end of the class. The data collected included their gender, blood pressure, heart rate, waist and hip circumferences, body weight and body height, body fat percentage, and fitness tests, such as pushups and sit-ups per minute and one mile run. All the pre-class measurements were collected during the first week of February, 2016. And the post-class measurements will be collected on the first week of April, 2016. Then, all the pre- and post-measurements will be compared with paired t test between to see if there's significant changes after 2 months of participation in this college fitness class. The post-class measurements showed a significance difference in their pushups (p=.027), mile run (p=.050), and sit-ups (p=.002). The exercise course was effective toward improving pushups, mile run, and sit-ups. However, there was no significant change among BW, HR, BP, hip and waist ratio, sit and reach, and BF percentage.

Student Author(s): Jahdiel Couchman, Sophomore, Associate of Science Central Piedmont Community College

Henrique Weh, Sophomore, Associate of Science, Central Piedmont Community College

Mentor(s): Joseph Little, Central Piedmont Community College

Presentation: Computer Science (B.S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 43 2nd Floor Mary Townes

Disaster Recovery: Data Loss and Recovery

We chose to do our project on data loss and recovery, which is part of the grand scheme of disaster recovery. We did research on this topic to experience other aspects of computer science and engineering. Discovering more about disaster recovery helped expand our choices for our future career. Knowing about data loss and recovery is important because it is vital to the continuation and success of a business. The world runs on technology, meaning that most of our information is stored on computers and hard drives, rather than on paper. With everything being stored digitally, it is imperative that people are aware of the possible ways that their data can be lost and how to prevent it. The purpose of our research is to inform people of the importance of data management and the different methods of maintaining data. The question we answered through our research project was "What should companies know about data loss to keep their businesses running?" We acquired the information for our research by taking advantage of online sources. The result of our research will describe the causes and processes of data loss, as well as the different ways to prevent the loss of that data.

Student Author(s): Colton Courtney, Freshman, Photography Appalachian State University

Mentor(s): KC Kirsten Clemens, Appalachian State University

Presentation: Graphic Design and Digital Imaging, Oral Presentations #3 (1:45 - 2:45 PM) 2226 MTSB

Fighting Boxing with Dancing

Stephen Daldry's 2000 film, Billy Elliot, begins with our main character Billy Elliot (Jamie Bell) in a light-hearted state repeatedly jumping on his bed like a trampoline. The scene cuts sharply

when the record playing the dream sequence's theme scratches and we see the reality Billy has been forcefully sucked back into. This reality is society and introduces the prime conflict of the film: Billy wants to be a dancer, and society doesn't agree with him due to stringent, working-class, male gender roles of the 1980s. Daldry's story pulls focus on various controversial lifestyles and the pursuit of happiness in a constricting and narrow-minded coal mining town via the heartwarming story of a kid breaking from the status quo and succeeding, by not only finding happiness and pride in his talent, but also by changing the views of his community in Durham, England. Billy must metaphorically box society's past and present, to enter his hopeful future as a ballet dancer. The deep conflict of a man versus society is displayed through the mise en scène elements of setting, props, and movement of the characters throughout the film. I will use film analysis in my paper to ascertain Billy's conflict and resolution.

Student Author(s): Christine Craib, Senior, Mathematics University of North Carolina - Wilmington

Mentor(s): Wei Feng, University of North Carolina - Wilmington

Presentation: Mathematics, Oral Presentations #3 (1:45 - 2:45 PM) 1008 BRITE

A Mathematical Analysis on the Transmission Dynamics of Neisseria gonorrhoeae

In this project, we analyze an epidemiological model describing the transmission of gonorrhea, with a core sexual activity class and a noncore sexual activity class. We discuss the behavior of the model around the two equilibrium points, a disease-free equilibrium and a coexistence equilibrium. The focus of the project is to identify equilibrium points, analyze the stability of these points, and discuss the results in terms of the epidemiological model. Ultimately, the goal of the project is to find conditions of an endemic state, and the conditions that ensure the eradication of gonorrhea.

Student Author(s): Rachel Crawford, Sophomore, English Meredith College

Mentor(s): Steven Benko, Meredith College

Presentation: Religion, Oral Presentations #1 (9:30 - 10:30 AM) 2236 MTSB

Narrative Identity, Authenticity, and Religions in Game of Thrones

Philosophical explorations of identity use authenticity as a way of explaining the relation of the self to itself and to society. However, what counts as "authentic" has shifted due to changes in subjectivity formation and identity performance. Ultimately, authenticity is a search for truth, but it is more than an epistemological concern: it involves questions of self-worth and one's place in the world. In traditional narrative theory, authenticity is a social concern, impressed upon individuals as they are part of a cultural story that transcends them; authentic individuals navigate their life-stories in ways that are conducive to the traditional story. In contemporary understandings of subjectivity, narrative oppresses individuals by constructing them as falsely unified subjective wholes for heteroreproductive and/or capitalist purposes. In HBO's TV show *Game of Thrones,* this theoretical distinction is evident between the traditional, normative Faith of the Seven and the postmodern, nihilistic religion of the Faceless Men.

Student Author(s): Michael Crewes, Jr., Senior, CTIS Guilford College

Yazan Khalaf, Junior, CTIS, Guilford College

Mentor(s): Chafic Bou-Saba, Guilford College

Presentation: Computer Science (B.S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 50 2nd Floor Mary Townes

Investigating CPU Technologies and Software Tools

The Central Processing Unit (CPU) is a primary component of all computing and mobile devices.

The main components of a CPU include the Arithmetic Logic Unit (ALU), processor registers, and a control unit. The fundamental operation of CPUs is to execute stored instructions in Random Access Memory (RAM). The common instruction cycle of most CPUs follow the fetch, decode and execute steps. The goal of our research project is to perform a market analysis of the latest CPU technologies. The analysis will include manufacturers, specifications (total number of cores, cache size, clock speed measured in Hz, total number if instructions processed per second, physical size, total number of transistors, and bus size), and price. Our research project will also test free CPU software tools such as CPU-Z, Temperature Monitor, and SpeedFan among many tools and recommend the best tools.

Student Author(s): Jordan Crowell, Junior, Anthropology University of North Carolina - Greensboro

Mentor(s): Robert Anemone, University of North Carolina - Greensboro

Presentation: Sociology and Anthropology, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 21 1st Floor Mary Townes

A Geometric Morphometric Analysis of the Shoulder of Homo naledi

One of the goals of paleoanthropology is to describe and interpret the fossil remains of human ancestors. Recently, a new species of our genus (Homo naledi) was described from skeletal remains discovered at the Rising Star Cave in South Africa by Lee Berger of the University of the Witswatersrand. In this project, we examine the functional morphology of the shoulder region of Homo naledi in order to elucidate aspects of locomotor behavior of this potential human ancestor from the late Pleistocene of southern Africa. We studied 3 dimensional models of the proximal humerus of a variety of different living primates as well as several hominin fossils, including Homo naledi and several species of Australopithecus. We created 3 dimensional models of the humerus by 3-D scanning (using the Next Engine scanner) and by photogrammetry (using digital images and Agisoft's Photoscan software). We also downloaded available 3D models of other taxa (including the H. naledi humerus) from the Morphosource website (www.morphosource.org). We utilized a geometric morphometric approach in order to analyze size-free shape differences in the relative position of functionally important anatomical landmarks of the proximal humerus within our comparative sample. The results suggest a series of interesting similarities, as well as some potentially significant differences between the shape and function at the shoulder joint between modern humans, great apes, and H. naledi.

Student Author(s): Monserrat Cuevas, Junior, Biology University of North Carolina - Charlotte

Mentor(s): Andrew Truman, University of North Carolina - Charlotte

Presentation: Biology (B. S.), Oral Presentations #1 (9:30 - 10:30 AM) 2221 MTSB

Identifying novel regulators of the Hsp70 molecular chaperone

Hsp70 is a universally conserved molecular chaperone that performs a variety of functions in the cell including protein folding of both newly synthesized and denatured proteins, protein transport across membranes and disaggregation of oligomerized proteins. Research has primarily focused on how Hsp70 function specificity arises through regulation of a) expression of Hsp70, b) isoform differences in the Hsp70 protein family and c) the variety of co-chaperone proteins that bind to the Hsp70 molecule.

Despite the use of powerful technologies such as affinity purification of proteins coupled with tandem mass spectrometry (AP-MS/MS) that have uncovered a number of Hsp70 phosphorylation sites, the biological function of these remains unclear. The large number of detected phosphorylations (and indeed other kinds of modifications such as ubiquitination, SUMOylation and acetylation) suggest a “chaperone code” similar in nature to the combinatory PTM code that exists on histones.

We screened 420 kinases for their ability to phosphorylate Hsp70 in vitro, using recombinantly

purified Hsp70 as a substrate. We identified ULK1, Aurora A kinase (AUKA), BTK and Calmodulin kinase as four candidates. Previous studies have connected Hsp70, autophagy and cell cycle progression and as such we decided to characterize the relationship between Hsp70, ULK1 and Aurora kinase. Using Immobilized Metal Affinity Chromatography (IMAC), we confirmed *in vivo* interaction between Hsp70 and AUKA. These interactions were stress-induced, increasing upon cellular treatment with Nocodazole respectively.
In an effort to identify potential phosphorylation sites on Hsp70 by Aurora A kinase, we employed the use of *in silico* strategies (such as kinase motif analysis) and in vivo techniques such as PhosTag gel systems. Having identified several putative Aurora A kinase phosphorylation sites on Hsp70, we intend to investigate these sites at a later date through site-directed mutagenesis and mass spectrometry.

Student Author(s): Itaevia Curry-Chisolm, Junior, Biology and Family and Consumer Sciences North Carolina Central University

Mentor(s): Timothy Shafer, Environmental Protection Agency

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 6 2nd Floor Mary Townes

Loperamide Inhibits Spontaneous Network Activity

Loperamide (LOP) is a widely used over-the-counter antidiarrheal that binds to the μ-opioid receptors in the gastrointestinal tract to halt peristaltic contractions. At therapeutic concentrations, LOP is unable to cross the blood brain barrier (BBB), so there have been few studies conducted to determine whether it has central nervous system effects. Recently, in vitro studies have demonstrated that exposure to LOP from day in vitro 0-12 alters development of neural networks grown on microelectrode arrays (MEAs), where no BBB is present. Based on these findings, it was hypothesized that LOP would have acute effects in vitro. The present experiments used primary rat cortical neurons cultured at a density of 150k cells per well on 48-well, multi-well MEAplates. Cortical cultures express stable spontaneous activity by days in vitro (DIV) 12 in the form of spikes (action potentials) and bursts (groups of spikes). Spontaneous activity was recorded for 40 minutes before treatment to establish a baseline recording, and then recorded after treatment for 40 minutes for comparison. On DIV 15 or 22, the cortical neurons were treated with LOP at the concentrations of 0.3-30μM and measured by analyzing spontaneous network activity (mean firing rate, MFR), and number of active electrodes (#AE). MFR was increased by 34.4% at 0.03 μM, but decreased in a concentration-dependent manner at 0.1-30μM. The #AE was unchanged at 0.03μM but decreased from an average of 15 to 0 #AE at 1.0-30μM. This action may have contributed to LOP's alteration of network formation and may indicate increased risk of CNS effects in vivo if the BBB is compromised. (This abstract does not reflect EPA policy)

Student Author(s): Cami Czejdo, Freshman, undeclared Fayetteville State University

Mentor(s): Sambit Bhattacharya, Fayetteville State University

Presentation: Computer Science (B.S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 52 2nd Floor Mary Townes

Machine Learning Methods for Human-Like Locomotion from Position States

Recent advances in machine learning methods have created tools with unprecedented ability to humanize virtual speech, such as Google Now and Apple Siri. By utilizing methods similar to those that made these intelligent assistants become mainstream, this project aims to select the "most human" set of key points between two position states, an important problem in humanizing interactions with robotic assistants. Previous work in position key point prediction has involved a tedious process of creating a virtual skeleton, adding virtual muscles, and then finding the most likely combinations of muscle contractions based on model stability. The methods developed in this research do not require this process, and instead generate multiple sets of key points between

positions and evaluate them based on what would be the most human-like movement. This work uses large motion capture data sets to train machine learning models such as artificial neural networks to achieve this goal. Position states were segmented based on motion-specific behaviors (like raising a hand or taking a step), and the difference between the positions undertaken by the model and the actual behavior were used to train and test the models. Different position state time frames were used to analyze at what point the models could best simulate human motion. The result is a robust enhancement of robot behavior that can be applied for better robot assistants.

Student Author(s): Jenna Dafgek, Senior, Biology Elon University

Mentor(s): Yuko Miyamoto, Elon University

Presentation: Biology (B. S.), Oral Presentations #3 (1:45 - 2:45 PM) 1233 MTSB

Effect of long-term exposure of Rapamycin on T cell proliferation and survival

Rapamycin is an immunosuppressive drug currently being investigated to treat multiple diseases due to its inhibition of mTORC1. mTORC1 is known to control several aspects of cell growth and homeostasis. The drug's effect on T cells is an area of interest due to the implications of cell-mediated immunity and the overall immune system. Rapamycin is known to inhibit mTORC1 causing G_1 arrest in the cell cycle, however there is no definitive answer regarding what happens to cells treated longitudinally nor why this arrest occurs. In this study, Jurkat cells were treated with high concentrations (20 nm/mL – 50 nm/mL) of rapamycin up to 72 hours and analyzed with flow cytometry. Analysis with Propidium Iodide staining confirmed cell cycle G_1 arrest at 48 hours of treatment and showed that this arrest continues at 72 hours of drug treatment. Cells fixed with p53 antibody and analyzed with flow cytometry showed a 6.0 – 12.0% change in p53 phosphorylation after 48 hours of treatment and 22.0 – 34.0 % change after 72 hours of treatment. The study intends to extend treatment to one week and analyze specific downstream molecules of mTORC1 that feed back into the cell cycle by Western blot analysis by FACS using other cell cycle control proteins as markers.

Student Author(s): Brian Darst, Senior, Biochemistry North Carolina State University

Mentor(s): Ross Sozzani, North Carolina State University

Presentation: Biology (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 64 2nd Floor Mary Townes

Elucidating the Genes Involved in Arabidopsis Root Development

The stem cell niche (SCN) of the root apical meristem in *Arabidopsis thaliana* is a highly organized cluster of cells containing several distinct cell populations. These cells regenerate themselves and give rise to daughter cells through strictly regulated formative divisions. In this project, we sought to identify the genes involved in these regulatory networks and the roles they play in the SCN through the use of knockout/knockdown TDNA lines. We measured the root growth rate of individual plants in which genes of interest had been shown to be disrupted via TDNA insertion. The root tips of mutant individuals whose growth rates were significantly different from a wild type were then imaged under a confocal microscope to determine how disrupting a certain gene of interest compromises the *Arabidopsis* SCN structure. The genes found to have a significant impact on root growth were catalogued along with their perceived effects.

Student Author(s): Lindsay Davenport, Senior, Biology East Carolina University

Mentor(s): Elizabeth Ables, East Carolina University

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 21 1st Floor Mary Townes

Investigating the molecular control of the ecdysone response gene, E74, in the Drosophila ovary.

Oogenesis is the process by which an egg develops from undifferentiated cells in the ovary. This process has been widely studied; however, there is still a magnitude of information to be gained about oogenesis. The *Drosophila melanogaster* (fruit fly) ovary is an exceptional model system for studying the mechanisms of oogenesis. In this system, germ cells are surrounded by somatic cells which help with proper progression during oogenesis. Steroid hormones largely drive this process, and in *Drosophila*, the predominant steroid hormone is ecdysone, which is similar to human estrogen. Ecdysone binds to its receptor to act as a transcription factor to cause gene expression, and is required for oogenesis through the regulation of many target genes. One target, *Ecdysone-induced protein at 74EF* (*E74*), is known to be required for oogenesis and is highly expressed in in the ovary. The question still remains whether any other transcription factors may refine the expression of this gene to germline cells. In order to determine other factors controlling expression of *E74* in the ovary, twenty-eight fly lines carrying pieces of the *E74* gene locus were crossed with a reporter fly line. My results indicate that each line has a different expression pattern, suggesting the expression of *E74* in different cell types of the ovary are controlled by different transcription factors. Of the lines tested, two show germline expression while the other lines show expression in somatic cells. After the areas that control *E74* expression are determined, online databases will be used to identify other transcription factors binding at those sites. For example the transcription factor, *Trl*, binds in the same areas as lines showing *E74* expression. Additional transcription factors may account for the different expression patterns I see. My project elucidates the potential interactions of *E74* and other transcription factors in oogenesis.

Student Author(s): Emily Davis, Junior, Political Science and History High Point University

Mentor(s): Paul Ringel, High Point University

Presentation: History, Oral Presentations #1 (9:30 - 10:30 AM) 1233 MTSB

The Development of Federal Regulation

Today's market economy within the United States fully depends on modern transportation structures to operate. Through a study of government policy and historical legal cases, particularly Wabash, St. Louis & Pacific Railway Co. v. Illinois 1886, I am exploring how the federal government developed the regulatory system, with regards to transportation, that it has today. By asking 'What did the United States federal courts determine the US National Government had the right to regulate with regards to transportation in the 19th century?', we can better understand the priorities of the late 1800's government, more accuratly assess how the government's ability to regulate applied (and still applies) to other goods and services, and lastly, comprehend how the modern regulatory system was constructed. A study into this not only reveals how the United States federal government provided for and monitored regulations, but it also allows us to better understand the long-lasting ramifications of federal policy and law. In 1887, the Government ultimately ruled the United States National Government had the power to regulate any and all interstate commerce. Across the nation, the Interstate Commerce Commission Act immediately and significantly altered the way industry would operate. While the purpose of the Interstate Commerce Commission Act was to oversee the railroad industry, it has been interpreted and implmented differently overtime which has consistently provided the United States Government the ability to regulate its industries in a multitude of ways.

Student Author(s): Sarah Davis, Sophomore, Athletic Training Campbell University

Mentor(s): Sarah Christie, Campbell University

Presentation: Exercise Science, Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 14 1st Floor Mary Townes

Bilateral Cubital Tunnel Syndrome In A Division I Collegiate Female Swimmer

Background: Twenty-one year old female collegiate swimmer began experiencing discomfort in

her left hand while swimming. The patient, a mid-distance back stroke swimmer, had no prior history of elbow, wrist, or hand pathology. The initial diagnosis was thoracic outlet syndrome. Over time, the patient complained of progressively worsening symptoms in the non-dominate extremity, including paresthesia of the 4th and 5th digits, forearm muscular weakness, and decreased grip strength. Differential Diagnosis: Thoracic outlet syndrome, cubital tunnel syndrome, ulnar nerve entrapment. Treatment: The patient was referred to the team physician and received a steroid injection, but saw no significant improvement. Osteopathic manipulative medicine was also initiated but the patient found no relief. The patient was referred to an orthopedic surgeon and via imaging, was diagnosed with left cubital tunnel syndrome. She underwent an ulnar nerve decompression with anterior subcutaneous transposition. She completed rehabilitation and was able to continue swimming. However, she became symptomatic in the opposite extremity and was diagnosed with cubital tunnel syndrome in the right extremity. She opted to undergo another ulnar nerve decompression with anterior subcutaneous transposition. Uniqueness: Cubital tunnel syndrome is normally seen in overhead throwing populations, characterized by its presence in the dominant extremity due to the rapid repetitive elbow extension and flexion with subsequent ulnar nerve subluxation in the throwing motion. In this case, the swimmers event, the backstroke, does not commonly cause cubital tunnel syndrome. Conclusion: Although cubital tunnel syndrome is a common condition, it is not common in female swimmers. This situation is rare and it is important for the healthcare community to recognize the signs and symptoms of cubital tunnel syndrome and its treatment. Providers also must be aware that despite being a common condition, this condition is not restricted to specific athletic populations and may occur in the non-dominate extremity and bilaterally.

Student Author(s): Alexa de Jongh, Freshman, Psychology Appalachian State University

Mentor(s): Clark Maddux, Appalachian State University
Amy Galloway Appalachian State University

Presentation: Psychology, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 51 1st Floor Mary Townes

Allergies Correlation with Behavior

Psychological research documents a positive correlation between allergies and negative behaviors, including low-self-esteem, recklessness, and hostility. Allergies affect as many as 30 percent of adults and 40 percent of children in the U.S. and they occur when the body has a negative physiological reaction to a substance that does not affect most other people. This research will analyze psychological research concerning allergies and how it relates to behavior in children and adults. It is thought that allergies may influence behavior and cognition by causing differences in self-esteem, anxiety, sleep, recklessness, sociability, and hostility. One of the primary causes for low self-esteem in allergic people is a longing to be like everyone else. This can also contribute to recklessness as they want to do the same things as their peers, causing them to engage in an impulsive act that may lead to an allergic reaction. Allergies also cause a person to have increased hostility towards themselves, which also correlates with low self-esteem. Sleep, which directly impacts behavior, is also altered by allergies and linked to problems with irritability, irrationality, and insomnia. People with allergies also have a higher chance of being timid as well as having increased anxiety generated by the thought that something around them might induce an allergic reaction. In addition to exploring the range of human behaviors and cognitive processes associated with allergies, this review will investigate parental behaviors of children with allergies. Research indicates that the parents of allergic children can be overprotective of their children or neglectful, which add more risk of behavior problems. This research can be used to understand individual behavioral differences in people with allergies and potential influences on the development of those behaviors.

Student Author(s): Reena Debray, Junior, Biology Duke University

Mentor(s): Jenny Tung, Duke University

Presentation: Biology (B. S.), Oral Presentations #3 (1:45 - 2:45 PM) 2235 MTSB

Social stress induces changes in mitochondrial copy number and gene regulation

In humans and other social mammals, low social status and social isolation are predictive of many disease outcomes. These relationships are thought to be driven in part by chronic social stress, but their molecular underpinnings are not well understood. Here, we examined the effects of social stress on mitochondrial copy number, gene expression, and heteroplasmy in captive female rhesus macaques (*Macaca mulatta*, n=45). In five purified populations of immune cells, we quantified mitochondrial copy number using qPCR, and assessed mitochondrial gene expression and heteroplasmy using RNA-sequencing. We obtained a composite estimate for social interaction, using a principal components analysis on social rank, grooming frequency, proximity association frequency, and aggressive actions received. Macaques that engaged in more affiliative behavior, as measured by higher scores on the second principal component (14.52% of total variance), had higher mitochondrial copy numbers (B=0.209, p=0.008). PC2 was also significantly correlated with gene expression level in six of thirteen protein-coding mitochondrial genes, including genes encoding subunits of NADH dehydrogenase, cytochrome c oxidase, and ATP synthase. Finally, we observed a negative relationship between PC2 and degree of heteroplasmy (B=–0.0001, p=0.076), suggesting that more socially integrated individuals had lower levels of somatic mutations in the mitochondrial genome. More work is needed to investigate the functional effects of alterations in mitochondrial copy number, but the lower rates of transcription and higher rates of heteroplasmy found in socially isolated macaques are likely to impair mitochondrial function. These results suggest a previously unappreciated contribution of changes in mitochondrial genome copy number, gene expression, and heteroplasmy in immune cells to the relationship between social connectedness and health.

Student Author(s): Nicole Denaeyer, Senior, Biology Meredith College

Mentor(s): Alexandra Ormond, Meredith College

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 62 2nd Floor Mary Townes

Combating Bacterial Resistance to Antibiotics: Synthesis and Analysis of Ciprofloxacin Derivatives to Improve Antibacterial Properties

Ciprofloxacin, an antibiotic in the fluoroquinolone class of drugs, has experienced a marked increase in bacterial resistance. Since the 1980s there has been a decline of novel antibiotic development that could counteract the bacterial resistance. Thus, the known drug, Ciprofloxacin, and a derivative, Norfloxacin, were modified at the piperazine site with the addition of an aroyl chloride. Reactions were analyzed using thin-layer chromatography (TLC) to confirm product formation and products were recrystallized for purification. Solid products were further analyzed using Fourier transform infrared (FTIR) spectroscopy to identify functional groups present in the compounds and proton nuclear magnetic resonance (1H-NMR) was used to determine the structure of the products. Different conditions were used to prepare varying products, which led to a range of yields from 25-87%. Further optimization of conditions is needed to obtain products of higher purity and greater yield.

Student Author(s): Job Derilus, Senior, Physics North Carolina Central University

Mentor(s): Yongan Tang, North Carolina Central University

Presentation: Physics (B.S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 74 2nd Floor Mary Townes

Development of Unmanned Aerial Vehicle with microprocessor

Unmanned Aerial Vehicle (U.A.V) are very useful tools that can be used for varies applications in our daily lives and much more, whether it may be exploration, surveillance, and research. The microprocessor provide us the possibility in developing UAV. We design the protocol of the structures of a quad-copter/Drone with the Arduino basic set. The microprocessor is programed to receiving controlling signal from a remote controller, and then it interpret the signal and send it out to the four motors, which respond as how to fly. In this project, we focused on hardware design and software development. UAVs have potential applications in roof inspections, delivery goods, and exploring the world under the sea.

Student Author(s): Katelyn DeZego, Senior, Biology Catawba College

Mentor(s): Jay F. Bolin, Catawba College

Presentation: Biology (B. S.), Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 48 2nd Floor Mary Townes

Broccoli glucosinolate profile is critical for its anticancer activity in human colon cancer cells

Increased consumption of broccoli is associated with reduced risk of colorectal cancer in humans. However, the natural genetic variation and cultivation provides large differences in biological activity across the broccoli populations. In this study, we will determine anti-cancer potential of individual glucosinolates and their mixtures on cell proliferation of human epithelial colon cancer HT-29 and normal colon CCD841 cells. A better understanding of the metabolite components responsible for the anticancer effects will allow for developing a unique broccoli genetic resource for breeding novel broccoli varieties with maximized health components.

Student Author(s): Emily Diaz-Loar, Senior, Mathematics University of North Carolina - Asheville

Mentor(s): Leah Mathews, University of North Carolina - Asheville

Presentation: Economics, Oral Presentations #2 (10:45 - 11:45 AM) 2226 MTSB

What do UNC Asheville Alumni Think About Their Undergraduate Research Experiences?

Many universities offer undergraduate research (UR) opportunities for students across disciplines. Nationwide, 33% of undergraduates complete research projects. UR experiences can be improved by understanding alumni perceptions of their undergraduate research. UNC Asheville is nationally recognized for opportunities in UR, yet alumni perceptions of research have not been previously studied. This study reports on a 2014 survey of UNC Asheville alumni that prompted them to describe their UR experiences and the overall perceptions of their undergraduate education. The data were analyzed in aggregate and by academic division (Natural Sciences, Social Sciences, and Humanities) in order to determine whether there are distinct differences in alumni perceptions across academic disciplines. Overall, alumni responses were positive amongst the divisional cohorts. Identifying how alumni view their research experiences could aid in distinguishing what the strengths and weaknesses of UR are at UNC Asheville.By determining the perceived benefits of UR at UNC Asheville, the university can improve how research is conducted to provide students with more beneficial research opportunities that encourage further engagement in educational activities during, and after, their undergraduate careers.

Student Author(s): Cameron Dixon, Senior, Biology St. Andrews University

Mentor(s): Bonnie Draper, St. Andrews Presbyterian College

Presentation: Biology (B. S.), Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 41 2nd Floor Mary Townes

Biochemical characterization of wasp venom

The order Hymenoptera comprises over 115,000 species of bees, wasps, ants, and sawflies. A common characteristic of members of this order is that they produce venom. Venoms from these species have some ameliorating effects on rheumatoid arthritis and other immune-related diseases and have been shown to inhibit growth of certain cancer cell lines. Wasp venom appears to have the most potential as an anti-proliferative agent. The component which is responsible for this effect is mastoparan. Mastoparan acts on the intrinsic pathway of mitochondria, increasing mitochondrial membrane permeability, and leading to cell death. Since mastoparan is a major constituent of wasp venom, collection and purification for biochemical characterization is feasible and desirable to determine differences in mastoparan peptide solubility or stability among species. Wasps were collected from two separate sites in the Sandhills region of North Carolina using sweep nets and glass collection jars; preliminary identifications indicate that seven species are represented. Venom sacs were extracted from euthanized wasps and crude venom samples were subjected to gel electrophoresis to assess mastoparan concentration and solubility. Experiments to assess peptide stability are currently underway. It is expected that these techniques will reveal differences among wasp species and will aid in selecting a model that produces the largest amount of stable mastoparan for further studies.

Student Author(s): Mike Dole, Sophomore, Biotechnology Gaston College

David Palmer II, Sophomore, Biotechnology, Gaston College

Mentor(s): Anat Lev, Gaston College

Presentation: Biology (B. S.), Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 49 2nd Floor Mary Townes

Glowing Evolution

The purpose of this experiment is to alter the DNA in brine shrimp. Brine shrimp (*Artemia salina*), often referred to as "sea monkeys," are commonly sold as a type of fish food and also in science experiment kits for children. This organism was selected since it is easy to grow, maintain and has been studied very little. In a short amount of time an abundance of brine shrimp can be cultivated for a variety of types of experiments. In order to modify the genetic material of brine shrimp, cysts will be decapsulated to expose the soft tissue of the eggs' membrane. The gene for a green fluorescent protein (GFP) will be incorporated into the genome and when expressed will give a biofluorescence effect under UV light. The GFP was originally isolated from the jellyfish, *Aequorea victoria*. The vector that will be used in this experiment will be a modified plasmid containing a Cytomegalovirus (CMV) promoter and an enhancer sequence bound to a GFP. Both the promoter and enhancer sequence are necessary for gene expression in eukaryotic organisms. Electroporation will be used to transfer the plasmid (pCMV-GFP) into the decapsulated cysts. The purpose of electroporation is to use pulses of electricity to create temporary pores in the eggs' membranes and allow the pCMV-GFP to be absorbed into the developing embryo. Successful transfer of the plasmid will be expressed in the nauplii (larval brine shrimp) after they hatch. After the GFP has been expressed in brine shrimp this experiment will be continued to study the effect of other genes (ex: growth hormones).

Student Author(s): Caroline Donaghy, Sophomore, Chemistry Appalachian State University

Mentor(s): Jennifer Cecile, Appalachian State University
Brooke Hester Appalachian State University

Presentation: Chemistry (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 44 2nd Floor Mary Townes

A Fluorescence Anisotropy Instrument to Study Ligand Binding Events

Many biological systems can be investigated through steady-state fluorescence anisotropy. For example, the binding of a substrate to an enzyme may be measured if the substrate is fluorescent as this technique can be used to extract information about the orientation and mobility of

fluorescent molecules in solution. In this work, we have constructed a custom steady-state fluorescence anisotropy instrument. Advantages of the system include small sample size (microliter volumes) and the ability to introduce time resolution in the future. Anisotropy measurements from three fluorescent dyes (fluorescein, quinacrine and rhodamine 123) in solutions of increasing viscosity (glycerol ranging from 0-95% v/v) were measured with the custom-built instrument and also on a commercially available fluorescence anisotropy system for comparison. Anisotropy of the fluorescent dye increased with increasing viscosity as expected. Results contributed to the calculation of the G-factor, or instrument bias for the custom built system. Anisotropy measurements of free floating fluorescent dyes are compared to those of the fluorescent dyes bound to bovine serum albumin. The increase in anisotropy from free fluorescent dye to bound fluorescent dye serves to support that our custom built system is capable of categorizing molecular motion through anisotropy measurements.

Student Author(s): Ryan Dovel, Junior, Political Science Appalachian State University

Mentor(s): Nancy Love, Appalachian State University

Presentation: Liberal Studies, Oral Presentations #4 (3:00 - 4:00 PM) 1234 MTSB

Islam in Stereo: Muslim musicians and their fight against Islamophobia in the West

This paper examines two musicians on the front lines of an emerging culture war in the West. As war is waged against ISIS in the Middle-East, and extremist attacks are carried out in the name of jihadist groups in the West, political movements have organized against the perceived threat of Islam. These movements have taken the form of anti-migrant policy positions stemming from Islamophobia in the public sphere. While the influence of contemporary Islamic music over Muslim culture has been the subject of prior study, this paper's focus on Islamic musicians as mitigators of Islamophobia is unique. Specifically, I examine how Islamic musicians Sami Yusuf and Poetic Pilgrimage address Islamophobia and misunderstanding through their music. The acclaimed Sami Yusuf, who Time Magazine dubbed Islam's Biggest Rock Star, seeks a solution to increasing jihadist violence through his music, especially his 2016 album, Barakah. Yusuf, who was born in Iran, but raised in Britain, is himself a bridge between cultures, something reflected in his music. Poetic Pilgrimage, Britain's first female Muslim rap duo, use their music to grapple with stereotypes regarding the position of women in Islam, a common Western criticism of the faith. As black female Muslims in Europe, their music provides the unique perspective of an often overlooked demographic. In addition to examining each artist's musical and lyrical content, other spheres of influence, including interviews, social media and live performances, are considered. This paper finds that both artists defy commonly-held Western perceptions of Islam, demonstrating an affinity for Sufism, Islam's mystical path, in both a religious and musical context.

Student Author(s): Maya Drzewicki, Junior, Marine Biology University of North Carolina - Wilmington

Mentor(s): Alison Taylor, University of North Carolina - Wilmington

Presentation: Biology (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 70 2nd Floor Mary Townes

The Role of Mechanosensitivity in Regulating Predator-Prey Interactions in the Marine Microzooplankton Favella sp.

Planktonic alveolates (ciliates and dinoflagellates) are important components of the marine food web because they act as a key trophic link between phytoplankton and macroorganisms. We used high-speed video microscopy and electrophysiology techniques to better understand the sensory mechanisms that underlie the different behaviors exhibited by the model planktonic alveolate, Favella sp. Cells were tethered by a suction micropipette and stimulated by micro-fabricated glass

rods. Cells were contacted at two different velocities along the cell body with rods of different sizes that mimicked either predators or prey. Preliminary results showed that contacting Favella sp. with a large rod caused the cell to contract, while contacting with a smaller rod typically caused a backward swimming behavior. We have also shown that these behaviors are regulated by bioelectrical activity. Cell contractions are regulated by action potentials, and backward swimming behaviors are regulated by rhythmic depolarizations. This indicates that despite being unicellular, these organisms possess complex sensory mechanisms which allow them to detect and respond to various stimuli in the environment. Having the ability to distinguish between predators and prey is vital for the ecological success of these microorganisms in marine food webs.

Student Author(s): Marissa Duff, Senior, Communication Arts and Dance Johnson C. Smith University

Mentor(s): DaKysha Moore, Johnson C. Smith University

Presentation: Liberal Studies, Oral Presentations #3 (1:45 - 2:45 PM) 1234 MTSB

The representation of African Americans during the Civil Rights Movement through dance: An examination of Stormy Weather and Cabin in the Sky

This research study examines the portrayal of African Americans, specifically through dance and movement, in the films *Cabin in the Sky* and *Stormy Weather* during the early Civil Rights Movement. There are four research questions for the current study. How is dance represented in the films *Stormy Weather* and *Cabin in the Sky*? Through the American dance films *Stormy Weather* and *Cabin in the Sky*, how are African Americans able to present profitable dance to both Whites and other African Americans? What socialization characteristics are portrayed in *Stormy Weather* and *Cabin in the Sky* in relation to various aspects of the Civil Rights Movement? And how do *Stormy Weather* and *Cabin in the Sky* differ in the portrayal of the African American? By using a thematic analysis, the researcher is able to identify patterns in dance and performance in relation to ideologies of the Civil Rights Movement and then group this content into major themes. The three major themes developed within this research include (1) dance as a spectacle, (2) movement styles and (3) African American socialization characteristics. By analyzing African American dance and performance within both films, the researcher is able to understand how the Civil Rights Movement influenced both the positive and negative ways African Americans are viewed and regarded in media entertainment during that time. Through this research study, one is ultimately able to grasp an idea on how African Americans are portrayed within dance and performance during a problematic time in African American history.

Student Author(s): William Dulaney, Sophomore, Physics Appalachian State University

Mentor(s): Anthony Calamai, Appalachian State University

Presentation: Physics (B.S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 1 2nd Floor Mary Townes

Analytic Solution to a Three Level Optical Pumping System with Constant Coefficients

In the process of developing a new senior-level laboratory experience in atomic phosphorescence, we have noticed some discrepancies that exist in the literature for the radiative dynamics associated with the emission of the R-lines of Cr+++ in ruby at room temperature. Most of the existing work on the metastable levels that give rise to the R-lines focuses on the fluorescence decay of these lines. We have also decided to study the excitation of the metastable population as a function of time. In an attempt to identify an appropriate parent population for the metastable levels during the excitation phase, we approximated the dynamical system as three-energy levels in Cr+++ in ruby: a ground state, a “pump” excited state, and a metastable state. Assuming a constant optical pumping rate and natural decay rates for the three energy levels, we arrived at three coupled first-order, linear, differential equations that should predict the observed population dynamics for the three states in response to optical excitation. We will present our solution and

compare it to the experimental data for the metastable levels in Cr+++ in Ruby.

Student Author(s): Yves Dusenge, Senior, Computer Technology Information Systems Guilford College

Mentor(s): Richard Schilhavy , Guilford College

Presentation: Computer Science (B.S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 35 1st Floor Mary Townes

Applying Machine Learning to Enrollment

Modern organizations strive to align technology with information systems to catty out the best operations. One major innovation that is redefining the application of information technology is data mining, a study that aims at discovering patterns in data. This study develops and tests different machine learning techniques using Guilford College enrollment data for insights that can be used by college's administrators to increase admission and improve retention. Different machine learning algorithms are developed in python and applied to analyze the data, including decision tree classifier, naïve Bayes classifier, neural network classifier and k-nearest neighbor classifier. After the algorithms have been applied and the algorithm with the greatest performance identified, a web application is built to display the results of the data analyzed.

Student Author(s): Elizabeth Dustin, Senior, Biological Sciences North Carolina State University

Kelly Thompson, Senior, Biological Science, North Carolina State University

Mentor(s): Mary Beth Hawkins, North Carolina State University
Marshall Philips North Carolina State University; Melissa Lamm North Carolina State University; John Godwin North Carolina State University

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 29 1st Floor Mary Townes

Characterizing the differential neuronal expression of aromatase cyp19A1b mRNA in the sexual phenotypes of the sex-changing fish, *Thalassoma bifasciatum*

The Bluehead wrasse, *Thalassoma bifasciatum*, is a protogynous sequential hermaphrodite. This makes them a useful model organism is for understanding neural and physiological responses to the social environment. The interplay between the social environment of the wrasse and the reproductive neuroendocrine system is of great interest as the wrasse changes sex based on social cues. Many factors contribute to sex change, including hormones, neuropeptides, and other regulatory factors. Specifically, we hypothesize that brain estrogen levels vary among the three phenotypes the wrasse displays (terminal phase (TP) males, female-like initial phase(IP) males, and females). Testosterone is converted into estrogen by the brain form of aromatase (cyp19a1b) and this enzyme is thought to be critical for brain masculinization. Preliminary findings using quantitative PCR have shown that brain aromatase mRNA levels are highest in females, follow by TP males, and then IP males. Quantitative PCR provides little neuroanatomical resolution and so this study aims to localize and quantify the expression of cyp19a1b mRNA in specific regions of the brain across sexual phenotypes in bluehead wrasses. Using non-radioactive in situ hybridization and computerized image analysis, we are comparing terminal phase males, initial phase males, and females specifically in the preoptic area of the hypothalamus as this brain region is strongly linked to sexual behavior differences across vertebrate animals. These study will further our understanding of estrogen signaling in the brain of this model system for socially controlled sex change and more generally of the role of estrogen signaling in shaping sociosexual behaviors

Student Author(s): Tara Early, Senior, Environmental Science Appalachian State University

Mentor(s): Michael Gangloff, Appalachian State University

Presentation: Environmental Science, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 47 2nd Floor Mary Townes

Modeling the variable effects of low-head dams on freshwater mussel populations

The widespread damming of lotic ecosystems is commonly associated with debilitating ecological effects such as decreased temperature, hypoxia, altered flow regime, physical changes to the structure of the river, and fragmentation of important habitats of stream organisms. However, the majority of the research that describes these negative effects was conducted on large-scale hydroelectric dams that occurred on 6th order or higher streams. Contrary to these studies, recent research suggests that the effects of intact low-head dams vary widely across taxa and may be beneficial for some, such as mollusks. The focus of this study was to examine a poorly understood phenomena known as the 'mill-dam effect', that often results in the formation of high-density mussel aggregations in the tailrace of some, but not all, low-head (<10m) dams. We qualitatively sampled mussel populations from three reaches (tailrace, upstream, and downstream) for each dam site. These data were compared against a meta-database of dam features - structural height, hydraulic height, year built, length, upstream catchment area, stream order, depth/volume, elevation, dam material - using a multivariate statistical analysis to determine the parameters most influential to this phenomena. These results were used to inform the construction of a model meant to predict which low-head dams are likely to harbor high-density mussel aggregations. Currently dams are prioritized for removal based on funding and the logistical ease of the project. The results of this study may potentially inform improvements to best management practices for stream restorations with dam removal and benefit the regions imperiled mussel populations.

Student Author(s): Sarah Edmark, Junior, Biology High Point University

Mentor(s): Patrick Vigueira, High Point University

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 11 1st Floor Mary Townes

Methylglyoxal sensitizes Bacillus oleronius to topical antibiotics

Rosacea is an inflammatory disease of the skin that affects nearly 16 million people in the United States. Recent evidence suggests that this inflammation may be a response to *Bacillus oleronius*, a bacterial endosymbiont of *Demodex* mites that live in the hair follicles of humans. Several studies have demonstrated a positive correlation between the occurrence of rosacea and the presence of *B. oleronius*. In light of this association, topical treatments that limit *B. oleronius* colonization could represent a novel rosacea therapy for some patients. Manuka honey, a monofloral honey from the manuka bush of New Zealand, has natural antibacterial properties and is becoming increasingly popular as a natural skin care product. We assessed the effect of methylglyoxal (MGO), an active compound in manuka honey, on the growth of *B. oleronius* in broth culture. The minimum inhibitory concentration was 100 ug/mL. We then added a suboptimal concentration of MGO (25 ug/mL) to Muller-Hinton agar plates to explore the potential for MGO to alter *B. oleronius*'s sensitivity to a variety of antibiotics in a disc diffusion assay. We found that MGO produced statiscally significant increases in the sensitivity of *B. oleronius* to 3 commonly prescribed topical antibiotics.

Student Author(s): Alexia Edmunds, Junior, Criminal Justice North Carolina Central University

Mentor(s): Frank Anthony Rodriguez, North Carolina Central University

Presentation: Criminal Justice, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 46 2nd Floor Mary Townes

Treatment vs. Punishment for Juveniles

The criminal justice system has various ways on how they choose to deal with juvenile

delinquency. Depending on the crime the child commits they will either punish a child or give the child some type of treatment. As a society, they are trying to figure out what is the best way to decrease juvenile delinquency while also ensuring a child learns their lesson. Treatment is used for children who have serious psychological issues to help them not to commit crimes. Punishment is used to discipline a child, but does not necessarily work because crime has not decreased within the juvenile system. We will analyze which way is better to discipline juvenile within the criminal justice system.

Student Author(s): Ashley Edwards, Senior, Biology Guilford College

Mentor(s): Patricia Dos Santos , Wake Forest University

Presentation: Biology (B. S.), Oral Presentations #1 (9:30 - 10:30 AM) 1221 MTSB

Mutational Studies on Bacillus subtilus Cysteine Desulfurase YrvO and Subsequent Interactions with Known Sulfur Acceptor Proteins

Sulfur is an essential element for living cells and necessary for the maintenance of biological processes. Bacteria are able to mobilize sulfur from free cysteine by way of devoted or promiscuous cysteine desulfurases. The cleavage of the C-S bond from amino acid cysteine results in a persulfide intermediate and is subsequently shuttled to a variety of sulfur acceptor proteins. IscS, the master cysteine desulfurase in the Gram- negative bacteria *Escherichia coli*, transfers sulfur to an array of sulfur acceptor proteins; TusA, IscU, and ThiI. These proteins are pivotal in thiocofactor synthesis. In the Gram-positive bacteria *Bacillus subtilis*, three out of four cysteine desulfurases that are orthologous to *E. coli* Iscs are present and able to transfer sulfur directly to their devoted sulfur transferase and thio-cofactors. In this study, we utilized mutagenesis, structural modeling, UV/Visible absorption and CD spectroscopy, combined with kinetics assays, and complementation experiments to better understand the residues necessary for communication between the B.s. cysteine desulfurase YrvO and *E. coli* sulfur transferases TusA, ThiI and IscU. The single residue variations on YrvO did not affect the secondary structure and folding of this enzyme, but led to the isolation of enzyme-substrate or enzyme-product bound forms. Some B.s. Yrvo variants retained catalytic competency, and/or were enhanced by certain *E. coli* sulfur transferases. These results have aided in our understanding of ways in which cysteine desulfurase enzymes have evolved to interact with various sulfur acceptor protein for regulatory cell maintenance and viability.

Student Author(s): Joshua Edwards, Senior, Psychology and Sociology Catawba College

Mentor(s): Sheila Brownlow, Catawba College

Presentation: Psychology, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 70 2nd Floor Mary Townes

Effects of Glucose in Chewing Gum on Memory Performance

Past studies have demonstrated that glucose increases performance on memory tasks, however, no studies have examined whether artificial sweeteners increase recall performance. I examined the effects of glucose on performance on a free recall task among 39 college participants (n = 15 men and 24 women) who were assigned randomly to one of three groups (sugared gum, sugar-free gum with sorbitol, or no gum). A filler task was administered at two points in the study to allow the glucose to be absorbed as well as to avoid the effects of serial position on the free recall task. I found that participants correctly free recalled significantly more words when they were given gum than when they were not, regardless of whether actual glucose was in the gum, and they rated the words as more familiar to them if they were chewing gum of either kind. My findings suggested that increased cognitive performance across a short time period (10 *min*) may be a function of perception that sugar is being administered or that some ritual is helpful, rather than actual glucose. My results also indicated that perception of familiarity with the words, rather than glucose, may have improved recall.

Student Author(s): David Ellis, Senior, Communication Arts Johnson C. Smith University

Mentor(s): DaKysha Moore, Johnson C. Smith University

Presentation: Liberal Studies, Oral Presentations #4 (3:00 - 4:00 PM) 1234 MTSB

For the love of money or the game: The framing of pay-for-play among college athletes-Schooled: The Price of College Sports and The Business of Amateurs

NCAA sports have grown into a multibillion industry over the years due to its rising popularity. From television deals to corporate endorsements, the NCAA continues to find ways to rake in huge sums of money every year. The beneficiaries include the NCAA, the universities, faculty and staff, and even the corporate sponsors who benefit from the mass exposure. However, one group, the athletes who put on the show, are excluded from the profits. Instead, a free education is promised in return for what some see as a full time job. The argument over pay for play is a hot topic today as scandals continue to rear their heads all over the country due to violations of the NCAA amateurism rules. An increasing divide can be seen between the NCAA and its athletes. By analyzing what the media say about pay for play, a better understanding can be had as to what the two sides want and expect from each other. The purpose of this study is to explore the messages about paying college athletes in the films Schooled: The Price of College Sports and The Business of Amateurs. The researcher conducted a thematic analysis and found four main themes: 1) The popularity of college sports, 2) The cost of scholarship vs college vs college official's salaries, 3) Concept of amateurism, and 4) Free education or lack of education altogether.

Student Author(s): Peyton Ellis, Senior, History, Philosophy, and Political Science Salem College

Mentor(s): Megan Regan, Salem College

Presentation: Economics, Oral Presentations #2 (10:45 - 11:45 AM) 2226 MTSB

The Microeconomic Benefits of Profamilia in Colombia

Profamilia, a non-governmental, not-for-profit program, was introduced in Colombia in 1965 and presently provides over 60% of Colombia's family planning services. This research analyzes the program's impact on women's educational attainment, mortality rates, and socioeconomic status. Preliminary results reveal increases in standards of living for Colombian women in general and positive externalities at the household level. Policy implications of this analysis support microeconomic benefits of improved family planning.

Student Author(s): Sara ElMakawy, Senior, Psychology University of North Carolina - Wilmington

Nathaniel Liu, Junior, Pscyhology , University of North Carolina - Wilmington

Mentor(s): Shanhong Luo, University of North Carolina - Wilmington

Presentation: Psychology, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 37 2nd Floor Mary Townes

Monetary Behaviors in Romantic Relationships

Research on monetary decisions and behaviors in
romantic relationships, especially premarital relationships, is very limited. The purpose of this study was to research patterns of college students' monetary behaviors and expectations in dating and cohabiting relationships. A sample of 553 heterosexual participants completed an online survey that included questions about their actual and expected payment arrangement for their first and subsequent dates as well as for common expenditures in cohabiting relationships. The results showed that both men and women reported that the male partner tended to pay the whole

bill for the first dates and to a lesser degree, for subsequent dates. More than half of the participants in cohabiting relationships reported some form of sharing with their partner in paying the expenses. However, men and women showed consistent, significant sex differences in their expectations for payment: While men expected the male partner to take more payment responsibility in first dates, subsequent dates, and living expenses in cohabiting relationships, women had a stronger expectation to split the costs compared to men, although neither gender expected the female to pay everything or majority of the expenses. These findings are important to understanding gender norms with regard to young adults' monetary behaviors.

Student Author(s): Daphne Faircloth, Senior, Computer Science Fayetteville State University

Joshua Cohenour, Junior, Computer Science, Fayetteville State University

Casey Lorenzen, Junior, Computer Science, Fayetteville State University

Donny Lopera, Junior, Computer Science, Fayetteville State University

Brittany Jennette, Junior, Computer Science, Fayetteville State University

Ashlee Gaskins, Junior, Computer Science, Fayetteville State University

Mentor(s): Sambit Bhattacharya, Fayetteville State University

Presentation: Computer Science (B.S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 19 1st Floor Mary Townes

Object Detection for Target Search in Cooperative Robotics

In cooperative robotics, a group of robots are deployed within an environment to explore and carry out various tasks. This swarm of robots is often more efficient and cost-effective than using a single agent. Numerous applications for this exist, including search and rescue missions, automated flight, and use in space exploration. Students at Fayetteville State University have been engaged in research in this latter area since late 2015. This ongoing internship has an end-goal of participation in the NASA Swarmathon competition in April 2017, which encourages students to develop new search algorithms for potential use in swarm robotic exploration and sample collection on Mars. Each semester new and recurring interns are tasked with accomplishing goals relevant to the competition. The current internship has focused on the development of an Object Detection Tool to allow accurate detection of a desired target using computer vision. To address this goal, students have collected sample target images, and are utilizing the computer vision algorithms in the OpenCV library to create a robust object detector. That code has been modified to suit the needs of the challenge and images have been annotated and processed as both positive and negative training images. The accuracy of the detector is being tuned since currently we are receiving a significant number of false positives, and our correct positive findings reveal an abbreviated area of the target is being recognized versus the entire visible section. The use of Haar-cascade versus local binary patterns as images features is being compared. It is our intent to complete development of this object detector to allow a rover to search an area, recognize potential matches with its on-board camera, and test the image for a percentage of pattern-match certainty prior to attempting physical collection utilizing a 'grabber,' a new feature in the upcoming competition.

Student Author(s): Dipatrimarki Farkas, Senior, Environmental Health Science North Carolina Central University

Mentor(s): Zhiming Yang, North Carolina Central University

Presentation: Environmental Science, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 57 2nd Floor Mary Townes

Exploring AOD-PM2.5 Correlation for PM2.5 Monitoring

Particulate matter (PM), especially those smaller than 2.5 micrometers, strongly contribute to

respiratory problems in humans and reduced visibility via haze. A major problem with monitoring particulate matter in the atmosphere is that the instruments used to measure particle count or mass can only do so in their immediate vicinity due to their limited range. The purpose of this particular project is to examine the correlation between the PM2.5 data from the monitoring stations and NASA's Aerosol Optical Depth (AOD) data from satellites in order to test if AOD data could be used to estimate PM2.5 data of the regions that do not have PM monitoring stations nearby. The process mainly consists of retrieving the AOD data from NASA web site and PM2.5 data from the Air Now website and then combining both data into a single spreadsheet for each individual month in the years 2011, 2012, and 2013. The composite spreadsheets were then scoured for days that have both AOD and PM data and these days are transposed onto a new sheet. The data was then be graphed and a regression analysis was conducted. It was found that the 2012 AOD data did significantly correlate with PM2.5 data at a few PM stations while there was no significant AOD-PM2.5 correlation at some stations. The monitoring of fine particulate matter could help manage both point and non-point sources of air pollution. This could help prevent conditions that are hazardous to human health or reduce visibility.

Student Author(s): Jordy Farrier Mora, Senior, Financial Economics Methodist University

Mentor(s): Josiah Baker, Methodist University

Presentation: Economics, Oral Presentations #2 (10:45 - 11:45 AM) 2226 MTSB

What Are the Impacts of Remittances on Economic Growth in Central America's Northern Triangle Region

This project aims to investigate the economic significance of remittance inflows to the Northen Central American countries of Guatemala, Honduras and El Salvador. Using empirical evidence and time series analysis with data spanning 1990-2014, the results reflect that there is no significant evidence that sugests that remittances have long-run effects on real GDP per capita, but the results do show evidence of a relationship between remitance inflow and consumption patterns. This indicates that families use the inflow of remittance for consumption purposes only and not for investment activities; hence there might be an impact on poverty reduction, but not so in economic growth.

Student Author(s): Sanam Fazilova, Junior, Biochemistry Queens University of Charlotte

Mentor(s): Aaron Socha, Queens University of Charlotte

Presentation: Chemistry (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 25 1st Floor Mary Townes

Synthesis of Quaternary Ammonium Ionic Liquids for Biomass Pretreatment Studies

Ionic liquids (ILs) are extraordinary organic solvents, capable of solubilizing biopolymers such as cellulose, lignin and chitin. Most commercial ILs are derived from petroleum and natural gas, however recent studies from our group have shown that components of biomass (e.g. lignin and hemicellulose) can be converted to protic ILs. This study will describe the synthesis and characterization of several quaternary trimethylbenzylammonium (TmBzAm) ILs which served as model compounds. Specifically, three of the compounds (lysinate, thiosalicylate and dihydrogen phosphate) were tested in biomass pretreatment experiments whereby fermentable sugar yields were quantified. Additional analogues were prepared to study the melting points and toxicity profiles of model lignin-derived ILs.

Student Author(s): Billie Feather, Senior, Jazz Studies - Guitar North Carolina Central University

Mentor(s): Lenora Hammonds, North Carolina Central University

Presentation: Music, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 60 1st Floor

Mary Townes

The Effect of Parental Involvement on Long-Term Musical Success

The effect of parental involvement in a child's progression of musical study is often touted by pedagogues, parents, and educational supporters to have a direct and important correlation to creating a life-long successful musician. Through research in the role of parents in children's musical development (McPherson, 2009), teaching and informal surveying of other musicians I work with, I have affirmed that this seems to be the case. In my poster presentation, I will use a survey for both parents and students as well as personal interviews with musical colleagues, to deeply research the connection between levels of parental/mentor involvement and long-term musical success. There are several musical methods which directly require parental involvement in a child's music lessons and have produced multiple successful life-long musicians. The musical background and experience of the parental/mentor figure will also be explored to discover if it is directly passed onto the student to positively effect their musical development. Using a carefully crafted survey of current musicians, former musicians, and non-musicians alike I will explore the correlation between parental involvement and musical success. My findings will be presented in poster form with clear representation of my discoveries.

Student Author(s): Emily Featherston, Senior, Chemistry Appalachian State University

Mentor(s): Megen Culpepper, Appalachian State University

Presentation: Chemistry (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 33 1st Floor Mary Townes

Preliminary expression and purification of a putative flavin reductase from Hyphomicrobium sulfonivorans

Volatile organic sulfur compounds (VOSCs) play a major role in the global sulfur cycle, and contribute to acid rain, global warming and cloud formation. The major contributor in the VOSC family is dimethylsulfide (DMS), which is considered a climate-cooling gas. Once emitted into the atmosphere it volatilizes and causes an increase in cloud albedo, thereby decreasing incoming solar radiation. DMS plays an active role in linking the global sulfur cycle from the oceans to the atmosphere. Minimal characterization of enzymes involved in DMS degradation have been performed. The enzyme, dimethylsulfide monooxygenase, has been purified and characterized from the soil bacteria *Hyphomicrobium sulfonivorans* as a two-component enzyme, with the two subunits being DmoA, a putative monooxygenase, and DmoB, a putative flavin reductase. There are two putative flavin reductases on the operon containing the *dmoA* gene encoded by open reading frame (*orf*)*176* and *orf136*. It is proposed that one of these genes encodes for the native DmoB flavin reductase protein. One of the DmoB candidate proteins, DmoB176, has been expressed as a 19 kDa soluble protein at low yields in C41(DE3) *E. coli* cells and purified by affinity chromatography. The affinity column yields somewhat pure protein, but impurities are present. Multiple peaks are present on the Superdex 200 size exclusion chromatogram. Based off of the calibration curve comprised of protein standards of known molecular weights, peaks corresponding to possible monomer and dimer forms are present though no DmoB176 protein was detected by either SDS-PAGE or Western blot analysis due to low yields. Enzymatic activity has been measured on partially purified DmoB176 protein by measuring NADH oxidation at 340 nm by UV-visible spectroscopy. Initial specific activity of DmoB176 was determined to be 1.70 nmol NADH min^{-1} mg $protein^{-1}$.

Student Author(s): Taylor Felton, Junior, Chemistry University of North Carolina - Pembroke

Mentor(s): Meredith Storms, University of North Carolina - Pembroke

Presentation: Pharmacy, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 77 2nd Floor Mary Townes

HPLC Determination Of Amoxicillin From African Drug Samples

Various environmental factors such as temperature, humidity, and light play an important role in how the quality of a drug substance or product varies with time. While pharmaceutical companies in the United States are required to adhere to regulatory requirements set by agencies such as the Food and Drug Administration and the United States Pharmacopeia, these stability requirements are not necessarily viewed with the same importance in other countries. In Africa, for instance, a pharmaceutical company aims to make drugs economically and more readily available by packaging bulk generic drugs rather than importing the finished product. While it is important to produce their own drugs, it is essential for pharmaceutical manufacturers in African countries to understand the importance of drug stability in producing safe and effective products when extreme heat, humidity, and inconsistent voltage can easily destroy drugs. Therefore, the purpose of this research is to explore the environmental factors that contribute to drug degradation in Africa with the overarching goal to educate pharmaceutical manufacturers in African countries about the importance of stability in producing safe and effective drug products.

Student Author(s): Martin Fenn, Senior, Environmental Science Appalachian State University

Mentor(s): Robert Swarthout, Appalachian State University

Presentation: Environmental Science, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 54 2nd Floor Mary Townes

Terpene induction as a chemical response in Solidago altissima via exposure to Eurosta solidaginis

The relationship between the Goldenrod Ball Gall fly, *Eurosta solidaginis,* and tall goldenrod, *Solidago altissima,* has been studied from multiple different ecological and biological angles, most showing a co-evolutionary relationship between the insect and plant. In many similar host-specialist systems, chemical responses to predation or parasitism have been observed in host plants as well as nearby healthy plants prompted by semiochemical emissions. Most species of plants produce terpenes in varying amounts via secondary metabolic processes which play a role in protection from disease and predators. In this study, two genotypes of visually healthy and gall free ramets of *S.altissima*were individually placed in an exposure chamber along with a galled ramet to determine if there was an increase in monoterpene and sesquiterpene production. Foliar samples of the exposed rametswere collected prior to and immediately after treatment, extracted, and then analyzed using GC-FID to quantify monoterpenes and sesquiterpenes. In control treatments, where plants were not exposed to galled ramets, initial results show an overall negative trend in terpene production over time. This suggests that, under controlled conditions, *S.altissima* can recognize a lack of predators so energy is expended or stored in other metabolic processes. In contrast, spatial proximity to a galled *S.altissima* correlates with a systemic increase in the production of terpenes, suggesting that spatial proximity can invoke terpene responses in *S.altissima*, presumably in response to chemical signals released by gall infected ramets. All known monoterpene and sesquiterpene concentrations were increased in gall exposed plants. This suggests a broad, rather than specific, defensive response in the exposed ramets due to chemical signals released by galled ramets.

Student Author(s): Marisa Fernandez, Sophomore, Philosophy Appalachian State University

Liv Winnicki, Freshman, Anthropology, Appalachian State University

Mentor(s): Susan Lutz, Appalachian State University

Presentation: Theatre, Performances (9:30 - 10:30 AM) BN Duke Auditorium

The Body & Soul When They Intersect: A Cross-Disciplinary Exploration

This performance piece explores what happens when the worlds of open mics and dance performance collide to create one unique experience. Using a poem specifically written for this project, the choreographer/dancer uses the rhythm of the words and the changing pace of the piece

to make a story come to life. The dance illustrates the way words can move people in a physical way. The performance investigates the connection between the body and the mind, while creating an artform. It looks to discover what the outcome of such a connection would be and what it would look like. In order to fully appreciate the other's creative process, the dancer has experienced performing at an open mic and the poet has experienced taking a dance class. By doing this, the duo has explored the cross-disciplinary portion of the project and how the two seemingly opposite art forms can unite while also gaining an appreciation for their counterpart's hardwork and dedication.

Student Author(s): Deja Finch, Junior, Mass Communications North Carolina Central University

Mentor(s): Shauntae White, North Carolina Central University

Presentation: University Studies, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 24 1st Floor Mary Townes

Athlete Behavior: Bias in Media Commentary

This content analysis will evaluate viewer reactions to news reports of the 2016 incidents involving athletes Ryan Lochte and Colin Kaepernick. Olympic swimmer Lochte, had falsified statements that he and his three teammates were robbed at gunpoint while attending the 2016 Rio Summer Olympics. NFL quarterback Kaepernick, refused to stand during the national anthem, by kneeling on one knee, as protest of the unjust treatment of minorities and police brutality in the United States. Social media is a prevalent platform that creates active communication between audiences and news content. Within seconds many can share content which has changed the way news outlets may circulate information with the public. The study will look at reappearing themes amid reader commentary about each incident on the Facebook and Twitter pages of ESPN, Fox News, and NBC. By analyzing viewer responses, this study will showcase not only a contrast in the treatment of athletes by the media, but by the public.

Student Author(s): James Fisher, Senior, Computer Science Fayetteville State University

Philip Whiting, Freshman, Computer Science, Fayetteville State University

Mentor(s): Sambit Bhattacharya, Fayetteville State University

Presentation: Computer Science (B.S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 36 1st Floor Mary Townes

Automated Tracking of Human Movement with Computer Vision

A current challenge in the area of surveillance is the ability to autonomously track individuals for determination of threatening behavior. With the release of open source deep neural networks that can provide object recognition and classification along with masked segmentations and labels, it may be possible to increase the accuracy of automated tracking of human movement in a scene. Specifically, it is hypothesized that a human tracking algorithm can be devised to track each human present in a scene in light to moderate conditions using the segmentations to create color histograms of the individual. The color histogram along with other heuristics will be used to compare individuals to one another in order to make the most appropriate match. Once matching can be accomplished the algorithm will store information about the person's trajectory of movement through a scene to assist in the tracking of the individual during periods of time where the algorithm fails to make a correct detection. Further this research will attempt to utilize a commercial/military grade thermal imaging camera to determine if the algorithms will benefit from its natural ability to separate background from living objects in the foreground. Of course this will require a tandem camera set up where there is a corresponding RGB image for the greyscale image received from the thermal device. For a problem such as autonomously tracking individuals a multi angled approach must be used, as it is likely that one method alone will not be sufficient. This research could have tremendous positive impact on issues such as homeland security and public safety where early threat detection is paramount.

Student Author(s): Karnella Fobbs, Senior, Criminal Justice Fayetteville State University

Mentor(s): Terri Moore-Brown, Fayetteville State University

Presentation: Criminal Justice, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 2 1st Floor Mary Townes

Perceptions and Preventions of Expulsion Rates of African-American/ Minority Teens in the Public School System from Parents, Teachers, and Administration

Teens in the public school system, ranging from the freshman year to junior year of high school, have a high rate of expulsion in the public school system according to the "*Civil Rights Project*" (2016). What affects these expulsion rates and what are the prevention methods to prevent further expulsion rates in the public school system? Is there a different perspective between the parent and teacher in regards to the expulsion process as well as prevention steps to decrease the rates within in the school system? According to "*Parental Perceptions of the Expulsion Process and the Educational Opportunities offered by School Districts to their Expelled Children*" by Richard D. Christensen states that "Students who find themselves subject to disciplinary action under the provisions of the California Education Code requiring expulsion are unprepared for the steps that follow the action taken by the governing board of their school district" (2003). This research study will be conducted in a quantitative/qualitative research using a strategy use by Sharon A. Brown (2014) known as a content meta-analysis code sheet and Richard Clistenein (1994) descriptive survey to test the perception of parents' views and teachers' views of prevention steps to decrease expulsion rates in the public school system. This research will help further alleviate expulsion rates and disciplinary actions toward students in the school system with the findings of this research and further research.

Student Author(s): Kira Foglesong, Senior, Communication: Game and Interactive Media Design High Point University

Alfred Bozzo, Junior, Communication: Game and Interactive Media Design, High PointUniversity

Benjamin Rolison, Sophomore, Communication: Game and Interactive Media Design, High Point University

Mentor(s): Brian Heagney , High Point University

Presentation: Game Design/ Interactive Media, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 48 2nd Floor Mary Townes

AINA: An App for Testing the Cognitive Functions of Non-Human Animals

AINA is a mobile application designed to train and test cognitive ability in non-human animals. The goal is to have the animal take the Wisconsin Card Sorting Task (WCST), a test that measures executive function in humans, in order to further current scientific understanding and research of the cognitive ability of higher-functioning animals. Our research dealt with designing an interface for multiple users including non-humans and humans, revamping the aesthetics of a current prototype, and transferring said prototype to a new engine. Our app helps researchers study, document, and record data by simplifying the testing process with less risk for error and with the ability to quickly store, share, and access data. Each level on the app builds towards the WCST which tests working memory, reasoning, problem solving, and cognitive flexibility. In the WCST, one must classify and match cards based on color, shape, or number of the symbols, but the participant does not know which classification rule is being tested for and the only feedback received is whether the subject is right or wrong. The classification rule changes throughout the task in order to test how well the subject can adapt to changing rules. We hope that AINA, the resulting product of our research, will be distributed among zoos or other animal research facilities in the future.

Student Author(s): Briana Fonseca, Senior, Music Education Greensboro College

Mentor(s): Neill Clegg, Greensboro College

Presentation: Music, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 61 1st Floor Mary Townes

No Strings Attached: Applying Beethoven's String Quartet Model to the Saxophone Quartet

This project will consist of using Ludwig van Beethoven's unique musical language as a paradigm for creating an original saxophone quartet piece. Using existing models of style analysis by Joseph de Marliave, William Kinderman, and Daniel G. Mason and my own style analyses, I will compare and contrast the construction and use of melody, harmony, rhythm, chord structure, and placement of phrasing in Beethoven's "String Quartet No. 8 in E minor Op. 59 No. 2: II Molto Adagio" and "String Quartet No. 9 in C Major Op. 59 No. 3: III Menuetto Grazioso." In my research thus far, I have discovered Beethoven's use of independent melodic lines, his use of harmonic function that varies from Western tradition, and his use of chordal structure that can easily be applied to the voice leading of a saxophone quartet. As I continue through this process, I will develop my skills as a young composer by being able to apply Beethoven's compositional model to the musical characteristics of the saxophone, as well as the ensemble characteristics of the saxophone quartet. Completing my style analyses meant for a string quartet and implementing my findings into an original saxophone quartet piece will allow me to to apply scholarly research into a theory of composition. I hope the product of my work inspires musicians and music educators to apply various compositional styles to their own methods of study and instruction.

Student Author(s): Silver Frank, Senior, Applied Physics Appalachian State University

Mentor(s): Richard Gray, Appalachian State University

Presentation: Physics (B.S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 18 2nd Floor Mary Townes

Designing and Programming a High-altitude Ultraviolet Camera to Study Young Solar Analogs

In order to better study the effects of the young, active Sun on Earth in its early stages, this project aims to get ultraviolet data from other solar-type stars that are roughly the same age as the Sun was when life was first developing on the Earth. To gather these data, a UV-sensitive CCD camera will be sent above the stratosphere on a high-altitude balloon. The camera will be attached to a mount that was designed using LibreCAD software. The camera's movement is controlled using two stepper motors for azimuth and altitude motion. The Python 3 IDE on a Raspberry Pi 3 Model B was used to program all aspects of this project. Once in the air, the camera takes an initial photo of the star field it is pointed at and plate solves the image with astrometry.net software. This gives the current azimuth and altitude of the camera. The Raspberry Pi then compares the current location to the location of the star to be photographed and calculates the number of degrees to move in altitude and azimuth directions. The motors are equipped with a program that prevents the camera from rotating more than 180 degrees in either direction to prevent the cord from wrapping around the device. Once the camera has reached its desired location, it takes multiple photometric images of the star before repeating the process for the next star.

Student Author(s): Rae Freeman, Senior, Athletic Training Campbell University

Mentor(s): Sarah Christie, Campbell University

Presentation: Exercise Science, Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 16 1st Floor Mary Townes

Xertional Rhabdomyolysis In A High School Football Player

The patient was a seventeen year old African-American, high school football player; five foot

seven inches and weighed 190 pounds. He reported at the start of the season deconditioned and had not experienced much physical activity since the previous football season. The patient had completed his second day of football practice when he began to feel ill. He informed the athletic trainer that he had a migraine and was experiencing cramps in his lower extremity, specifically to his groin and quadriceps.The athletic trainer then questioned the patient about his water consumption in which he responded that he had only drank two bottles of water throughout the day.The patient was placed in an ice bath and following the ice bath the patient experienced a full body cramp. The athletic trainer contacted the patient's parents and suggested that he be taken to the local emergency room. Differential Diagnosis: Dehydration, Heat cramps, Exertional heat exhaustion, Exertional rhabdomyolysis. Upon arrival at the emergency room the patient was examined and a complete blood count (CBC) was conducted. With testing the patient had deoxygenated – dark red blood and was hypertensive. The CBC displayed inequalities of the electrolyte levels. The patient was diagnosed by the emergency room staff with exertional rhabdomyolysis, heat exhaustion and dehydration. Due to the patient's condition he was admitted to the hospital for three days until his electrolyte levels returned to normal. The patient was treated intravenously with sodium chloride. In addition, the patient's nutrition was monitored during his three day hospital stay. The patient was released from the hospital and was ordered not to return to activity for thirteen days. On the fourteenth day post-incident the patient was cleared to begin a return to exercise protocol. Exertional Rhabdomyolysis is not fully understood and patients should be treated on a case by case basis. Medical professionals must not become too comfortable in their daily clinical diagnoses and remember to seek other options when caring for patients. Most important, to prevent dehydration, exertional heat exhaustion and other associated conditions, patients need to be educated on proper hydration, food intake and nutrient timing.

Student Author(s): Josephine Frith, Senior, Elementary Education University of North Carolina - Wilmington

Mentor(s): Christine Liao, University of North Carolina - Wilmington

Presentation: Elementary Education, Oral Presentations #1 (9:30 - 10:30 AM) 2226 MTSB

Diversity in Popular Children's Literature

This project is a study in popular children's literature and how it showcases diversity. Popular children's literature is comprised, in this study, of the highest grossing children's films and books. Each film or book is analyzed for diversity in ten categories: race, gender, sexuality, economic status, ability, body type, religion, family, age, and sex. Each category is also broken into two subheadings: representation and discussion. Diversity is collected by examining each minute of film or page of book to see if any character fitting a diversity category is performing an action (speech included). Or if the subject of diversity, in any category, is discussed between characters. Any character that is not a white, cis-gender, heterosexual, middle or higher socioeconomic status, able bodied, non-fat/ non-scarred, young, Christian male from a family with two heterosexual parents and less than four children is concidered diverse. The objective of this project is to find out what diversity categories, if any, have few characters in popular children's literature and then to suggest literature that does have characters in those categories to be used in classrooms to increase exposure to the categories.

Student Author(s): Joelle Fuchs, Junior, Biology:Integrative Physiology and Neurobiology North Carolina State University

Mentor(s): Heather Patisaul, North Carolina State University

Presentation: Biology (B. S.), Oral Presentations #1 (9:30 - 10:30 AM) 2221 MTSB

Evaluating BPA's effect on hormone-sensitive regions of the developing rat brain

Bisphenol A (BPA) is a high volume production chemical found in a variety of commonly used products including plastics and epoxy resins. Because of its common use, human exposure

is nearly inescapable. Though the FDA considers BPA safe at current exposure levels, the validity of that conclusion continues to be debated, resulting in conflicting messages to the public. To address these ambiguities and generate data for risk assessment, the current project was conducted as part of the CLARITY-BPA (Consortium Linking Academic and Regulatory Insights on BPA Toxicity) program to test the hypothesis that perinatal BPA exposure induces morphological changes in hormone sensitive brain regions. Here we focused on the sexually dimorphic nucleus (SDN) of the hypothalamus and the anteroventral periventricular nucleus (AVPV); estrogen sensitive regions of the brain linked to sexual behavior and sex-linked physiology, respectively. NCTR Sprague-Dawley rats of both sexes were assigned to one of five dosing groups (BPA at 2.5, 25, 2500 μg/kg bw/day, vehicle, or ethinyl estradiol (0.5 μg/kg/bw/day)) and the SDN and AVPV assessed through unbiased stereology. Exposure was by gavage from gestation through lactation, with dams gavaged from gestational day 6 until birth, and offspring directly through weaning (n = 12/sex/group). Although we remain blinded in this study because it is not yet complete, we hypothesize that BPA's presence—due to its estrogen-mimicking properties—will result in enlarged SDNs in female rats, resembling a more masculine phenotype and enlarged AVPVs in male rats, resembling a more feminine phenotype. Assessments of other sexually dimorphic areas in the hypothalamus is currently underway. Once all data is collected it will be submitted to the CLARITY-BPA consortium for decoding. Blinding and other experimental design elements were included to maximize data utility for risk assessment by FDA and other regulatory agencies.

Student Author(s): Julia Furey, Junior, Informaion Sytems Guilford College

Damian Hinton, Sophomore, Informaion Technology, Guilford College

Mentor(s): Chafic Bou-Saba, Guilford College

Presentation: Computer Science (B.S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 49 2nd Floor Mary Townes

Investigating Hard-Drive Technologies and Software Tools

Hard-drives are low-cost, high capacity, physical storage devices that could be found in today's desktop computers, mobile devices, consumer electronics and enterprise storagearrays in data centers. Hard-drives are non-volatile memory devices that are able to permanently store and retrieve massive amounts of data. Hard-drives store Operating System (OS) files, software programs, and user generated files including videos, music, pictures, and text documents. The main characteristics of hard drives are storage capacity, access speed, form factor, and interface. Additional characteristics include latency, cache size, power consumption, audible noise, and shock resistance. Furthermore, there are different types of hard-drives such as internal, external, Solid State Drives (SSD), Hybrid Drives, and Network Array Storage (NAS) drives. The main goal of this research project is to provide a market analysis of the latest hard-drive technologies, prices, and to investigate the software tools that are used to perform various operations on them. These various operations include i) maintain: defragment (for performance optimization), clean (temporary or junk files); ii) copy and backup (files or partitions or volumes); iii) monitor and analyze hard-drive state or status (for failure prevention); iv) recover lost or erased or corrupted data; v) lock or secure sensitive data (from unauthorized access); vi) secure erase (data shredding). This research project will examine many free software tools such as MiniTool (Partition Wizard and Power Data Recovery), EaseUs Partition Recovery, Eraser, Smart Defrag, and Paragon Partition Manager, among others. This research will demonstrate how to efficiently utilize the hard-drive and recommend some of the free useful software tools.

Student Author(s): Nykesha Fyffe, Senior, Applied Physics Appalachian State University

Mentor(s): Brooke Hester, Appalachian State University

Presentation: Physics (B.S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 12 2nd

Floor Mary Townes

Fluorescence Imaging of Actin Coated Microspheres

Our project focuses on contributing towards the optimization of muscle function. In order to understand macroscopic muscle function, we want to monitor microscopic muscle performance. We seek to engineer the smallest unit of muscle that undergoes contraction: the sarcomere. Sarcomeres are composed of long, fibrous filaments with actin and myosin proteins that interact with each other as muscles contract and expand. We are building sarcomeres out of myosin monomers in buffer and actin coated microsphere beads. We need to understand how the actin influences the beads and the amount of actin on each bead. The actin is tagged with Alexa Fluor 555 that emits a range wavelengths of light when photo-excited. In order to successfully construct a synthetic sarcomere, it is crucial to visualize the actin and observe the fluorescence light emitted from the actin. To excite the Alexa Fluor 555, a fluorescence imaging microscope was constructed. A green laser was collimated through an objective lens to excite the Alexa Fluor 555. A filter for blocking green laser light was placed in front of the camera. Using this configuration, fluorescent images of the actin coated beads were achieved.

Student Author(s): Grace Gable, Junior, Chemistry University of North Carolina - Charlotte

Mentor(s): Daniel Rabinovich, University of North Carolina - Charlotte

Presentation: Chemistry (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 10 1st Floor Mary Townes

Reactivity of new chalcogenone ligands towards elemental halogens

This presentation outlines the reactions of several N-heterocyclic thione (NHT) and selone (NHSe) ligands towards elemental halogens, which leads to the formation of unusual hypervalent compounds. More specifically, the reactions of the sterically-demanding ligands SIArE, which feature a saturated backbone, with bromine (Br2) or iodine (I2) will be described in detail (Ar = xylyl, mesityl or 2,6-diisopropylphenyl; E = S, Se). The characterization of the products using Nuclear Magnetic Resonance (NMR), Infrared (IR), and Ultraviolet-Visible (UV-Vis) spectroscopies, along with elemental analysis and X-ray crystallography, will be discussed. Recent attempts to generate derivatives of chlorine, (SIArSe)Cl2, using thionyl chloride as the reagent rather than elemental chlorine (which is a toxic gas and therefore difficult to handle), will be explained.

Student Author(s): Daniel Gallimore, Junior, Physics University of North Carolina - Asheville

Mentor(s): James Perkins, University of North Carolina - Asheville

Presentation: Physics (B.S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 16 1st Floor Mary Townes

Electrostatics of the Growth and Formation of Silver Nanoparticles on a Ferroelectric Template

The lithographic growth of silver nanoparticles on a ferroelectric substrate is investigated using scanning electron microscopy (SEM). The initial process of particle formation is well described by the kinetic interactions between the silver ions in a dilute silver nitrate solution and the electrons in a periodically poled lithium niobate (PPLN) substrate. However, as more silver is deposited onto the substrate, the electrostatic properties of the growing nanoparticles more profoundly influence where silver ions will continue to accumulate. By observing the nanoparticles at various stages of development, it is found that ordinary nanoparticles on a smooth, clean substrate first form as discontinuous collections of point-like particles. Further deposition results in larger, jagged particles. As these particles gather more silver, their edges become more rounded until they reach a maximum diameter. Furthermore, it is shown that the condition of the substrate profoundly affects nanoparticle formation. A better understanding of how previously deposited silver affects the future deposition of silver ions still in solution will

allow future research more control over wire properties, such as shape and size. This is particularly advantageous for applications that are highly dependent on nanoparticle dimensions, such as surface enhanced Raman spectroscopy (SERS), a method of detecting and characterizing single biomolecules or trace impurities.

Student Author(s): Justine Galliou, Senior, Animal science North Carolina State University

Mentor(s): Nick Serão, North Carolina State University

Presentation: Animal Genetics, Oral Presentations #4 (3:00 - 4:00 PM) 2221 MTSB

Evaluating the accuracy of a new commercial genetic test for response to fescue toxicosis in cattle.

Most fescue in the Southeastern states contains an endophyte that causes fescue toxicosis in grazing animals, a serious disease responsible for $1 billion economic losses to the US beef industry. The T-Snip™ test (AgBotanica, LCC, Columbia, MO), has been developed with the objective of identifying animals with genetic variation for fescue toxicosis tolerance. The aim of this study was to ascertain the accuracy of this genetic test. Over 13 weeks, weekly body weight (BW) data, and blood samples for genotyping with the T-Snip™ test, were collected on 148 pregnant Angus cows at two locations (Butner and Reidsville, NC). T-Snip™ results are expressed as "tolerance rating", ranging from 0 to 5, with lower scores representing less tolerant animals. There were 33, 89, 25 and 2 animals with ratings of 1, 2, 3, and 4, respectively. After 13 weeks, average weekly gain (AWG) was calculated as the slope of the linear regression of BW on weeks and analyzed in ASReml4 including the fixed effects of location, parity, initial body weight (covariate), and the random additive genetic effect. Pre-adjusted phenotypes (AWG* = additive genetic + residuals) were used for analysis. In R, T-Snip™ accuracy was determined using Spearman's correlation between AWG* and the T-Snip™ scores. This was done in 3 scenarios: all animals, and only animals in each location. Correlation between AWG* and tolerance ratings using all animals was 0. When analysis was done by location, correlations were 0.36 and –0.29 for Butner and Reidsville, respectively. These results suggest that the T-Snip™ test does not accurately identify animals with genetic potential for response to fescue toxicosis in Angus cows. Studies using other breeds are needed to test the accuracy of this test in different breeds.

Student Author(s): Megha Ganatra, Senior, Human Biology North Carolina State University

Mentor(s): Lisa Paciulli, North Carolina State University

Presentation: Biology (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 67 2nd Floor Mary Townes

A Preliminary Analysis of the Effects of Dominance on Ring-tailed Lemurs (Lemur catta): Responses to Novel Objects

Female dominance, although rare in the animal kingdom, is a characteristic trait in many lemur species (Family: Lemuridae). Female dominance is typically defined as females having feeding priority (Radespiel and Zimmermann, 2001). Ring-tail lemurs *(Lemur catta)* are a female-dominant species that lives in groups of 3 to 25 individuals in Madagascar. They are omnivorous, and females have first access to foods (Duke Lemur Center, 2016). Female ring-tailed lemurs are also aggressive towards males (Sauther *et al.,* 1999). In this study, behavioral differences between captive female and male ring-tailed lemurs in response to exposure to control (food bowl) and novel objects (Rubik's cube) were documented. It was found that for both females and males, the mean latency to approach novel objects was shorter than the mean latency to approach control objects. Also, females approached the control objects before males did. However, there was not a great difference in which individual approached the novel object first. In fact, the novel object was approached by every individual (except one) during every trial. This implies that the presentation of a non-food novel object may not elicit a dominant response, and that perhaps food-related items were those that selected for female dominance in this species. This study is

important because it helps us better understand behavioral patterns of lemurs, especially the behavioral responses of non-dominant individuals in the presence of dominant individuals. Future research should be conducted on novel food objects to see whether they elicit a dominant response.

Student Author(s): Lorenna Garcia-Bochas, Senior, Biology Fayetteville State University

Mentor(s): Sharon Morrison, University of North Carolina - Greensboro

Presentation: Public Health, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 18 1st Floor Mary Townes

Tailoring The Montagnard Hypertension Survey Process For The Bunong Community

The Montagnards are a group from the Central Highlands of Vietnam who reside in Greensboro, NC. The Bunong tribe is the 4th largest within the Montagnard community with a language that is distinct from the other Montagnard tribes. Our project is an extension of the ongoing Montagnard Hypertension Research Project which focuses on the cultural, structural, biological and behavioral factors that make this community vulnerable to chronic disease. Our goal is to gather behavioral information specific to this tribal community that can help us understand their specific hypertension prevention needs. In our data collection process we created an informed consent video for the Bunong participants in this study, translated the existing Montagnard Hypertension Behavioral survey into terms that are more familiar to the Bunong people and documented our observations and participant reactions to selected questions. Participants readily gave consent to the collection of biological specimens. However, we found that repsonding to pregnancy related questions were uncomfortable for the female participants; this was due to differences in age between interviewer and participant. It was also a cultural taboo to discuss pregnancy matters with strangers. In conclusion, there are limited tools to assess Montagnards general health status and few, if any, tailored risk assessments for Bunong tribal subgroup. These procedures aim to close that gap. In the future, we plan to conduct laboratory analyses of hair and saliva cortisol samples as indicators for chronic stress and to categorize levels hypertension. We will use the findings biological and behavioral survey data analysis to guide opportunities for Bunong community and researchers to design relevant community health education.

Student Author(s): Miranda Garrett, Senior, Biology Queens University of Charlotte

Mentor(s): Joanna Katsanos, Queens University of Charlotte

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 58 2nd Floor Mary Townes

Development of a consistent protocol for the genetic sexing of raptors found in the Southeastern United States

Unlike many other species of birds, raptor species do not display sexual dimorphism. As a result, a molecular sexing protocol is necessary to accurately determine sex which has many important applications including field research and breeding programs. In birds, females the heterogametic sex with one Z chromosome and one W chromosome, while males are homogametic with two Z chromosomes. A different size of the CHD gene has been found on each of these chromosomes. This allows birds to be sexed molecularly since males will only display the CHDZ gene, while females will display both the CHDW gene and the CHDZ gene. This research aims to develop a consistently effective protocol for molecularly sexing various raptor species found near Charlotte, NC using blood and tissue samples including feathers. While, in the past, blood and other tissues have been shown to be a better source of DNA, feathers could also be a very useful source of DNA if a functional protocol can be developed since they can be accessed noninvasively while birds are alive. DNA will be isolated from blood and tissue samples using a Qiagen DNeasy kit. The CHDZ and CHDW genes will then be amplified using a PCR reaction involving 2550F and 2781R primers and a multiplex PCR reaction involving 3007F, 2987F, and 3112R primers. These

primers have been shown to have differing, inconsistent success levels with various raptor species. The sex of the birds will then be determined based on the amplified CHDZ and CHDW genes using gel electrophoresis.

Student Author(s): Elizabeth Gerdes, Senior, Biology University of North Carolina - Pembroke

Mentor(s): Leonard Holmes, University of North Carolina - Pembroke
Sivanadane Mandjiny University of Norh Carolina - Pembroke

Presentation: Biology (B. S.), Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 44 2nd Floor Mary Townes

Fermentation Study of Photorhabdus luminescens in a bioreactor

Photorhabdus luminescens is a bioluminescent, entomopathogenic bacterium which is part of a symbiotic relationship with *Heterorhabditis bacteriophora*. *P. luminescens* was inoculated into liquid Yoo media and grown in a 2L A+ Sartorius Stedim Bioreactor for 24 hours. Once the 24 hours was complete, the luminosity and the optical density were measured and recorded. The data was harvested and put into a Microsoft Excel spreadsheet to allow a scatterplot to be created. From the scatterplot, the specific growth rate and the doubling time were calculated in order to determine which media composition produced the largest, healthy yield. The optimal composition was found to be original Yoo media with a concentration of 2.50% soytone, 0.50% yeast extract, and 1.00% peptone with the highest specific growth rate 0.91 h-1 and the lowest doubling time 0.8hr."

Student Author(s): Steven Gibbs, Freshman, Physics Appalachian State University

Michael Marand, Freshman, Physics, Appalachian State University

Mentor(s): John Cockman, Appalachian State University

Presentation: Physics (B.S.), Oral Presentations #3 (1:45 - 2:45 PM) 1008 BRITE

Optimal Glider Launch Angle

The primary objective of this project was to develop a method that determines the optimal angle of launch for any glider based on wing loading , the ratio of total mass (kg) to the surface area (m^2) of the wings and stabilizer. Launching at the perfect angle is crucial to a desirable glide because too small of an angle causes a nose dive, while too large of an angle causes stall and descent. Launches at inappropriate angles can result in injury and costly damage to the glider or one's surroundings. Gliders of eight different wing loading values were tested at three to five different angles with constant velocity until the ideal launch angle was determined for each. The data resulted in an inverse exponential relationship between ideal launch angle and wing loading, represented by a single unique equation. This experiment revealed a trend in gliders that with increasing wing loading, the ideal launch angle increases, until it peaks at about 39 degrees.With increasing wing loading the glider behaves more like a projectile. However, due to the glider's ability to produce lift, no glider's ideal angle reached the 45 degree angle that the range equation predicts is optimal for a true projectile. The use of the aforementioned equation provides the field of flight science with a unique relation of mass vs lift generated and how it affects the ideal launch angle.

Student Author(s): David Giordano, Senior, Exercise Science University of North Carolina - Wilmington

Savannah Knight, Senior, Exercise Science, University of North Carolina - Wilmington

Mentor(s): Robert Boyce, University of North Carolina - Wilmington

Presentation: Exercise Science, Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 24 1st Floor Mary Townes

Exploring Treatment Options for Chronic Obstructive Pulmonary Disease

Chronic Obstructive Pulmonary Disease (COPD) represents the third leading cause of death in the United States and worldwide. Conventional approaches to treatment include medicines, often presenting themselves with undesirable side effects, and surgery, which has proven to be risky and invasive for the patient. While these conventional approaches are on the frontline when it comes to battling COPD, complementary therapies, such as yoga, tai chi, meditation, and a device called the lung flute, have shown promise. With hopes of adding to the arsenal of complementary therapies, a local entrepreneur in Wilmington, North Carolina developed the Easy Breather Exercise Table (EBET), a rocking bed designed to facilitate breathing in patients with COPD. The inventor contacted The University of North Carolina Wilmington (UNCW) looking for the academic rigor to see a device through the clinical trials process. Subsequently, an interdisciplinary group of faculty and student researchers was formed. In addition to beginning a feasibility and usability study on the device, the group began a nationwide survey targeting COPD patients in an effort to learn more about their current treatment regimens and lifestyles. This poster will elaborate on the concepts behind the EBET, as well as explain the methods used to carry out the feasibility and usability study as well as the survey.

Student Author(s): Kyra Gladden, Junior, Communication, Electronic Media/Broadcasting Appalachian State University

Mentor(s): KC Kirsten Clemens, Appalachian State University

Presentation: English (Literature), Oral Presentations #2 (10:45 - 11:45 AM) 1234 MTSB

Conflict in Casablanca: Rick vs Ilsa

Michael Curtiz's *Casablanca*, released nationally in early 1943,is set during one of the greatest conflicts of the 20th century: World War II. The city of Casablanca has managed to remain unoccupied throughout the war, but fleeing Europeans who wish to escape to America are trapped there, unable to acquire the elusive papers of transit. It is here that we meet Rick, a jaded man, and later Ilsa, a woman who teeters on the edge of virtue and faithlessness. As the movie unfolds and the audience learns more about Rick and Ilsa's past relationship, several conflicts arise. However, the irrefutable main conflict of Casablaca is man vs man; Rick and Ilsa clash over their past relationship as lovers in Paris, and they find that they cannot escape the past. Through both visual elements—chiaroscuro and character placement—as well as auditory elements—namely the variations of "As Time Goes By"—Curtiz exposes the conflict between these two characters.

Student Author(s): Josh Goheen, Senior, Chemistry Campbell University

Mentor(s): Jason Ezell, Campbell University

Presentation: Chemistry (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 22 1st Floor Mary Townes

Modification of a Finnigan TSQ7000 Mass Spectrometer for Carbon 14 Dating of Indigenous People's Artifacts

The ratio of the naturally occurring Carbon 14 isotope to the more ubiquitous Carbon 12 was determined using a Finnigan Triple Stage Quadrapole Mass spectrometer out fitted with a special combustion system designed to convert organic carbon samples to carbon dioxide gas. The generation of CO_2 gas was necessary due to the low ionization capability of the spectrometer source. This research required the development of custom techniques for our instrumentation. Several contemporaneous samples were examined to evaluate the sensitivity of the instrument. With this information, a protocol was established for examination of pottery sherds from native fire pits as well as charcoal samples. With this ratio data accurately established, the age of the charcoal found at several archeological sites along the North Carolina coast could be calculated using the known radioactive decay rate.

Student Author(s): A.J. Golding, Senior, Environmental Science Appalachian State University

Mentor(s): Chris Thaxton, Appalachian State University

Presentation: Environmental Science, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 54 2nd Floor Mary Townes

Relating detrended fluctuation analysis techniques to standard methods for determining urbanization impacts on mountain streams

Detrended fluctuation analysis (DFA) is a well-established statistical analysis method used to quantify long-term correlations in non-stationary time series. Thaxton et al. (2016) employed DFA to high-resolution time-series data for stream temperatures in Boone Creek, an increasingly urbanized mountain stream in the Southern Appalachians. To relate DFA techniques to well-established methods, we present an analysis of the more commonly-employed stream and air temperature correlation approach. Daily, weekly, and monthly stream temperature data for eight locations along a 1.5-km reach of Boone Creek were correlated with local meteorological data. A larger stream-air temperature linear correlation slope and lower y-intercept values suggests that the stream temperature is more meteorologically controlled, consistent with DFA exponents in the range from 0.0-to-0.5, indicating consistently anti-persistent long-term correlations. Herein, we demonstrate that Boone Creek increasingly exhibits meteorologically-controlled behaviors identified through both methods, suggesting an increase in urbanization impacts over the study period.

Student Author(s): Ismael Gomez, Junior, Biology Nash Community College

Mentor(s): David Beamer, Nash Community College

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 17 1st Floor Mary Townes

Diversification of Seepage Salamanders (Desmognathus aeneus) as Revealed Through Mitochondrial and Nuclear Sequence Data

The seepage salamander, (*Desmognathus aeneus*) is among the smallest amphibians in the world (*Desmognathus aeneus*.

Student Author(s): Robert Gordon, Senior, Biology University of North Carolina - Wilmington

Mentor(s): Kevin Kiser, University of North Carolina - Wilmington

Presentation: Biology (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 22 1st Floor Mary Townes

The Use Of Soil Extraction Agar To Cultivate Antibiotic-Producing Bacteria Under Environment-Like Conditions

Due to the increasing prevalence of antibiotic resistant pathogens it is urgent that new antibiotics are discovered to combat new resistant strains. Even with modern techniques we are only able to cultivate around one percent of microbes present. An additional issue in identifying antibiotic producing bacteria is that the potential antibiotic producing colonies grown do not always produce their antibiotics under their present conditions. Agar has been prepared using water that has been filtered through the same soil as the sample being cultured in an attempt to leach the nutrients and any other abiotic factors present within the soil. This should allow the bacteria present in the sample to grow in nutritive conditions similar to that of their natural environment. A new species belonging to the genus Paenibacillus has been isolated using this method and appears to be producing a broad-spectrum antibiotic.

Student Author(s): Saahj Gosrani, Junior, Biochemistry North Carolina State University

Mentor(s): Leslie Sombers, North Carolina State University

Presentation: Chemistry (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 69 2nd Floor Mary Townes

Quantitative Comparison of Enzyme Immobilization Strategies for Real-Time Glucose Detection Employing Fast Scan Cyclic Voltammetry

Electrochemical detection of non-electroactive species, such as glucose, requires biosensors which are stable, selective, and have physiologically relevant sensitivities to targeted analytes. Glucose oxidase enables the electrochemical detection of glucose, a non-electroactive molecule, through the production of enzymatically generated hydrogen peroxide. This hydrogen peroxide is electroactive and serves as the glucose reporter molecule. We have demonstrated sub-second electrochemical detection of glucose fluctuations by combining glucose oxidase modified carbon fiber microelectrodes with fast-scan cyclic- voltammetry (FSCV). The work presented herein quantitatively compares three approaches for enzyme immobilization - physical adsorption, hydrogel entrapment, and electrospinning - on a carbon-fiber microelectrode. The data suggest that each of these methods can be used to create functional microbiosensors; however, of these, hydrogel entrapment is the most effective approach to glucose oxidase immobilization on the carbon electrode surface. Electrodes that are enzymatically modified in this way are sensitive and stable over many hours, allowing one to measure glucose concentrations in the brain over the course of an experiment. These data are useful because they define an effective strategy for microbiosensor fabrication that is broadly applicable to other oxidase enzymes, allowing the detection of non-electroactive molecules such as choline and glutamate. Overall, tools such as these will enable researchers to study multiple facets of neuroscience and tackle problems surrounding the detection of non-electroactive molecules.

Student Author(s): Danika Gottbrecht, Junior, European Studies, French Guilford College

Mentor(s): ,

Presentation: French and Francophone Studies, Oral Presentations #3 (1:45 - 2:45 PM) 2236 MTSB

Les Trois Mousquetaires: A Post-Colonial Analysis and Glimpse into French Culture

The primary purpose of the research conducted for this project was to analyze specific chapters in Alexandre Dumas' *The Three Musketeers* (1844) for key variances in language. Through juxtaposing the original French text and the modern English translation, a bilingual reader may note linguistic differences between the two, thus discovering what may be lost in a work's translation from its native language. The research findings concluded in a post-colonial analysis of Dumas' work, specifically chapter XXXIII "Soubrette et Maîtresse", due to its overt use of colonial language and representation of characters throughout the novel. The original French edition of Dumas' text alludes to French colonial expansion throughout the 19th century, while the 2006 translation completed by Richard Pevear seemingly buries these ideas. *The Three Musketeers* is a prime example of how literature may be used as a vehicle for various cultural, social, and political ideas. This research enforces the value of examining a text in its appropriate linguistic and historical context in order to better comprehend the period in which it was written, as well as the intentions of the authors themselves.

Student Author(s): Arshay Grant, Senior, Biology Fayetteville State University

Ismael Hernandezvillasuso, Senior, Biology, Fayetteville State University

Mentor(s): Kristen Delaney, Fayetteville State University

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 67 2nd Floor Mary Townes

Generation of an Antioxidant-deficient Strain of Escherichia coli

The gspS and ggt genes encode the proteins GspS (glutathionylspermadine synthetase) and GGT

(gamma-glutamyltranspeptidase) in *Escherichia coli*, respectively. Both are involved in managing oxidative stress via the glutathione pathway. Previous work revealed that the loss of one of these genes does not result in increased sensitivity to oxidative stress. Therefore, we tested the hypothesis that GspS and GGT provides compensatory function when one of these genes becomes dysfunctional. To this end, we developed a strategy to remove ggt from a gspS knockout strain (JW2956-1) by replacing ggt with an ampicillin resistance cassette. Repeated attempts to isolate a ggt gspS double knockout have failed. Thus, our data suggest that *E. coli* cannot survive at atmospheric oxygen levels when both of these genes are absent. Results from this study are consistent with the hypothesis that GGT and GspS have compensatory roles when one of these genes becomes dysfunctional. Future studies will address whether a ggt gspS double knockout can be isolated under the reduced oxidative stress of anaerobic growth conditions.

Student Author(s): Jaylin Grant, Senior, Biology- Pre-PA Campbell University

Mentor(s): Michelle Thomas, Campbell University

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 22 1st Floor Mary Townes

The Identification of Environmental Microorganisms that utilize Bifenthrin

Insecticides and herbicides are widely used for lawn maintenance in golf courses throughout the Piedmont area of North Carolina. Bifenthrin is a common pyrethroid insecticide used among residential, agricultural, and commercial settings including golf courses. Environmental microorganisms that degrade pyrethroids may play a key role in bioremediation and discovering species with this property is significant. The aim of this project is to test previously isolated bacteria for Bifenthrin utilization and to identify and characterize these bacterial isolates. Soil samples from Keith Hills golf course in Buies Creek, NC yielded four bacterial isolates. Isolates were screened for Bifenthrin utilization by testing them on media where Bifenthrin was the only carbon source. The identification process was performed using ribosomal RNA analysis. Bacterial chromosomal DNA was extracted and used with universal primers in PCR to amplify the rRNA gene. PCR products were examined by agarose gel electrophoresis to determine size, and then purified, and sequenced. Sequences were compared to sequences from known microorganisms, revealing at least one isolate is from the genus *Pseudochrobactrum*. Future studies will examine the isolates' ability to degrade pyrethroids and discern their potential future use for bioremediation.

Student Author(s): Kaitlyn Griffith, Junior, Chemistry High Point University

Mentor(s): Keir Fogarty, High Point University

Presentation: Chemistry (B. S.), Oral Presentations #1 (9:30 - 10:30 AM) 1223 MTSB

Construction and Alignment of a Total Internal Reflection Fluorescence Microscope

An instrument was constructed that was capable of achieving total internal reflection fluorescence (TIRF) microscopy. This type of microscopy only allows for fluorophores very near the surface of a coverslip to be seen due to its 100 nm excitation field depth. TIRF excels at observing surface interactions, like interactions that may occur at the cell membrane. The process of constructing the instrument began by coupling an optic fiber with the laser. Then through a series of mirrors and lenses, the beam size and direction was manipulated. Later in the light path the beam met up with a periscope, which is a tool that allows for the beam's height to be adjusted. After being raised to the appropriate height, the laser beam was focused through a lens into the back aperture of a 60x objective. Movable stages were situated in such a way that lenses and mirrors could be moved to alternate between TIRF and laser spectroscopy. TIRF requires the laser beam to enter at the back side-edge of the aperture, while spectroscopy requires the beam to travel straight through the center of the objective. Once TIRF was in place fluorescein and fluorescent nanospheres were used in proof of principal experiments that confirmed the functionality of the laser excitation field.

Having the ability to use both methods of excitation will add to the versatility of the instrument.

Student Author(s): Evan Grimm, Freshman, Chemistry University of North Carolina - Charlotte

Mentor(s): Daniel Rabinovich, University of North Carolina - Charlotte

Presentation: Chemistry (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 49 2nd Floor Mary Townes

New reactivity of caffeine sulfide and selenide

This presentation entails the coordination chemistry of novel chalcogenone derivatives of caffeine. Coordination chemistry of the CaffEMe ligands (E = S, Se) has been performed to prepare several mercury(II), copper(I), and gold(I) complexes, including (CaffEMe)nHgX2 (n = 1, 2; X = Cl, Br, I) and (CaffEMe)MX (M = Cu, Au; X = Cl, Br). More recently, ruthenium complexes (p-cymene)RuCl2(CaffEMe) have been isolated, where the nature of the complexes has been established by a combination of elemental analysis and electrospray ionization mass spectrometry (ESI-MS) even though the thione and selone ligands in these complexes appear to be quite labile. Additionally, this presentation will outline the synthesis and structures of hypervalent dihalogen compounds (CaffEMe)X2 (E = S, X = I; E = Se, X = Br, I) as well as initial attempts to access the first bismuth(III) and tin(IV) derivatives of these thione and selone ligands.

Student Author(s): Corbin Grohol, Senior, Mechanical Engineering University of North Carolina - Charlotte

Mentor(s): Tom Bryan, NASA MSFC

Presentation: Engineering - Mechanical & Aerospace, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 64 2nd Floor Mary Townes

Electrostatic Detainment Unit for Automated Removal of Debris in Orbit

The U.S. Strategic Command is currently tracking over 16,000 objects in Earth orbit. The vast majority is considered orbital debris: pieces of older satellites, abandoned rockets, and other inoperable spacecraft. Frequently, larger debris breaks down into daughter debris, of which 200,000 to 300,000 pieces exist. Orbital debris poses a serious threat to the active satellites functioning in Earth's vicinity. The Electrostatic Detainment Unit for Automated Removal of Debris in Orbit, EDUARDO, is suggested to manage the larger debris. EDUARDO is a multi-jointed mechanism with an electrostatic gripping pad end effector, designed to detain any debris it contacts. EDUARDO's robotic arm assists in the removal of large debris to prevent the creation of daughter debris, and also enables repairs of malfunctioning or inactive satellites. The prototype for this arm has been constructed with a rotating motorized shoulder mount, dual extendable booms, and a rotating motorized joint for mounting the electrostatic gripper. It is built on a thruster-propelled air bearing mobility base designed to simulate motion in near-Earth orbit and succesfully demonstrates the application of electrostatics for the capturing of orbital debris. In future developments, EDUARDO will have the capability to autonomously locate and capture problematic debris or damaged satellites.

Student Author(s): Katharine Gunther, Senior, Art, North Carolina Central University

Mentor(s): Michele Patterson, North Carolina Central University

Presentation: Studio Art, Exhibits (10:45 - 12:00 PM) 1225 MTSB

A Study of Cezanne's Style and Subjects

This ten piece series is a study of Cezanne's style and subjects using Sennelier oil pastel on grey toned paper. The grey ground was chosen to allow warm colors to pull forward. To mimic the effect of layered oil paint using pastels, colors were scraped and layered with a palette knife, and sometimes heated with a hairdryer to create a more fluid application. Color application in these

works mimic Cezanne's style of using patches of color with distinct directions to create depth, texture, movement, and composition.An effort has been made to investigate aspects of style and thought found in Cezanne work but transformed by me. The subject matter of the 10 works covers The Portraits, The Nudes, The Landscapes and The Still Life Works.

Student Author(s): Megan Haase, Freshman, Biomedical Engineering Summer Ventures in Science and Mathmatics

Mentor(s): Lori Tyler, Appalachian State University

Presentation: Public Health, Oral Presentations #3 (1:45 - 2:45 PM) 2226 MTSB

To Screen or Not to Screen: A Comparison of Percentages of Spinal Fusion Surgeries in States with Mandated Scoliosis Screenings in Schools versus Those Without

Scoliosis is the most common spinal deformity and, when left untreated, can lead to organ dysfunction and even death, making early diagnosis crucial to adolescents. Recently, regular scoliosis screenings in schools have been questioned for their accuracy and overall usefulness. The purpose of this study was to determine the effectiveness of school scoliosis screenings to prevent severe progression of the spinal curvature. Spinal fusion surgery was used as an indicator for severe progression of scoliosis. Spinal fusion data, as well as state population data, was collected and utilized to examine the percentages of spinal fusion surgeries in states that have mandated scoliosis screenings compared to those that do not. Results indicated that states with scoliosis screenings in schools have a significantly lower percentage of spinal fusion surgeries. This implies that a lower percent of the population develops severe scoliosis, suggesting that those with scoliosis in screening states have a higher rate of receiving proper prevention treatment.

Student Author(s): Millie Hair, Junior, Biological Sciences North Carolina State University

Mentor(s): Lisa Paciulli, North Carolina State University

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 59 2nd Floor Mary Townes

The effects of males on female responses to novel objects in Coquerel's sifakas (Propithecus coquereli)

Most animal species have male-dominant social systems. One notable exception is the members of the Family Lemuridae. Many female lemurs have priority of access to food resources over males. Vick and Pereira (1989) found that male aggression in the female-dominant ringtail lemurs (*Lemur catta*) was sensitive to the sex-ratio, and that female aggression increased with increasing group size. Coquerel's sifakas (*Propithecus coquereli*) are another female-dominant lemur species, naturally occurring in small family groups of between three and ten individuals. In this study, modeled after Verdolin & Harper (2013), the responses of female Coquerel's sifakas to novel objects when they were isolated, and in a group setting, were examined. It was hypothesized that because females are dominant, they would be more likely to approach objects when others were around. The data did not support the hypothesis. However, females approached both control and novel objects more often than males, and they approached the novel object more often than the control object. In addition, four acts of female aggression towards males were observed. Although this study was limited by confounding variables, a small sample size, and expedited data collection, it still demonstrates that when it comes to responses to objects / priority of access to 'resources,' female Coquerel's sifakas appear to be dominant.

Student Author(s): Nicholas Hall, Senior, Chemistry Appalachian State University

Mentor(s): James Sherman , Appalachian State University

Presentation: Physics (B.A.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 38 2nd Floor Mary Townes

Variability in the Radiative Effects of Aerosols over Boone NC

Aerosols are suspended solid or liquid particles that modify solar radiation directly by scattering and absorbing sunlight, and currently represent a large source of uncertainty in current climate models. The main goals of this study were (1) determine seasonal and inter-annual variability in aerosol direct radiative forcing (DRF) above the NASA and NOAA-supported aerosol monitoring sites at ASU and (2) determine the relative importance of key aerosol properties and surface albedo on DRF at the top of atmosphere (TOA) and at the surface. To accomplish these objectives, daily-averaged values of 3 aerosol properties; aerosol optical depth (AOD), single-scattering albedo (SSA), and scattering asymmetry parameter(g), along with 8-day NASA satellite-measured spectral surface albedo, as inputs to the Santa Barbara Discrete Ordinate Radiative Transfer Code[SBDART] for the period June 2012-March 2016, and binned daily-averaged DRF values by month, and used code to vary one of the inputs to SBDART while holding the others constant to produce sensitivity curves representing the error induced in DRF by that parameter. This analysis produced values indicative of the largest cooling effects stemming from aerosols from April-September, with a significant drop off in the cooling effects in October, most likely due to a decrease in the abundance of biogenic aerosols during this month and throughout the winter. The sensitivity analysis found that the greatest amount of error in the DRF values was induced by the SSA during the summer months [~ (±1.2) and (±1.5) W/m^2 for the TOA and surface respectively], with a significant contribution from errors in AOD [between ~(±0.21) and (±1.15) W/m^2 depending on season]. It can also be seen by the sensitivity analysis results that an increase in SSA makes DRF more negative at the TOA and more positive at the surface, while an increase in AOD causes DRF to decrease throughout the atmosphere

Student Author(s): Erika Harris, Senior, History Salem College

Mentor(s): Daniel Prosterman, Salem College

Presentation: History, Oral Presentations #3 (1:45 - 2:45 PM) 2225 MTSB

Gender and Sex in the Winston-Salem Black Panther Party

Though the primary interests of the Black Panther Party (BPP) were centered around issues of race and class, relations between individual Panthers were affected by strict, often unspoken, expectations of gender and sex. Further, because Winston-Salem is part of a culture that is particular to the Southern United States, members of this city chapter were subject to a unique blend of identities that led to a perception of gender that differed from that of other regions. There is very little scholarship on the Black Panther Party (BPP) that focuses on Southern chapters; of those works, there is practically no scholarship on gender dynamics in the Party. This paper seeks to fill that gap in the historiography by analyzing expectations of gender and sexuality within a chapter that is representative of Black Panther Party in the South: Winston-Salem. The primary source material includes books written by former Panthers, BPP newspaper articles, FBI files on the Party, and oral histories of former Panthers from Winston-Salem and the greater Triad area. Thus far, the research has shown that there is a difference between gender norms in Southern and non-Southern BPP chapters; women appear in more public leadership roles in non-Southern chapters. Upon completion of this paper, I expect to be able to draw the conclusion that though there are expectations set by the national organization, the experiences of members of the Winston-Salem Black Panther Party were unique in part because of the regional identity of the chapter.

Student Author(s): Kelly Harris, Senior, Biological and Agricultural Engineering North Carolina State University

Mentor(s): Steven Frank, North Carolina State University

Presentation: Urban Ecology, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 25 1st Floor Mary Townes

Assessing the ecological benefits of stormwater biocells

Biocells are vegetated drainage systems designed by environmental engineers to attenuate peak stormwater runoff while providing landscaping aesthetics to urban areas. Urbanization has unintended consequences for wildlife, but biocells could serve as important foraging spots for urban birds if they are found to sustain certain arthropod populations. This study aims to determine how design factors, such as plant diversity or complexity and impervious surface cover, and environmental conditions, such as soil moisture, affect the arthropod community composition of biocells. In understanding the arthropod community of biocells we can then examine whether biocells are facilitating ecological interactions between birds and arthropods in an urban environment. Fifteen biocells of various designs across NC State were compared to seven urban forest sites to detect differences in arthropod species, and the fifteen biocells were analyzed for design and environmental factors. Pitfall traps were used to collect ground arthropods, namely of the orders Coleoptera, Isopoda, Orthoptera and Myriapoda. Preliminary bird point counts were also conducted, and more will be done in the Spring. In comparing biocell design factors and arthropods, we found that ant abundance was significantly correlated with percent grass cover and the number of plant species. Isopods appear to be more abundant in biocells than urban forests, which could be beneficial for urban birds. Determining which biocell design elements are most important in promoting arthropod and bird diversity in urban areas could help inform engineers and designers of ways to maximize these spaces for both wildlife habitat and stormwater control.

Student Author(s): Travis Haysley, Senior, Biochemistry East Carolina University

Dalton Chapman, Junior, Biology and Chemistry, East Carolina University

Presentation: Biology (B. S.), Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 53 2nd Floor Mary Townes

Investigating the Role of Antimicrobial Peptides on Biofilm Formation in Streptococcus mutans

Dental caries, or tooth decay, is a biofilm-associated oral disease associated with the increased consumption of sucrose and other fermentable carbohydrates. When these biofilms remain attached to the enamel of teeth, acidogenic bacteria present in the biofilm, or dental plaque, convert available carbohydrates to organic acids, leading to breakdown of the protective enamel and the early stages of tooth decay. To prevent development of dental caries, regular brushing and periodic manual removal of remaining plaque is traditionally recommended. The goal of this research was to determine if targeted disruption of the developing or established biofilm has potential as an alternative and more effective approach. *Streptococcus mutans* is a Gram positivefacultative anaerobe commonly found in the human oral cavity and is one of the primary contributors to plaque formation and tooth decay in humans. *S. mutans* adheres to tooth surfaces where it establishes a biofilm by utilizing sucrose to produce an adhesive dextran polymer. This polymer anchors *S. mutans* to the enamel becoming the matrix of dental plaque, and allowing the acidogenic *S. mutans* to promote degradation of the tooth enamel. To target this biofilm production, and thus, protect the enamel from decay, a number of "unnatural" amino acid constructs were engineered that are predicted to disrupt biofilm stability through charged side chain interactions with the biofilm matrix. One of these antimicrobial peptides, TTO-53, is effective at reducing biofilm production of *S. mutans* when administered prior to culturing of the organism. Currently, we are working to evaluate the effect of TTO-53 on established biofilm and to determine its' specific mode of action.

Student Author(s): Davelle Heath, Senior, Communication North Carolina Central University

Anthony Rodgers-Williams, Junior, Mass Communications, North Carolina Central University

Terri King, Sophomore, Mass Communications, North Carolina Central University

Mentor(s): Candace Parrish, North Carolina Central University

Presentation: Mass Communications, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 55 1st Floor Mary Townes

Status of Public Relations Curriculum at Historically Black Colleges and Universities

Over time, Public Relations curriculum has rapidly evolved to accommodate the ever-changing communication field within the digital landscape. Thus, it has become imperative that universities offering a public relations' major and/or concentration continually update their curriculum to adequately prepare enrolling students for a communication career. There are many challenges colleges and universities may face that can deter the advancement of public relations curriculum such as lack of financial support, faculty and resources. This research is a work-in-progress that proposes to take an in-depth qualitative approach to assessing public relations curriculum at Historically Black Colleges and Universities (HBCU) in particular. This research is the first of its kind to be conducted and will yield very impactful outcomes to help researchers understand current public relations curriculum challenges more in-depth—to potentially advance public relations curriculum at HBCUs' in the future. A list of all HBCUs has been created and the coding process for this qualitative content analysis has begun. The analysis will offer deep and meaningful observation of public relations programs as it will review units of analysis like "Major or Concentration," "Number of Public Relations Courses," and "Department and/or School Program is Under." This research is to be completed by the Spring of 2017 in order to serve as a strategic analysis that will reveal the strongest issues in current public relations curriculum at HBCUs. Upon completion of this research, outcomes will be submitted for publishing in top PR and Communication journals and future research for addressing the current issues in public relations curriculum will begin to be researched.

Student Author(s): Cory Henderson, Senior, Anthropology University of North Carolina - Greensboro

Mentor(s): Charles Egeland, University of North Carolina - Greensboro

Presentation: Sociology and Anthropology, Oral Presentations #4 (3:00 - 4:00 PM) 1233 MTSB

Patterns of hominin landuse and raw material procurement in the paleo-Olduvai Basin, Tanzania

Complex culture is a key aspect of the human adaptation, and the earliest evidence for this profound evolutionary shift is the invention and use of stone tools in the early Pleistocene (roughly between 2.5 and 1.0 million years ago). Much can be gleaned about early human cognition, culture, and landscape use by understanding why particular rock types were chosen for stone tool manufacture. Olduvai Gorge, Tanzania, apart from preserving some of the world's most well-preserved early Pleistocene archaeological sites, is home to a lithologically diverse set of rock outcrops that were used by early humans as sources of raw materials. Here, we use standard engineering tools to quantify variation in the physical characteristics of these rocks. Behaviorally meaningful characteristics such as hardness vary significantly between rock types. These data are combined with rock type frequencies from archaeological sites to understand why early humans used particular rock types while ignoring others.

Student Author(s): Gabrielle Henriksen, Senior, Anthropology Wake Forest University

Mentor(s): Sherri Lawson Clark, Wake Forest University

Presentation: Sociology and Anthropology, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 23 1st Floor Mary Townes

Shifting Contours of the Built Environment: How Events Impact the Movement of People

The built environment is shaped and is shaped by the movement of people. Physical buildings remain constant yet the movement of who deserves certain spaces is in constant shift. This study examines the transformation of a historically poor and working class district in Vienna, Austria into an epicenter for trendy upscale developments spearheaded by economic, political, and social

events. Over the course of eight weeks, I conducted ethnographic observations in four working class districts of Vienna and Copenhagen. I also completed participant observations as a volunteer assisting Syrian refugees at Caritas Vienna and at Vienna's Islamic Center, to better understand the lived experiences of the newly relocated poor. Vienna is home to the largest social housing program in the world. This is due to efforts of the 20th century Red Vienna, a movement dedicated to providing quality affordable housing to all residents of the city. Over a period of 16 years, the government built 23 extravagant public baths and over 60,000 social housing units. These sites are now being subject to development and displacement of recipients. My preliminary findings demonstrate three categories of the spatial movement of people: 1) displacement of the poor; 2) refugee settlements; and 3) gentrification. Places where refugees and homeless are occupying now, are changing into sites of great development with sky towers, upscale parks, and new railway stations. Findings are guided by the Homeplace Model that conceptualizes Red Vienna as an ongoing site of resistance.

Student Author(s): Zakiyah Henry, Sophomore, Biology Winston-Salem State University

Mentor(s): Tennille Presley, Winston-Salem State University

Presentation: Biology (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 66 2nd Floor Mary Townes

Double the Fun: Using Heat Acclimation to Combat Insulin Resistance in Type II Diabetes

Insulin supports cellular absorption of glucose from the bloodstream, resulting in declining blood glucose levels. In the presence of type II diabetes (T2DM), cells are unable to properly uptake glucose as a source of energy due to insulin resistance. Excessive weight gain is also a common factor of T2DM. To combat these detrimental effects, studies have shown that insulin sensitivity and weight loss occur from regular physical activity. Similarly, heat treatment aids in regulating insulin. Thus, we hypothesize that the use of both heat and exercise (heat acclimation) will reduce blood glucose levels, body mass and insulin resistance, while also augmenting insulin production and sensitivity. Using a combinatory approach, we tested the effect of heat acclimation on regulating insulin resistance, weight gain and blood glucose levels in T2DM. For 14 days, Goto Kakizaki (GK, type II diabetic) and Wistar (non-diabetic) rodents performed daily physical activity within a heated chamber. Body mass was measured daily to observe any changes in weight. Blood samples were collected to measure both blood glucose levels and insulin concentrations. Our results reveal that the combination of heat and exercise significantly lowered the blood glucose levels by 43% in comparison to the control (327.5 ± 0.5 mg/dL vs. 187 ± 2.0 mg/dL, $p < 0.05$), just after two days of treatment Insulin sensitivity was estimated by determining the half life at which the blood glucose levels declined, being ~1.4%/hour. Over the treatment period, insulin concentrations improved by 45%, and the body mass declined by 18% in the GK rodent. We conclude that heat and exercise collectively regulate insulin and weight gain in T2DM.

Student Author(s): Rachel Hill, Senior, Economics University of North Carolina - Chapel Hill

Mentor(s): Donna Gilleskie, University of North Carolina - Chapel Hill

Presentation: Economics, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 7 1st Floor Mary Townes

Modeling Dental Care Demand

I use data on all individuals participating in the 1996 through 2012 Medical Expenditure Panel Surveys to understand the demand for preventative dental care. The theoretically-relevant explanatory variables include sources of payment (to proxy for price) and income, as well as other variables that capture health status, education, demographics, risk preferences, and time

constraints. Dental care demand is measured by participation (i.e., consumption of any dental care during a calendar year), annual number and dollar value of preventative care visits, and the amount of time between preventative care visits. I estimate the demand equations separately by age groups:

Student Author(s): Rebekah Hilton, Senior, Biology Campbell University

Mentor(s): William Coker, Campbell University

Presentation: Chemistry (B. S.), Oral Presentations #2 (10:45 - 11:45 AM) 1223 MTSB

Determination of Lead Content in Children's Lip Glosses

Much research has been done in the past decade regarding the study of lead concentrations in everyday materials: house paints, ladies' makeup, and children's toys. A new material was studied in this analysis: children's lip glosses. These lip products are found in toy makeup sets and in children's fashion stores. A sampling of lip glosses from different manufacturers and brands was obtained, and prepared for graphite furnace analysis using heat cycles and acid digestion. The objective was to determine the amount of lead in each sample, and to determine if any particular brand or manufacturer contained a higher concentration of lead than others in the sample pool. The conclusions of this analysis will be discussed at the presentation.

Student Author(s): Audrey Hoffman, Senior, Biology Catawba College

Mentor(s): Jay F. Bolin, Catawba College

Presentation: Biology (B. S.), Oral Presentations #4 (3:00 - 4:00 PM) 1221 MTSB

A Study of Host Selection by the Parasitic Plant Cuscuta gronovii

Parasitic plants are angiosperms that parasitize other plants using a highly modified root called a haustorium. All parasitic plants use this specialized structure to penetrate host cells and take up nutrients and water. A major group of economically important parasitic plants is the genus *Cuscuta* in the morning glory family (Convolvulaceae), also known as dodders. *Cuscuta* species are holoparasitic plants known for causing major crop damage. Notably, *Cuscuta* species in North America have caused large infestations in tomato crops in California. Studies have shown that *Cuscuta* species use volatile cues given off by host plants to locate and select its host. One of the volatiles given off by the tomato plants is d-Limonene. Limonene is a volatile organic compound (VOC) that many chemical household products include due to its desired odor characteristics. The purpose of this study is to determine if VOC interference may inhibit the ability of *Cuscuta gronovii* to find a suitable host. *Cuscuta gronovii* is a common species distributed across much of North America and very common in NC. This study uses tomato plants as the host and commercial products that emit VOCS as a source of VOC interference. For each choice experiment the dodder seed is placed on a petri dish between two choices. Once the seed germinates, the dodder seedlings "stands up", then directs its growth towards the desired choice. The binary choice is recorded 72 hours after the seed has germinated. A plastic container sits over the experiment to partially control ambient VOCs. A preliminary study was conducted giving the *Cuscuta* a choice between a pot of soil and a potted tomato plant. The primary experimental trial be a choice between a potted tomato plant and the control pot of soil, with the experimental chamber containing a source of VOCs from a household product, to determine if the addition VOCs inhibits the ability of the dodder to select the host plant.

Student Author(s): Allison Holland, Junior, International Relations High Point University

Mentor(s): Daniel Hall, High Point University

Presentation: Economics, Oral Presentations #2 (10:45 - 11:45 AM) 2225 MTSB

Green Washing: Rethinking Sustainability and Environmental Myths

This research looks into the environmental and economic consequences that stem from popular myths surrounding sustainability. In recent years, the push for greener products and services has incentivized corporations and politicians to put forth an environmental friendly public image, resulting in a trend of "greenwashing." Greenwashing occurs when organizations attempt to present their products and policies in way that creates the perception of an environmentally responsible image, regardless of the true ecological impact. This appearance of being green gives corporations a monopolistic edge in their respective market, as it appeases the demand for environmentally friendly products. As a result, this detrimental practice perpetuates environmental myths that become widespread among society and result in a false sense of environmental progress. One thoroughly green washed belief is that paper bags are more environmentally friendly than plastic bags because of their natural appearance and biodegradability quality. However, further research into this issue debunks that myth, suggesting that it is time to reexamine the way we think about sustainability. By examining this controversy, one is able to see the importance of exploring the entire process of developing a green product and comparing the trade offs, rather than merely focusing on the final result. In doing this, true sustainability and corporate social responsibility can be attainable.

Student Author(s): Christina Honeycutt, Senior, Special Education High Point University

Mentor(s): Sarah Vess, High Point University

Presentation: Special Education, Oral Presentations #4 (3:00 - 4:00 PM) 2226 MTSB

Intervention Embedded Assessments in a Sample of Struggling Middle School Readers

This project focuses on the effectiveness of assessments embedded in a sample of struggling middle school readers. 60 sixth and seventh graders participated in the current study. All participants received Helping Early Literacy with Practice and Strategies- Small Group (HELPS-SG) as a reading intervention three times a week for a total of 30 sessions. This particular intervention was given because of its use of embedded assessments and the short time that the intervention requires students to be pulled out of their classroom. Data collected from each student were used to calculate a generalization of passage gains number (GPG) and a retention of passage gains number (RPG). These numbers were used to conclude if continuous, minimally invasive assessments were effective in the overall growth of students' reading skills.

Student Author(s): Callie Hood, Senior, Physics- Astrophysics option University of North Carolina - Chapel Hill

Mentor(s): Sheila Kannappan, University of North Carolina - Chapel Hill

Presentation: Physics (B.S.), Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 68 2nd Floor Mary Townes

Detecting and Interpreting Faint Tidal Features Around RESOLVE Galaxies

In the paradigm of modern cosmology, galaxy interactions play a key role in galaxy growth through galaxy-galaxy mergers and cannibalization of smaller neighbors. For decades, numerical simulations have shown how stellar light can trace these merging events through morphological features created by strong tides during the interactions. Thus, a robust search for tidal features in galaxy images can help construct a fossil record of the history of recent galaxy accretion events. We present an initial study of the frequency of faint tidal features around galaxies in the REsolved Spectroscopy of a Local VolumE (RESOLVE) survey. Our sample consists of 476 galaxies of the RESOLVE-B subvolume and 600 galaxies of the RESOLVE-A subvolume, overlapping IAC Stripe 82 Legacy co-adds and the r-band of the Dark Energy Camera Legacy Survey (DECaLS), respectively. Images of each galaxy from these sources were masked, smoothed, and visually inspected for signs of tidal features such as streams or shells. We find that about 1/4 of the galaxies demonstrate this faint substructure with data of this depth and seeing, setting a lower limit on the frequency of such features in this sample. We explore the significance

of tidal features through possible relationships to environment and other galaxy characteristics, particularly parameters related to star formation such as gas content and fractional stellar mass growth rate.

Student Author(s): Michael Hopkins, Junior, Pharmaceutical Science North Carolina Central University

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 47 2nd Floor Mary Townes

Determining how Ubiquitin Signaling Regulates Cell Fate Determination during Human Stem-Cell Differentiation

In this study, we examined the effects of ubiquitin signaling on cell fate determination of human embryonic stem cells (hESC) to neuronal lineages. Specifically we are studying Cullin-RING-Ligase 3 (CUL3) which we know plays a critical role in human development because is frequently mutated in a variety of developmental diseases and mouse knock out of CUL3 is embryonic lethal. CUL3 is a multi-subunit ligase that recognizes substrates through a substrate adaptor protein. Our protein of interest Kelch 8 (KLHL8), a substrate adaptor of CUL3, is upregulated during embryoid body formation and forms an active ligase complex with CUL3. KLHL8 knock down alters the normal hESC neuronal differentiation pathway. To identify important interactors of KLHL8 we performed immunoprecipitation and mass spectrometry assays. These experiments identified TYK2 as a potential interactor of the CUL3-KLHL8 complex. We confirmed interaction of KLHL8 and TYK2 by co-expression in HEK293T cells, and cloned truncation mutations of TYK2 to identify regions important for binding. This study indicates that KLHL8regulates TYK2 and its associated signaling pathways, and may provide insight into the cellular mechanism behind the observed phenotype of KLHL8 knockdown during neuronal stem cell differentiation.

Student Author(s): Julia Horiates, Senior, BS Biology and BA English East Carolina University

Mentor(s): Chris Balakrishnan, East Carolina University

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 51 2nd Floor Mary Townes

Conservation Genetics of the Brook Trout Salvelinus fontinalis

The brook trout of eastern Pennsylvania, *Salvelinus fontinalis,* species has declined dramatically due to environmental stressors such as mining, logging, water withdrawal, and acid deposition. Brook trout are game fish and are valued economically in eastern Pennsylvania. Genetic analyses are required to help determine patterns of genetic diversity and infer patterns of population connectivity. The analyses could be used potentially increase population numbers. Five tri-and tetranucleotide microsatellite DNA markers were analyzed to investigate allelic diversity of the of *Salvenlinus fontinalis*. Microsatellites are repetitive structures within the genome, thus are highly susceptible to mutation and suitable for analyzing patterns of regional population variation. A survey of 16 fin clips from *Salvenlinus fontinalis* of four streams in eastern Pennsylvania were analyzed for each stream population, making it a total of 64 fin clips. Extracted DNA was analyzed using Geneious 6.0 software that estimated PCR product sizes and converted sizes into estimates of the number of microsatellite repeats at each locus. Using the locus estimates, Genepop 4.2 program was used to obtain the fixation index to measure population divergence and possible differentiation. The results showed moderate divergence across all population pairs (average pairwise divergence FST= 0.24) with highly significant differentiation ($P<0.001$).

Student Author(s): Alex Hubbell, Freshman, Film Studies Appalachian State University

Mentor(s): KC Kirsten Clemens, Appalachian State University

Presentation: English (Writing), Oral Presentations #2 (10:45 - 11:45 AM) 2236 MTSB

Rick Blaine: An Introspective Focus

Casablanca, (Michael Curtiz, 1942) is not only a practically sound romantic drama, but also a introspective struggle piece. This introspective focus is concentrated on the most fleshed out character; that of Rick Blaine. He is deceived, manipulated all the while given the full control of Rick's old lover Ilsa (Ingrid Bergman) life. He's given responsibility of something, a choice to be noble, yet all the while he yearns to be in their shoes (that of Ilsa and Laszlo played by Paul Henreid). It's a complex struggle that dresses Rick's mind, body, and heart. The cinematography, pacing, mise en scene and character performances all develop a character piece which illustrates the conflict within Rick; one in which he must keep his best interest and Ilsa's relationship synonymously complementary. My goal in writing this analysis was to better grasp the complex character of Rick, and in hand with this, indulge in the artistic piece that this film is.

Student Author(s): Katelyn Hunt, Senior, Psychology Campbell University

Ashley Thomason, Senior, Psychology , Campbell University

Mentor(s): Jutta Street, Campbell University

Presentation: Psychology, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 72 1st Floor Mary Townes

The Role of Birth Order in Attachment, Attraction, and Jealousy in Romantic Relationships

Psychologists have studied birth order in relation to sibling relationships, family dynamics, and impact on personality, but little research has focused on the influence of birth order in romantic relationships. The purpose of this study was to increase knowledge of this limited researched topic. The three hypotheses explored were would participants be attracted to a significant other of the same birth order ranking, would the middle child have the greatest level of jealousy, and would only children report the greatest level of secure attachment. A sample of 90 undergraduate college students were surveyed using a 26-question composite survey based on the influence of birth order on attraction, jealousy, and attachment in their romantic relationships. Statistical significance was found in attachment style with a p-value of .025. Middle children were found to have an avoidant attachment style and only children were found to have an anxious/ambivalent attachment style with their significant others. Though there was no statistical significance found on the impact of birth order with attraction or jealousy, there was a possible trend between attraction of the oldest child to the oldest child of another family. In contrast to birth order stereotypes, birth order did not have an influence on jealousy in romantic relationships. Birth order does not have an apparent influence on jealousy or attraction, but can impact the type of attachment (avoidant, secure, or anxious/ambivalent) in a romantic relationship.

Student Author(s): Ashley Hurst, Junior, Criminal Justice North Carolina Central University

Mentor(s): Frank Anthony Rodriguez, North Carolina Central University

Presentation: Criminal Justice, Oral Presentations #1 (9:30 - 10:30 AM) 2225 MTSB

New Paradigms in Juvenile Psychopathy

Psychopathy is an important clinical construct that has been studied for more than 200 years and has exploded in recent years as a guiding explanatory concept for a range of antisocial behaviors across a range of populations and subgroups. In this research, psychopathy will be assessed in an attempt to identify an explanation for juvenile delinquency. Juveniles with conduct issues constitute a heterogeneous group, and a large number of the diverse interpersonal and affective elements connected with the infrastructure of psychopathy only apply to a small amount of children displaying antisocial behavior. There is a need in terms of understanding the distinct precursors of the amoral, affectionless, and narcissistic nature that psychopathic youths show towards other individuals. The emphasis is on the ideas of disposition and connection in early youth, and their links to the rise of morality sometime down the road. The information available

now has been examined, highlighting the bits of knowledge picked up from this assemblage of work and laying out the conceptual and methodological difficulties that still need to be acknowledged.

Student Author(s): Tre'Sean Hutchison, Junior, Biology Fayetteville State University

Mentor(s): Subir Nagdas, Fayetteville State University

Presentation: Chemistry (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 21 1st Floor Mary Townes

Identification of Bovine Sperm Acrosomal Matrix Proteins that Interact with a 32 kDa Acrosomal Matrix Protein

Mammalian fertilization is accomplished by the interaction between sperm and egg. Previous studies from this laboratory have identified a stable acrosomal matrix assembly from the bovine sperm acrosome termed the outer acrosomal membrane-matrix complex (OMC). Proteomic identification of the OMC32 polypeptide (32kDa polypeptide isolated from high-pH soluble fraction of OMC) yielded two peptides that matched the NCBI database sequence of acrosin-binding protein. OMC32 may also be complexed to other acrosomal proteins. The present study was undertaken to identify and localize the OMC32 binding polypeptides and to elucidate the potential role of the acrosomal protein complex in sperm function. OMC32 affinity chromatography of a detergent soluble fraction of bovine cauda sperm acrosome followed by mass spectrometry-based identification of bound proteins identified acrosin, lactadherin, SPACA3, and IZUMO1. Co-immunoprecipitation analysis also demonstrated the interaction of OMC32 with acrosin, lactadherin, SPACA3, and IZUMO1. Our immunofluorescence studies revealed the presence ofSPACA3 and lactadherin over the apical segment; whereas, IZUMO1 is localized over the equatorial segment of Triton X-100 permeabilized cauda sperm.associated to the particulate fraction. We propose that the interaction of OMC32 matrix polypeptide with detergent soluble acrosomal proteins regulates the release of hydrolases/other acrosomal protein(s).

Student Author(s): Dina Ibrahim, Senior, Animal Science North Carolina State University

Mentor(s): Anthony Blikslager, North Carolina State University

Presentation: Biology (B. S.), Oral Presentations #4 (3:00 - 4:00 PM) 1008 BRITE

Chloride Channel ClC-2 Regulates Intestinal Epithelial Homeostasis and Tumorigenicity in Colorectal Cancer

Colorectal cancer (CRC) is the third most common cancer in the United States. CRC usually starts out as a polyp or adenoma that transitions into cancer overtime and is characterized by malignant tumors arising from the inner wall of the large intestine. Common symptoms include rectal bleeding, change in bowel habits such as diarrhea or constipation, abdominal pain, weight loss, and fatigue due to anemia. CRC has been associated with tight junction (TJ) permeability. TJs are a part of the apical junctional complex (AJC), which regulates the polarity and proximity of epithelial cells. In addition to TJs, the AJC also contains adherens junctions (AJ). Without AJCs there is an increased propensity for cells to develop neoplastic characteristics. In addition, AJC function is thought to be critical to avoidance of epithelial mesenchymal transition (EMT), during which epithelial cells assume an invasive mesenchymal cell phenotype. We have previously identified a novel protein target for regulating TJs in inflammation-associated intestinal injury called chloride channel protein 2 (ClC-2). By utilizing cell culture and transfection, western blotting, immunofluorescence microscopy, and proliferation, clonogenic, and monolayer wound healing assays, we concluded that ClC-2 deletion induced an increase in the expression and nuclear distribution of claudin-2 and that it resulted in increased proliferation and tumorigenicity.The abscence of ClC-2 also caused disruption of AJs resulting in increased proliferation, tumorigenicity, and EMT-associated metastasis. In addition, lack of ClC-2 reduced TJ proteins promoting colorectal EMT-associated metastasis. Overall, our studies also suggested

the potential clinical use of ClC-2 as a prognostic marker or as target for therapy in patients with CRC.

Student Author(s): Shima Idries, Senior, Biological Sciences: Human Biology Concentration North Carolina State University

Mentor(s): Heather Patisaul, North Carolina State University

Presentation: Biology (B. S.), Oral Presentations #4 (3:00 - 4:00 PM) 1221 MTSB

Diethylstilbestrol, (DES) brain, and behavior: interaction of exposure and strain on behavior

Diethylstilbestrol (DES) is a synthetic nonsteroidal estrogen introduced in the 1940s to prevent premature births and miscarriages. 30 years later, the drug was linked to cervical cancer and reproductive tract anomalies in exposed individuals. Today, the effect of DES on social and complex behaviors is still poorly understood. In this experiment we hypothesized that susceptibility to DES exposure would vary with genetic background, and that behavioral outcomes would be affected by both exposure and genetics. We exposed mice from eight different inbred strains to either DES or a vehicle control at ages 1-5 days. This exposure paradigm has been shown to cause uterine cancer and is the most established mouse model for DES. Mice were videotaped during an open field task for 30 minutes designed to examine their exploratory behavior and anxiety, and a social approach task where they were introduced to an unfamiliar mouse. The median ages of the mice during each task were 7.9 weeks and 9.4 weeks, respectively. We scored their behavior using Topscan software and conducted a preliminary analysis of the data using Sigma Plot 11.0. For open field data, total bouts of body in center and total distance traveled in center were measures of anxiety. A significant effect of strain was found on these endpoints (P

Student Author(s): Meghan Ingold, Senior, Spanish and Homeland Security Campbell University

Mentor(s): Rene Ibarra, Campbell University

Presentation: Spanish, Oral Presentations #3 (1:45 - 2:45 PM) 2236 MTSB

“El Medio Pollito”, or “The Half Little Chicken”

In this thesis, “El Medio Pollito”, or “The Half Little Chicken”, will be examined through the lens of the island of Puerto Rico. Since many have argued that this children’s book actually speaks to a much broader audience, it has gained recognition as a voice of the *puertorriqueños*. Puerto Rico has not been an independent nation since its discovery and has largely been under the control of either Spain or the United States. This has given the Puerto Ricans a very unique sense of nationalism and poses a potential threat to the United States today. The story of “El Medio Pollito” illustrates how the island could react to the United States not granting their independence. The United States has already seen peaceful protests as well as acts of terror as a result of Puerto Rican nationalism. “El Medio Pollito” sends a clear message of warning to the American government about the underestimation of the will and determination of the Puerto Rican people.

Student Author(s): Emilee Isenhour, Senior, Biology Catawba College

Mentor(s): Constance Rogers Lowery, Catawba College

Presentation: Biology (B.A.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 19 1st Floor Mary Townes

Measuring Chlorophyll in Coral

Over the course of the monthly reproductive cycle, color changes in the coral species *Favia fragum*can be observed by the naked eye. We propose that coral loose or gain additional chlorophyll throughout the month as a response to reproduction. By measuring the rate of

photosynthesis over the course of a month, we can determine if there is actually a significant change in the abundance of chlorophyll over the course of the reproductive cycle.
To do the measurements, we used a Fluoracam and the accompanying software to measure the abundance of chlorophyll in a given specimen of coral. After 3 months of data collection, we used Microsoft Excel to detect any trends in the data we collected. By averaging the daily values of 24 coral specimens and looking at each month separately, we are able to detect a trend in the data that corresponds with our visual observations.

Student Author(s): Neveen Issa, Junior, biology, biomedical emphasis University of North Carolina - Pembroke

Mentor(s): Leonard Holmes, University of North Carolina - Pembroke
Sivanadane Mandjiny University of Norh Carolina - Pembroke

Presentation: Biology (B. S.), Oral Presentations #4 (3:00 - 4:00 PM) 2221 MTSB

Elementary Kinetic Analysis of Beef Liver Lactate Dehydrogenase

Lactate Dehydrogenase (LDH) is found in tissues such as blood and muscle. LDH enzyme reduces pyruvate to lactate with oxidation of NADH to NAD^+. In the present research, extraction of LDH enzyme from beef liver and its purification were conducted. After extraction, purification of LDH was performed using dialysis and anion exchange chromatography. Biuret assay was conducted to determine protein concentration of purified samples. The characterization of LDH was performed using enzyme kinetic assays. The enzyme activity was measured to be 1.6 U/mL. The optimum pH for LDH activity was found to be from 6 to 7.3. Michaelis- Menten constants (K_m) for NADH and sodium pyruvate were determined. In results, from Lineweaver- Burk, Eadie-Hofstee and Hanes plots, the K_m for NADH was 2.57 mM, 2.68 mM, and 2.98 mM respectively. Whereas, K_m for sodium pyruvate was 6.15 mM, 6.11 mM and 6.05 mM respectively. The specific activity of purified LDH was measured at 140 Units/mg at a protein concentration of 0.2 mg/mL.

Student Author(s): Aiperi Iusupova, Senior, Biology, Chemistry, Health Sciences Duke University

Mentor(s): Cagla Eroglu, Duke University Medical Center
Sehwon Koh Duke University

Presentation: Biology (B. S.), Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 52 2nd Floor Mary Townes

Does MERTK Modulate Glial Synaptogenic Function?

Synaptic dysfunction and synapse loss are the hallmarks of neurological and neurodegenerative disorders. In central nervous system (CNS), glial cells modulate synapse formation and elimination by secreting synaptogenic proteins and clearing synapses, respectively.
Hence, understanding molecular mechanisms of how glial cells regulate synapses provides insight into potential regenerative approaches for treatment mechanisms. Previous studies have shown that MER receptor tyrosine kinase (MERTK) is highly and specifically expressed in glial cells, and it mediates synapse elimination during development. However, their functions in modulating synapse formation remain poorly understood. This study aims to understand the role of MERTK in glia mediated synapse formation. To do so, we plan to utilize purified rat retinal neurons co-cultured with MERTK knocked-out astrocytes and test if astrocyte-mediated synaptogenesis is affected. In this preliminary study, we have constructed CRISPR-SaCas9 vectors that target rat *Mertk* gene to silence its expression. Genomic mutations induced by the CRISPR-SaCas9 vectors were visualized by T7-endonuclease I assay, and the mutations were further confirmed by sequencing. Later, this construct was used to silence Mertk gene in astrocytes. The results of this study will provide potential molecular mechanisms of how glial cells regulate synapse formation in CNS.

Student Author(s): Jordan Izzo, Senior, Psychology High Point University

Mentor(s): Sadie Leder-Elder, High Point University

Presentation: Psychology, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 49 1st Floor Mary Townes

Self-Conceptualization in Rekindled Relationships: How One's Ideal and Actual Self Perceptions Relate to On-Again/Off-Again Relationships

Rekindling is the process of reuniting with an ex-partner, and it has been shown to be a frequently occurring relationship phenomenon. Previous research has established that more negative feelings and less positive feelings are common in rekindled relationships (Dailey, Pfiester, Jin, Beck, & Clark, 2009). Similarly, problems with communication and perceptions of less love and understanding (Dailey et al., 2009) are found in rekindled unions. Elsewhere it has been shown that partners with low self-esteem report less positive experiences and lower relationship satisfaction (MacGregor, Fitzsimons, & Holmes, 2013). This correlational study aimed to bridge these findings to examine the relationship between an individual's self-concept and whether or not that person will rekindle. Specifically, this study hypothesized that individuals with a positive self-concept will be less likely to engage in rekindling behavior with their ex-partner. Participants consisted of 76 undergraduate students who had experienced a romantic breakup. In this study participants completed two versions of the Feelings of Inadequacy Scale (Janis & Field, 1959). First, participants responded based on their actual self. The second time, participants responded based upon perceptions of their ideal self. Contrary to our predictions, results showed that participants who closely resembled their ideal self were more likely to get back together with an ex-partner than participants who less closely resembled their ideal self ($r = -.25$, $p < .03$). Discussion of results will center on our belief that these findings may be the result of cognitive biases associated with the past partner and relationship.

Student Author(s): Jordan Jackson, Senior, Biochemistry Campbell University

Mentor(s): Taek You, Campbell University

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 8 2nd Floor Mary Townes

Cloning of Promoter Region of Human CHMP3 Gene

Charged multi-vesicular body protein 3 (CHMP3), also known as vps24 in Saccharomyces, is a protein component of the core unit of ESCRT-III. The ESCRT (Endosomal Sorting Complexes Required for Transport) is a protein complex that associates with the endosome membrane and aids in multi-vesicular body formation and protein sorting. Recycling of endosomes internally is called autophagy, and dysfunction of the recycling process is implicated in many cellular diseases, such as cancer, Parkinson's disease, Alzheimer's disease, etc. The CHMP3 gene in humans is shown to be upregulated by p53 tumor suppressor gene activity. In some cancers, EGFR (epidermal growth factor receptor) is overexpressed, and ESCRT complexes form endosomal vesicles for recycling EGFR. In order to define the specific function of CHMP3 in cancer, the promoter region of human CHMP3 gene is cloned and expressed to study the activity of endosomal recycling of cellular components. By up-regulating p53 gene expression, we are going to study expression of CHMP3 protein and subsequent endosomal activities in the cell.

Student Author(s): Kendall Jackson, Senior, Physics North Carolina Central University

Mentor(s): Yongan Tang, North Carolina Central University

Presentation: Physics (B.S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 69 2nd Floor Mary Townes

Surface Plasmon Biosensor Applications

We investigated the application of Surface Plasmon Resonance (SPR) in biosensor with food based materials. The Finite-Difference Time Domain (FDTD) method is applied for simulation the SPR biosensor. The simulations of biosensor include one grating coupled element and one fiber optics element. The grating element has the surface covered in ridges and/or holes for the incident light to propagate through the material into the sample. A fiber optics surface plasmon resonance allows the incident light to propagate within the optical fiber. The designed structures allow the light of certain wavelengths to couple with the surface plasmon resonance into the fiber. These simulations will show how surface plasmon resonance detection due to the wavelength change caused by the reflective indices varying as the surrounding medium (samples). A few samples with different reflective indices are studied in the simulations; These results will help further the development of SPR biosensors on a more commercial level.

Student Author(s): Shavonne Jackson, Junior, Criminal Justice North Carolina Central University

Mentor(s): Frank Anthony Rodriguez, North Carolina Central University

Presentation: Criminal Justice, Oral Presentations #1 (9:30 - 10:30 AM) 2225 MTSB

Young Girls in the Juvenile Justice System

In the US there is limited knowledge when it comes to juvenile females in the juvenile justice system. What is well known is that the rate of young females entering the juvenile justice system has increased in recent decades compared to their male counterparts. Females have similar risk factors as their males counter parts which may be an indicator on how females are introduced to the juvenile justice system. Positive trends in juvenile justice will be assessed in order to recommend that females are the beneficiaries of these positive factors. Females who experience family violence and are commercially sexually exploited will also be explored. Recommendations will be made for the potential to reduce embedded gender bias, particularly bias at the intersection of race and gender.

Student Author(s): Victoria Jackson, Junior, Business Management and Leadership and Accounting (double major) Pfeiffer University

Mentor(s): Marissa Schwalm, Pfeiffer University

Presentation: Women's and Gender Studies, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 26 1st Floor Mary Townes

Fourth Wave Feminism

Modern feminism and all of the different opinions, branches, and divisions that comes with it has become an increasingly controversial and often difficult topic to understand. Continuously in the media and in the public eye is the issue of women's rights as well as what exactly it means to be a feminist within the modern world. Not only is it drastically different from traditional feminism, but it also is continuously changing and adjusting making it that much more difficult to pinpoint what modern feminism is and stands for. In order to fully understand the shifts that have occurred and how the current version of feminism has come to be (or even what it is), this research intends to outline how feminism has developed over time and how the current version of feminism (the 4th wave of feminism) has become increasingly internet-based and diverse in topics, people, and cultures. This new 4th wave of feminism has come to develop many different connotations, including numerous negative ones, as well as many misconceptions. In the end, the research demonstrates how the Internet-based fourth wave of feminism is not successful in unifying people together on the same issues and therefore makes it far more difficult to accomplish the larger feminist issues: achieving equality for all people.

Student Author(s): Deja Jeter, Junior, Criminal Justice North Carolina Central University

Mentor(s): Frank Anthony Rodriguez, North Carolina Central University

Presentation: Criminal Justice, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 44 2nd Floor Mary Townes

Delinquents vs Criminals

In many ways the juvenile justice system is different from the criminal (Adult) justice system. Juveniles can sometimes get tried as adults but that depends on the extent of the crime. Some would say that juveniles get more chances than a criminal. Juveniles have the opportunity for rehabilitation and treatment whereas criminals have rehabilitation and deterrence methods. Juvenile records are kept private because the belief they can be rehabilitated; criminals' records are open to public access in all court proceedings. There are numerous differences between the two and there are methods to where a delinquent can be rerouted in the best way to prevent them from becoming a criminal to society. Juveniles get the chance most criminals do not get in life. Recommendation in keeping adolescents in the juvenile justice system will be suggested.

Student Author(s): Braedon Jewett, Senior, Criminal Justice Greensboro College

Mentor(s): Deirdre. Sommerlad-Rogers, Greensboro College

Presentation: Criminal Justice, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 3 1st Floor Mary Townes

The Disparity of Race In Traffic Stops Made By Greensboro Police Department

Every day, thousands of traffic stops are made in the United States. All citizens should be able to feel confident that they are receiving equal treatment, no matter their race, when they are interacting with law enforcement. Since law enforcement was created in the United States, research has found a great amount of racial disparity among policing practices. One area in need of further investigation is the relationship between the race of a driver and the likelihood of being stopped by a police office. This investigation argues that demographic and geographic information could provide a unique factor to the research. This thesis will examine the relationship between community characteristics, driver's race, traffic stops made and enforcement action taken by Greensboro Police Department officers. Greensboro is a unique location to conduct this research as the population of 282,586 people is 48 percent white and 40 percent black. Comparatively, the US Census estimates that the demographic breakdown in the entire United States is 77% white population and a 14% African American population. Preliminary statistical analysis shows that there is some indication of a discrepancy between traffic stops and community demographic characteristics. Further analysis is in progress.

Student Author(s): Zachary Johannesson, Senior, Biology University of North Carolina - Wilmington

Mentor(s): Kevin Kiser, University of North Carolina - Wilmington

Presentation: Biology (B. S.), Oral Presentations #2 (10:45 - 11:45 AM) 1221 MTSB

Triclosan resistance in Staphylococcus aureus isolated from noses and throats of nursing students

Triclosan is an antimicrobial agent that, up until the recent ban by the FDA, was a common component of antibacterial consumer products, such as soaps and detergents. Triclosan works by inhibiting bacterial fatty-acid synthesis by binding to the bacterial enoyl-acyl carrier protein reductase, encoded by the *fabI* gene. Previous research looking at clinical isolates of *Staphylococcus aureus* indicated that mutations in *fabI* could lead to the development of triclosan resistance. In addition to causing infections, *S. aureus* is carried in the noses of approximately 30% of the population. This is of concern in healthcare settings where 80% of nosocomial infections are caused by nasal carriers. For this research we tested *S. aureus* isolates collected

from the noses and throats of UNCW nursing students for triclosan resistance and looked for *fabI* mutations in those with the highest resistance. *S. aureus* isolates were first screened for susceptibility to triclosan on tryptic soy agar that contained increasing concentrations of triclosan (TSAT). Of the 331 isolates tested, nine were able to grow on TSAT plates with concentrations up to 1 μg/mL. Minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) were determined for each of these isolates with use of a 96-well microdilution test. MICs ranged from 2 μg/mL to 0.25 μg/mL concentrations, whereas all had MBCs of 8 μg/mL. This study reveals that *S. aureus* isolated from carriers can develop triclosan resistance similar to clinical isolates.

Student Author(s): Brennan Johnson, Senior, Chemistry Appalachian State University

Jackson Gordon, Senior, Chemistry, Appalachian State University

Mentor(s): Megen Culpepper, Appalachian State University

Presentation: Chemistry (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 7 1st Floor Mary Townes

Purification and initial characterization, including divalent metal binding studies, on a putative monooxygenase from Hyphomicrobia sulfonivorans.

Dimethylsulfide (DMS) is a volatile organosulfur compound that is readily aerosolized in the atmosphere. Aerosolized DMS decreases the overall solar radiation by increasing cloud albedo, resulting in overall climate cooling. DMS is degraded by bacterial metabolic pathways, including the enzyme DMS monooxygenase. DMS monooxygenase has been purified from Hyphomicrobium sulfonivorans (H. sulfonivorans) and identified as a two component enzyme, in which the monooxygenase of subunit A (DmoA), is coupled with the NADH dependent FMNH2 oxidoreductase subunit B (DmoB) to convert DMS and molecular oxygen into methanethiol, water, and formaldehyde. Recombinant DmoA was expressed by BL21(DE3) E. coli. A purification strategy has been developed comprised of affinity chromatography, followed by size exclusion chromatography. DmoA was determined to be >99% pure after size exclusion chromatography, with a yield of 5.215mg of DmoA per liter of culture. Data from size exclusion chromatography also shows that recombinant DmoA exists as a tetramer with a molecular weight of 212 kDa. Reports have shown that DmoA activity increases in the presence of divalent metals. The metal binding stoichiometry, however, is not known. To investigate further, metal-binding studies were conducted on DmoA using iron and magnesium metals, and analyzed by Inductively Coupled Plasma – Optical Emission Spectroscopy (ICP-OES). Results suggests that DmoA function is dependent upon the binding of iron, with an average binding of 1.09 +/- 0.18 iron atoms per DmoA monomer. Additional binding studies using other divalent metals are being pursed to determine the specificity of DmoA for iron. These will also be measured and quantitated by ICP-OES. These metals include calcium, copper, manganese, cobalt, and zinc. After metal binding stoichiometry has been assessed, enzymatic activity of DmoA by head-space gas chromatography coupled to a flame ionization detector will be pursued.

Student Author(s): Gareth Johnson, Senior, Mathematics North Carolina State University

Mentor(s): Pierre Gremaud, North Carolina State University

Presentation: Mathematics, Oral Presentations #3 (1:45 - 2:45 PM) 1008 BRITE

Resistance of Vascular Trees and Stability to Random Topological Changes

The modeling of blood flow cannot be done at full scale because of the billions of blood vessels in the human body. Smaller computational domains are therefore defined, requiring the use of boundary conditions linking the modeled and un-modeled parts of the vasculature. It is known how to construct such conditions for simple fractal vascular trees. This research project is focused

on the use of more realistic trees and on the effect of topological changes of these tree on their overall resistance. I will discuss the construction process and the method for computing the resistance of each tree.

Student Author(s): Lauren Johnson, Senior, Computer Engineering University of North Carolina - Charlotte

Mentor(s): James Conrad, University of North Carolina - Charlotte

Presentation: Engineering - Electrical & Computer, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 63 2nd Floor Mary Townes

A Comparative Analysis of Trilateration Localization Techniques using RSSI-Distance Estimation

Localization is an important attribute for autonomous robotics during space exploration. Wireless sensor networks can be used for localization of a robot in an extraterrestrial environment. This research assists with the understanding of the capabilities of various wireless technologies and their effectiveness in robot localization through trilateration techniques. A primary goal of this research was to review some of the trilateration localization techniques used in Received Signal Strength Indication (RSSI) distance estimation. RSSI-Distance estimation is useful for robot localization, but due to reflections from multipath effects from wireless signals, localization errors are likely to occur. Therefore research efforts and comparative analysis of software and hardware filtering techniques to be applied with the RSSI-Distance estimation model were conducted. The software technique focused on was using a weighted non-linear least squares fitted trilateration algorithm, while the hardware used XBee ZB radio modules and an omnidirectional antenna.

Student Author(s): Qeashaunda Johnson, Junior, Business Administration Chowan University

Mentor(s): Bryan Herek, Chowan University

Presentation: English (Literature), Oral Presentations #1 (9:30 - 10:30 AM) 1234 MTSB

Rhetoric of the Horrifying

The purpose of my research is to present a record of information gained from reviewing slave narratives. The slave narratives were written in the forms of letters, short stories, and novels. While conducting archival research I focused on less canonical slave narratives. This allowed me the opportunity to expand my knowledge of the rhetorical strategies employed by African Americans in recounting their enslavement. Rhetorical devising can be used to convey meanings, persuade, and/or evoke emotions. With respect to my research, I documented the data using the three appeals: ethos, pathos, and logos. My research took place at the David M. Rubenstein Rare Book Manuscript Library located at Duke University. I discovered thought provoking lessons through the readings. In many of the archival data, the appeals were used in an exceptional manner, in order to engage the reader. I also found that it was more difficult to uncover where the logos method was used compared to the other two appeals. At the conclusion of the research, I further ascertained that slave narratives were exasperating to write. Slaves not only risked the backlash of being educated, but they had to tell real life accounts and prove their credibility as convincingly as possible. An unexpected discovery includes the relationships between (ex) slaves and their (ex) masters/mistresses. Through the written collections not all of the communication in these relationships is depicted negatively.

Student Author(s): Caleb Jones, Senior, Kinesiology Campbell University

Mentor(s): Jennifer Bunn, Campbell University

Presentation: Exercise Science, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 9 1st Floor Mary Townes

The Effect Of A 6-Week Training Program On Heart Rate Acceleration As A Parameter

For Measuring Fitness

The purpose of this study was to investigate heart rate (HR) acceleration as a useful parameter for measuring fitness as an individual becomes more trained. Ten untrained participants completed six weeks of exercise training. Assessments of aerobic and anaerobic performance were performed before and after participation in the 6-week training program. Training included three cardio workouts and two circuit workouts each week. HR was monitored during all exercise sessions, and participants were instructed to stay within individually prescribed HR zones. Before each session, participants completed a 15-minute warmup, consisting of 3 minutes of walking at 3-3.5 mph, 4 minutes jogging below lactate threshold, 4 minutes of jogging at lactate threshold, and 4 minutes of walking at 3-3.5 mph again. A multivariate repeated-measures ANOVA revealed no significant difference in HR response to intensity changes during warm-up over six weeks. Previous cross-sectional studies supporting changes in HR acceleration have compared trained and sedentary individuals. The results of this study did not show a change in HR acceleration despite six weeks of training. Further dissemination of exercise intensity and length of training will be useful to determine a threshold for change in HR acceleration.

Student Author(s): Makaela Jones, Senior, Psychology University of North Carolina - Chapel Hill

Mentor(s): J.D. DeFreese, University of North Carolina - Chapel Hill

Presentation: Psychology, Oral Presentations #4 (3:00 - 4:00 PM) 2226 MTSB

Psychosocial Antecedents of Athlete Burnout in Black Student-athletes

Previous literature on Black student athletes points to their experiences being negatively shaped by racism, discrimination, and racial inequities. For instance, Black student-athletes graduate at lower rates than White student-athletes; however, Black student-athletes also make up over half of athletes participating in high-revenue sports. In addition to negative psychological factors facing this population, they also may be vulnerable to stress and stereotypes pertaining to their student-athlete status. Aims of the study are to determine if the negative impacts of racism and discrimination have an effect on their susceptibility to negative psychological sport outcomes, like athlete burnout. The study will include 100-200 active varsity or club Black student-athletes. Participants will take a survey battery measuring levels of athlete burnout, psychosocial factors (stress and social support), and identity (racial and athletic). It is hypothesized that race-related stress and sport-related stress will be positively associated with each other, as well as dimensions of athlete burnout. Secondly, social support will act as a buffer against the psychosocial stress-burnout relationship. Also, racial and athletic identity will be examined as exploratory variables such that each hypothesis may be moderated by identity. If hypotheses are supported, Black student-athletes may not be receiving the appropriate resources to deal with psychosocial stress and those with high levels of stress may be likely to also leave their sport. This may be especially detrimental to this population given that many are offered a unique opportunity through a college education and their athletic ability. Thus, withdrawal from sport may also have negative implications for life outcomes such as educational attainment and career opportunities.

Student Author(s): Zachary Jones, Junior, Environment & Sustainability Catawba College

Mentor(s): Joseph Poston, Catawba College

Presentation: Environmental Science, Oral Presentations #3 (1:45 - 2:45 PM) 1233 MTSB

Analysis of a feral hog population in Rowan County North Carolina

Feral Hogs are an invasive species that are established in North Carolina. The rate at which these hogs can reproduce is alarming. Recently, feral hogs have been observed at the South Yadkin Wildlife Refuge, managed by the Land Trust for Central North Carolina. My goal is to get an accurate estimate of how many hogs are on this property, learn their movement patterns and to see

if they are pushing other wildlife like whitetail deer and wild turkey off this tract of land. I have several game cameras out in many different locations that I check every week. With so much ground to cover I am limiting camera locations to areas that show obvious hog activity. This project is ongoing and I will be presenting my latest results.

Student Author(s): Brendan Joyce, Junior, Environmental Technology and Management North Carolina State University

Emory Quillian , Senior, Environmental Technology and Management , North Carolina State University

Mentor(s): Elizabeth Nichols, North Carolina State University

Presentation: Environmental Science, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 60 2nd Floor Mary Townes

Fertilizer, Planting Density, and Weed Management methods that optimize Poplar Productivity in Coastal North Carolina

The increasingly popular use of wood pellets as biofuel has created an entire new field of silviculture to meet the biomass demands of the future. The demand for biomass is so high that it is possible that NC will greatly exceed its current forest wood resource in the near future. Quickly growing trees that grow well in marginal soils are necessary to meet this future demand. This study compared the growth rates of cottonwood and hybrid poplar clones at two sites with vastly different soil quality. The soil at Williamsdale NC is an older, highly productive, agricultural soil while the soil in Clinton is marginal at best. Fertilization, weed control, and plating density were also tested against the soil types in the two locations. The three fertilizer treatments compared were 100 diammonium phosphate (DAP), 200 DAP, and no fertilization. (at 2500 and 5000 trees/ha) Two duplicated sections of four different weed treatments were tested at three different planting densities. (.5x1 ft, 1x1 ft, 2x2 ft) The four weed control strategies were chemical suppression (45% glyphosate), chemical obliteration (100% glyphosate), mowing, and no management. The 100 DAP at both sites yielded greater heights for all of the clones. The 100% glyphosate weed control also yielded the greatest heights for the four clones. The stem heights and volumes for year two will be statistically analyzed and reported to reflect the profitability of the various treatments.

Student Author(s): Robbie Juel, Senior, Biology University of North Carolina - Pembroke

Mentor(s): Lisa Kelly, University of North Carolina - Pembroke

Presentation: Biology (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 57 2nd Floor Mary Townes

Defining Plant Communities and the Vascular Flora of Sampson's Landing, Robeson County, North Carolina.

Floristic inventories aid in understanding the plant diversity of ecological communities. We analyzed data from plant inventories (2010 and 2011) of Sampson's Landing in Robeson County, North Carolina, for floristic composition. The Lumber River Conservancy acquired the site to protect the biological resources and water quality of the Lumber River. Our main objectives were to identify dried pressed plants collected from Sampson's Landing and to integrate this information with our existing database: 1) number of taxa present, 2) number of rare and exotic species, and 3) life history characteristics. We also mapped plant communities via GPS coordinates. The analysis revealed 91 families, 197 genera and 265 species (of which 16 were exotic), and 6 plant communities. The most common growth habit identified was forb (127 species). One species named *Macbridea caroliniana* is listed as a federal Species of Concern and state Endangered species. The large variety of plant communities is likely caused by various elevational and soil differences on the site. This study has already aided the Lumber River Conservancy in the identification of species of concern and noxious weeds on the site. The study

will assist in teaching students about the local flora and could aid entities in managing similar sites along the Lumber River.

Student Author(s): Elvis Kahric, Sophomore, Mathematics and Computer Science Methodist University

Mentor(s): Terry House , Methodist University

Presentation: Computer Science (B.S.), Oral Presentations #2 (10:45 - 11:45 AM) 1008 BRITE

Advanced Hotel Management Application

As I come from a country that is still said to be a country in development, therefore, our cities are not so much equipped with modern technology. While I am a freshman student at Methodist University, I started my research on this field in order of gaining more knowledge about basics of programming. During my research, I got in touch with the manager of a local hotel in my city back home, called “Hotel Eki”. The problem and question that has arisen was: “How to improve the management and modernize the system?”. As a solution, I have decided to make the application - *Advanced Hotel Management*. We concluded that for this hotel and for its proper functioning an application like this, will be necessary in future. The application itself is connected with SQL database, which allows multiple entries, readings from database and editing as well as manipulating with information. Whole application is divided on two interfaces; first one is for the employers and for the manager of the hotel, while the other application is for guests. This guest application allows guests to research about the hotel, check their status as a guest, and check the availability as well as to enter the virtual gallery. On the other hand the application for employers has a slightly different GUI (Graphical User Interface). Employers are able to enter their own panel with tools such as payroll, services, check in guests and as well to check the database, but without making any changes. In the end the main role in this application has the manager, which is allowed to access the database as well as keeping it up to date. The application was made based on my own knowledge and it is easy for access for everyone.

Student Author(s): Brandon Kassab, Senior, Music - Performance Western Carolina University

Mentor(s): Christina Reitz, Western Carolina University

Presentation: Music, Oral Presentations #4 (3:00 - 4:00 PM) 2226 MTSB

The History of Germanic Notation and Shostakovich’s Tenth Symphony

The inspiration for this research sparked during the summer of 2015 when I performed with a group called The Cadets Drum and Bugle Corps. At the Cadets, a performing ensemble of Drum Corps International (a semi-professional drum and bugle corps circuit for highly proficient musicians), we performed music from the Tenth Symphony of Dmitri Shostakovich (1906-1975). The majority of the symphony and the entirety of the third movement revolve around a motif, “DSCH”. This motif is German musical nomenclature for “Dmitri Shostakovich” when spelled out in the native tongue (D. Schostakowitsch). After beginning research on the subject, I found that Stalin and the Soviet Union had outlawed such German practices due to the tension between the two countries. Once Stalin died, Shostakovich premiered his Tenth Symphony in 1953, which is focused around Germanic musical nomenclature and celebrated the death of the dictator. The purpose of this research is to look deeper into the history of the art of Germanic musical nomenclature and to apply this knowledge to the analyzation of Shostakovich’s Tenth Symphony. In this research paper, I explore the origins and uses of Germanic musical nomenclature from its adoption during the Baroque era to the mid-1900’s, as well as analyze Shostakovich’s Tenth Symphony for locations where he used musical nomenclature. From there, my research links notation with the idea that the Tenth Symphony is a portrait of Stalin’s reign and that it also reveals more information about the personal life of Shostakovich. Completing the presentation will be musical examples provided by excerpts from Shostakovich's Tenth Symphony.

Student Author(s): Smiti Kaul, Sophomore, Computer Science & Physics Wake Forest University

Mentor(s): Qiong Zhang, Wake Forest University

Presentation: History, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 10 1st Floor Mary Townes

The Potential of Mind-Body Medicine to Address Pain Management in Resource-Poor Regions

Pain relief is a fundamental human right that must not be exclusively reserved for patients in the developed world. Yet in under-equipped regions in the United States and beyond, financial and infrastructural limitations lead to improper analgesia that has serious immediate and long-term consequences on an individual's health. This research project, in an attempt to contribute to a more ethical approach to human care worldwide, connects two thus far largely mutually-insulated discourses in medical literature: one focused on challenges of pain management in resource-scarce regions, the other on mind-body medicine, that is, the mind's immense influence across nearly all measures of wellbeing. The latter, often grounded in ancient systems such as Traditional Chinese Medicine and Ayurveda, has undercut rigid assumptions about mind-body dualism and instead demonstrated how various nonspecific aspects of patient care – the physician-patient relationship, patient expectation, the varying theatrics inherent in different modes of treatment, etc. – along with the powerful placebo effect determine health outcomes. While strengthening conventional biomedical systems globally is important, it is worth our attention to understand how optimal analgesia can too be reached, often more effectively, through mind-body techniques. This project examines mind-body medicine's historical context and contemporary clinical research on its efficacy to understand its implications for the current state of pain management in resource-poor regions. We also examine existing models of mind-body-focused medical care and the importance of community-based traditional health practitioners (THPs). Thus far, this research has found that a medical framework that actively supports mind-body medicine as an alternative or complement to conventional practices is necessary to provide proper, better-distributed analgesic care to patients in economically-marginalized regions.

Student Author(s): Aysha Khan, Senior, Mathematics University of North Carolina - Wilmington

Mentor(s): Yaw Chang, University of North Carolina - Wilmington

Presentation: Mathematical Economics, Oral Presentations #1 (9:30 - 10:30 AM) 1008 BRITE

Signaling Models in Open-Market, Cooperative Settings: an Application of Game Theory to Islamic Finance

In 2010, the International Monetary Fund conducted a study investigating the performance of Islamic banks during the Great Recession. It was concluded that Islamic banks were more resilient than conventional banks. The I.M.F. attributed this phenomenon to the strong risk management methods that ameliorated conventional exploitative, high-risk practices. Islamic finance prohibits *riba* and *gharar*, or "unjust increases" and "exploitative usury", respectively. For over a millennium, scholars have debated which financial practices and instruments can be categorized as *riba* or *gharar*, coming to the conclusion that Islamic finance is characterized by cooperation between all parties involved in a transaction, bound by religious principles that will circumvent exploitative practices, allowing all parties to gain. Dr. Mahmoud El-Gamal utilizes a game theoretical approach, the prisoner's dilemma, to illustrate that both parties in any transaction benefit greater should there be mutual cooperation, as set up by the Trading in Risky Assets Model. El-Gamal proves that trading in risk is "at worst efficiency neutral and at best efficiency enhancing." In this presentation, we present a signaling model that employs cooperative risk and return sharing between competitive open-market entities. We conduct a case study, utilizing this model, on the manufacturing of the 2014 World Cup Brazuca.

Student Author(s): Nadia Kirmani, Sophomore, Biology Duke University

Mentor(s): Ashutosh Chilkoti, Duke University

Presentation: Engineering - Biomedical, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 59 2nd Floor Mary Townes

Genetically Engineered Zwitterionic Peptide Polymers for Drug Delivery

Prognosis and survival rates of cancer patients can be improved by controlling primary tumors at their local sites. However, it is difficult to target primary tumors with high doses of chemotherapeutics because of systemic toxicity. Moreover, traditionally used chemotherapeutics are limited in their efficacy due to their small size and hydrophobicity which lead to rapid clearance and poor bioavailability. One way to address these issues is to design effective drug carriers that can increase the bioavailability of chemotherapeutic drugs, their accumulation at the tumor site, and consequently, their therapeutic potential. The overall aim of this project is to design recombinant zwitterionic polypeptides (ZIPPs) and to characterize their potential as drug carriers to solid tumors. Zwitterionic polypeptides have the consensus sequence VPX_1X_2G, where X_1 and X_2 are a pair of oppositely charged residues. These novel constructs are hydrophilic such that they will create a hydration layer around themselves and sterically shield drug cargo from degradation in vivo, thus prolonging the overall circulation and efficacy of the conjugated therapeutics. ZIPPs are a promising class of biopolymers due to their biodegradability, biocompatibility, and ease of synthesis, as they can be easily expressed and purified in *Escherichia coli* by adding kosmotropic salts to trigger phase transition (a method referred to as Inverse Transition Cycling). A ZIPP mini-library was designed by genetic engineering using Recursive Directional Ligation with all possible ion pairs K, R, D, and E. The constructs VPKEG, VPREG, VPKDG, and VPRDG were then expressed and purified using Inverse Transition Cycling. The pharmacokinetics of these ZIPPs were studied in mice, and the sequence VPKEG was found to have the longest circulation time. Overall, ZIPPs were found to have the potential to increase the bioavailability of therapeutics by more than two-fold compared to a well-studied uncharged elastin like polypeptide.

Student Author(s): Nathan Kirse, Senior, Physics University of North Carolina - Asheville

Mentor(s): Brian Dennison, University of North Carolina - Asheville

Presentation: Physics (B.A.), Oral Presentations #4 (3:00 - 4:00 PM) 2236 MTSB

Multi-Filter Photometry of KOIs

The goal of this research was to detect multiple unconfirmed exoplanets via the transit method. An exoplanet refers any planet that orbits a star other than our own. The transit method utilizes the periodic partial eclipse of the parent star by its planet. If observations are made during the eclipse, a decrease in brightness of the parent star can be observed. Kepler Objects of Interest (KOIs) are potential exoplanets discovered by the Kepler Spacecraft. Once there is sufficient evidence, these objects can become confirmed exoplanets. Confirmed exoplanets discovered by the Kepler Spacecraft are given the Kepler designation, such as Kepler-438b, which is the most Earth-like exoplanet discovered to date. The Sierra Star Observatory, located in a dark region of California, was used to carry out this project. Fifteen different observations were made for ten different KOIs. Multiple CCD filters were used in order to differentiate between a false positive and an actual exoplanet. This research aims to deliver helpful data for professional astronomers working with the Kepler planets. Successfully detecting any of these KOIs will add to the ever-growing list of confirmed exoplanets. At the date of submission of this abstract, additional analysis of transit light-curves will be needed before any conclusions can be drawn.

Student Author(s): Kelly Kosco, Senior, Zoology North Carolina State University

Ashley Le, Sophomore, Zoology, North Carolina State University

Mentor(s): Jennifer Campbell, North Carolina State University

Presentation: Zoology, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 27 1st Floor Mary Townes

Observations of captive western lowland gorilla behavior: Does placement of diet items in enrichment increase its effectiveness?

The purpose of this study was to determine the effects of diet placement in enrichment items on captive western lowland gorilla behavior and to determine possible differences in activity budgets due to age (adult vs. juvenile) and sex (male vs. female). Seven gorillas (three adult females, one adult male, and three juvenile males) were observed at the North Carolina Zoo over a three month period. We obtained a total of 135 hours of scan observations. Observations were divided among three treatments—diet in item, item only, and no enrichment (control). We used five enrichment items—burlap sacks, two types of feeder balls, small gas cans, and plastic, hollow logs—chosen based on staff recommendations. Results were analyzed using fit mixed modeling and fit Y by X modeling. Means were compared using Tukey-Kramer HSD. Juvenile males spent the most time playing, interacting with guests, and manipulating objects, locomoting, and being social compared to adult males and adult females, which did not differ. Females spent the most time foraging compared to juvenile males and adult males. Adult males exhibited the most abnormal behaviors compared to juvenile males and females. Time spent foraging decreased when diet was present in item, but did not differ with item only and no enrichment. Time spent self-grooming increased when diet was present in item, but did not differ with item only and no enrichment. Understanding individual activity budgets in response to commonly used enrichment items will allow programs to be more effective. These findings provide staff details on how effective these items are at eliciting desired species-specific behaviors and provide info on effectiveness of captive gorilla enrichment in general.

Student Author(s): Darby Kozan, Junior, Biology Guilford College

Mentor(s): Melanie Lee-Brown, Guilford College

Presentation: Biology (B. S.), Oral Presentations #4 (3:00 - 4:00 PM) 1221 MTSB

Identification of Gene Expression Within the Interpeduncular Nucleus

The habenulo-interpeduncular (Hb-IPN) pathway is a forebrain to midbrain pathway in all invertebrates from the most primitive fish to humans. This pathway has many diverse functions such as regulating behaviors of fear, anxiety, sleep, hunger, and drug withdrawal. Neurons in the dorsal habenula (dHb) project their axons down to the interpeduncular nucleus (IPN) in a conserved forebrain to midbrain pathway. While there is a lot known about the dorsal habenula, the IPN and its subregions are poorly understood. Transgenic tools were used to visualize the dHb-IPN pathway. The IPN was dissected from adult zebrafish brains and its RNA was isolated for transcriptional profiling. RNA sequencing identified a list of approximately four hundred candidate genes likely enriched in the IPN. The goal of this study was to verify the expression of candidate genes in the IPN by RNA *in situ* hybridization to show sub-compartment localization of these neurons. Additionally, transcripts were identified that localize to discrete subregions of the IPN. All six of the candidate genes analyzed were found to be enriched in the IPN. Transcripts for *chemokine (cxc motif) ligand 14, netrin 1b, and sultafase 1* localized to the dorsal interpeduncular nucleus (dIPN). The *growth differentiation factor 5, copine IVb*, and *milk fat globule-EGF factor 8* protein genes are expressed in the ventral interpeduncular nucleus (vIPN). Mapping of these genes will help to further explore the function of each specific neuronal population, how these regions of neurons within the IPN connect to other parts of the brain, and understanding their roles in regulating behaviors of fear, anxiety, sleep, hunger, and drug withdrawal.

Student Author(s): Georgi Krastev, Senior, Biology St. Andrews University

Mentor(s): Bonnie Draper, St. Andrews Presbyterian College

Presentation: Biology (B. S.), Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 42 2nd Floor Mary Townes

Characterization of Amoeba-parasitized Mycobacteria

Mycobacteria are gram non-specific, aerobic bacilli from soil and freshwater areas. They have characteristic slow growth due to guanine-cytosine-rich genomes and mycolic acid containing membranes. Amoebae are unicellular eukaryotic organisms that phagocytosize mycobacteria. However, some mycobacteria are capable of persistence and replication within the amoebae. The engulfed mycobacteria thus resist antimicrobials and later escape from the host and infect subsequent eukaryotic cells or be degraded by the host's vesicles and expelled as waste. This project aims to address the question: 1) Do multiple encystment events influence persistence or antibiotic sensitivity? Based on our results, we will be better able to understand the sensitivity response amoeba-parasitized mycobacteria have towards antibiotics. Kirby-Bauer tests are currently underway to test the antibiotic sensitivity of mycobacteria before and after amoeba encystment, and after multiple amoeba encystment events. Briefly, amoebae will be introduced to mycobacterial lawns and allowed to begin feeding. The leading edge of amoebae will be sampled to isolate cells containing mycobacteria. Kanamycin will be used to lyse extracellular bacteria but will not enter the eukaryotic amoeba. The sample will then be centrifuged, lysed, separated, and the previously protected intracellular mycobacteria will be characterized. Based on the body of published research, encystment events may allow for genetic exchange between the amoeba and mycobacterium, so multiple encystments events could enhance the bacterium’s intracellular persistence and antibiotic resistance.

Student Author(s): Arvind Krishnamurthy, Senior, Political Science University of North Carolina - Chapel Hill

Mentor(s): Isaac Unah, University of North Carolina - Chapel Hill

Presentation: Liberal Studies, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 64 1st Floor Mary Townes

The Effect of Personally Solicited Campaign Finance on Judicial Legitimacy

Lacking the power of purse and sword, the judiciary does not possess the coercive force afforded to the legislative and executive branches, leaving it dependent upon institutional legitimacy and public trust for effective functioning. However, due to rising campaign finance in increasingly political judicial elections, many have questioned the integrity, independence and legitimacy of elected judicial officials. These questions came to a head in *Williams-Yulee* v. *Florida Bar* (2014), where the Supreme Court ruled that the personal solicitation of campaign finance from a judicial candidate was unconstitutional, determining that the electorate may lack confidence in a judge’s ability to serve impartially due to campaign activity. While this claim seems to have sound theoretical foundations, empirical evidence on how personally solicited campaign finance affects public trust is quite sparse. Through the presentation of experimental vignettes with hypothetical judicial candidate profiles, this study provides the empirical evidence to determine the effects that campaign finance have upon judicial legitimacy. While data collection is ongoing, preliminary results suggest that the net positive effect of the accountability mechanism that elections provide far outweighs the negative effects that personally solicited campaign finance has upon institutional legitimacy. There are no elections without campaign activity and this analysis indicates that while the presence of campaign finance can deplete institutional legitimacy, elections themselves enhance judicial legitimacy, making the inherent tie between the two of consequence for future scholarship and court cases.

Student Author(s): Kshitij Kumar, Senior, Environmental Science, NC Central University

Mentor(s): John Buchweitz, Michigan State University

Margaret Johnson Michigan State University

Andreas Lehner Michigan State University

Presentation: Environmental Science, Oral Presentations #4 (3:00 - 4:00 PM) 1009 BRITE

Development of a Novel Quantitative Technique for SapoSgenins by GC-MS/MS

Saponins are chemical compounds derived from Yucca Schigidegera. This compounds have been utilized as natural product feed additives for the reduction of noxious gases generated by ruminants. The plant driven compound are suspected to accomplish this through defaunation of the rumen. The primary difficulty with using natural products, though, is controlling saponin content and quantity from one lot to the next. Therefore, the objective of this study was to evaluate the utility of gas chromatography tandem mass spectrometry (GC-MS/MS) as an instrumental technique for detecting and quantifying saponins with greater specificity than preexisting spectrophotometric techniques. It is demonstrated that GC-MS/MS provides a reproducible "fingerprint" of saponin extracts, thus serving as an excellent technique for product quality control. Furthermore, with the use of an internal standard, GC-MS/MS also provides superior quantification of the individual and total saponins when compared to the spectrophotometric technique alone.

Student Author(s): Sachit Kumar, Freshman, Biology Appalachian State University

Alexa Langley, Freshman, Biology, Appalachian State University

Mentor(s): Lori Tyler, Appalachian State University

Presentation: Biology (B. S.), Oral Presentations #3 (1:45 - 2:45 PM) 1221 MTSB

The River Continuum Concept as Related to Cataloochee Creek, GSMNP

The River Continuum Concept proposes that a river's physical characteristics change as the water continues downstream, affecting the biodiversity in different stream orders along the river. The aim of this research was to compare the River Continuum Concept to the conditions in Cataloochee Creek, in the Great Smoky Mountains National Park (GSMNP), using water chemistry samples and macroinvertebrate examinations. Samples of water chemistry and biodiversity were taken from three different stream orders (second through fifth order). Probes were used to analyze pH, turbidity, conductivity, chlorides, nitrates, oxygen, and temperature. Kick-seines and visual collections were used to gather macroinvertebrates to measure the biodiversity. Stream discharge, temperature, turbidity, and nitrate levels increased as testing moved downstream. Chloride levels, dissolved oxygen, pH, and conductivity fluctuated slightly across the tests, most likely due to concomitant rainfall. The number of macroinvertebrates collected increased with stream order. Family assemblage diversity increased from second order (n=12) to fourth order (n=22) and decreased from fourth order to fifth order (n=18). NCDWQ macroinvertebrate IBI scores indicated that all sites were ranked as having excellent water quality. As predicted by the concept, percentage of shredders in the assemblage decreased and the percentage of collectors increased downstream. Overall, the data from Cataloochee Creek supports the River Continuum Concept.

Student Author(s): Minnie Lane, Junior, Dance and Creative Writing Elon University

Mentor(s): Renay Aumiller, Elon University

Presentation: English (Writing), Oral Presentations #2 (10:45 - 11:45 AM) 1234 MTSB

Words that Move: The Confluence of Creative Writing and Dance Criticism

This project researches the effectiveness of dance criticism as an embodiment of dance. Dance is abstract and ineffable by nature, presenting a challenge to those who attempt to concretize it. Effective dance critics, according to writer Deborah Jowitt, act as a witness to the reader, writing pieces that embody the movement, rather than present *like* or *dislike*. However, dance criticism in

America is declining in amount and quality, as most leading newspapers no longer employ full-time dance critics. Literary and poetry criticism has maintained its ethicality over the years: commenting, evaluating, and interpreting of the qualities of a literary source and the significance of the work in the context of society. What patterns have emerged in twenty first century dance criticism that has strayed from its literary criticism roots? How has this affected the way audiences view dance, and how can we share this? As a qualitative research study, I will invite a freelance North two Carolinian dance critics to review the same dance performance. I will analyze the differences in the two writings and their emotional impact on the reader. I hope to research how a creative approach to dance criticism may explore a deeper meaning to the choreography.

Student Author(s): Nathaniel Laughner, Sophomore, Biochemistry North Carolina State University

Mentor(s): Colleen Doherty, North Carolina State University

Presentation: Chemistry (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 34 2nd Floor Mary Townes

Using Metabolomics and Transcriptomic Networks to Understand Nutraceutical Metabolite Production

Hop (*Humulus lupulus)* flowers, or cones as they are more commonly known, are biochemical factories producing many phytochemicals including those important for flavoring beer. The production of these specialized metabolites is highly sensitive to the environment, and there is the potential for unique flavors or nutraceutical properties from the hops grown in new environments, such as North Carolina. In order to understand the connection between growth conditions and metabolite production, we are examining the transcriptome of different varieties in response to abiotic and biotic stressors. We are combining Illumina and Pacific Biosciences IsoSeq sequencing techniques to generate an accurate transcriptome. The purpose of using two different sequencing methods is to gain a comprehensive data set. Illumina sequencing techniques will focus on sequencing short segments of RNA with high accuracy. The IsoSeq technique is for sequencing complete segments of RNA with low accuracy. My goal is to identify patterns that connect the transcriptome with metabolomics data. The initial results will provide information that may assist growth of hops in North Carolina, but the long term goal is to understand this fundamental signaling pathways and the intersection with metabolite production in Hops.

Student Author(s): YeBon Lee, Senior, Biochemistry Queens University of Charlotte

Mentor(s): Aaron Socha, Queens University of Charlotte

Presentation: Chemistry (B. S.), Oral Presentations #1 (9:30 - 10:30 AM) 1223 MTSB

Synthesis of Quaternary Ammonium Methyl Carbonate Ionic Liquids from Vanillin and Syringaldehyde

Due to their unique physical and chemical properties, ionic liquids (ILs), organic solvents composed entirely of paired ions, have a variety of applications in renewable energy. Commercially available ionic liquids are largely derived from petroleum and natural gas, and their large- scale production could be made more environmentally friendly by the exploration of renewable feedstock. In this study, the lignin-derived benzaldehydes, vanillin, and syringaldehyde were converted to benzylamines via reductive amination, and subsequently converted to quaternary ammonium methyl carbonates. The latter served as a “platform IL” for the synthesis of task-specific ionic liquids – including ILs that can convert biomass into fermentable sugars. In order to assess the effects of phenol and methoxy substituents on the phenyl ring, the melting points and toxicity of the lignin-derived ILs were compared to trimethylbenzylammonium IL model compounds.

Student Author(s): Abigail Leonard, Senior, Exercise Science North Carolina Wesleyan College

Mentor(s): Shannon Crowley, North Carolina Wesleyan College

Presentation: Exercise Science, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 29 1st Floor Mary Townes

Relationship between physical fitness and stress-related sleep disturbances

Research indicates that clinically relevant sleep disturbances are linked to chronic stress, and that disruptions in the physiological response to stress may underlie this relationship. Physical fitness may be protective against adverse symptoms related to stress, however, to date, there has been limited investigation of the relationship between physical fitness and stress-related sleep disturbances. We aim to investigate the relationship between physical fitness and stress-related disturbances, and the stress-related physiological mechanisms which might underlie this relationship. Following a two-tiered screening process, we are enrolling 30 healthy women (18-45y) who are medication-free at study enrollment and have regular menstrual cycles. Participants complete: (1) enrollment visit, (including mood and sleep assessment and assessment of cardiorespiratory fitness via maximal oxygen consumption during exercise); (2) two-week sleep monitoring period (objective and subjective measures of sleep-wake behavior); and (3) psychosocial stressor protocol for the collection of hemodynamic [blood pressure (SBP, DBP) and heart rate (HR)] stress responses. Psychosocial stress testing sessions occur during the follicular phase of the menstrual cycle to control for hormone fluctuations which can influence the physiological response to stress. Though not significant at this time, preliminary results from this ongoing study (n = 3) show that higher levels of physical fitness are associated with improved sleep quality (r = .98, p = .09), reduced time spent awake during the sleep interval (r = -.83, p = .38), reduced sleep onset latency (r + -.84, p = .36), and a reduced a hemodynamic response to psychosocial stress (SBP: r = -.89, p = .30; DBP: r = -.89, p = .30; HR: r = -.85, p = .35). If confirmed in our larger sample, results suggest that physical fitness may be protective against stress-related sleep disturbances, and this effect may be mediated by positive alterations of the physiological response to psychosocial stress.

Student Author(s): Rachel Lerner, Senior, Psychology University of North Carolina - Chapel Hill

Mentor(s): Cathi Propper, University of North Carolina - Chapel Hill

Presentation: Psychology, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 76 2nd Floor Mary Townes

Links Among Infant Sleep Location, Bed-Sharing Intent, and Parent-Child Relationship Quality

The current study assesses the independent contributions of infant sleep location and bed-sharing intent on infant behavior during the Still-Face Paradigm (SFP), an indicator of parent-child relationship quality. The sample contains 28 African-American mother-infant pairs that were classified through video observation as solitary sleeping (SS; n = 10) or bed-sharing (BS; n = 18). BS dyads were also classified as proactively (intentionally) bed-sharing (PBS; n = 10) or reactively (in response to child factors) bed-sharing (RBS; n = 8). Dyads were naturalistically video-recorded for one night when infants were 3-months old, and at 6-months the SFP was conducted. Infant's positive and negative expressions, gazes towards mother, and self-regulatory behaviors were coded. Results indicated that during the SFP recovery episode, BS infants displayed significantly fewer negative affective expressions (M = .24, SD = .30) than SS infants (M = .65, SD = .34); t(22) = 2.99, p = .007. The remaining results were found during the SFP still-face episode. BS infants exhibited significantly more self-regulatory behaviors (M = .68, SD = .26) than SS infants (M = .46, SD = .25); t(26) = -2.17, p = .04. Additionally, the PBS group displayed significantly more negative affective expressions (M = .45, SD = .43) than the RBS group (M = .13, SD = .14); t(11.44) = -2.18, p = .05. The PBS group also exhibited significantly more gazes towards mother (M = .44, SD = .26) than the RBS group (M = .15, SD = .10); t(12.26)

= -3.18, p = .008. These findings suggest that infant behaviors during the SFP vary based on early nighttime experiences, with bed-sharing, specifically proactive bed-sharing, potentially promoting the parent-child relationship.

Student Author(s): Alexander Li, Junior, Chemistry University of North Carolina - Chapel Hill

Mentor(s): Kevin Weeks, University of North Carolina - Chapel Hill

Presentation: Chemistry (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 15 1st Floor Mary Townes

Visualization of the Tertiary Structure of the RNA Genome within Satellite Tobacco Mosaic Virus (STMV) Using Native Gel Electrophoresis

Satellite tobacco mosaic virus (STMV) serves as a simple and iconic model for broad classes of icosahedral virus; it is composed of a capsid shell made of 60 copies of a single protein and a 1058-nucleotide-(+)-ssRNA genome. We focus on three important frontier questions for the STMV: (1) By what mechanism does STMV assemble and disassemble? (2) What forces stabilize the internal structure of the RNA genome? (3) Can we create a strategy to visualize the RNA genome at a high resolution? The primary objective of this research is to distinguish three different conformations of RNA genomic structure within STMV: the RNA-capsid complex, compact RNA genome, and extended RNA genome. The experimental work has focused on: (1) Visualizing the state of RNA genome under different temperatures when digested with proteinase K; (2) Determining the effectiveness of PMSF in inhibiting proteinase K under different temperatures; (3) Determining if the compact RNA genome can still be unraveled into the extended RNA genome when the temperature is increased; (4) Determining the most effective way to purify the compact RNA genome free of the viral capsid. Native gel electrophoresis using agarose was used to analyze the tertiary sturcture of the RNA genome. STMV was incubated in a physioloical-like buffer (including Mg^{2+}) and treated with either or both proteinase K and PMSF; all reactions were incubated at 0 ºC and 37 ºC for various times. Results suggest that the RNA genome of STMV may have its own autonomous structure of 0 ºC, independent of the capsid shell, because the majority of the RNA genome is still in the compact conformation after long periods of proteinase K digestion.

Student Author(s): Hengxuan Li, Junior, Computer Science North Carolina State University

Mentor(s): Tiffany Barnes, North Carolina State University

Presentation: Computer Science (B.S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 18 1st Floor Mary Townes

Applying machine learning model to predict students' performance by log files

My central research question is how to apply machine learning to predict a student's final grade in a course based on his/her homework performance and statistics. By doing so, instructors can intervene earlier when a student shows symptoms of low overall performance. Previously, researchers have shown success on predicting students' off-task behavior by log files of actions students accomplished on an intelligent tutor. For example, another group uses support vector machine to detect whether a student's learning process is shallow based on learning logs. However, my project aims to build a multi-feature model to predict students' grades that no previous research has adequately fulfilled. In this project, I designed several features from homework log files and used automatic feature selection. Then I applied different machine learning models using 10-fold cross validation. I expect my final model to accurately predict 90% of the course letter grades. I also expect the model to reveal the impact of different features on the final grades. If this model is successful, it will provide useful information that will help instructors monitor student progress and intervene when needed.

Student Author(s): Christopher Lile, Senior, Biology and Psychology Gardner-Webb University

Mentor(s): Joseph Oyugi, Gardner-Webb University

Presentation: Biology (B. S.), Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 46 2nd Floor Mary Townes

Small Mammal Survey of Broad River Greenway and the surrounding area, North Carolina

A small mammal survey was conducted at Broad River Greenway and Gardner-Webb University property from 23 May through 20 July, 2016. Six trapping sites were established, consisting of two shrub lands, two forested areas, and two grasslands. A diamond-shaped, grid system of trapping was used at each study site. The diamond was composed of five transects, each sixty meters long and starting twenty meters after the previous transect ended, with a trap every twenty meters (for a total of 20 traps at each site). Sherman live traps of alternating sizes were used, limiting the survey to terrestrial mammals, and were baited with a mix of commercial rodent food and rolled oats. Traps were set for four nights for a total of 80 trap nights in each site (480 trap-nights for all sites combined). The following species were captured during the survey: Golden Mouse (*Ochrotomys nuttali*); White Footed Mouse (*Peromyscus leucopus*); Hispid Cotton Rat (*Sigmodon hispidus*) and Eastern Gray Squirrel (*Sciurus carolinensis*). Overall trap success was 4.38% with greatest capture recorded in the shrubland (5.63%) and equal but lower captured in the forest and grassland (3.75% respectively). *S.hispidus* were the most abundantly caught at 42.86%, while the *P.leucopus* represented 38.1% of captured specimens, and the *O. nuttali* and *S.carolinensis* represented 14.29% and 4.76% respectively. In terms of habitat preferences, the *P. leucopus* was the only species found in all habitat types. The *O. nuttali* was found in the forest and shrub land sites. The *S. hispidus* were found in the shrub land and grassland sites. It was also interesting to note that *O. nuttalli* was only captured at study sites located in Broad River Greenway and none were found in sites within Gardner-Webb University property.

Student Author(s): Emily Linton, Senior, Biochemistry Campbell University

Mentor(s): Michelle Suhan-Thomas, Campbell University
Jason Ezell Campbell University

Presentation: Biology (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 65 2nd Floor Mary Townes

Taxonomic Characterization of a Novel Kistimonas Species and Detection of Biosurfactant Production Using Multiple Screening Methods

The genus *Kistimonas* is comprised of two species, *Kistimonas asteriae* and *Kistimonas scapharcae,* which were isolated from marine invertebrates in the Korean coastal waters. A proposed third *Kistimonas* species, *Kistimonas allitiae*, has been isolated from *Alitta succinea* and shows resistance to surfactants like cetyltrimethylammonium bromide. DNA hybridization studies were performed on the genomic DNA of the three organisms using a chemiluminescent probe created from *K. allitiae* DNA. Densitometry was used to calculate percent homology. The results confirm the proposed *K. allitiae* is a distinct species, with less than 70% homology to the other species. Biolog PM1 and PM19 phenotypic microassay plates were inoculated with each species to screen for carbon utilization and resistance to antibiotics, surfactants, and other compounds. Each species was shown to have a similar, but unique phenotypic profile. Each species demonstrated the ability to withstand and metabolize tween compounds. Organisms resistant to surfactants are predicted to have to the capacity to produce biosurfactants. Three methods were used to screen for surfactant production: blood agar lysis, drop collapse, and Du Nouy Tensiomat surface tension measurements. *Kistimonas asteriae* shows preliminary biosurfactant production. Future directions involve isolating potential biosurfactants by solvent extraction and characterization using mass spectrometry and biochemical assays.

Student Author(s): Shweta Lodha, Sophomore, Neuroscience Duke University

Mentor(s): Tatijana Abaffy , Duke University

Presentation: Pre-Medicine, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 42 2nd Floor Mary Townes

Towards a Novel Mechanism Through Which an Olfactory Receptor Regulates Prostate Cancer

Prostate cancer is the second leading cause of cancer-related death in men in the United States. Prostate cancer development and progression is associated with neuroendocrine differentiation (NED), a process through which tumorous cells transform into neuroendocrine-like cells. Although recent research supports the role of signaling molecule cAMP in inducing NED, our present knowledge of the mechanism through which this occurs remains sparse. Of potential relevance is Prostate Specific G-protein coupled Receptor (PSGR), an odorant receptor significantly upregulated in prostate cancer. Given that PSGR stimulation increases cellular cAMP, we hypothesized that PSGR stimulation is involved in the NED and subsequent tumorous growth of prostate cancer cells. To determine whether PSGR plays a role in NED, we first validated ligands for this receptor, previously identified by virtual screening, using in vitro luciferase assay. We confirmed 5 ligands, four agonists, and one antagonist. Furthermore, we cultured LNCaP prostate cancer cells under specific conditions, and observed morphological changes and signs of neuroendocrine differentiation. Our future goal is to determine the impact of PSGR ligands on NED. Ultimately, a better understanding of NED and the role of PSGR in this process will allow for better treatment of prostate cancer.

Student Author(s): Mariah Lowry, Junior, Communication Appalachian State University

Mentor(s): KC Kirsten Clemens, Appalachian State University

Presentation: Liberal Studies, Exhibits (10:45 - 12:00 PM) 1225 MTSB

Reflection on Billy Elliot and the Film's Presentation of Societal Constructs

The film *Billy Elliot*, directed by Stephen Daldry in 2000 presents many controversial themes and unrests as the plot unfolds. The audience is introduced to Billy and his struggles at home, in his community, and with his peers. The film does not hesitate to question societal standards and how these standards may create familial divides. In choosing to pursue his passion, Billy also chooses to risk the possibility of being ostracized by his peers and even his family. While one could argue many conflicts are presented internally in the film, the most prominent conflict presented concerns man vs. society. Two specific scenes stand out and serve as excellent examples of deviations from these societal norms, Billy's audition scene and the last scene where Billy performs as the lead dancer in Swan Lake. This conflict in *Billy Elliot* focuses on the consequences and rewards of going against the grain by creating a nonconformist environment for oneself outside of society's expectations.

Student Author(s): Jana Lu, Junior, Biology Duke University

Mentor(s): Eric Spana, Duke University

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 9 1st Floor Mary Townes

Identification of key residues in a human scaffold protein that are phosphorylated by a kinase effector from Legionella pneumophila

The Gram-negative intracellular pathogen *Legionella pneumophila* causes a severe form of pneumonia known as Legionnaires' disease by infecting human alveolar macrophages upon inhalation of contaminated aerosols. *L. pneumophila* uses a Dot/Icm protein secretion system to translocate effector proteins into its host in order to avoid fusion with the host lysosome and replicate in the Legionella-containing vacuole (LCV). Through *in vitro* human protein microarrays, our laboratory discovered that Jpm1, a kinase effector of *L. pneumophila*, phosphorylates human protein C2orf6 (Chromosome 2 open reading frame 6). C2orf6 is a

phosphorylation dependent scaffold protein involved in regulating cell proliferation, differentiation, and apoptosis. Previous studies have shown that four threonine residues of C2orf6 can be post-translational modified via phosphorylation. We hypothesized that Jpm1 might also target these residues. We used the Stratagene QuickchangePCR and crossover PCR to construct plasmids encoding C2orf6 variants with alanine substitutions in individual or all four threonine residues respectively and performed GST-tagged purification to obtain GST-tagged C2orf6 variants from *E. coli*. Protein phosphorylation was tested through a non-radioactive *in vitro* ATPgS kinase assay and detected by immunoblotting. Overall, we concluded that three out of four residues of C2orf6 are phosphorylated by Jpm1. The target residues identified *in vitro* will need to be further validated *in vivo* in human infected cells and the mechanism by which C2orf6 phosphorylation affects downstream signaling in infected cells will need to be determined

Student Author(s): John Lu, Freshman, Chemistry and Mathematics Duke University

Mentor(s): Micah Luftig, Duke University
Nicholas Homa Duke University

Presentation: Chemistry (B. S.), Oral Presentations #4 (3:00 - 4:00 PM) 2221 MTSB

Determining the unique binding sites on RBPJ for EBNA 2, 3, and Notch

Latent infection of B lymphocytes by Epstein-Barr virus (EBV) induces cell proliferation, which is associated with Burkitt lymphoma and several other B cell lymphomas. Latent infection is maintained by viral replication caused by the interaction of four viral proteins, EBNA-2, 3A, 3B, 3C, with host transcription factor RBPJ, a member of the host cellular Notch signaling pathway. These interactions were partially mapped by performing pulldown assays and fluorescence anisotropy using mutated RBPJ. Experiments reveal that EBNA2, EBNA3s, and Notch bind to RBPJ at overlapping and unique sites. Future research can target specific domains that inhibit binding by EBV proteins, but do not block the host cell-signaling pathway.

Student Author(s): Kara Lugli, Junior, Chemistry University of North Carolina - Charlotte

Mentor(s): Daniel Rabinovich, University of North Carolina - Charlotte

Presentation: Chemistry (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 13 1st Floor Mary Townes

Reactivity of dialkylbenzimidazole chalcogenones

The coordination chemistry of benzimidazole thiones and selones bearing alkyl or aryl substituents on both nitrogen atoms is underdeveloped. In this presentation, three relatively rare examples of such compounds, which we abbreviate R2bimE (E = S, R = Me, iPr; E = Se, R = iPr), will be described. The synthesis and reactivity of these ligands will be outlined, as well as their characterization using elemental analysis, Nuclear Magnetic Resonance (NMR) spectroscopy, and X-ray crystallography, among other techniques. The preparation of several series of copper(I), gold(I), and mercury(II) complexes of these benzimidazole derivatives will be explained herein. In addition, hypervalent dihalogen derivatives (R2bimE)X2 (E = S, X = I; E = Se, X = Cl, Br, I) have been isolated and fully characterized. Recent attempts to synthesize bismuth(III) and tin(IV) coordination complexes with these ligands will also be presented.

Student Author(s): Sarina Madhavan, Junior, Program II: "Medicine in the Genomic Era" Duke University

Mentor(s): Charles Gersbach, Duke University

Presentation: Individualized Major Program, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 15 1st Floor Mary Townes

Genome editing using CRISPR-Cpf1 in vitro for a Duchenne Muscular Dystrophy gene therapy

Duchenne Muscular Dystrophy (DMD) is a disorder characterized by progressive muscle degeneration and weakness, affecting 1 in 5,000 boys and caused by frame-disrupting mutations in the dystrophin gene. Genome editing has potential to restore a modified but functional form of dystrophin to slow disease progression by inducing deletions that correct the transcript reading frame. Prior research has established the potential of using the clustered regularly interspaced palindromic repeats (CRISPR)-Cas9 system to successfully correct the reading frame of the dystrophin gene in patient derived cells and in mice. In this study, CRISPR RNAs (crRNAs) for the CRISPR-Cpf1 system were designed and screened. Unlike the Cas9 endonuclease, which makes blunt-end cuts proximal to its recognition site and requires both a crRNA and a tracrRNA, the Cpf1 endonuclease makes staggered-end cuts with 5' overhangs that are distal from its recognition site and requires only a crRNA. This study examined the relative efficacy of two Cpf1-family proteins AsCpf1 (from *Acidaminococcus*) and LbCpf1 (from *Lachnospiraceae*) in making targeted deletions in the dystrophin gene. This study found both effective guides and guide pairs in targeting either splice sites or genetic deletions of whole exons for their removal from the dystrophin mRNA transcript *in vitro*. Correction strategies for highly prevalent DMD patient mutations were targeted. Ongoing work will characterize protein restoration in patient derived cells and efficiency in animal models. This study indicates Cpf1's potential role in editing the dystrophin gene and treating DMD.

Student Author(s): Megan Mahalik, Senior, Information Technology and Graphic Design Campbell University

Mentor(s): Larkin Tysor, Campbell University

Presentation: Studio Art, Exhibits (10:45 - 12:00 PM) 1225 MTSB

The Tiger

This drawing was a growing exercise for me as an artist. When I started work on it, I determined that this would be a very detailed piece on which I spent a great deal of time. The goal was to improve my attention to detail and increase my capacity for patience in creating artwork. As such, I spent a quite a while focused on small details of the drawing; for example, I drew every hair individually, and created the drawing in two layers: graphite and color pencil. The final product is a result of several months of deliberate, careful work that contributed greatly to my overall skill as an artist. My current drawing style would not be what it is were it not for the time I spent on this piece.

Student Author(s): Bryant Maldonado, Senior, Biology, B.Sc. University of North Carolina - Charlotte

Mentor(s): Valery Grdzelishvili, University of North Carolina - Charlotte
Andrew Truman University of North Carolina - Charlotte

Presentation: Biology (B. S.), Oral Presentations #4 (3:00 - 4:00 PM) 1009 BRITE

Effect of molecular chaperones on efficacy of oncolytic vesicular stomatitis virus against pancreatic cancer cells

Oncolytic virus (OV) therapy is a relatively novel anticancer approach using replication-competent, oncoselective viruses. Vesicular stomatitis virus-based recombinant viruses (VSV) are promising OVs, and a phase I clinical trial using VSV against liver cancer is currently in progress. Previously, our laboratory demonstrated that clinically-relevant human pancreatic ductal adenocarcinoma (PDAC) cell lines are highly heterogeneous in their permissiveness to VSV-mediated oncolysis, with some PDAC cell lines showing strong resistance to VSV. Here we wanted to examine whether small molecule inhibitors of heat shock protein 70 (Hsp70) and heat shock protein 90 (Hsp90) could be used to improve efficacy of VSV against PDAC. Molecular chaperones Hsp70 and Hsp90 have been implicated in key steps of neoplastic cell viability due to

their role in protecting the proteome. In addition, these chaperones have been shown as required components in antiviral JAK-STAT signaling, which plays a major role in cellular resistance to VSV. On the other hand, both Hsp70 and Hsp90 were shown to be required for VSV replication. In order to experimentally assess the possibility of modulating heat shock proteins to increase permissiveness of PDAC cells to VSV, two Hsp90 inhibitors, two Hsp70 inhibitors, and one Hsp70 inducer were tested against four PDAC cell lines. This pilot study identified one Hsp90 inhibitor and one Hsp70 inhibitor that strongly modulated cell viability and/or VSV replication in virus-infected PDAC cells. This proof-of-concept study demonstrates the utility of small molecule inhibitors of HSPs as modulators of OV efficacy against pancreatic cancer. Future studies will further explore the possibility of combination therapies based on VSV and HSPs.

Student Author(s): Viridiana Mandujano, Junior, Biology Catawba College

Morgan Elder, Junior, Environmental Science , Catawba College

Karina Noyola- Alonso , Junior, Biology, Catawba College

Mentor(s): Jay F. Bolin, Catawba College

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 60 2nd Floor Mary Townes

Identification of mycorrhizae associated with the aquatic plant Isoetes (Isoeteaceae)

Aquatic plants form a variety of associations with arbuscular mycorrhizae (AM) but are understudied relative to terrestrial plants. The Lycophyte genus *Isoetes* represents an ancient lineage and may provide insight into the evolution of AM associations. Fossil data from Carboniferous era ancestors of lycophytes demonstrate that the co-evolution of lycophytes and AM dates to at least 300 million years before present. Only a handful of *Isoetes* spp. have been evaluated for the presence of AM and no studies have been conducted in the New World. We collected *Isoetes melanopoda* subsp. *sylvatica* and *Isoetes engelmanii* from the central piedmont of North Carolina to determine the presence of AM, and if present to identify the AM species. We used *Glomus* specific AML1 and AML2 PCR primers to amplify AM fungi from whole root DNA extracts. Preliminary data indicate the presence of *Glomus* AM associates in 100% of root samples analyzed (n=6). The next steps of our research include microscopic evaluation of the roots and cloning and sequencing of the purified PCR products.

Student Author(s): Renee Manzini, Senior, Criminal Justice Western Carolina University

Mentor(s): Albert Kopak, Western Carolina University

Presentation: Criminal Justice, Oral Presentations #1 (9:30 - 10:30 AM) 2225 MTSB

Indicators of Program Success and Rearrest among Adult Civil Citation Participants

The Adult Civil Citation program in Florida's Second Judicial Circuit is a pre-arrest direct diversion program used by law enforcement officers to address adults accused of certain first-time misdemeanor offenses. The program affords eligible adults the opportunity to participate in a community-based intervention, allowing those who successfully complete the program to maintain a clean criminal record that shows no arrest has taken place. The intervention program is based on a comprehensive behavioral health assessment which is used to inform case managers in the development of individualized intervention plans. This approach addresses the underlying reasons for the initial offense, which is intended to reduce first-time misdemeanor offenders' likelihood of rearrest. The assessment provides managers with information related to internalizing disorders, externalizing disorders, substance use disorders, and propensity for involvement in future crime or violence. This presentation examines these mental and behavioral health indicators as they relate to successful Adult Civil Citation program completion, as well as post-program recidivism. Results demonstrate the importance of properly considering these mental and behavioral health needs to maximize program benefits and minimize future involvement in the criminal justice system.

Student Author(s): Tierney Marey, Freshman, Cultural Anthropology Duke University

Mentor(s): Katya Wesolowski, Duke University

Presentation: Sociology and Anthropology, Oral Presentations #4 (3:00 - 4:00 PM) 1233 MTSB

I'm Not Sure But...Women's Confidence in the Elite University Setting

The university is a liminal space: college students on these campuses are no longer children but not yet adults. In the university "bubble," with its own codes of conduct and values, students are granted a fair amount of freedom from adult responsibilities while experiencing the stress of high expectations. Elite universities in particular create a hyper-competitive and unhealthy "pressure cooker" atmosphere. While the stress of competition impacts the student body as a whole, several studies have shown that it affects women's confidence more drastically. While women and men enter the university system with comparable achievements and confidence levels, over the course of obtaining their degree women's confidence is likely to decline while men's increases. Why do undergraduate women at elite universities experience this decline in confidence? What factors contribute to this phenomenon and what is its impact? Drawing on participant-observation, academic research and extended interviews with undergraduate women, university faculty and psychosocial providers at elite universities in the United States, England and Australia this research explores the causes and impacts of the "confidence crash." I argue that the disproportionate pressure on women to be effortlessly perfect in a highly competitive environment, sexual climate on campus, emphasis on beauty as a form of social capital and the hesitant and doubtful ways in which women communicate all contribute to the decline in confidence. This confidence crash in turn leads to serious mental health problems, a discord between achievement and potential and the "imposture syndrome". Furthermore, when women lack ownership over their voices and withdraw or limit their engagement in academia, extra-curricular activities or leadership their potential is limited. If half of our university populations are likely to graduate with decreased confidence thus undermining their abilities what does this say about the system of elite education, gender equity and these women's future?

Student Author(s): Yakema Marquez, Freshman, Associates of Science Robeson Community College

Mentor(s): Courtney Kilgore, Robeson Community College

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 13 1st Floor Mary Townes

Restoration of Robeson Community College's

Robeson Community College's "Green Zone" was established during the 2011/2012 academic year through a grant commissioned by the NC BioNetWork. The grant expired during the 2014/2015 academic year and the Green Zone was subsequently abandoned. There are many opportunities for student projects in the Green Zone, such as solar and wind energy, biodiesel, and sustainable agriculture. This project aims to restore the Green Zone into a working laboratory that will offer students hands on experience, research opportunities and workforce development in these areas of sustainability.

Student Author(s): John Martin, Junior, Physics University of North Carolina - Chapel Hill

Mentor(s): Daniel Reichart, University of North Carolina - Chapel Hill

Presentation: Physics (B.S.), Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 66 2nd Floor Mary Townes

Robust Chauvenet Rejection Implementation into Radio Skynet

As telescopes continue to evolve, so do their sources of contamination. When imaging in the

radio, minute and local events such as lightning strikes, passing spark-plug engine cars, radio tracking devices, etc. dramatically alter data sets. Such sensitive equipment demands astronomers to sift through massive data sets to identify sources of contamination. Traditionally, astronomers use standard outlier rejection techniques; however, these methods are inherently contaminated themselves. Most rejection techniques base their algorithms off of calculated means and standard deviations which include the outlier data points they are trying to reject. This results in rejections of only the most extreme outliers, often leaving data sets contaminated and images blurred. Our research focuses on the development and incorporation of an outlier removal algorithm called Robust Chauvenet Rejection (RCR) into Radio Skynet, UNC's robotic telescope network. This rejection algorithm hosts six rejection techniques that preemptively search and remove outliers within a data set without using a biased mean or standard deviation. We have developed a mapping software capable of applying RCR to radio data sets, such that we can produce essentially contamination free radio images from data sets that were once deemed upward of 85 percent contaminated.

Student Author(s): Jesus Martinez, Junior, Computer Science Appalachian State University

Grayson Fenwick, Senior, Computer Science, Appalachian State University

Mentor(s): Rahman Tashakkori, Appalachian State University

Presentation: Computer Science (B.S.), Oral Presentations #1 (9:30 - 10:30 AM) 1009 BRITE

Using LittleBits for Problem Solving and Programming

LittleBits are a platform of "electronic building blocks" that are easy to use to facilitate problem solving and creativity. In their native format, LittleBits are excellent for helping K-12 students design and create projects of their own. However, by using the Arduino Microcontroller Module and a programming language such as C++ with the LittleBits, we can create programming projects ranging in difficulty levels from introductory to complex. The programs are only limited by the memory on the Arduino. Through the Research Experience for Teachers (RET) program at Appalachian State University, we presented various LittleBbit course modules to high school teachers. These course modules covered multiple subjects that the teachers would address in their classrooms. Beyond the Arduino, LittleBits also contain a vast array of possible bits, all of which are compatible with each other. LittleBits also contains prototype bits that allow for a great deal of customization using outside electronics. This allows for increasingly complex projects to be attempted, without being intimidated by lack of technical knowledge. This presentation discusses some of the modules that were created and illustrates how they can be used to teach problem solving and programming.

Student Author(s): Katherine Matchunis, Senior, Physics and Astronomy Appalachian State University

Mentor(s): Rachel Smith, Appalachian State University

Presentation: Physics (B.S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 1 1st Floor Mary Townes

Analysis of [12C18O]/[12C17O] Abundance Ratios of Young Stellar Objects in the Local Solar Neighborhood

Young stellar objects (YSOs) are important analogs for understanding the early conditions during the formation of the solar system ~ 4.56 billion years ago. High-resolution absorption spectra from large ground-based telescopes, such as from the Cryogenic Infrared Echelle Spectrograph (CRIRES) instrument (R~95,000) on the Very Large Telescope, enable meaningful comparisons between YSOs and solar system materials (i.e., meteorites and the Sun). Carbon monoxide (CO) is particularly revealing in such investigations due to its relatively large abundance, and as a key reservoir for the protoplanetary elements, carbon and oxygen. This project addresses whether the 18O/17O abundance ratio found for the solar system (5.2 +/- 0.2) is consistently higher than for

solar-type YSOs (thus far, mostly ~ 4 and lower), implying that supernovae from other generations of stars could have influenced the oxygen isotopic composition of the early solar nebula. Using fundamental (4-micron) rovibrational spectra from the CRIRES archive (courtesy of K. Pontoppidan) and our customized IDL codes, we identified 12C18O and 12C17O spectral lines, and calculated precise abundances of these isotopologues from which 18O/17O abundance ratios were derived. Of the 100 spectra reviewed, only seven targets revealed significant CO in absorption: T Tau (a binary pair) and TMC-1A in the Taurus molecular cloud, HH 100 and T-CrA in Corona Australis, RY Lup in Lupus, and LLN 8 in Vela, all within 1 kpc of the Sun. From the cold and warm gas (derived gas temperatures ranged from ~ 20 to 870 Kelvin) surrounding the YSOs, 18O/17O ratios ranged from 0.51+/-0.13 to 4.3+/-0.21, significantly lower than that of the solar system. These results enhance the current catalog of published CRIRES data, strengthening the conclusion that the solar system is statistically anomalous in oxygen isotopes, and thus may have formed under unusual conditions as compared to local solar-type YSOs today.

Student Author(s): Melissa Mayfield, Senior, Psychology and Sociology University of North Carolina - Greensboro

Mentor(s): Susan Keane, University of North Carolina - Greensboro

Presentation: Psychology, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 58 1st Floor Mary Townes

The Effects of Impulsivity and Neighborhood Safety on Risky Behavior

Effortful control, which refers to the ability to inhibit a dominant response to perform a subdominant response, has been linked to future risk taking behavior. Effortful control is typically measured using measures of inhibition or impulsivity. Existing work has shown few studies to link signs of effortful control, such as impulsivity, in middle childhood to adolescent risky behavior. The current study tested impulsivity in middle childhood as a predictor of risky behavior in adolescence. Neighborhood safety was also examined as a protective factor for adolescent risky behavior. Participants included 249 children from a longitudinal study of emotional and social development. Impulsivity at age 10 was measured using mother-report on the Behavior Assessment System for Children. Risky behavior was assessed using self-report at age 15 on impulsive (e.g. dangerous dare; stolen something) and substance use (e.g. smoked cigarettes; drunk alcohol) items from the “Things I Do” scale on the Risky Behavior Protocol. Neighborhood safety was measured using mother-report on the Neighborhood Safety subscale of the Neighborhood Location and Structural Characteristics at age 15. Regression analyses yielded a main effect of impulsivity predicting risky behaviors (? = .194, $p < .01$) and neighborhood safety (? = -.128, $p < .05$). However, these main effects were not qualified by a significant interaction. These findings provide additional support for childhood impulsivity as a risk factor for adolescent risk taking behaviors. Additionally, neighborhood safety was concurrently and negatively associated with adolescent risky behaviors, such that adolescents who lived in unsafe neighborhoods were more likely to engage in risky behaviors. Future work examining potential mechanisms explaining these relations as well as other risk and protective factors of risky behavior is warranted.

Student Author(s): Nicholas Mazzoleni, Junior, Mechanical Engineering North Carolina State University

Mentor(s): Matthew Bryant, North Carolina State University

Presentation: Engineering - Mechanical & Aerospace, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 62 2nd Floor Mary Townes

Fabrication and Testing of Multifunctional Compliant Solar-Wind Hybrid Energy Harvesting Structures

In 2014, the Intelligent Structures and Systems Research Lab (iSSRL) at NC State, under the

direction of Dr. Matthew Bryant, received funding from the North Carolina Space Grant Consortium (NCSG) to develop a flexible solar ribbon that flutters in the wind when put under tension, harvesting this energy through piezoelectric transducers. The motivation behind developing such a technology is that on a planet like Mars, dust storms often block sunlight from reaching the planet, rendering all solar-powered devices ineffective. However, there is an abundance of wind power during these storms, so developing a device that can capture this power would greatly expand the utility of using solar panels for power generation on the surface of Mars. This project, completed during the summer of 2016 and also funded by NCSG, investigated some of the different parameters that affect the flutter behavior of these tension ribbons, including the Young's modulus and shear modulus of the material, the amount of tension in the ribbon, and the aspect ratio of the ribbon. Wind tunnel tests were conducted on three different ribbon samples at tension values between 0.5 N and 3.0 N, and amplitude and frequency data were collected for wind speeds ranging from 0 m/s to 11.5 m/s using a National Instruments Labview VI and a Polytec laser vibrometer. From the data collected, amplitude vs. wind speed and frequency vs. wind speed plots for different tension values were generated in MATLAB. From these plots, the cut-in wind speed (the wind speed at which flutter starts to occur), the cut-in frequency, and the maximum amplitude were determined. These experiments have aided in the development of an analytical model of these ribbons and have also provided insight into the sensitivity of the experimental results to slight changes in key parameters of the system.

Student Author(s): Joel McAuliffe, Senior, Geography, Planning, and Environment East Carolina University

Mentor(s): Rosana Ferreira, East Carolina University

Presentation: Environmental Science, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 32 1st Floor Mary Townes

The Effect of the Gulf Stream on Precipitation Rates in the Southeast United States Atlantic Region

The Gulf Stream is a warm ocean current, originating in the Gulf of Mexico and travels around Florida and follows the outline of the Eastern coast of the United States. Due to the Gulf Stream, maximum sea surface temperatures (SSTs) are about 50 miles off the coast where the stream is located and cooler temperatures closer to the coast. These temperatures impact total precipitation rates for the Atlantic region for rainfall off land is associated with local evaporation. A rain-shadow signature was identified off the coast of Georgia with significantly lower amounts of total precipitation than the surrounding area. The environmental characteristics required to develop this signature are unknown. The research process initially required a timeframe of 10 days which the rain-shadow was present. Afterwards, a WRF-ARW model simulation was ran during those dates with the exact SSTs and labeled as the control. Furthermore, more models were programmed without the temperature gradient. These models with altered SSTs were analyzed then compared to the control to determine the actual impact of the Gulf Stream. This research will provide information regarding the relationship between the temperature gradient and the formation of the rain-shadow.

Student Author(s): Kaela McCoy, Senior, Graphic Design/Studio Art Campbell University

Mentor(s): Larkin Tysor, Campbell University

Presentation: Studio Art, Exhibits (10:45 - 12:00 PM) 1225 MTSB

Rose

Created in August 2015, this painting is the product of my first experimentation with oil paint. I began with a loose, acrylic underpainting and layered the oil on top. The dark background serves to create stark contrast in value, enhancing the warm, rich colors of the subject. In addition to

strengthening light source, the triad of water droplets serve to emphasize the calm, still, peaceful nature of the painting, while keeping viewers' eyes continuously moving throughout the piece. This piece is 16X20 inches.

Student Author(s): Ashley McGhee, Senior, History University of North Carolina - Asheville

Mentor(s): Tracey Rizzo, University of North Carolina - Asheville

Presentation: History, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 12 1st Floor Mary Townes

The Wilderness Act of 1964: The Rise and Fall of Wilderness in Western North Carolina

In the early 20th century a burgeoning awareness regarding the intrinsic value of America's last remaining wilderness areas began to take shape, and by 1964 the landmark legislation of The Wilderness Act was signed into law. In Western North Carolina it provided for the formation of six wilderness areas. However, the passage of the Wilderness Act also encouraged heavy opposition, both locally and regionally in Western North Carolina. Only in the last few decades has scholarship begun to emerge regarding the significant impact the Wilderness Act had on the people, the economy, and the land of Western North Carolina. This thesis paper draws on an analysis of newspaper articles, legislation, primary and secondary source works to argue that the future of wilderness areas in Western North Carolina remains precarious due to the continued varied interpretations of the Wilderness Act, the "commons" mentality of viewing these wilderness areas as semi-public places for local utilization, the shifting political climate in North Carolina in the 1970's, the continued extractive culture still practiced by many in Western North Carolina, and the resistance to having these wilderness areas adjoin private lands.

Student Author(s): Madeleine McKenzie, Senior, Interior Design Appalachian State University

Mentor(s): Hessam Ghamari, Appalachian State University

Presentation: Interior Design, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 70 1st Floor Mary Townes

Visual Environmental Attributes/ Elements of Wayfinding in Unfamiliar Healthcare Environments

Wayfinding is the ability to learn and remember a route through the environment and be able to relocate from one place to another in a large scale space. Research shows that insufficient wayfinding in healthcare facilities leads to frustration, irritation, anxiety, and stress. A crucial component of wayfinding is the involvement of complex cognitive functions that deal with attributes pertaining to all senses of a human being. Vision is the most important sense contributing to successful wayfinding and represents 80 percent of human perception. This study extends the findings of a previous study examining eye-fixation on environmental attributes in unfamiliar settings and identifies elements that attracts eye fixation during wayfinding. EyeGuide® - Mobile Tracking Technology was used to capture data on gaze-fixation as subjects navigated through a complex unfamiliar healthcare setting. The study was conducted at Watauga Medical Center in Boone, NC. Sixty subjects in different age groups (young, middle age, and elderly) and different genders were asked to navigate different routes. Each navigation began with instructions for the participant about the intended destination point from their point of origin and continued sequentially after each destination was reached. Each subject was asked to navigate to five total destinations. The findings of this study would also be beneficial for designers and administrators in healthcare and aging facilities.

Student Author(s): Minnie McMillian, Senior, Psychology East Carolina University

Mentor(s): Lori Curtindale , East Carolina University

Presentation: Psychology, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 41 1st Floor Mary Townes

The Presence and Perception of Technology: Does Mobile Device Use Enhance Students' Reading Comprehension?

The purpose of this research is to see if mobile devices enhance students' reading comprehension. The improvement of literacy, more specifically reading, is important because findings show that poor reading performance in early grades are determinant of negative outcomes later in school such as lower grades and dropping out of school. Mobile devices can provide children with different levels of engaging academic applications and games that promote creativity and learning. Therefore, this project will focus on the influence of technology primarily on third grade students' ability to read and answer comprehensive questions. Prior to the experiment, the children will complete a background information questionnaire about their current use of electronic devices. Next, students will be given either an Apple iPad or the traditional paper method to read a story and answer questions. Following the task, students will be asked to self-report on their workload experience. For this project, the data collected from the students' answers and their workload experiences may suggest mobile devices could help retain more knowledge on comprehensive reading tasks. In addition, children may report lower mental demand on the workload scale with the use of a mobile devices than on the traditional paper method.

Student Author(s): Tatianaide Medina Nieto, Junior, Psychology Wake Forest University

Mentor(s): Susan Fahrbach, Wake Forest University

Presentation: Biology (B. S.), Oral Presentations #1 (9:30 - 10:30 AM) 2221 MTSB

The effect of queen pheromone exposure on the growth of the worker honey bee brain

Queen mandibular pheromone (QMP) is a pheromone produced by the queen honey bee that suppresses ovary development in worker honey bees. When exposed to QMP, the ovaries of worker honey bees are not only suppressed, but they can also produce ecdysteroids. The amount of ecdysteroids produced is influenced by the age of exposure to QMP. Ecdysteroids are steroid hormones responsible for development and reproduction in insects. During the metamorphosis of the honey bee, ecdysteroids promote neuronal growth. In this study, we focused on a central region of the insect brain critical for learning and memory called the mushroom bodies to ask if QMP, ecdysteroids, or a combination of both signals shape the adult brain. We used a competitive enzyme immunoassay to determine ecdysteroid levels in caged honey bees exposed to QMP and/or injected with ecdysone. We then used an antibody to a presynaptic protein to assay changes in the synaptic structure in the brain. Studies are ongoing, but we predict honey bees injected with ecdysone and responders to QMP will have high ecdysteroid levels and an increase in synaptic connections.

Student Author(s): Carmen Mesa, Junior, Biology Guilford College

Evan Poag, Junior, Chemistry, Guilford College

Mentor(s): Christine Stracey, Guilford College

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 7 1st Floor Mary Townes

Eastern Bluebird Nest Sanitation

Nestling songbirds produce membrane-bound feces that help with nest sanitation. For some songbirds species, parents consume the fecal sacs when nestlings are young and then transport them away from the nest as the nestlings mature. This behavior has prompted multiple hypotheses to explain why this behavior towards fecal sacs occurs. In a cross-disciplinary project at Guilford College, we hypothesized that birds stop ingesting the fecal sacs because the microbial community of the fecal sac changes as the nestlings age and becomes harmful to the parents. This summer,

our research team continued fecal sac research with an aim to increase our sample size. Along with recording parent-nestling interactions from nestling age zero to twelve, we also gathered fecal sac samples for microbial characterization. As our research team makes observations by going through each video, the parent Eastern Bluebirds are displaying similar behaviors as they did last summer, specifically in the transitioning from nestling fecal sac consumption to transportation outside of the nest. This study will build off last year's research and continue to investigate if the parental nest sanitation behaviors are mediated by the microbial community within the fecal sacs.

Student Author(s): Mathilde Meyenberg, Senior, Chemistry and Biology Warren Wilson College

Mentor(s): Stephen Cartier, Warren Wilson College

Presentation: Chemistry (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 21 1st Floor Mary Townes

SNP assay of the Gb-Rbp-1 gene in G. pallida populations across the UK and the relation to pathogenicity and pathotype

Every year U.K. potato farmers suffer a combined ecomonic loss of 26 million British pounds due to potato cyst nematode infection by the two potato cyst nematode (PCN) species present in Europe, *Globodera rostochiensis* and *Globodera pallida*. In recent years new potato cultivars, partially resistant to *G. rostichiensis*, have been developed, which increased the selective pressure on the more aggressive of the two species, *G. pallida*. While much research is directed toward the development of new PCN pesticides, no genetic markers, specifically relating to the virulence of *G. pallida*, are known that could be used as molecular targets for pesticides. This project evaluated the pathogenicity (virulence) of several *G. pallida* populations found across the U.K. with respect to 6 common crop potato varieties and sought genetic markers related to the pathogenicity of *G. pallida* in the feeding site initiation gene Gb-Rbp-1. Employing a single nucleotide polymorphism (SNP) PCR assay and obtaining the nucleotide ratios at several SNP sites through Pyro mark sequencing, each tested population was described with a SNP profile for Gb-Rbp-1 and grouped into one of three pathotypes as defined by the cytochrome b gene. The correlation analysis between pathogenicity and pathotype of a population, and the SNP profile of the Gb-Rbp-1 gene within a given population showed that the virulence of a given population cannot be traced to the genetic profile in the Gb-Rbp-1 gene.

Student Author(s): Samuel Migirditch, Senior, Physics and Mathematics Appalachian State University

Mentor(s): Brooke Hester, Appalachian State University

Presentation: Physics (B.S.), Oral Presentations #1 (9:30 - 10:30 AM) 1008 BRITE

Computational Models of Metallic Nanoshell Particles for Enhanced Trapping with Optical Tweezers

Optical tweezers are a powerful tool for many disciplines from biology to molecular physics, allowing for precise control and measurements of particles on the nanometer to micrometer scale though the use of focused light. The effective use of optical tweezers relies on a sufficiently high trap stiffness, typically reached by increasing laser power until stable trapping occurs. However, when performing measurements on biological samples, excessive heating must be avoided, requiring trap stiffness to be increased by means other than increased trapping laser power. Because the diameter of the particles used here is comparable to the wavelengths used for trapping, both Rayleigh scattering and geometric optical models fail, requiring the use of Lorenz-Mie scattering theory. We utilize a computational toolbox to model an optically trapped metallic nanoshell particle and to study the dependence of trap stiffness on laser wavelength and particle geometry combinations. Additionally, the effects of using more complex beam geometries, such

as circularly polarized light and radially polarized light, are examined.

Student Author(s): Sarah Miller, Junior, Chemistry University of North Carolina - Chapel Hill

Mentor(s): Keriayn Smith, University of North Carolina - Chapel Hill
Terry Magnuson University of North Carolina - Chapel Hill

Presentation: Animal Genetics, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 1 1st Floor Mary Townes

lincRNA Cyrano's Role in the Maintenance of Embryonic Stem Cell Pluripotency

Long noncoding RNAs, lncRNAs, are known to be influential in gene expression and disease progression, but the mechanisms and functions of most have not been determined. Contributing to a majority of the transcriptome, lncRNAs have been a focus of scientific research in recent years. *Cyrano,* a long intergenic noncoding RNA (lincRNA) first identified in zebrafish, was found to be crucial to normal embryonic development. Known orthologs to *Cyrano* exist in mice and humans. *OIP5-AS1*, the human ortholog of *Cyrano*, is a 15.5 kbp lincRNA on chromosome 15. *OIP5-AS1* has been previously associated with the reduction of cell proliferation in HeLa cells and is most highly expressed in the cerebellar hemisphere of the brain. We will describe investigations into the role *Cyrano* plays in embryonic stem cells as it relates to the maintenance of pluripotency. We will discuss qRT-PCR analysis of *Cyrano* expression during the pluripotent stage of ESCs and during differentiation. We will also use qRT-PCR to determine expression of *Cyrano* in R1 ESCs cultured in 2i media, which generally leads to homogeneous archetypal pluripotent ESC morphology, and expression of *Cyrano* in R1 ESCs cultured in media with serum, which leads to more heterogeneous morphology. We will also examine colony morphology after a knockdown of *Cyrano* in 2i media. The above experiments may suggest *Cyrano's* role in the maintenance of pluripotency of ESCs.

Student Author(s): Eni Minerali, Senior, Biochemistry University of North Carolina - Greensboro

Mentor(s): Kimberly Petersen, University of North Carolina - Greensboro

Presentation: Chemistry (B. S.), Oral Presentations #2 (10:45 - 11:45 AM) 1223 MTSB

Asymmetric Synthesis of Enantioenriched Cyclic Compounds

The project focuses on the synthesis of biologically important compounds that contain the lactam/lactone motif and are highly enantioenriched. A synthetic technique known as desymmetrization was used, and complex cyclic compounds were prepared. The desymmetrization of prochiral diesters with a chiral phosphoric acid catalyst to produce highly enantioneriched lactams/lactones is also described.

Student Author(s): Melyssa Minto, Senior, Biology and Mathematics Meredith College

Mentor(s): Bronwyn Williams, Prairie Ridge Ecostation

Presentation: Biology (B. S.), Oral Presentations #3 (1:45 - 2:45 PM) 1221 MTSB

Cray Cray Morphometrics

Crayfishes are considered one of the most imperiled groups of organisms in the U.S. Effective conservation of these organisms is predicated on reliable identification of species. Crayfishes typically are distinguished using a suite of morphological characters, both quantitative and qualitative, assumed to be consistent within, but variable among species. A substantial challenge faced in crayfish taxonomy is that confident identification is often based on adult reproductive form males, the presence of which is highly dependent on time of year. Further, increasing evidence suggests that several key taxonomic characters may vary with environment. Our primary

objective is to extend and automate a morphometric technique, i.e., landmark analysis, previously used to examine morphological variation in crayfishes. Instead of landmark analysis, Haar cascades will be trained on a Beowulf cluster to detect features of the crayfish automatically. This will aid in reliable identification of crayfish species regardless of sex age and reproductive stage and which characters vary across space and environment irrespective of taxonomic group.

Student Author(s): Lloyd Mitchell, Senior, Psychology Fayetteville State University

Mentor(s): Daniel Montoya, Fayetteville State University

Presentation: Human Relations, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 13 1st Floor Mary Townes

Robots and Human Interaction Involving Relaxation

This research project will use the advancement of robotic technology to replicate human movements by using yoga relaxation techniques. The software Choreograph will be used to program an Aldebaran Nao robot to perform an instructional yoga video, mimicking human instructor's movements. The robot will be programmed to perform a series of relaxation techniques involving hand, neck, and leg movements. The video will be compared to actual human yoga instructional video. The purpose of this technical development is to show the possibility of programming the robotic agent to mimic human behavior and the possibility that they may influence human behavior in a healthy way.

Student Author(s): Robert Monroe, Senior, Biochemistry North Carolina State University

Mentor(s): Jose Ascencio-Ibanez, North Carolina State University

Presentation: Chemistry (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 28 1st Floor Mary Townes

Purification and Structure Identification of the Replication Enhancer Protein in Cabbage Leaf Curl Virus

Cabbage leaf curl virus (CaLCuV) is a bipartite geminivirus that contributes to crop losses in many areas of the world. CaLCuV's REn is a protein that enhances the infectivity and symptom expression of the virus in plants as well as contributes to an increase in viral DNA accumulation. Our objective is to purify, sequence, and determine the structure of this protein. In order to do this, we transformed a plasmid containing the DNA for our target protein with a his-tag into *E. Coli*. Then, using affinity chromatography with a nickel slurry, will purify the protein for further analysis using Nuclear Magnetic Resonance. Results have shown that our method of purification does purify REn out of the target solution. Further research is being done to continue the process of studying the structure of this protein.

Student Author(s): Evan Montpellier, Senior, Geography Appalachian State University

Mentor(s): Peter Soule, Appalachian State University

Presentation: Environmental Science, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 40 1st Floor Mary Townes

Understanding spatial parameters for study sites in tree-ring science: divergent growth rates of alpine larch trees in response to microenvironmental variability.

In tree-ring science, a study site typically consists of a minimum of 30 trees from which two core samples per tree are obtained. While there are no rules governing the spatial extent of a given site, there are many studies that contain trees sampled over horizontal distances that extend several kilometers. In this study we explore radial growth rates and climatic responses of alpine larch trees (*Larix lyallii* Parl; LALY) growing in high elevations of the Rocky Mountains of Montana. Specifically, we examine responses between two stands of LALY that are separated by less than one kilometer horizontally and growing at similar elevations, but with different slope and aspect.

Following the coldest year in the instrumental climate record (1993), the trees growing on the north-facing study site (BAK) began to grow at significantly ($p < 0.01$) faster rates than trees growing on the south-facing study site (TPL). We posit that changes in the primary driver of radial growth, maximum summer temperatures, are preferentially benefitting the trees growing on the north-facing site by extending the growing season. We conclude that caution should be used when selecting the geographic range for a tree-ring study site.

Student Author(s): Desiree Moore, Junior, Biology Fayetteville State University

Mentor(s): Erin White, Fayetteville State University

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 54 2nd Floor Mary Townes

Canine Appendicular Osteosarcoma Treatment Comparison

Canine appendicular osteosarcoma is the most common malignant bone cancer in dogs. It is extremely aggressive, occurring in more than 8,000 dogs and claims the lives of thousands of dogs every year in the United States. Large and giant breed dogs are at a higher risk of developing the disease over their lifetime than small and medium breed dogs. There are currently several widely accepted treatments for canine appendicular osteosarcoma, but most dogs diagnosed with the disease die within a year of being diagnosed. Through a literature review of thirty journals, the five most common treatments for canine appendicular osteosarcoma were analyzed: amputation, cortical bone allograft implantation, bone transport osteogenesis, radiation therapy, and chemotherapy. Based on cost, tumor reoccurrence, and longevity, amputation combined with chemotherapy proved to be the most effective treatment.

Student Author(s): Julian Morgan, Senior, Computational Biology Duke University

Mentor(s): Brad Bebout, NASA Ames

Presentation: Computer Science (B.S.), Oral Presentations #1 (9:30 - 10:30 AM) 1009 BRITE

Metabolic transfer in an algal-bacterial consortium proposed for spaceflight experiments

NASA develops technologies to fulfill basic human requirements for human exploration missions. Microalgae are especially promising in life support systems because they can be cultivated in extreme environments, have high photosynthetic efficiency, and require less resources and space than higher plants. Co-culturing algae (models for higher plants) with plant growth-promoting bacteria (PGPB) increases plant growth rate, enhances stress tolerance and reduces dependence on fertilizers. The effects of the space environment on the association of PGPB and plants are completely unknown.

We are investigating the interaction between a green alga (*Chlorella sorokiniana*) and a PGPB (*Azospirillum brasilense*) to quantify metabolic transfer between these organisms and to develop a spaceflight experiment. We hypothesize that an association with the PGPB will enhance the survival and growth of algae under extreme conditions in space. As *A. brasilense* is a known nitrogen fixer, we are focusing on aspects of the transfer of nitrogen between these two organisms. The activity and synthesis of nitrogenase is known to be inhibited by the presence of oxygen, nitrate and ammonium; *A. brasilense* itself, however, requires oxygen for respiration. Determining the exact microaerophilic values at which dinitrogen fixation is optimal is very important, particularly in an association with oxygen-producing microalgae.

Student Author(s): William Morgan, Sophomore, History, Politics and International Affairs Wake Forest University

Mentor(s): John Oksanish, Wake Forest University

Presentation: History, Oral Presentations #1 (9:30 - 10:30 AM) 1233 MTSB

Quod Mirabilius Est: Reconsidering Cicero's De Re Publica

This paper contextualizes and analyzes a fragment of Cicero's *De re publica*, Book Three. It addresses problems with the text, its traditional translation, placement by editors, and sets limits for further inquiry. This fragment, which seems to address the rewards due virtue, may be of some value to important discussions of government, justice, and ideal humanity. Cicero is an integral reason why such things became important during his time and were preserved to this day.

Student Author(s): Brianna Morris, Senior, Biology Elizabeth City State University

Mentor(s): Julie Sterling, Vanderbilt University

Presentation: Biology (B. S.), Oral Presentations #3 (1:45 - 2:45 PM) 2235 MTSB

Targeting Gli2 in Tumor-Induced Bone Disease

Cancer progression not only involves tumor growth at the primary site but can also lead to the spread of tumor cells to other organs. In late stage solid cancers such as breast, prostate, renal, and lung patients are more likely to be diagnosed with tumor-induced bone disease (TIBD) which involves the establishment of tumor cells in bone as well as the consequent destruction of bone tissue. Cancers that originate in bone like osteosarcoma and chondrosarcoma also cause bone destruction. There is no cure for TIBD and patients continue to suffer from severe pain and bone fractures. Tumor expression of the Hedgehog family transcription factor Gli2 and its gene target parathyroid hormone related protein (PTHrP) promotes TIBD. We hypothesized that tumors residing in bone upregulate Gli2 and PTHrP and that inhibiting Gli2 will reduce tumor growth. First, we isolated cells from patient tumor samples that were surgically removed from sites of bone. By stimulating these tumor cells with transforming growth factor beta (TGF-β), an abundant protein found in bone, we will determine Gli2 and PTHrP mRNA and protein expression levels by quantitative real-time polymerase chain reaction (qPCR) and western blot respectively. Additionally, we will treat these cells with the Gli-antagonist GANT58 and evaluate growth and viability via trypan-blue staining. We believe that inhibition of Gli2 will reduce TGF-β-dependent expression of PTHrP in patient tumor cells as well as significantly reduce tumor growth in vitro. In summary, Gli inhibition may be a promising strategy for targeting TIBD.

Student Author(s): Courtney Morrison, Junior, Film Studies Appalachian State University

Mentor(s): KC Kirsten Clemens, Appalachian State University

Presentation: English (Writing), Oral Presentations #2 (10:45 - 11:45 AM) 2236 MTSB

Ever Absent: The Mystery and Suspense in Alfred Hitchcock's Rebecca (1940)

In a 1970's interview with the American Film Institute Master Seminar, Alfred Hitchcock explained, in his own words, the difference between mystery and suspense. He argues that suspense is an emotional response whereas mystery evokes no emotional response and is, therefore, "a waste of time." He states: "There's a huge confusion between the words 'mystery' and 'suspense' and the two things are absolutely miles apart." However, it is important to note that while in the mind of Hitchcock mystery and suspense may not be synonymous, that mystery can be used to induce suspense in the viewer and, subsequently, gain an emotional response. Not only is this possible, but Hitchcock himself uses this device in his films; it can be seen in *Rebecca (1940).* The film centers on a poor girl (Joan Fontaine) who serves as a professional companion to the upper class before marrying a rich widower, Maxim de Winder (Laurence Olivier), only to be vexed by the shadow of his late wife's existence. While throughout the film it is apparently evident what caused the untimely death of Rebecca de Winter, there is an incessant air of "mystery" surrounding her and her demise. This notion is only reinforced by the physical absence of the woman herself. While the film generally falls within the suspense genre, it would be unjust to dismiss any claims that it is also a mystery, for without the undeniably mysterious aspects it would not largely unnerve the audience as it does.

Student Author(s): Madison Morrow, Senior, Psychology and Criminology North Carolina State University

Caroline Gainey, Sophomore, Psychology and Communication, North Carolina State University

Mentor(s): Laura Widman, North Carolina State University

Presentation: Psychology, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 72 2nd Floor Mary Townes

Analysis of quantitative and qualitative data on the acceptability of a web-based HIV/STI prevention program for adolescent girls

Sexually transmitted infections (STIs), including HIV, are a significant problem for adolescents – particularly in the south. To address this problem, a new web-program for adolescent girls was created called Project HEART (Health Education and Relationship Training). This is an interactive program designed to improve sexual communication skills and to reduce the risk of HIV/STIs among adolescent girls. The purpose of the current study was to assess the acceptability of Project HEART among a diverse sample of adolescent girls and to explore if program acceptability varied by participant demographics.

We evaluated the acceptability of Project HEART in a sample of 107 high school girls (*M* age=15.2; 38% Caucasian, 29% Hispanic, 24% African-American). To measure the extent of program usefulness we combined three acceptability items on 1) how much girls liked the program; 2) how much girls learn from the program; and 3) how much girls felt the program kept their attention. We also asked several open-ended questions about how we could improve the program.

We found 94% of participants found the program "somewhat" or "a lot" useful. Neither participants' race or their sexual activity status significantly affected usefulness scores ($p>.05$). However, there was a marginal effect between sexual orientation and usefulness, with heterosexual participants ($M=2.65$, $SD=0.41$) finding the program slightly more useful than sexual minority participants ($M=2.50$, $SD=0.41$). Our qualitative data revealed participants wanted increased sexual health content, as well as activities and resources beyond the program's website. Although most girls found the program to be useful, many found that it was hard to answer some the questions because they either were not interested in boys or had never been in a relationship before. In future versions, the program should be more LGBTQ+ inclusive and should have a list of tailored resources for participants based on their location and needs.

Student Author(s): Jordan Mullins, Junior, Athletic Training Campbell University

Mentor(s): Sarah Christie, Campbell University

Presentation: Exercise Science, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 4 1st Floor Mary Townes

Failed Accessory Navicular Resection in Female Collegiate Soccer Player

Background: Twenty-two year old female collegiate soccer player was struck on the left foot by an opposing player's cleat. She had immediate onset of medial left foot pain but completed the game. The following morning the examination revealed that she was point tender along the navicular and unable to bare full weight on her left lower extremity. Subject was immobilized in a walking boot, non-weight baring on crutches, and referred to an orthopedic physician. Radiographs revealed a navicular fracture that was later determined to be an accessory navicular via the MRI. The subject was treated conservatively for three months. Symptoms did not abate; the orthopedist recommended a modified Kidner procedure to resect the navicular bone. The procedure was completed and the athlete underwent rehabilitation and was ultimately cleared for full activity. During a practice she reported recurrent signs and symptoms as her initial injury but

the examination by the athletic trainer was inconclusive. An MRI which was inconclusive due to tissue damage incurred by the first surgery. Conservative treatment was deemed the best approach; the subject was casted for eight weeks. Treatment: The cast was removed and the subject continued to experience pain. She was re-evaluation and it was determined that exploratory surgery was necessary. Exploratory surgery revealed a partial rupture at the insertion of the posterior tibialis tendon. Her tendon was reattached to the navicular bone by a Modified Kidner procedure. Uniqueness: Usually the injury responds well to conservative management. However, this case it is distinctive that conservative treatment did not relieve her symptoms and surgical intervention was necessary. Conclusion: Although there is no evidence that the initial injury led to a secondary posterior tibialis tendon injury, this is one potential outcome of which healthcare professionals should be aware.

Student Author(s): Andrew Murdock II, Senior, Biology/Science Education East Carolina University

Mentor(s): Eric Anderson, East Carolina University

Presentation: Biology (B. S.), Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 45 2nd Floor Mary Townes

Comparison of Strawberry DNA Isolation Techniques for Potential Use in the Polymerase Chain Reaction to Enhance Learning in Secondary Education

Comparison of Strawberry DNA Isolation Techniques for Potential Use in the Polymerase Chain Reaction to Enhance Learning in Secondary Education

Andrew J. Murdock II and Eric S. Anderson. East Carolina University Department of Biology.

With DNA technology on the rise, there is a potential disconnect between high school students' understanding of technology and the technology in practice. In order to provide a more complete understanding of DNA techniques two common procedures; gel electrophoresis, and DNA extraction will be combined with the Polymerase Chain Reaction (PCR). Through the investigation of DNA extraction protocols familiar to educators, a suitable protocol will be found to PCR amplify the DNA of Strawberries. Current teachers perform strawberry DNA isolations which are designed to help visualize massive amounts of the nucleic acid. Teachers will also purchase DNA samples to be run in gel electrophoresis; this provides students with little background as to where the DNA came from compared to what they are looking at. By taking several of these isolation techniques and analyzing them for yield of DNA and quality, an understanding of this crude extraction can be obtained. From there the extraction process can be adapted for PCR. The PCR program can also be optimized for higher yields from potentially dirty chromosomal DNA. All of this combined will allow students to work with the same DNA that they start with, thus providing the students with the cognitive link needed for in depth understanding of DNA. Once this procedure is fully realized, further studies can be done to measure if student understanding is improved by using PCR to link these two standard techniques.

Student Author(s): Brandon Murphy, Senior, Biology Fayetteville State University

Mentor(s): Carmen Herrera, University of Georgia Athens

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 65 2nd Floor Mary Townes

Identification of Genes Involved in Vancomycin Resistance in Acinetobacter baumannii 5075

Acinetobacter baumannii is an opportunistic gram-negative bacterium that is primarily found in the hospitals and intensive care units. Recently, public health concerns have increased, especially by government and health care facilities, regarding the life-threatening infections caused by this

pathogen. Colistin (polymyxin E) is an example of the cationic antimicrobial peptides (CAMPs) used in the health care communities as a last resort to treat A. baumannii infections. Most gram-negative bacteria have two membranes. The outer membrane (OM) provides additional protection from the surrounding environment and promotes resistance to key components of the innate immune response and to antibiotics. The OM typically contains lipopolysaccharides (LPS) composed by O-antigen, core oligosaccharides (OS) and lipid A. A. baumannii synthesizes lipooligosaccharides (LOS), which includes only lipid A and OS. A. baumannii has the ability to become highly resistant to CAMPs due to lacking of its main component of the outer membrane, the LOS, which has a concomitant decreased resistance to the antibiotic vancomycin. Some studies reported a synergistic effect between colistin and vancomycin on A. baumannii multi resistant strains. Due to A. baumannii's complex response to polymyxin and how polymyxin resistance is related to cell envelope structure, we wanted to identify what genes are responsible for vancomycin resistance. For this purpose, we screened the AB5075 ordered transposon library to select mutants with increased susceptibility to vancomycin (32 μg/ml) grown in Luria broth. We have identified over 20 genes that are involved in vancomycin resistance. This project allows us a better understanding of how A. baumannii compensates the absence of LOS and adapting its resistance to other antimicrobial agents.

Student Author(s): Prince Neequaye, Senior, Biology North Carolina Central University

Mentor(s): Wendy Heck-Grillo, North Carolina Central University

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 6 1st Floor Mary Townes

Effect of Sorafenib With Or Without Carboplatin Treatment in Triple Negative Breast Cancer.

Triple-negative breast cancer (TNBC) is aggressive, with a high risk of visceral metastasis and death. TNBC is a subtype with poor prognosis, and treatment options are limited. The objectives were to evaluate the response of T11 cells, a murine line of TNBC, to the standard of care carboplatin treatment with or without sorafenib, a tyrosine kinase inhibitor. TNBC standard of care treatment in combination with small molecule inhibition may slow growth and prolong the subject's life in comparison to standard of care alone. We conducted a four-arm study with cohorts of 5 animals (vehicle, carboplatin, sorafenib, sorafenib plus carboplatin) in BALB/cJ mice that were xenografted with T11 murine cells line (claudin low subtype of breast cancer). We administered intraperitoneal injections of 50mg/kg carboplatin once weekly with sorafenib 30mg/kg daily by oral gavage. The vehicle was DMSO The response rate of carboplatin and sorafenib offered significant improvement in overall survival compared to the vehicle. The regiment was well tolerated and consistent with other reports of response for chemotherapy and targeted therapy in TNBC. Treatment of TNBC with single-agent sorafenib and platinum-based therapies are more common for subsequent lines of therapy. Despite the ongoing development of novel targeted therapies, chemotherapy remains the mainstay of treatment for TNBC. Our findings show that the sorafenib and carboplatin treated tumors were the most responsive compared to the vehicle. There was no significant difference between the treatment with sorafenib and carboplatin as single-agents when compared to sorafenib plus carboplatin.

Student Author(s): Taylor Nguyen, Junior, Anthropology, Science, Technology, and Society North Carolina State University

Mentor(s): Lisa Paciulli, North Carolina State University

Presentation: Biology (B.A.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 27 1st Floor Mary Townes

A Preliminary Comparison of Morphological Features of the Extinct Giant Aye-Aye (Daubentonia robusta) and Extant Aye-Aye (Daubentonia madagascariensis).

The aye-aye (Daubentonia) is a monotypic genus belonging to the Primate suborder, Prosimii. There is one extant species, D. madagascariensis, in Madagascar, and it is known for its distinct anatomic structure. Aye-ayes have large ever-growing incisors and an elongated tapping finger, which allows for unique foraging behavior. Subfossils dating to less than ~1,000 years ago of a giant version of the present day aye-aye were found in arid environments in the south and southwest regions of Madagascar (Simons 1994). They were brought back to the Institut de Paléontologie in Paris, and were identified as belonging to the species, D. robusta (Simons 1994). In this study, a comparison of the anatomy of the extinct and extant aye-ayes was undertaken. Digital calipers were used on digital micro–computed tomography (micro-CT) scans of the subfossil bones to take measurements such as proximal-distal length and anterior-posterior width of the limb bones. Results were compared to measurements of the extinct aye-aye taken from the literature. The size, robusticity, and inferred locomotor patterns of the two species were compared. Despite having longer limbs, D. robusta was ~1.2 times more robust than D. madagascariensis. Due to this robusticity, the extinct aye-aye most likely moved slowly and was primarily terrestrial, compared to the extant form, whose lighter and more gracile limbs allow for more rapid locomotion and arboreality. Future research should include a comparison of the diets of the two Daubentonia species to see what differences exist that contribute to their size differences.

Student Author(s): Tiffany Nguyen, Senior, Pharmaceutical Sciences North Carolina Central University

Mentor(s): Kevin Williams, North Carolina Central University

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 63 2nd Floor Mary Townes

Optimization and validation of a high throughput screen for identifying Nrf2 inhibitors

Tiffany Nguyen[1], David R Lamson[1], Xiaoxin L Chen, Ph.D.[2], Ben Major, Ph.D.[3], Kevin P. Williams, Ph.D.[1]

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The Nrf2-Keap1 signaling pathway is a primary cell defense and survival pathway. Keap1 (Kelch-like ECH-associated protein 1) regulates the transcription factor Nrf2 (nuclear factor erythroid 2-related factor 2,) which, in turn, activates a wide range of cytoprotective genes including NQO1 to stimulate an antioxidant response and protect cells from a number of toxins and carcinogens.Though the Nrf2-Keap1 pathway is an essential defense mechanism for normal cell survival, recent evidence shows that Nrf2 also promotes cancer cell survival. In particular, esophageal cancer exhibits high expression of Nrf2. Nrf2 overexpression is also associated with chemotherapeutic drug resistance. Several studies have shown that cancer cells with elevated levels of Nrf2 are less sensitive to common chemotherapeutic agents such as etoposide, carboplatin, cisplatin, 5-fluorouracil, and doxorubicin. Additionally, cells that have developed resistance to chemotherapeutic agents have been shown to express high levels of Nrf2.The purpose of this study is to screen for compounds which inhibit the activation of Nrf2 to potentially reduce both its cancer cell protective role and drug resistance role. A GFP reporter human non-small cell lung carcinoma cell line (H1299-GFP NQO1) was used. This cell line contained GFP under control of the NQO1 promoter. In a previous study, these cells were treated with known Nrf2 agonists CDDO [2-cyano-3, 12-dioxo-oleana-1,9(11)-dien-28-oic acid, methyl ester] and tBHQ (tert-butylhydroquinone) in a

12-well assay to overexpress Nrf2. This resulted in increased GFP levels due to activation of the NQO1 promoter controlling GFP expression. This study optimizes the assay to a 384-well format to validate reproducibility. When it is evident that variability is minimal, a compound library will be screened to find potential inhibitors against Nrf2. In the presence of an Nrf2 inhibitor, decreased Nrf2 expression would be detected as decreased GFP expression.

Student Author(s): Christine Nienhuis, Senior, Engineering North Carolina A&T State University

Mentor(s): Christopher Doss, North Carolina A & T State University

Presentation: Engineering - Biomedical, Oral Presentations #3 (1:45 - 2:45 PM) 1009 BRITE

Non Playable Character Behavioral Script Execution using Opensimulator

Behavioral scripts are sets of rehearsed behaviors acted out by people as they perform familiar actions. Examples include the way a person grabs a door handle, the way the person approaches a door to unlock it, and the cadence of their steps. The behavioral scripts can potentially be used to identify a person. The proliferation of smart devices (e.g. motion sensors, smart lights, smart locks, etc.) means there are many opportunities for interactions with people. As a person interacts with these devices they produce an event schema, which could be used to identify a behavioral script. This identification could then be used for enhanced security, safety, and better medical care. This research presents the use of OpenSimulator, an open source platform for building virtual worlds, to simulate non-playable characters (NPCs) being monitored as they maneuver throughout a smart home. Several NPCs will be created to act out various personas, including the homeowner, a friend, and an intruder. Simulated smart devices will be placed throughout the home to monitor the NPCs. The resulting event schemas will be able to capture the NPCs going through the home on a usual day and the activities they perform within the home on a regular basis. They will also capture events of when the friend visits. The resulting data will be used to determine if software could distinguish the homeowner from the intruder based on how the actions diverge from the behavioral script of homeowner. The presentation will highlight development methods and preliminary results.

Student Author(s): Haley Norris, Junior, Exercise Science University of North Carolina - Wilmington

Austin Smith, Senior, Exercise Science, University of North Carolina - Wilmington

Elizabeth Seldomridge, Senior, Exercise Science, University of North Carolina - Wilmington

Mentor(s): Robert Boyce, University of North Carolina - Wilmington
Michele Parker University of North Carolina - Wilmington

Presentation: Exercise Science, Oral Presentations #4 (3:00 - 4:00 PM) , Poster Number 23 1st Floor Mary Townes

A Longitudinal Retrospective Study of Body Composition Trends in Police Recruits

Mapping body composition patterns of those hired as police officers has implications not only to the health of officers during their careers but also in their ability to perform in emergency situations. To evaluate body composition changes that occur in police recruits from 1990 to 2013 with gender comparisons. During the first week of police recruit training in a large southeastern metropolitan area, physical fitness levels were evaluated in 2,468 recruits. This study's variables of interest are: body mass (kg), lean mass (kg), and % body fat. ANOVA and Bonferroni post hoc procedures were used to evaluate data. The initial ANOVA shows significance for males in all three variables at p ? 0.05. Males tended to increase in body mass and lean mass from 1990 to 2000 (80.6 ± 1.2kg to 87.3 ± 1.2kg, p ? 0.05) (68.9 ± 0.8kg to 73.4 ± 0.8kg, p ? 0.05), respectively. These values remained relatively constant between 2000 and 2013. No discernible pattern was seen in female lean mass nor body mass. Males tended to increase in % body fat from 1994 to 2010 (13.6 ± 5.0 to 16.7 ± 7.2, p ? 0.05). Although not significant, female % body fat

means increased from 1990 to 2013 (22. 9 ± 1.0 to 26.2 ± 1.2). Even though there was an increase in body mass, pre lean mass and % body fat over time in males, these increases were low. In addition, these increases were lower in females.

Student Author(s): Robert Nowland, Senior, History University of North Carolina - Asheville

Mentor(s): Tracey Rizzo, University of North Carolina - Asheville

Presentation: History, Oral Presentations #1 (9:30 - 10:30 AM) 1233 MTSB

Prolonging the Great War: The Game of United States Diplomacy Within the Ottoman Empire !

At the outbreak of World War I, the Ottoman Empire expanded its diplomatic ties with many world powers, in hopes of remaining the gateway to the Middle East. The empire remained a target for land acquisition by Britain, France, and Russia through their expansion of imperialist interests. The United States (US) at this time was a budding superpower that established a diplomatic tie with the Ottomans through Henry Morgenthau, the US diplomat to Constantinople. The United States created a unique bond with the Ottoman Empire due to its lack of interest in Ottoman lands, but with more of an interest in building an economic, social, and political relationships. Scholars have overlooked the history of the United States' interests within the Ottoman Empire during the few months leading up to the Great War. This lack of scholarship suggests that scholars do not view the United States' interests as a story that should be told. However, it is this history that is important because it represents the beginning stages of the United States becoming a global super power. Using the primary sources from the National Archives of the US, I hope to discuss the untold history of American interests within the Ottoman Empire.

Student Author(s): Steve Nwanguma, Senior, Nursing North Carolina Central University

Mentor(s): Mildred Pointer, North Carolina Central University

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 24 1st Floor Mary Townes

Relative Sodium to Potassium Excretion Correlates with Age in African American Females but not in African American Males

African Americans (AAs) are four times more likely to have kidney disease compared to the rest of the population. Increased sodium (Na) retention and increased potassium (K) excretion is linked to high blood pressure and kidney injury. Thus, the relative excretion of Na and K (Na/K) is important in disease; low Na/K predisposes to hypertension and kidney disease while higher Na/K protects from disease. Consequently, those with high blood pressure and kidney disease will have a lower Na/K excretion ratio compared to those without the disease. Young hypertensive AA males have the highest rate of kidney disease than any other sector of the population. Therefore, this study sought to determine whether (1) AA males have lower Na/K ratio compared to AA females; (2) Na/K ratio correlates with age; and (3) this correlation differs between AA males and females. To answer these questions, urine samples were collected from AAs (33 males; 35 females) between 18 and 80 years of age at a health fair in Halifax County, North Carolina. Na and K concentrations in each sample were measured using an electrolyte analyzer. Females exhibited a lower Na/K ratio compared to males (2.5 +/- 0.2 vs. 3.1 +/- 0.2, $p=0.0668$); the opposite of what we expected. Additionally, the Na/K ratio was negatively correlated with age in females ($p<0.05$), i.e., Na/K ratio decreased as age increased. On the other hand, there was, no correlation between the Na/K ratio and age observed in the males ($p=0.8117$). Our results suggest that: (1) retaining more sodium and excreting more potassium does not explain the greater risk for AA males for hypertensive kidney disease and (2) AA females retain more Na+ and excrete more K+ as they age. Further studies are needed to explain the Na/K link to disease and the sex difference in Na/K levels.

Student Author(s): Jesse O'Campo, Senior, Biology University of North Carolina - Pembroke

Mentor(s): Leonard Holmes, University of North Carolina - Pembroke
Sivanadane Mandjiny University of Norh Carolina - Pembroke

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 11 1st Floor Mary Townes

Fermentation Study of Xenorhabdus nematophilus in a bioreactor

Xenorhabdus nematophilus is a gram-negative bacterium in the family Enterobacteriaceae. This microbe can be described as entomopathogenic. X. nematophilus is not found free living in the soil environment. It exists in a symbiotic relationship with insect-parasitizing nematodes of Steinernema carpocapsae. The interaction is
specific to each species, and both are found ubiquitously in soil environments. Their ecological significance is particularly apparent in agriculture, as a form of biological control of pest insect species. The biological processes of the bacterium are matched by the needs of the nematode and vice versa. Together this mutualistic relationship results in the predation of insect species.What this study focuses on is the media concentration effects on the growth kinetics of phase II X. nematophilus using a 5 L Sartorius Stedim Biostat® A+ Batch Fermentation System. By varying the conditions of the media we can find the most optimal conditions for the bacteria to grow. Bacterial growth can be measured by inoculating the bacteria into a media and monitoring the changes in the bacterial density over time. The highest specific growth rate 1.44 h^{-1} and the lowest doubling time 0.5 hr were determined with the media composition of 2.5 % soytone, 0.5% yeast extract and 1.0% peptone of original Yoo media.

Student Author(s): Shaaron Ochoa-Rios, Senior, Biology Fayetteville State University

Mentor(s): Emily Jackson, Georgia Institute of Technology
Hang Lu Georgia Institute of Technology

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 68 2nd Floor Mary Townes

Controlling Stem Cell Aggregate Differentiation Using Microfluidic Devices Optimization of a Microfluidic Platform for Culture of Stem Cell Aggregates

Embryonic stem cells (ESCs) can give rise to any of hundreds of cell types in the body. These cells can be used to establish models for mammalian development. ESCs aggregates, a three dimensional (3-D) context, have been shown to facilitate cellular interactions and promote morphogenesis. However, current culture methods present challenges for aggregate cultures like interactions between aggregates which can introduce variability and prevent assessment of single aggregates through the course of differentiation. To address these challenges in aggregate culture methods, we have optimized a microfluidic device for aggregate cultures. The device permits stem cell aggregates to be loaded into individual traps, where they can be cultured for multiple days and observed through time. Our specific goals were to improve the efficiency of single aggregate loading within the device traps and to characterize aggregate phenotypes over multiple days of differentiation. *We hypothesized that by altering the dimensions of key device geometries we will improve the percentage of traps loaded with single aggregates.* Our results showed that by optimizing device loading protocols and the device geometries, we can achieve a higher percentage of traps loaded with single aggregates more consistently. In addition, we characterized multi-day spontaneous differentiation in the device by quantifying protein expression of pluripotency markers. We concluded from this study, the improved microfluidic design allowed us to handle, culture and image ESC aggregates individually through time in contrast to results obtained from batch cultures from previous experiments in the laboratory. In future studies we will investigate whether microfluidic culture can modulate environmental sources of heterogeneity during differentiation.

Student Author(s): Hakeem Oufkir, Senior, Chemistry Wake Forest University

Mentor(s): Patricia Dos Santos , Wake Forest University

Presentation: Chemistry (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 36 2nd Floor Mary Townes

Isolation of SufU sulfurtransferase from Bacillus subtilis

Bacteria has evolved complex machinery for the biogenesis of Iron-Sulfur [Fe-S] clusters, a cofactor necessary for multiple biological and chemical processes. These machineries embody a paradigm stating that each system contains at least a PLP-dependent cysteine desulfurase and protein scaffold. Gram positive bacteria, like *B. subitilis,* are projected to solely contain the **S**ulfur **U**tilizing **F**actor (SUF) system for the synthesis of [Fe-S] clusters which includes the cysteine desulfurase, SufS that abstracts a sulfur atom from a free amino acid cysteine then transfers the sulfur to sulfurtransferase SufU. The sulfur is then hypothesized to be transferred to the SufBCD complex for the assembly of Fe-S clusters. In previous work, we characterized the kinetic reactivity of heterologously expressed SufU and showed that the presence of a zinc atom tightly bound to the protein is essential for its sulfurtransferase function. In this work we sought to isolate SufU from its native organism to determine the activity, metal content, and interacting protein partners as a strategy to provide an in vivo validation for the dedicate role of SufU as a sulfurtransferase. To achieve this goal we constructed two strains of *B. subtilis* in which we placed a copy of $SufU_{his}$ or $SufU^{C41A}{}_{his}$ under control of the inducible xylose promoter. Immunoblot analysis of the cell extracts of these strains demonstrated a successful expression of both endogenous SufU and modified $SufU_{his}$. Different purification techniques are currently being employed to isolate suitable amounts of $SufU_{his}$ and $SufU^{C41A}{}_{his}$ for biochemical analysis.

Student Author(s): Ashle Page, Senior, Chemical Engineering; Polymer & Color Chemistry North Carolina State University

Mentor(s): Jobi Cook, North Carolina State University

Presentation: Engineering - Chemical & Biomolecular, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 54 2nd Floor Mary Townes

Investigation of the Public Perception of Science and Technology Policy

Technology is becoming an ever-increasing necessity within the lives of individuals globally. Science, as a tool to describe the natural world, does, in fact, contribute to one's daily life from the growing of food to the use of a laptop. Awareness of science, in particular, can allow individuals to reap its benefits. Technology, however, can also have adverse effects. Consider the potential negative consequences of nuclear power. While nuclear energy can be used to provide electricity to a large percentage of people worldwide, it can also have damaging effects on society. Consequently, technology has the potential for both positive and negative outcomes. To combat technology's adverse effects, policies can be established to protect individuals while promoting proper usage to benefit society. All too often, however, policy lags begin the creation and widespread functioning of technology, leaving room for improper use. This gap between researchers and policymakers provides for potential hazards in emerging areas such as cybersecurity, medical techniques, cloning, and autonomous robots. This study investigates the public's views of science and technology policy, especially within the upcoming workforce, through a survey of their involvement and desired interest in the topic. The results of this study will be used to raise awareness of such issues within the public, research, and lawmaking communities, in hopes of promoting interaction between those communities and ultimately activism within science policy.

Student Author(s): Lindsey Palmquist, Sophomore, Biochemistry High Point University

Mentor(s): Melissa Srougi, High Point University

Presentation: Chemistry (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 40 2nd Floor Mary Townes

Evaluating the Efficacy of the Anti-Tumor Agent Beta-Lapachone in NQO1 Expressing BRCA2 Mutant Human Breast Cancer Cells

Currently, there are few specialized treatments that target breast cancer cells with BRCA1/2 mutations, while causing little to no harm to normal tissues. Beta-Lapachone (Beta-Lap) is a antitumor quinone that is selectively bioactivated in the presence of NAD(P)H:quinone oxidoreductase 1 (NQO1). NQO1 is overexpressed in solid tumors as compared to normal tissues. In the presence of NQO1, Beta-lap undergoes a two-electron reduction forming a hydroquinone, which can be further reduced to a semiquinone intermediate. The semiquinone reverts back to the parent quinone resulting in futile redox cycling and production of reactive oxygen species (ROS). ROS-induced DNA damage hyperactivates the DNA repair protein poly (ADP-ribose) polymerase-1 (PARP-1) leading to cell death. Of interest, cancers with BRCA1/2 mutations are unable to efficiently repair double-stranded DNA breaks. As a result, we hypothesize that BRCA1/2 mutant, NQO1 positive cells will be highly sensitive to Beta-lap, which will result in irreparable DNA damage resulting in cell death. To test this hypothesis, the breast cancer cell line HCC1428, a BRCA2 mutant, was used. These cells were transfected with wild type BRCA2 to compare BRCA2 status vs sensitivity to Beta-lap. Cellular survival experiments were used on these cells to determine the toxicity of Beta-lap and IB-DNQ (a Beta-lap derivative) at different doses over various periods of time. Our research will be able to provide information on the pathway of Beta-lap-induced cell death in NQO1 expressing, BRCA2 mutant breast cancer cells.

Student Author(s): Michael Paolino, Senior, Physics Appalachian State University

Mentor(s): Brooke Hester, Appalachian State University

Presentation: Physics (B.S.), Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 69 2nd Floor Mary Townes

Measuring Muscle Contraction with Automated Optical Tweezers

The primary protein involved in human muscle contraction is myosin, which exists in alpha- and beta- isoforms. A decrease of in the concentration of alpha-Myosin in the heart is directly linked to heart failure. It is proposed that slow beta-Myosin in a failing heart could, through introduction of a drug, be made to mimic the action of alpha-Myosin, thereby improving cardiac muscle performance. To test this hypothesis, measurements of the contraction of sarcomeres, the fundamental unit of muscle, will be made on the micrometer scale through the use of optical tweezers. An optical tweezers (OTs) system, also known as an optical trap, uses highly focused laser light to trap and manipulate a microscopic object for observation and experimentation. An

Student Author(s): Elizabeth Parker, Senior, Biology High Point University

Sarah Forget, Junior, Biology , High Point University

Mentor(s): Nicole Hughes, High Point University

Presentation: Botany, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 28 1st Floor Mary Townes

Effects of Summer Leaf Angle on Polystichum acrostichoides Stress Physiology

Abstract: *Polystichum acrostichoides,* also known as the Christmas fern, is an evergreen fern that is native to the eastern United States. It grows in and around river banks in shaded microsites. In the winter, its leaves lay flat (prone) against the ground. The objective of our research was to observe whether or not there would be any negative physiological consequences if the leaves were forced to lay flat in the summer months as well. We compared leaf temperature, photosynthetic gas exchange, and light stress (F_v/F_m) of artificially flattened versus naturally upright fronds on 10 separate plants from June-September, 2016. Temperatures were measured using thermocouples, Daqlink data loggers, and an infrared gun. Photosynthetic gas exchange and chlorophyll fluorescence were measured with a LI-COR 6400 and Walz Mini-PAM fluorometer. We found that, in shaded habitats, prone leaves were generally significantly cooler than upright leaves; however when the plant received direct sunlight, flattened leaves quickly warmed (by as much as 15^{o}C), while upright leaves did not. However, intense episodes such as this were generally rare ($_{sat}$) or sustained quantum yield efficiency of PSII (F_v/F_m) compared to upright leaves, even after four months of laying prone. Our results suggest that flattened leaves may incur episodic heat stress during sunflecks during summer months, but that these events are so rare and/or brief that no significant, physiological consequences result. Instead, we suspect that upright leaf orientation during summer may be important for other, non-physiological reasons (e.g. spore dispersal).

optically trapped microsphere can be modeled as a Hookean system for small displacements from equilibrium. If a sarcomere is constructed between two optically trapped polystyrene microspheres, then by monitoring the displacement of the microsphere during sarcomere contraction, this dual trap system can be used to measure the forces exerted by the sarcomere. With this capability, we will be able to test the performance of muscle at the fundamental level in order to assess the validity of our hypothesis. In this work, the implementation of a dual trapping apparatus, method development for trapping of large microspheres in a buffered environment, and preliminary data collection are discussed.

Student Author(s): Ihasia Parker, Senior, Chemistry University of North Carolina - Pembroke

Mentor(s): Leonard Holmes, University of North Carolina - Pembroke
Sivanadane Mandjiny University of Norh Carolina - Pembroke

Presentation: Chemistry (B. S.), Oral Presentations #1 (9:30 - 10:30 AM) 1223 MTSB

Effect of sugar concentration on the sugar utilization rate by the bacterium Lactobacillus lactis

Lactobacillus lactis is a well-known gram-positive bacterium that helps keep our intestinal tract healthy and protected against harmful bacteria and fungi. By having the ability to live and flourish in the gastrointestinal tract, *Lactobacillus lactis* is the exemplary bacterium that shows resilience. In previous research, it has been shown that Lactobacillus lactis has important use as a probiotic bacteria and has been used as vaccines, vitamins, and treatment for digestive health, immune boosting, and respiratory infections. Aside from the medical benefits, it is used commercially as a lactic starter for yogurts, cheese and fermented milk products. In this study, *Lactobacillus lactis* was incubated in tryptic soy media containing different sugars: glucose, fructose, maltose, cellobiose and lactose to analyze the carbohydrate utilization rate at different sugar concentrations.The importance of sugar utilization regarding *L. lactis* is to understand which specific carbohydrate will provide sufficient growth for this bacterium. This information will allow us to successfully produce *L. lactis* and gain more of andvantage and knowledge for biomedical applications.

Student Author(s): Kelly Parker, Junior, English Appalachian State University

Mentor(s): KC Kirsten Clemens, Appalachian State University

Presentation: English (Literature), Oral Presentations #1 (9:30 - 10:30 AM) 1234 MTSB

The Intersectional Selfhood

The geographical and social barriers separating the United States and Mexico have historically posed impossible questions regarding multicultural identity for those living in the borderlands. Chicano people, specifically, experience the gravity of this cultural schism. Educational systems and other institutions in the United States systematically assimilate 'foreign' languages that do not perfectly conform to Western culture. In the same vein, Spanish-speaking purist views ostracize the diverse Chicano voice, a rich combination of eight distinct Spanish languages. Moreover, women of color—especially Chicana women—confront labor exploitation and the high probability of sexual violence by American and Mexican cultures alike. Sexist gender roles further threaten to restrict the Chicana woman's identity. Alienated by several cultural norms, Chicana women must construct an intersectional selfhood; a sense of identity that encompasses gender, sexuality, ethnicity, and race. This analysis explores the notion of identity and legitimization of Chicano culture for those who live near the U.S.-Mexican border. More broadly, I will also examine the reality that many individuals encounter while attempting to discover an individual and cultural sense of belonging within societies that otherwise reject them. Not only must Chicana women navigate suppressive ultimatums, but so do other marginalized groups within American society today—a harsh truth our society must address.

Student Author(s): Taylor Parker, Senior, Biology and Environmental Science Catawba College

Mentor(s): Carmony Hartwig, Catawba College ;Richard Macri Catawba College;Jay F. Bolin Catawba College

Presentation: Biology (B. S.), Oral Presentations #1 (9:30 - 10:30 AM) 2221 MTSB

Citrus extracts as natural larvicides against Culex mosquitoes

Although several mosquito species fulfill important ecological functions by serving as food sources and floral pollinators, some additionally serve as vectors that promote pathogen transmission resulting in devastating pathologies like Malaria, West Nile virus and Zika virus infection. As with antibiotics, insecticides used for the reduction of mosquitoes are becoming less effective as mosquitoes develop resistance against them. Synthetic insecticides like DDT can also have detrimental effects on natural ecosystems and the overall health of untargeted species. The use of natural plant extracts as insecticides offers the ability to reduce mosquito populations with a compound that is biodegradable, target-specific (Hafeez et al., 2010), and less likely to develop resistance amongst mosquitoes (Ghosh et al., 2011). To investigate the larvicidal potential of a local herbaceous plant *Pteridium aquilinum*, we prepared a simple water extraction from leaf matter and tested it against fourth instars of *Culexrestuans* found in the Catawba College Ecological Preserve. Preliminary tests indicated no larvicidal response in *C.restuans* larvae. Many members of the family Rutaceae are proposed to contain insecticidal properties associated with their peels, leaves, and seeds (Ghosh et al., 2011), which may be attributed to the varying amounts of limonoids that have demonstrated activity against third and fourth instar larvae of *Aedes albopictus* (Hafeez et al., 2010). In order to concentrate active liminoids and other potential larvicidal compounds from plant material, we performed a steam distillation on fruit peels of *Poncirus trifoliata.* Here we discuss the collective results of the concentrated volatile essential oils of *P. trifoliata* against *C. restuans* larvae and our future work toward determining purified volatiles with larvicidal activity.

Student Author(s): Ami Patel, Sophomore, Chemistry University of North Carolina - Charlotte

Mentor(s): Daniel Rabinovich, University of North Carolina - Charlotte

Presentation: Chemistry (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 11 1st Floor Mary Townes

Mercury(II) complexes of new chalcogenone ligands

The synthesis of a new N-heterocyclic thione (NHT) ligand consisting of a six-membered ring formally derived from pyrimidine will be described in this presentation together with its selenium analogue (NHSe). More specifically, new ligands featuring 2,6-diisopropylphenyl (2,6-Dipp) substituents on both nitrogen atoms, SpymDippS and SpymDippSe, have been synthesized and fully characterized. The coordination chemistry of the new ligands towards mercury(II) has been explored, leading to the isolation of complexes with a 3:2 (metal:ligand) stoichiometry rather than the expected 1:1 ratio. Interestingly, the Hg3(SpymDippE)3X6 complexes (E = S, Se; X = Cl, Br, I) actually consist of mononuclear [Hg(SpymDippE)2]2+ cations and [Hg2X6]2- anions, as established unequivocally by X-ray crystallography. The formation of these complex ions will be contrasted with related thione and selone complexes of mercury(II) that have been reported in the literature or previously prepared in our research group. In addition, comparisons with related ligands and complexes bearing different sterically-demanding N-substituents will be discussed.

Student Author(s): Mitul Patel, Junior, Chemistry East Carolina University

Jahmil James, Junior, Chemistry, East Carolina University

Mentor(s): Anthony Kennedy, East Carolina University

Presentation: Chemistry (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 8 1st Floor Mary Townes

Impact of Sugars on fluorescence of DPH in liposomes.

We hypothesize that sucralose molecules insert between the polar heads of lipids, displacing water at the lipid membrane water interface, based on previous data obtained by other researchers in our lab. Our specific research focuses on measuring the impact of sucralose on the fluorescence spectra of diphenylhexatriene (DPH) at low concentrations of sugar. The fluorescence intensity of DPH is sensitive to small changes in polarity which ensure it is an effective probe to test our hypothesis. Initial data indicates that at low sugar concentrations the fluorescence intensity decreases possibly indicating a change in polarity near the probe molecule.

Student Author(s): Ravi Patel, Senior, Applied Physics Appalachian State University

Mentor(s): Brooke Hester, Appalachian State University

Presentation: Physics (B.S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 33 2nd Floor Mary Townes

Optimization of imaging in an optical tweezers system using a tunable field lens

Optical Tweezers are used for precision measurements of small-scale forces, on the order of nano- to pico-Newtons. In an optical tweezers system, a microsphere is trapped near a laser beam focus and simultaneously viewed using a camera. The axial equilibrium position of the bead in the optical trap is dependent on the trapped bead size. A smaller particle will trap at a different viewing plane than a larger particle, requiring an adjustment of the microscope tube lens. The goal of the project is to automate the adjustment of the focal length of a tunable tube lens in order to optimize the image of the trapped microsphere. Within the tunable lens utilized here, an optical fluid is sealed inside an elastic polymer membrane, and the focal length of the lens is controlled by adjusting the current flowing through the coil of an actuator. Actuator displacement causes a change in pressure on the container and a change in curvature of the membrane and therefore a change in lens focal length. Using an image analysis program, the image will be monitored and analyzed while the current of the tunable lens is adjusted. The analysis consists of a measurement of the line profile of intensity through the center of the trapped bead image. The process of image monitoring and analysis parallel with the adjustment of lens focal length is repeated until a certain set of criteria are met. These criteria are based on previous experiments, and are, per line

profile: i) a minimized standard deviation of intensity, ii) a maximized minimum intensity value, and iii) a minimized maximum intensity value. The final steps of this project include integration into a custom-built optical tweezers automation software package.

Student Author(s): Rohan Patel, Senior, Biology North Carolina School of Science and Mathematics

Mentor(s): Amy Sheck, North Carolina School of Science and Mathematics

Presentation: Biology (B. S.), Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 65 2nd Floor Mary Townes

Protein-Specific Inhibition on the Multixenobiotic Resistance Mechanism of Daphnia magna

Multixenobiotic Resistance, or MXR, is a mechanism common in aquatic organisms that provides cross-resistance with a relatively low number of proteins, part of the ATP-Binding Cassette (ABC) group, which contain subfamilies. Protein family-specific inhibitors of MXR target individual proteins to prevent efflux of their substrates, although the issue of leaving other proteins uninhibited may allow for effective MXR function. However, the severity of specific inhibition has not been evaluated in-depth, leaving the question of the greater danger of certain inhibitors from an ecological viewpoint unaddressed. Daphnia magna, an aquatic water flea, possesses ABCB1 and ABCC proteins, making ideal for evaluating protein-specific inhibition. Reversin 205 and MK571, specific inhibitors of ABCB1 and ABCC proteins, respectively, were administered in individual treatments or a combined treatment at concentrations of 1 μM, 5 μM, and 10 μM to individual daphnids. Rhodamine B, a fluorescent substrate of MXR proteins, was administered to daphnids and its fluorescence was measured as a proxy for MXR function. Higher fluorescence in daphnids signified less MXR function. The combined inhibitor treatment was found to have no statistically significant difference from that of the Reversin 205 treatment, which was found to inhibit MXR activity in D. magna at a greater degree than MK571. Furthermore, there was no statistically significant difference between the control and MK571 treatments, suggesting that ABCC proteins have little impact in MXR function in D. magna. The results of the experiment suggest that ABCB1 is a more active protein in D. magna's MXR function. Thus, protein-specific inhibitors of MXR likely vary in severity by organism. In regard to inhibition of MXR, the influence an MXR protein has on MXR function in specific organisms should be addressed to identify the risk inhibitors pose in a larger ecological context.

Student Author(s): Yash Patil, Senior, N/A Enloe High School

Mentor(s): Michael Dickey, North Carolina State University

Presentation: Engineering - Chemical & Biomolecular, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 48 2nd Floor Mary Townes

Characterizing the Actuation of Liquid Metal Droplets within Microfluidic Channels

Liquid metal alloys such as eutectic gallium indium (EGaIn) are promising, non toxic-alternatives to mercury. Actuation of these metals by taking advantage of their fluidic properties has direct applications in reconfigurable electronics, RF antennas, and microfluidic systems. Specifically, the electrically induced movement of EGaIn by means of continuous electrowetting (CEW) has shown to be a promising method of reliable actuation. However, facile movement of the metal is affected by a rapidly forming oxide skin, which mechanically stabilizes EGaIn and impedes the movement of EGaIn plugs. This work studies key parameters that influence reliable actuation of EGaIn within capillaries. We investigated the effects of electrolytes on the actuation of the liquid metal, whose varying pH levels affect the oxide skin and slip layer. In addition, investigations were conducted in hydrophobic capillaries and T-shaped microchannels on the velocity, displacement, and splitting of the liquid metal plugs

Student Author(s): Meghan Patton, Senior, Exercise Science High Point University

Mentor(s): Matthew Kuennen, High Point University

Presentation: Exercise Science, Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 34 1st Floor Mary Townes

Repeated Thermal Stress Sensitizes C2C12 Myotubes To Subsequent LPS Exposure

This study investigated the hypothesis that"preconditioning" hyperthermia affords cytoprotection against subsequent LPS stimulation in C2C12 myotubes. C2C12 myotubes were incubated for 2hr/d at 40°C for 6d (HEAT) or maintained at 37°C (CONTROL). After recovering for 24 hours, myotubes were stimulated with LPS (500ng/ml) for 2hr, following which protein markers of the heat shock response (HSR), NFKB activation, and lipid/glycogen storage capacity were examined via Western Blot. As expected, the HSR was strongly activated by HEAT [HSP32 (+38%; $p<0.01$), HSP60 (+32%; $p<0.01$), HSP70 (+68%; $p<0.01$)]. Unexpectedly, HEAT exhibited a*heightened* inflammatory response [p-IKKa/b (+81%; $p=0.04$), p-IKBa (+432%; $p<0.01$), p-NFKBp65 (+283%; $p=0.04$)]. Intermediate enzymes of lipid [p-ACCa (-33%; $p=0.02$)] and glycogen [p-GSK3a/b (+367%; $p=0.03$)] biosynthesis were also down regulated, with elevated p-AMPK (+80%; $p<0.01$) suggesting an energetic deficit. Apoptosis activators Caspase 8 (+53%; $p=0.04$) and FOXO1 (+74%; $p=0.02$) were up regulated, as was p-JNK (+41%; $p=0.03$). Through follow-up analysis we determined these undesirable responses were linked to upregulation of TLR4 (+24%; $p=0.03$) and MyD88 (+308%; $p<0.01$), as well as p-NIK (+199%; $p=0.02$) but not IRAK-1 ($p=0.46$). We conclude that despite a robust activation of the HSR, repeated thermal stress imparts an exaggerated pro-inflammatory and pro-apoptotic response to LPS stimulation in C2C12 myotubes. This may be due to elevated TLR4 signaling capacity. We speculate that reduced glycogen storage in HEAT may have contributed to lower stress tolerance, with the upregulation of apoptosis serving as a negative-feedback mechanism (to reduce myotube number).

Student Author(s): Kaela Payne, Junior, Biological Sciences North Carolina State University

Mentor(s): Mary Beth Hawkins, North Carolina State University

Student Author(s): Nicholas Payne, Senior, B.S. Biology East Carolina University

Mentor(s): Marcelo Ardon, North Carolina State University

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 10 1st Floor Ma

Stick of Truth: Creating and using an inexpensive Basal Area Scoping Tool for rapid assessment of

Coastal forested wetlands are rapidly changing along the southeastern United States. Many forested wetla
There is a need to develop tools to allow interested parties (such as managers or citizen scientists) to colle
forested coastal wetlands. Measuring basal area groundcover, commonly used in forestry and ecological r
coastal wetlands transition to marshes, we would expect basal area groundcover to decline. Basal area gro
trunks of trees on a given plot. The units are usually f^2 per acre or m^2 per hectare. One way to measure ba
tool, which can vary in design and is available for purchase through various sources. I developed a protoc
inexpensively constructed tool can provide results similar to the professional grade tools. I took measurer
degraded forested wetland site, using both tools. I found that my inexpensive tool provided results simila
training. Our results showed that both tools provided similar results at the degraded wetland site (within 2
(within 167.07 ft^2/acre). Future research will use the method at more sites to determine reasons for the dis
could be used by managers and citizen scientists to collect basic data on the health of forested coastal wet
inexpensive methods to monitor coastal wetland ecosystems will become more important in the face of a

Presentation: Biology (B.A.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 35 1st Floor Mary Townes

A single amino acid substitution in the ligand binding domain of the teleost estrogen receptor ER alpha alters its binding affinity to the estrogenic mycotoxin, zearalenone

Zearalenone is a mycotoxin that is a common contaminant of grains worldwide. In addition to general toxic effects, zearalenone is thought to cause reproductive disorders in animals and humans due to its interaction with estrogen receptors. Like mammals, teleost fish have multiple estrogen receptor subtypes with different tissue distributions and ligand binding affinities. However, teleost fish possess an additional ER subtype not found in mammals called ER beta-A. Zearalenone (ZEAR) binds to the teleost fish ER beta-A with 11X lower affinity than to ER alpha. This difference in affinity correlates with evolutionarily-conserved amino acid substitutions in the ligand binding domain of the teleost ER beta-A subtype. To investigate the role of one of these substitutions in the differential binding of ZEAR to teleost ERs, we mutated the Atlantic croaker (ac)ER Alpha Cys to acER beta-A Met at the amino acid position corresponding to human ER alpha C530. We used this acER alpha C-M construct for bacterial protein expression and subsequent competitive binding studies with ZEAR or E2 as the competitor. As predicted, the binding affinity of ZEAR to the acER alpha C-M mutant was decreased compared to that of acER alpha, while the binding affinity to 17b-estradiol (E2) was unchanged. These data support our hypothesis that the substitution of the cysteine found in vertebrate ER alpha to methionine in the ER beta-As is partially responsible for the decrease in ZEAR binding affinity to the ER beta-A subtype. We propose that this conserved amino acid substitution may explain differences in ER beta-A binding affinities observed for other estrogenic compounds.

Student Author(s): Catrina Peaks, Senior, Pharmaceutical Science and minor in Chemistry
North Carolina Central University

Mentor(s): Audrey Adcock, North Carolina Central University

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 33 1st Floor Mary Townes

Novel Pharmacological Mechanism for Parkinson's Treatment

Parkinson's disease represents the 2nd most prevalent neurodegenerative disease worldwide, affecting an estimated 7 million people globally. We utilized the model organism *Drosophila melanogaster*, the fruit fly, to investigate the mechanism of action of a pharmacologically active natural compound, verbenachalcone (VC), and one of its synthetic analogs (C95) towards a fruit fly model of Parkinson's. Interestingly both VC and C95 alleviated some of the behavioral (climbing activity) and biochemical (phospho-tau (a microtubule-associated/structural protein) accumulation, a hallmark of Parkinson's progression) deficits of the fruit fly model of Parkinson's. Our findings may shed light on a novel pharmacological mechanism for Parkinson's treatment.

Student Author(s): Matthew Peek, Senior, Computer Science University of North Carolina - Asheville

Mentor(s): Judy Beck, University of North Carolina - Asheville
Brian Dennison University of North Carolina - Asheville

Presentation: Computer Science (B.S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 3 1st Floor Mary Townes

Astronomical Imaging at Lookout Observatory

During the summer of 2016 several projects were performed at Lookout Observatory in order to improve student and community enjoyment and research opportunities. The most notable of these projects was the enhancement of the University's telescope imaging system. This project required the use of multiple computer software and hardware integrations along with extensive testing. Software and hardware augmentation included: 1) installation of Software Bisque's "The SkyX Pro" Camera Add-On; 2) incorporation of Auto-Focusing software and hardware technology; 3) improving the Paramount ME telescope mount's pointing and tracking model by utilizing the automated pointing correction model included in the T-Point software; and 4) extensive testing of

software and hardware performance by taking multiple long exposure images of deep-space objects. These updates greatly reduced the amount of time required to accurately bring the CCD camera into focus. Additionally, these improvements have resulted in superior accuracy of the telescope's tracking ability, allowing users to achieve exposure times of up to five minutes, resulting in remarkable color pictures of galaxies and nebulae. In conclusion, this project serves students and faculty of UNC Asheville by allowing them the ability to consistently and accurately perform astronomical imaging for research purposes. In addition, enhancements to Lookout Observatory also benefit members of the broader community by encouraging further enjoyment and enthusiasm in humankind's quest to explore the universe.

Student Author(s): Jeffrey Penley, Senior, Chemistry University of North Carolina - Chapel Hill

Mentor(s): Matthew Lockett, University of North Carolina - Chapel Hill

Presentation: Chemistry (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 43 2nd Floor Mary Townes

Cell-Free Expression of Cytochrome P450 Oxidoreductase for Studies in Drug Metabolism

Cytochrome P450s (CYPs) are a superfamily of heme-containing enzymes responsible for the metabolism of steroid hormones, drugs, and xenobiotics. These enzymes couple with the redox partner cytochrome P450 oxidoreductase (CPR) – an enzyme localized to the endoplasmic reticulum that contains two flavin cofactors, which transfer electrons to CYPs from NADPH. CPR is critical for activating CYPs for drug metabolism. Current studies of drug metabolism rely on CPR and CYPs in the form of human liver microsomes. The over-expression of CPR and CYPs in bacterial or insect cells is an alternative source; however, the isolation of enzymes from these cells poses a great technical challenge. Here, we present a cell-free expression method that overcomes many of the challenges associated with recombinant expression methods. We demonstrate the expression of full-length rat CPR and full-length human CPR in a cell-free system of *E. coli* extract. The CPR variants express at similar levels, 250 nM, as demonstrated with semi-quantitative Western blotting analysis. To determine if the cell-free CPR is active, we use spectrophotometric methods to measure reduction of cytochrome c by CPR. Future work will focus on co-expression of CPR with other CYPs within the same cell-free expression reaction for high-throughput screens of drug metabolism.

Student Author(s): Kiana Perez-Jimenez, Junior, Psychology University of North Carolina - Pembroke

Mentor(s): Ashley Batts Allen, University of North Carolina - Pembroke

Presentation: Psychology, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 45 1st Floor Mary Townes

The Relationship between Self-Compassion, Post-traumatic Stress Disorder, Coping, and Acceptance in a Military Population

Self-Compassion involves being kind to oneself, aware of one's emotions, and conscious that other people go through difficult situations. Self-compassion has numerous benefits including greater psychological well-being as well as less depression and anxiety (Macbeth & Gumley, 2012; Zessin Dickhauser, & Garbade, 2015). U.S. military personnel experience an increased rate of depression with approximately 12% experiencing major depressive disorder. Therefore, self-compassion may be particularly beneficial in this population (Gadermann, et al., 2014). Previous research shows self-compassion may be related to less chronic PTSD symptoms in veterans (Hiraika, Meyer, Kimbrel, DeBeer, Gulliver, & Morissette, 2015). Other findings suggest self-compassion may minimize the effects of traumatic experiences on veterans' overall functioning (Dahm, Meyer, Neff, Kimbrel, Gulliver, & Morissette, 2015). Research with a civilian population shows self-compassionate individuals use more effective coping strategies such as positive

cognitive restructuring (Allen & Leary, 2010). Self-compassion also involves acceptance of one's emotions and circumstances; therefore, self-compassion should also be related to acceptance for a military population (Neff, 2003). In this proposed study, we will recruit 200 military-affiliated participants through Amazon Mechanical Turk. These participants will complete an online survey to assess self-compassion, PTSD, coping, and acceptance. Additionally, fear of self-compassion and social acceptability of self-compassion will be included to determine if being self-compassionate is undesirable in a military setting. We hypothesize that self-compassion will be negatively related to PTSD and positively related to effective coping and overall acceptance. However, we expect for these effects to be moderated by one's belief in the social acceptability of self-compassion.

Student Author(s): David Perez-Suarez, Senior, Statistics University of North Carolina - Greensboro

Mentor(s): Sat Gupta, University of North Carolina - Greensboro

Presentation: Mathematics, Oral Presentations #1 (9:30 - 10:30 AM) 1008 BRITE

Variations of the Greenberg Unrelated Question Binary Model

Unrelated-question RRT models have been used in many field surveys and are proven to be quite effective just like the ones we used for this project. For this project, the main objective is to examine variations of the unrelated question model known as the Greenberg et al. (1969) model by using inverse sampling. We find that the regular Greenberg et al. (1969) model had a higher variance than the modified Greenberg et al. (1969) model with multiple responses as well as the model with inverse sampling. For this project, we will present both theoretical and simulation results to show that the new variations work better than the original unrelated question model.

Student Author(s): Jasmine Perry, Junior, Biology North Carolina Central University

Mentor(s): Wendy Heck-Grillo, North Carolina Central University
Sivanadane Mandjiny University of Norh Carolina - Pembroke

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 4 1st Floor Mary Townes

Identifying the Most Effective Activation Method of T-Lymphocyte for Immunotherapy Approaches

Chimeric antigen receptor (CAR) T cell therapy is an immunotherapy approach that exploits the immune system to eliminate tumors for patients with hematologic malignancies. CAR T cells combine the targeting capacity of B cell antibodies with the attack advantages of T cells. To express the desired CAR, T-lymphocytes are activated using CD3-CD28 specific monoclonal antibodies (MAbs) available in different formats: soluble, plate-bounded (immobilized, I), coated beads (Dynabeads, D), or conjugated on a polymeric nanomatrix (Transact, T). Although adoptive transfer of T-cells with a CD19-specific-CAR (CAR-Ts) have shown remarkable clinical efficacy in patients with B-cell-malignancies, the optimal method of activation of T lymphocytes for expansion, persistence, and antitumor effectiveness of CAR-Ts is unknown. We have undertaken a comparison of these approaches in three heathy buffy-coats donors, hypothesizing that CD3/CD28-coated-beads will prove superior as they have more available binding-sites and are continuously present during CAR-Ts expansion as beads are removed at the time of the product infusion.
We used flow cytometry to assess CAR expression. We found comparable expression between methods: I-CD19.CAR-Ts, 84.5%±2.6%; D-CD19.CAR-Ts, 86.2%±5.0%; and T-CD19.CAR-Ts 84.7%±3.2%. All CAR-Ts expanded well; a trend for higher fold-increase was observed for CAR-Ts generated with I-CD3/CD28. Higher mean fluorescence intensity (MFI) was observed in D-CAR-Ts and T-CAR-Ts (10468±5561, 7669±2182 vs 3997±1046 in I-CAR-Ts). Immune profile of CAR-Ts showed similar composition between activation methods in term of

CD4+/CD8+, memory and effector cells. We observed no differences in cytokine production or proliferative potential. Our preliminary data suggests that all strategies generate efficient CD19.CAR-Ts; therefore, each method proved to be effective, and the initial hypothesis was disproven. We will next explore potential differences in their vivo efficacy in a CD19+ leukemia xenograft model.

Student Author(s): Benjamin Peterson, Senior, Materials Science & Engineering North Carolina State University

Mentor(s): Sabrina Robertson, North Carolina State University

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 77 2nd Floor Mary Townes

Using MRI to Evaluate Norepinephrine's Role in the Development of Brain Structure

Release of norepinephrine (NE) is essential for the maintenance of critical behaviors such as attention, mood, memory, and arousal. NE neuron disruption in adults has been linked to disorders including anxiety, depression, Parkinson's, and Alzheimer's disease. However, it is unclear if NE neuron dysfunction during development contributes directly to these disorders. Our genetic-based approach utilizes a mouse model with a hM3Dq DREADD (Designer Receptor Exclusively Activated by a Designer Drug) receptor targeted to a genetically-defined subpopulation of NE neurons (LC-*En1* neurons) *in vivo.* To enable *in vivo* manipulation of LC-*En1* neurons, mice were treated with a pharmacologically inert drug-CNO, from embryonic day 12 thru post-natal day 10, resulting in aberrant NE release in the DREADD mutants. We hypothesize that this NE neuron stimulation throughout critical developmental timeframes will impact the brains development, structure, and function. To test this hypothesis, DREADD expressing mice and their controls were tested in the light-dark anxiety-related paradigm at post-natal day 29. DREADD mice spent significantly less time on the light side of the chamber compared to littermate controls. These behavior deficits led us to explore the impact of LC-*En1* NE neuron over activation on embryonic brain development utilizing MR contrast imaging. Here we outline our MRI analysis pipeline utilizing freeware, such as ITK-Snap and 3D Slicer, to measure cortical thickness and other key regions of the brain involved in anxiety-related behaviors. DREADD animals will be compared to controls to determine if activation of a subset of NE neurons throughout embryonic development impacts brain structure..

Student Author(s): Anna Phillips, Senior, Political Science East Carolina University

Mentor(s): Jody Baumgartner, East Carolina University

Presentation: Individualized Major Program, Oral Presentations #3 (1:45 - 2:45 PM) 1234 MTSB

Social Media and Democracy: How do Facebook Videos Affect Individuals' Political Values?

One of the greatest innovations in the 21st century is the high level of accessibility to information via forms of media such as Facebook, Twitter, and online news services. In this scholarly article, the intent is to examine how the videos individuals view on Facebook affect their opinions on current issues. With the emergence of social media as a distinctive news source, sharing information on sites like Facebook has become one of the main methods used by political organizations to educate the masses on their stance. The purpose of this research study is to observe correlations between the sharing of videos on Facebook and those videos' ability to sway the views of participants. Methodology used will be based on a survey conducted after participants view selected videos. A posttest only questionnaire will be distributed to Facebook users through the website. Participants are split into three groups: a control group, and two groups that each viewed a short video about a current issue. The videos selected are chosen from the most popular posts on Facebook. After viewing the videos, participants from groups 1 and 2

each filled out the same survey as the control group. Once the data is collected, independent variables such as age and education will be used to determine whether viewing the videos made a difference in participants' opinions or reinforced opinions they already held. I expect to find that opinions of participants who watch the videos will tend to be more message consistent with the video viewed than the opinions of participants who did not view it. This research increases our understanding of how social media can be used as a platform for political groups to gain support of their positions.

Student Author(s): Lucas Piedrahita, Junior, Biology Appalachian State University

Mentor(s): Lynn Siefferman, Appalachian State University

Presentation: Biology (B. S.), Oral Presentations #3 (1:45 - 2:45 PM) 2235 MTSB

Phenology and Reproductive Success of Silene acualis

Flowering plant populations can have different reproductive systems, potentially influencing the effects of different ecological factors on reproductive success. Gynodioecious systems include female plants that only produce seeds and hermaphroditic plants that produce both seeds and pollen. We tested whether floral display and flowering synchrony with neighbors affected reproductive success, measured by fruit set, of each sex in a gynodioecious species, *Silene acaulis*. We observed four sites of this alpine cushion plant throughout the flowering period at Niwot Ridge, Colorado. We counted open flowers every other day and the total number of flowers and fruits produced at the end of the season for 629 individuals. Female plants had significantly higher fruit set than hermaphrodites. The synchrony of flowering of an individual with its neighbors was positively correlated with fruit set in the latest flowering site, possibly due to a lack of external sources of pollen from other sites. The total number of flowers produced by an individual was positively correlated with fruit set, suggesting that individuals that produce more flowers are more likely to be pollinated. Understanding the factors that influence the reproductive success of a gynodioecious population clarifies the processes that may influence populations' responses to climate change.

Student Author(s): Jessica Pierce, Junior, Gender, Women's and Sexuality Studies Appalachian State University

Mentor(s): Ann Kaplan, Appalachian State University

Presentation: Women's and Gender Studies, Oral Presentations #1 (9:30 - 10:30 AM) 2236 MTSB

Appalachian Women: Food Insecurity As A Form Of Violence

My research looks at the daily experience of being a food insecure woman in Watauga County, North Carolina and how this unique struggle works to perpetuate violence against women. I explore the mental and physical toll food insecurity puts on women through by pairing my own documentary photographs with academic texts <what texts/disciplines/such as, give example(s)?>as a way to contextualize this struggle while also maintaining dignity for individual women portrayed. The goal of this visual research is to examine how food insecurity works within this specific gendered, geography, how government systems perpetuate this issue, and to explore possible alternative solutions.

Student Author(s): Patricia Pinckombe, Junior, Evolutionary Anthropology and African and African American Studies Duke University

Mentor(s): Jasmine Cobb, Duke University

Presentation: History, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 11 1st Floor Mary Townes

Postmortem Racism and the Eugenics Movement: a Politic of Double Death

The pseudoscience of eugenics and social Darwinism was used to justify experimental exploitation and third-rate medical treatment of blacks, and the view that they were genetically inferior, hypersexual and unfit for adult responsibilities. This work documents the history of this experimentation and medical maltreatment on African Americans in the Jim Crow era through extensive research in medical journals and experimental reports. This research also makes possible an understanding of current disparity issues as they relate to African American health. In concern for racial justice and public health, this work also aims to aid in understanding the relationship and distrust among African Americans and medical institutions.

Student Author(s): Andres Ponce Romero, Senior, Physics North Carolina State University

Mentor(s): Matthew Green, North Carolina State University

Presentation: Physics (B.S.), Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 67 2nd Floor Mary Townes

Low-energy Event Detection Efficiency in P-Type Point Contact Germanium Detectors

P-Type Point Contact (PPC) germanium detectors have very low energy thresholds and excellent energy resolution at low energies. For these reasons the COHERENT Collaboration aims to detect Coherent Elastic Neutrino-Nuclear Scattering at Oak Ridge National Laboratory's Spallation Neutron Source using an array of PPC detectors. In this work, we aim to measure detection efficiencies for low-energy events near threshold. This will require an experimental procedure using low angle compton scattering of gamma rays. Specifically, the gamma rays will be aimed to scatter through a germanium detector coincident with an external trigger in order to investigate energy thresholds. The data collected will be used to determine the detection efficiency as a function of energy. This will determine how effectively we will be able to measure low-energy neutrino scattering events at the SNS.

Student Author(s): Cody Postich, Junior, Terrestrial Biology University of North Carolina - Wilmington

Mentor(s): Kevin Kiser, University of North Carolina - Wilmington

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 12 2nd Floor Mary Townes

Actinomycete Isolation and Antibiotic Discovery of Freshwater and Anthill Sediments

Antibiotics lose potency against deadly pathogensbecause developed antibiotic resistance rises from overuse on infections and diseases. Microbiology experiments incorporate bacterial research from sediments in aquatic environments. These studies benefit the medical field by obtaining greater knowledge about the growing strength ESKAPE pathogens. The goals of antibiotic discovery consist of discovering unique bacteria species that produces antibiotic properties against ESKAPE pathogens and incorporating those properties into manufacturing antibiotics. The research design starts by taking sediment samples from four locations, two in the anthill topsoil and two from the banks of freshwater environments. These environments were chosen because of soil properties from moisture content to aeration capability. Four isolates, two from each environment, resisted many of the ESKAPE pathogens using cross-streak tests. The promisingbacteria had unique characteristics and their scientific names identified through microscopy, PCR and BLAST results. Future research involves isolating and

characterizing antibiotics from the isolates.

Student Author(s): Elesa Poteres, Senior, Biology High Point University

Mentor(s): Charles Smith, High Point University

Presentation: Biology (B. S.), Oral Presentations #4 (3:00 - 4:00 PM) 1008 BRITE

Use of Power Line Corridors By Flower Visiting Beetles and Bees

Pollinators are enormously important with respect to the ecosystem service and the related economic value they provide. At the same time many pollinator populations, particularly bees, appear to be in decline. Although forest habitat fragmentation caused by rights-of-way for utilities (e.g., power-lines) are generally considered to have a negative effect on biodiversity, they may be of benefit to insect pollinators. In this study, we examine the use of a power-line corridor passing through a forested area by flower-visiting beetles and bees in the Piedmont of central North Carolina. We used bowl-traps set along 4 transects running from the power-line into the adjacent forest stand with trap stations located in the center of the power-line clearing, at the forest-clearing edge, and in the forest 50 m from the edge. All insects belonging to 2 major groups of pollinators (beetles, bees) collecting during the trapping period (April-November, 2015) were enumerated and the data analyzed for differences among trap locations (power-line clearing, forested area, and clearing-forest edge).

Student Author(s): Matthew Powell, Senior, Physics (BS) / Chemistry (BA) North Carolina State University

Mentor(s): Tao Hong, Clemson University

Presentation: Engineering - Materials, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 61 2nd Floor Mary Townes

BaCO3 Infiltration on La2NiO4 Cathode for Improved Performance of Solid Oxide Fuel Cells

Solid oxide fuel cells offer the promise of being a cleaner, more efficient energy source. The development of cathodes with better polarization resistance (R_p) values at intermediate temperatures would allow for cheaper costs, improved durability, and increased viability as an alternative power supply. LNO powder was produced using a sol-gel combustion reaction followed by powder calcination. Symmetrical lanthanum nickelate (LNO) and gadolinium-doped ceria (GDC) electrode-electrolyte cells were constructed via screen-printing an LNO organic slurry onto a GDC electrolyte pellet and sintering at 900C for 2 hrs. The resulting cell yielded an average cathode thickness of 30 um and surface area of 0.7507 cm^2. Barium Carbonate ($BACO_3$) infiltrated samples were prepared by depositing 15 uL of a 0.3 M $BACO_3$ solution two, three, or four times onto each cathode surface and heated to 800C for 5 hrs. Powder x-ray diffraction (XRD) analysis confirmed the chemical compatibility of LNO-GDC composite and of LNO-$BaCO_3$ at measurement temperatures to ensure no substantial reaction occurred. Electrochemical impedance spectroscopy (EIS) found R_P values decreased as much as 66% over a range of 600-800C. At 800C, the minimum area-specific resistance (ASR) was 0.34 Ohm cm^2 for the four times infiltrated sample. The bare LNO sample yielded an ASR of 0.85 Ohm cm^2. Properly infiltrated samples demonstrated at least a factor of two decrease from the bare LNO standard.

Student Author(s): Davor Pranjic, Sophomore, Computer Science Methodist University

Mentor(s): ,

Presentation: Computer Science (B.S.), Oral Presentations #2 (10:45 - 11:45 AM) 1009 BRITE

CoffeeTime Android Social Application

In order to both research about the current technologies in mobile development, as well as the

startup scene and the mobile application market itself, I've decided to develop a social Android application. Coffee Time is an Android social application for younger people which helps with finding people interested in a certain type of event much easier, as well as with the very organization process. It enables users to easily arrange meetings with existing friends, and even make new friends with people nearby. The application implements Facebook login and GPS service for quick setup and intelligent results. Everything the user has to do is mark people from a highly customizable and filterable list, define the time and place and optionally provide a short description of the activity. The application also includes a fun Roulette-esque mini game that can be used for stuff like determining who's paying for the drinks. In short, the application aims to provide a super fast, simple and smart organization of different events at a fixed time and place, as well as to match up people of similar interests who live or happen to be nearby, which makes it rather different than other services provides by popular social networking application. Considering the technology I quickly realized how demanding and important it is today to maintain a 24/7 working server and to keep user's info secure and that it's imperative today to keep up to date with the latest technologies and trends. Other than the full publish, beta testing proved to be the most rewarding method of getting quality feedback. The results were positive, as application gained both some user traction and got invited/accepted to many conferences in the Balkan region.

Student Author(s): Andrea Prestemon, Junior, Biological Sciences North Carolina State University

Mentor(s): George Kennedy, North Carolina State University
Anders Huseth North Carolina State University

Presentation: Biology (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 61 2nd Floor Mary Townes

Manipulating pest behavior: documenting tobacco thrips antixenosis to imidacloprid-treated cotton

Insect damage to crops causes negative economic effects. Antixenosis (host non-preference) is used to manipulate pests to reduce infestation. We used a crop-pest system to determine whether a behavior-altering plant treatment could change a pest's plant preference. *Frankliniella fusca* is a key pest of agricultural crops, including cotton. We hypothesized that *F. fusca,* a mobile pest, would prefer to reproduce on plants of higher quality. We used an insecticide treatment to modify cotton plant quality, and determined if *F. fusca*has a predictable reproductive response to varying plant quality (antixenosis). An insecticide (imidacloprid) was used to adjust host plant quality prior to infestation. A choice study was conducted using cages containing common gardens of treated and non-treated plants. Each cage contained one release plant as well as an imidacloprid-treated and non-treated plant. Density of imidacloprid-treated versus non-treated plants varied by cage. Each cage was infested with adult female *F. fusca*. After ten days, eggs on each plant were counted. Significantly higher counts of eggs were found in non-treated release plants than imidacloprid release plants. Analysis of sink plant egg counts followed the same trend. Results indicate that *F. fusca* reproductive behavior can be changed with knowledge of host plant quality.

Student Author(s): Holly Price, Sophomore, Athletic Training Campbell University

Mentor(s): Sarah Christie, Campbell University

Presentation: Exercise Science, Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 15 1st Floor Mary Townes

Scaphoid Fracture In A Division I Collegiate Baseball Player

Background: 19 year old male presented with persistent pain in his right wrist.He injured the same wrist three months prior during summer baseball by siding into third base with his hand extended in front of him. At that time, he was put into a brace, sent home and told to apply ice and take Tylenol.The athlete continued with activities of daily living and continued to play in the summer league. He returned school in the fall and reported to his athletic trainer that he had injured his right wrist and was still experiencing pain. The patient was referred to an orthopedic physician for radiographs. Differential Diagnosis: Bone contusion, radial collateral ligament sprain, wrist strain. Treatment: The radiographs revealed a transverse slightly displaced fracture of the right scaphoid. The orthopedic physician recommended an open reduction internal fixation of the scaphoid.The surgical procedure included scraping away the dead bone from the fracture line to assist with bone repair. A bone graph was harvested from the distal radius. A compression screw was applied through the middle of the scaphoid to join the bones together. Uniqueness: Although fractures can occur at anytime it is important to note the patients symptomatic response to an injury so that crucial diagnosis are not overlooked. Conclusion: The athletic trainer who evaluated the athlete and quickly referred made it possible for the patient to have proper imaging and a complete treatment plan.It is important to note that the scaphoid is highly avascular and tends to have a slow healing process. This injury if left untreated and misdiagnosed could have resulted in a much different outcome. It is important for healthcare providers to always be cautious to avoid potential threats or unnecessary pain for our patients.

Student Author(s): Ena Prskalo, Senior, Sociology University of North Carolina - Greensboro

Mentor(s): Joanne Murphy, University of North Carolina - Greensboro

Presentation: Sociology and Anthropology, Oral Presentations #4 (3:00 - 4:00 PM) 1233 MTSB

Examining Deviants of Classical Athens

During the Classical period in Athens, officials established laws meant to control burial practices and to identify deviants within the Athenian society. Written documentation defines the deviants of Athens as murderers, pirates, and even those that committed suicide. With this identification of outcasts came the expectations for burying their bodies. However, despite literary records that explain the burial process for deviants, little to no physical evidence has been found to confirm that these practices actually occurred. In order to understand who the true deviants of the Athenian society were, I explore the expectations of a socially accepted Athenian citizen and how they were buried in comparison to Athenian deviants. This analysis shows that there were certain groups that became exceptions to the expectations of Athenian normalcy while some remained dismissed from the community. Rather than being buried in areas of Athens designated for the dead, certain groups had their remains displayed through more honorable means or in places affiliated with trash and abandonment. It is because of their detachment to Athenian normality that I argue children, warriors, and the disabled are seen as the actual deviants, as opposed to the outcasts identified in literary records belonging to the Classical period.

Student Author(s): Hannah Przelomski, Junior, Chemistry and Environmental Science Catawba College

Pamela Casdorph, Senior, Biology and Environmental Science, Catawba College

Mentor(s): Carol Ann Miderski, Catawba College; ChaMarra Saner Catawba College; Joseph Poston Catawba College

Presentation: Chemistry (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 32 2nd Floor Mary Townes

Method Development for Sediment Analysis using DMA80 Mercury Analyzer

Point sources and non-point sources of pollutants can lead to elevated levels of pollutants in

environmental samples, even samples taken several miles from the source. In central North Carolina, multiple sources of mercury pollution have been identified in the Yadkin River watershed. Sediment samples were taken from Badin Lake, part of the Yadkin River watershed, during the severe drought in 2007. Core samples were preserved by being frozen in a PVC pipe at -4?C until 2016. To test mercury levels in the sediments we used a DMA80 Mercury Analyzer (Milestone). Results of initial testing showed a gradual climb in mercury levels in sequential samples. Additional testing indicated that the instrument did not return to zero between samples. After processing many samples, our team came up with an adjusted protocol based off of the interpretation of trial testing. The protocol includes using smaller amounts of sample, newer sample boats, and additional time between samples to burn off what we assume to be residual mercury from previous sample. These changes allowed us to be more accurate when using the DMA80 for measuring mercury levels. New results showed that changes to the protocol were effective.

Student Author(s): Eric Pullen, Junior, Criminal Justice North Carolina Central University

Mentor(s): Frank Anthony Rodriguez, North Carolina Central University

Presentation: Criminal Justice, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 0 2nd Floor Mary Townes

Solving Delinquency: Combining Criminal Justice and Education Systems

This article focuses on the ways in which the criminal justice and educational systems are able to prevent and aid the problem of juvenile delinquency. In America, juvenile delinquents are able to slip through efforts of an individual system that is designed to help them become assets to their community and to help them better understand the social contract that governs their community. In order to combat youth of the criminal justice system from relapsing into their known negative behaviors, funds and resources can be allocated to educational programs along with juvenile probation officers, counselors, and educators to help them step forth and combat the growing problem of youths entering the adult criminal system. Through researching current methods these systems are using and exploring new methods that can be used, it is conceivable that the juvenile justice and educational systems can combine their expertise and assets to solve a growing problem in America.

Student Author(s): Samantha Pulliam, Senior, English Chowan University

Mentor(s): Timothy Hayes, Chowan University

Presentation: English (Literature), Oral Presentations #2 (10:45 - 11:45 AM) 1234 MTSB

Kept in the Dark

In Heart of Darkness (1899), Joseph Conrad tells the story of Charlie Marlow, a man who travels to Africa and meets a corrupt man named Kurtz. Kurtz begins with good intentions but quickly turns to selfishly and savagely exploiting the African people. After Kurtz's death, Marlow visits Kurtz's fiancee with the hope that he can help her with her grief. Ultimately, Marlow chooses not to tell her the truth behind Kurtz's death because he is certain she will not be able to handle the truth about who he became. In a letter to a friend, Conrad said, "[T]he interview of the man with the girl locks in—as it were—the whole 30000 words of narrative description into one suggestive view of a whole phase of life, and makes of that story something quite on another plane than an anecdote of a man who went mad in the Centre of Africa." The question for critics is what exactly Conrad means for readers to see. Many critics say that Marlow and, to some extent, Conrad think women are too weak to handle the inner workings of imperialism. Upon closer analysis, Conrad's novella actually exposes the way that European women were deliberately kept in the dark about the harsh realities of European imperialism. Without this ignorance, the men on the ground might not have had support from the women back home and imperialism might not have existed in the same way.

Student Author(s): Autumn Rainey, Senior, Vocal Jazz Studies North Carolina Central University

Mentor(s): Lenora Hammonds, North Carolina Central University

Presentation: Music, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 57 1st Floor Mary Townes

Jacquel Brel: The inspiration behind No Me Quitte Pas

This research will examine the original inspiration and the meaning behind the renowned chanson, *No me quitte pas*. The composer, Jaquel Brel wrote the music in 1959 and it was published by Warner-Chappel. It is thought to be one of the most heart wrenching and timeless love songs of the twentieth century. There are recorded versions in twenty-five different languages, with the most well known versions being in French, English, and Dutch. Jazz pianist and singer, Nina Simone, was noted for a French version, among many other performers. I will explore why the recording done by Jaquel Brel is considered to be the most famous recording. In this presentation, I will be make inquiry into the life events that led to the writing of *No me quite pas,* as well as the text, meanings, social interpretations and musical critiques.

Student Author(s): Mizrain Ramirez, Senior, Physics North Carolina Central University

Mentor(s): Marvin Wu, North Carolina Central University

Presentation: Physics (B.S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 62 2nd Floor Mary Townes

The Characterization and Assembly of VO2 Nanostructures

Vanadium dioxide is researched for tuning electrical properties, optical properties and metal-insulator properties. The metal-insulator transition is captivating, for it occurs around room temperature. The transition temperature could be further reduced to even closer to room temperature by doping with molybdenum (Mo). Which is beneficial for several applications, such as thermochromic smart windows. In this project we have successfully synthesized VO_2 and Mo doped VO_2 by solution process method. The characterization of the product was possible by X-ray diffraction (XRD), energy dispersive X-ray spectroscopy (EDS), transmission electron microscopy (TEM), and differential scanning calorimetry (DSC). Controlling the organization of assembly could help advance the promising properties of VO_2nanostructures.

Student Author(s): Brittany Ramsey, Senior, Economics Appalachian State University

Mentor(s): John Whitehead, Appalachian State University

Presentation: Economics, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 8 1st Floor Mary Townes

Travel Cost and Consumer Surplus Analysis of 2016 Blood Sweat and Gears Bike Race

The purpose of this research is to determine if potential changing travel costs and the way the survey question is asked has an effect on whether participants of the 2016 Blood, Sweat, and Gears bike race will return the following year. This is the first study to estimate the consumer surplus of this type of sports tourism event using willingness to travel data in the return visitation literature. Data was collected in a post-race survey in which participants were asked if they would return the following year based on changes in distance traveled, yielding 510 observations. Participants were randomly assigned different versions of the question in the survey. The number of miles traveled was converted into a lower travel costs using 12.38 cents per mile, which is the cost of gas to the driver per mile (source: AAA), and participant's income. A higher travel cost variable was also used, with the cost being 48.8 cents per mile, which included the cost of maintenance. In this study, regression analysis was used to create a linear probability models. In

the model that included the participants that answered both “yes definitely” and “yes probably”, we found that the question type assigned was significant; however, in the model that only included participants that answered “yes definitely”, the question type was not significant. We also found that as travel costs increased, participants were less likely to want to return the following year. The estimated consumer surplus in the lower travel cost model that included “yes probably” and “yes definitely” responses was about $100.

Student Author(s): Elizabeth Reardon, Senior, Biology High Point University

Mentor(s): Haw Chuan Lim, Smithsonian Institution, National Museum of Natural History; Michael Braun Smithsonian Institution, National Museum of Natural History; Ehsan Kayal Smithsonian Institution National Museum of Natural History

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 53 2nd Floor Mary Townes

Phylogeographic analysis of mitogenomes of five tropical Asian birds

Phylogeography is a subdiscipline of evolutionary biology that takes into account how space and time affect the population divergence history of a species. We used a phylogeographic approach to study five tropical rainforest bird species from Asia: *Arachnothera longirostra*(Little spiderhunter), *Irena puella* (Asian fairy-bluebird), *Niltava grandis* (Large Niltava), *Pycnonotus atriceps* (Black-headed bulbul),*Stachyris nigriceps* (Grey-throated babbler). Individual members of these species can be found in museum collections throughout the world, with collection dates going as far back as the 1800s. The mtDNA of specimens were used to analyze the intra-species phylogentic relationships through next-gen sequencing, with a further evaluation of the geographic localities and the organization of the phylogenetic trees. A comparative phylogeographic analysis revealed commonalities and discrepancies among the five study species, with individuals from peripheral islands consistently demonstrating divergent taxa. Historic geographic formation of landmasses did not appear to have contributed to extensive gene flow, though further analysis and expansion is required to account for degradation occurring in mitochondrial DNA and to understand specific synonymous and non-synomous changes in the mtDNA.

Student Author(s): Quinlin Riggs, Senior, Physics Appalachian State University

Mentor(s): Richard Gray, Appalachian State University

Presentation: Physics (B.S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 5 1st Floor Mary Townes

Spectroscopic Discovery of Lambda Bootis stars and Infrared Excess Detection using Archival Data

As a part of the continued search for Lambda Boötis (λ Bootis) stars we have obtained a large number of classification spectra of early A- to early F-type stars with the SAAO (South African Astronomical Observatory) 1.9m telescope and have classified them on the extended MK system. A λ Bootis star is characterized as an early A-type to early F-type star with mild to pronounced under abundances of the iron-peak elements but near-solar abundances of carbon, nitrogen, oxygen, and sulfur. The prevailing hypothesis to explain the abundance anomalies in λ Bootis stars is that there is accretion of metal-depleted gas onto the photospheres of the stars. In order to investigate this question we are looking for circumstellar dust detectable in the far infrared part of the electromagnetic spectrum. In order to find dust we utilize a wide range of archival photometric data from sources such as the W.I.S.E. (Wide-field Infrared Survey Explorer) and Spitzer space telescopes. By modeling the flux data derived from archival data we can fit a

theoretical stellar spectrum and then add other blackbody curves on top on the stellar spectrum to try and account for any flux excesses we find in the infrared.

Student Author(s): Gabrielle Robbins, Senior, Animal Science North Carolina State University

Mentor(s): Jeffrey Yoder, North Carolina State University

Presentation: Biology (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 63 2nd Floor Mary Townes

Investigating the Role of nitr9 in Zebrafish Immunity

A large multigene family of novel immune-type receptors (NITRs) have been identified in zebrafish and other teleost fish. NITRs include inhibitory and activating forms and are structurally similar to human killer-cell immunoglobulin (Ig)-like receptors (KIRs), which are expressed on natural killer (NK) cells. A major role of NK cells is to employ NK receptors (NKRs), such as KIRs, to differentiate between normal cells and infected or cancerous cells. In general, NKRs that recognize normal cells (or "self") inhibit NK cell function, whereas NKRs that recognize infected or cancer cells activate NK cells to release cytolytic granules which directly kill the "non-self" cells. One zebrafish NITR gene, *nitr9,* is predicted to function as an activating NKR, and provide the cellular signals to activate zebrafish NK cells. Based on cell culture experiments showing that zebrafish Nitr9 can provide the cellular signals required for NK cell activation, we hypothesize that Nitr9 functions as an NKR in vivo. In order to test this hypothesis, we are generating *nitr9*-deficient ("knock-out") zebrafish and will compare their ability to battle infections and cancer with wild-type zebrafish: we predict that *nitr9*-deficient zebrafish will be more susceptible to infections and cancer. We are using CRISPR/Cas9 genome engineering strategies to develop *nitr9*-deficient zebrafish. We are employing medium-throughput strategies for targeted mutagenesis, somatic analysis, and founder screening. Here we present data on the targeted mutagenesis of *nitr9* by fluorescent PCR-based analyses. Subsequently, infection assays and tumor induction assays will be employed to compare the immune systems of wild-type zebrafish to those that *nitr9*-deficient (homozygous).

Student Author(s): Melissa Roberts, Senior, Sociology University of North Carolina - Greensboro

Mentor(s): Stephen Sills, University of North Carolina - Greensboro

Presentation: Sociology and Anthropology, Oral Presentations #4 (3:00 - 4:00 PM) 2225 MTSB

Intolerance and Inequality in LGBTQ Housing: A Fair Housing study

In January 2015, the Greensboro City Council voted to modify the City's Fair Housing Ordinance and add protections for gender identity, gender expression, and sexual orientation, making Greensboro the first city in North Carolina to protect gay, lesbian, bisexual, and transgender citizens from housing discrimination. Per this ordinance, individuals identifying as such are safeguarded from discrimination "in any public or private residential real estate transaction, including buying, selling, renting, financing, and advertising." This project aimed to uncover the current state of housing discrimination for same-sex couples by gauging the prevalence of sexual orientation discrimination by housing providers. Limited data exists on the prevalence of rental housing discrimination based on sexual orientation bias in the United States. Friedman *et al.* (2013) found evidence of differential outcomes for same-sex couples in online solicitations for rental housing as part of a large scale study (n=6,833). While evidence of discrimination on the basis of sexual orientation and gender identity has been established by Freidman's study, there yet exists a gap in research, as well as reporting, and enforcement for a problem that may affect up to a third of same-sex home seekers. Prior to our study, no tests had been conducted for sexual orientation or sexual identity discrimination in Greensboro. This project followed the methods of previous correspondence tests by sending email solicitations to

all known Greensboro housing providers who could be contacted online or via email. Three conditions were tested: male same-sex couple, female same-sex couple, and heterosexual couples as a control. Findings show some differential outcomes, as well as poor business practices that may confound some results. This presentation will focus on correspondence study methods as well as study findings.

Student Author(s): Michelle Robinson, Senior, Public Health Education North Carolina Central University

Mentor(s): Mildred Pointer, North Carolina Central University

Presentation: Public Health Education, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 31 1st Floor Mary Townes

Sex Difference in Coping May Explain Biological Response to Environmental Stress in a Cohort of African Americans

Young hypertensive African American (AA) males are up to 14 times more likely to have kidney disease than any other sector of the US population. The cause of this increased risk for kidney disease is unknown. Recent studies reveal that stress is a significant contributor to kidney disease in AAs. Therefore, we postulated that stress may contribute to kidney disease by activating biological systems as a consequence of emotional and/or uncontrolled reactions to stress. We further posit that AA males may exhibit uncontrolled reactions to stress, which may cause them to have a greater biological response to stress. To test this hypothesis, we recruited AA males (n=21) and females (n=45) between 18 and 60 years of age from the Research Triangle region in North Carolina. Two surveys were administered: one for assessing emotional response to environmental stress of perceived racism (Perceived Racism Scale) and one for assessing uncontrolled reactions to stress (John Henryism Active Coping--JHAC). Saliva samples were collected to measure cortisol, a biomarker of biological system activation. We found that AA males did not control their emotional response to perceived racism; cortisol levels increased as emotional response to racism increased (p=0.033). No association between emotional response and cortisol was found in females (p=0.6). On the other hand, higher JHAC coping scores were associated with lower cortisol levels in females (p=0.0003), but no such association in males (p=0.4). We interpret these findings to suggest that: (1) John Henryism, used as a coping mechanism, can mitigate the stress response; and (2) this coping mechanism appears to work for AA females but not for AA males. Thus, if AA males learn how to use the John Henryism coping mechanism to control their emotional response to stress from racism, it may mitigate the biological response and reduce their risk for kidney disease.

Student Author(s): Luis Roldan, Junior, Chemical and Biomanufacturing Engineering North Carolina State University

Mentor(s): Michael C. Flickinger, North Carolina State University

Presentation: Engineering Cooperative Program, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 71 2nd Floor Mary Townes

Developing non--growth conditions for Methylomicrobium alcaliphilum

The group works with *Methylomicrobium alcaliphilum 20ZR*, an aerobic methanotrophic bacterium that produces organic acids from methane. The bacteria are currently being studied for these properties; however, they are traditionally cultivated in a stirred tank reactor (STR), which requires high amounts of energy to provide the cells with the adequate methane and oxygen amounts. Our laboratory immobilizes cells on paper substrates to be placed in continuous falling film reactors (FFR). Gas transfer to the cells in a FFR occurs at much lower energy input than in a STR. Additionally, our lab has shown that the cells can be sustained in a non-growth condition,

and remain metabolically active for thousands of hours. Non-growth conditions are achieved by low temperatures or nitrogen limitation, which might have a negative effect on the rate of methane and oxygen consumption by the cells. On the other hand, salinity and copper availability could increase consumption and counteract the negative effects of the non-growth conditions. Using design of experiment, we will determine the effects that different compositions of the liquid media have on the growth rate of the cells and their methane and oxygen consumption. We will use gas chromatography as a method to establish the specific methane and oxygen consumption rate per cell. We are determining the optimal very slow or non-growth conditions, which retains the highest rate of methane and oxygen consumption. Our team will prove that *Methylomicrobium. alcaliphilum 20ZR* will remain metabolically active under non-growth conditions. This will enable the design of falling film bioreactors to convert methane at much lower energy input into fuels and chemicals, while reducing environmental contamination from methane flaring.

Student Author(s): Gabriel Rowell, Senior, Business Administration High Point University

Mentor(s): Daniel Hall, High Point University

Presentation: Economics, Oral Presentations #2 (10:45 - 11:45 AM) 2225 MTSB

Desertification In China: An Environmental and Economic Hazard.

China's desertification is symptom of the depletion of grasslands, forests, and watersheds and the ecosystem services they provide. It is also a symptom of climate change, but this is a global problem so focus remains on what China can control within its borders. Desertification exacerbates other environmental and resource problems, including those that contribute to more desertification. China, in response, has attempted restoration of these resources that are being used to combat desertification. The goal of this research is to see what are the environmental risks, economic threats and human health damages of desertification in China. How did China's past policies bring itself to the challenges of desertification? How has desertification affected environmental quality in China? How are their policies dealing with the problem?

Student Author(s): Jacobo Rozo Posso, Junior, Bachelor's of Science Plant and Soil Science Agronomic Business concentration North Carolina State University

Mentor(s): Marcela Pierce, North Carolina State University

Presentation: Biology (B. S.), Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 7 2nd Floor Mary Townes

Vacuole morphology might contribute to tentacle movement of the carnivorous plant Drosera capensis

Vacuoles play an important role in plant cells, occupying more than 90% of the volume in most cells and are essential for metabolic processes. Vacuole fusion plays a role in the formation of the central vacuole, and vacuole morphology is responsive to environmental stimuli. This is observed, for example, in guard cells during stomata movements, where vacuoles are fused in open stomata and they fragment when the stomata close. In these cells, fragmented vacuoles will also fuse after application of Wortmannin, which implicates phosphoinositides in vacuole fusion. Wortmannin inhibits the synthesis of phosphoinositides, which are important lipids for membrane trafficking. Moreover, vacuole morphology changes have been observed in pulvini motor cells of *Mimosa pudica*, a plant that folds its leaves inward when touched. In this study, we are analyzing the role of vacuoles during tentacle movement of the carnivorous plant *Drosera capensis*. We hypothesize that the central vacuoles in the motor cells will fragment when stimulus is applied to the leaf, and the vacuoles will fuse to a large central vacuole during the process of tentacle re-opening. We have developed a tentacle stimulation assay in Drosera using

Murashige and Skoog media. Staining with fluorescent dyes is being used to visualize vacuole morphology changes by confocal microscopy. We also provide evidence that phosphoinositides are regulators of tentacle movement by a pharmacological approach. These results suggest that organ movement in Drosera is analogous to organ movements in the guard cells of stomata and pulvini motor cells in the mimosa plant. All three movements have similar function but different anatomical context.

Student Author(s): Georgina Ruiz, Senior, Biology University of North Carolina - Wilmington
Katy Nickel, Junior, Marine Conservation Biology, University of North Carolina - Wilmington
Kelcie Hall, Senior, Biology, University of North Carolina - Wilmington
Mentor(s): Susanne Brander, University of North Carolina - Wilmington
Presentation: Biology (B. S.), Exhibits (10:45 - 12:00 PM) 1225 MTSB

Impacts of marine plastics on a mid-trophic level estuarine fish (Menidia species)

The environmental impact of marine plastic debris continues to increase, and it is predicted that by the year 2050 there will be more plastic than fish in the oceans. Plastic debris can harm marine organism via multiple mechanisms, such as the adsorption of toxic chemicals which are transferred to the organism, or by physical injury induced by hard, often sharp, plastic fragments. Previous studies have determined that estuarine fish such as Menidia beryllina (Inland silverside) will ingest microplastics (<5 mm) via trophic transfer (from prey) in a laboratory setting. This plastic ingestion by silversides appears to lead to physical blockage of their digestive tracts. The current study is examining whether wild silversides ingest plastic debris in their natural habitat. The digestive tracts of fish collected from several locations in the Cape Fear region were processed to separate organic from synthetic materials (e.g. plastic particles). Remaining particles were stained with plastic selective dye and found to fluoresce under a confocal microscope. Samples will now undergo Ramen spectroscopy to both confirm the presence of plastics and to determine the type of plastic if they are found. We hypothesize that wild silversides will have ingested microplastic particles, given the predominance of this type of debris in estuaries and oceans.

Student Author(s): Christian Rust, Sophomore, Chemical Engineering, Textile Engineering North Carolina State University
Mentor(s): Stephen Rankin, University of Kentucky
Presentation: Engineering - Chemical & Biomolecular, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 46 2nd Floor Mary Townes

Photocatalytic Mesoporous Titania Thin Films on Porous Substrate through the Evaporation-Induced Self-Assembly Method

Mesoporous titania with accessible hexagonally close-packed (HCP) pores have been layered onto a macroporous support (anodized aluminum oxide (AAO) membrane). These composite membranes have been characterized through SEM imaging, solvent flux measurements, X-ray diffraction, and Grazing-Incidence Small-Angle X-ray Scattering (GISAXS) experiments. These membranes were made by first altering the AAO support to be chemically neutral to the deposition of titania with the pore templating surfactant, Pluronic F127, then using a sol-gel method of preparation using titania tetrachloride as a precursor, and through evaporation-induced self-assembly, a porous layer of titania was deposited onto the surface of the AAO support. These membranes were then calcinated to remove the surfactant. Further these membrane's photocatalytic properties were tested in a batch system using methylene blue as a model pollutant.

Student Author(s): Emily Ryu, Freshman, Mathematics Appalachian State University

Mentor(s): Lori Tyler, Appalachian State University

Presentation: Mathematical Economics, Oral Presentations #1 (9:30 - 10:30 AM) 1008 BRITE

A Model for Political Polarization Based on Various Economic Indicators

The American political atmosphere is becoming increasingly polarized, an undesirable situation that decreases efficiency in and satisfaction with political systems. Existing research has found a positive correlation between economic inequality and political polarization and a negative correlation between private investment and political polarization. To better understand polarization, this study examined various national economic indicators and their relationships with the level of political polarization in the United States to find which factors were most strongly correlated with polarization. No significant correlations were found between individual income, income inequality, foreign direct investment, or inflation and political polarization, but significant positive correlations were found between unemployment and poverty rates and political polarization. Based on these findings, a multiple regression analysis was used to create a model for political polarization based on the unemployment and poverty rates. This model can help further understanding of some of the driving factors behind increasing political polarization and has potential extensions to other years and countries where polarization is occurring.

Student Author(s): Ryan Sacchere, Sophomore, Biology/Wildlife Veterinary Medicine Gaston College

Mentor(s): Ashley Hagler, Gaston College

Presentation: Biology (B. S.), Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 51 2nd Floor Mary Townes

Analysis of Soil Isolates from Antibiotic Producing Bacteria

The **Small World Initiative (SWI)** incorporates the search for antibiotic producing microbes from soil in the undergraduate biology curriculum at Gaston College. Excessive use of antibiotics can lead to naturally occurring bacterial strains becoming antibiotic resistant (Zuraw, 2013). The "ESKAPE" pathogens cause serious and life-threatening infections, and are also currently the cause of the majority of U.S. hospital infections and effectively "escape" the effects of available drugs (Relman, 2012). For this project, soil samples from a local residence within a 30-mile radius of Gaston College are plated for antibiotic resistance against known safe pathogenic bacterial relatives. The bacterial relatives used in this research include *Staphylococcus aureus, Escherichia coli, Enterobacter aerogenes*, *Klebsiella pneumonia*e , and *Proteus vulgaris*. A BSL 2 Laboratory on the campus of Gaston College is used. The samples are involved in several processes including the patch and plate, lawn, Gram stain, SIMS, KOH, and Amylase. Various chemical testing, including solubility, separation, and extraction of organic solvents are utilized. Genetic testing provides the final classification of the isolates. LB agar with cycloheximide and MacConkey agar for enteric classification are used.

Student Author(s): Justin Safin, Senior, BS Biology East Carolina University

Mentor(s): Elizabeth Ables, East Carolina University

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 52 2nd Floor Mary Townes

The Role of Pre-Replication Complex Proteins in Drosophila Ovarian Stem Cell Maintenance

Cancer stem cells (CSCs) may hold the key to advances in cancer research. Like adult tissue-specific stem cells, CSCs are able to self-renew and last a lifetime. These shared characteristics can thus be used to help learn more about CSCs and how they work. More specifically, understanding the molecular mechanisms that control adult tissue-specific stem cell proliferation can lead to better regenerative therapies and a better understanding of CSCs overall. The proliferation of *Drosophila* ovarian germline stem cells (GSCs), as well as their ability to create differentiated daughters, relies on proper DNA replication. By investigating the regulation of stem cell division, we can advance our knowledge of the fine line between regulated versus unregulated division, and the causes behind each. One of the major components of replication control are the pre-initiation complex (PIC) proteins, which are essential for proper DNA replication. For example, Minichromosome maintenance protein 10 (*MCM10*) is recruited during the transition from G1 to S-phase, and aids in the recruitment of other PIC proteins to the replication fork. My research demonstrates that loss of *MCM10* results in a reduction in stem cell number and an increase S-phase length which is an indication of an altered cell cycle. Further research should be conducted to determine if stem cell loss in *MCM10* mutants is due to DNA damage and to observe the effects of other pre-replication initiation complex mutant proteins.

Student Author(s): Indrani Saha, Senior, Program II (Cognitive Aesthetics) Duke University

Mentor(s): Mark Olson, Duke University

Presentation: Individualized Major Program, Oral Presentations #3 (1:45 - 2:45 PM) 2225 MTSB

Being Within: Carlos Cruz-Diez's Chromosaturation, a Site of Perceptual Disruption and Action

Ocularcentrism informs dominant art historical methodologies. However, contemporary art requires a different type of analysis -- one that addresses the whole body in space and moves beyond the primacy of vision. The case study of Carlos Cruz-Diez's light-based installation,*Chromosaturation*, demonstrates the need for an embodied approach to contemporary art analysis. The experience of immersive art places participants in a domain where they encounter both loss and reconstitution of the body. In Cruz-Diez's work, light creates an environment, but it is the action of the participant that provide the context. With a thorough understanding of visual neurobiology, Cruz-Diez disrupts vision's spatial orientation within three monochromatic light chambers. Crowd-sourced video data collected from the installation reveals an interesting trend: with vision inhibited, participants seek to employ other sensory modalities to find their bearings. They attempt to feelgrounded within each chromatic chamber, often using other bodies to situate themselves in the disorienting space. The treatment of the senses and the body of the participant becomes integral to examining the installation, but is often ignored. This lacuna in the discussion of*Chromosaturation* and other sensorial works warrants examination especially through an interdisciplinary lens, combining neuroscience, phenomenology, anthropology and art history. How each discipline treats the concept of embodiment serves as a site of convergence. The work of Maurice Merleau-Ponty and Marshall McLuhan, in particular, provide a theoretical framework to support a sensory modality-based approach. Immersive environments demand a methodology that addresses not only information from the visual faculty, but ultimately, the multi-sensorial body as a whole.

Student Author(s): Gurnoor Sangha, Senior, Biomedical Engineering East Carolina University

Mentor(s): Barbara Muller-Borer, East Carolina University

Presentation: Engineering - Biomedical, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 50 2nd Floor Mary Townes

Improving Cell Culture with a Rapid Prototyping Technique

A challenge to successfully grow stem cells on electrospun scaffolds is to keep the scaffolds

submerged and hydrated to facilitate cell growth and proliferation. The goal of this project was to design a system, technique or tool to immerse and secure electrospun scaffolds in multiwell tissue culture plates during cell culture. Circular weights to fit inside a 6 well cell culture plate (1.14 inches in diameter with a 0.30 inch diameter hole) were designed in SolidWorks. The weights were 3D printed in a thermoplastic polymer, Acrylonitrile Butadiene Styrene (ABS) on The Dimension machine (1200es). An acetone vaporization process was used to seal the weights. The 3D printed ABS weights were suspended above a volume of acetone in a glass container. The container was heated to near Acetone's boiling point 56°C for 20 minutes. The vapor from the warmed acetone sealed the weights. The weights were rinsed in 70% solution of ethyl alcohol and placed under UV lights for 24 hours with the scaffolds. The 3D printed weights were evaluated for ease of use, stability and effectiveness under several scaffold hydration and cell culture protocols. These weights were placed and removed from the wells using forceps easily. Observations were made on timing, placement, cell interaction, cell culture sterility, and ease of use. Although the weights were effective in keeping the scaffolds hydrated to facilitate cell growth, it was found that the weights contributed to cell culture contamination. In addition the weights adhered to the scaffolds when placed in cell culture media making it harder to remove without damaging the scaffolds. In the future, more effective sterilization techniques will be developed to enhance cell proliferation and viability.

Student Author(s): Crystal Sarnor, Senior, Biology Chowan University

Mentor(s): Corina Wack, Chowan University

Presentation: Biology (B. S.), Oral Presentations #3 (1:45 - 2:45 PM) 1221 MTSB

Effects of handling stress on the physiology and behavior in mudminnows

Understanding the physiological effects of stress in fish allows for a better understanding of the environment and aquaculture. In fish, the stress response stimulates the release of cortisol (Barton, 2002). Stress alters the immune response through the release of cortisol, which increases the number of circulating neutrophils and decreases the number of circulating lymphocytes, thereby increasing the neutrophil:lymphocyte (N:L) ratio (Barton and Iwama, 1991; Davis and Maerz, 2010). Stress also directly affects behavior and indirectly affects oxygen consumption in fish. When an animal is stressed, some behaviors are increased to allow the animal to flee, which also increases oxygen consumption due to the increased metabolic need (Christansen, et al., 1991). Mudminnows (*Umbrae pygmaea*) were used to test the effects of handling stress on N:L ratio, activity, and oxygen consumption. For activity levels and oxygen consumption, each fish was tested after a handling stress and no stress control in a repeated measures design. For the N:L ratio, half of the fish were stressed while the other half were not stressed (control) before trunk blood was collected. I predicted that N:L ratio, activity, and oxygen consumption will increase after handling stress compared to the controls.

Student Author(s): Daniel Sasfy, Senior, Financial Economics Methodist University

Mentor(s): Josiah Baker, Methodist University

Presentation: Economics, Oral Presentations #2 (10:45 - 11:45 AM) 2225 MTSB

China`s Dual System: How is Communism Compatible with a Free Market Economy?

This presentation explores three main economic policies that form the basis of China`s unique market-oriented system. Present-day, China is an unusual mixture of communist politics and market-oriented economics. Unlike other communist countries China so far has successfully reform its economy while retaining its governmental structure and system. Like all countries China depends on tax revenue. However, taxes are often used to its domestic industries to provide advantages to export-oriented corporations. This strategy serves the interest of the government. This arrangement has yielded a prosperous economy, which benefits the Chines government by eradicating pressures for political reform. Ultimately, this presentation aims to

answer the question: What economic policies contribute to China`s success? This presentation will show that for example, China`s arrangement is a modernized form of mercantilism, which aims to maximize export revenues. China has rightly realized that the ills of public ownership leads to a decrease in corporate revenues. As a result, China`s government provides partial or complete private ownership in some segments of the market. In China`s case government ownership, subsided wages, and impressive economic growth all have positively affected the country enough to preserve its political order. Maintaining a positive trade balance is a critical component. Despite economic development being clustered on the east coast, China has planned to develop its entire territory by aggressively applying its export oriented policies. This includes low taxes on exports, low labor costs, and minimal production costs. These policies are predominant presented in its Special Economic Zones (SEZs). Last this presentation will explain China has a maintained a political and economic system that ideologically contradict each other.

Student Author(s): Gabrielle Saygbe, Senior, Communication Arts Johnson C. Smith University

Mentor(s): DaKysha Moore, Johnson C. Smith University

Presentation: Liberal Studies, Oral Presentations #4 (3:00 - 4:00 PM) 1234 MTSB

Exploring the Image of Black Characters in the Science Fiction Films Beloved and the Book of Eli.

This study explores the image of Black characters in the science fiction films *Beloved* and *the Book of Eli***.** Using a thematic analysis, characteristics and traits of Black characters will be examined by comparing the two films through several focuses that identify the roles Blacks play in science fiction films. Science fiction has been deemed as an esoteric, extra-terrestrial, green-eyed being. Producers are now finding ways to make the genre more alluring by adding elements to the film that are speculative as well as relevant to viewers' experiences. While being in a time where society creates subjugated labels for imageries for one to live by, Hollywood's film industry gives minorities a certain role films. The purpose of this study is to explore the Black image in the science fiction films *Beloved* and *the Book of Eli*. There are three main research questions for this study. How are African Americans portrayed in the films *Beloved* and *the Book of Eli*? How do the supporting characters respond to the main African American characters in *Beloved* and the *Book of Eli*? And, what mystical elements can be found in the films *Beloved* and *the Book of Eli*? These two films introduce science fiction in a way that is concealed and apparent altogether. The films also present Black protagonist that are seen through a heroic and alienated scope. The researcher developed four major themes after analyzing the films. The main themes are religion, spiritual gifts, quest and death.

Student Author(s): Shania Scales, Junior, Criminal Justice North Carolina Central University

Mentor(s): Frank Anthony Rodriguez, North Carolina Central University

Presentation: Criminal Justice, Oral Presentations #1 (9:30 - 10:30 AM) 2225 MTSB

The Differential Association Theory

Delinquent behavior and preventing such behavior, by positive/negative reinforcement, modeling, and imitation are posited in the learning theory. Learning theory may be used to analyze delinquent behavior and prevention.Learning theory also states that criminal behavior is decreased through extinction or punishment. Edwin Sutherland developed differential association theory, by proposing that when individuals interacted with each other, they learned: values, attitudes, techniques, and motivations towards delinquent behavior. Differential association theory is a critical aspect when it comes to the learning theories of deviance. Recommendations to help reduce delinquency will also be explored.

Student Author(s): Hannah Scanlon, Freshman, Statistics University of North Carolina -

Charlotte

Chelsea Fang, Freshman, Statistics, University of North Carolina - Charlotte

Mentor(s): Lori Tyler, Appalachian State University

Presentation: Individualized Major Program, Oral Presentations #1 (9:30 - 10:30 AM) 2226 MTSB

Influential Factors in STEM Learning

For the past several decades, and more intensely in the last few years, STEM education has been pushed to the forefront of the education field in order to improve the United States' international standing in relation to STEM. Using the National Center for Education Statistics' High School Longitudinal Study of 2009, the breadth of pedagogical approaches related to STEM education that student experienced in high school was studied to identify any positive influences on those students' objective math test scores, self-reported identification with STEM disciplines, and STEM-related career choices. The relative impacts of selected demographic variables including parent education level and socioeconomic status on objective math test scores was also tested. Hypothesis tests and linear regressions were applied to the data to identify relationships and correlations among the variety of variables tested. Based on this described approach, relationships were found between a number of variables including STEM education experienced and students' self-reported identification with math. However, no relationship was found among many other variables including STEM education experienced and students' intentions to pursue STEM careers. This research assesses the effectiveness of recent educational efforts and can be used to further the national improvement in STEM fields.

Student Author(s): Aleaha Schenck, Junior, Chemistry North Carolina Central University

Mentor(s): ,

Presentation: Chemistry (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 32 1st Floor Mary Townes

The Effects of Plasma Treatment on Pristine Graphene

Graphene is a fascinating two-dimensional (2D) materials with outstanding physico-chemical properties that makes it promising for a variety of different applications. As a 2D material in which all of the atoms are on the surface, graphene is very sensitive to its chemical environment. In this work, chemical vapor deposition routes were using to synthesize pristine and nitrogen-doped graphenes, after which they were chemically modified. The ultimate goal of the modification of the graphene is to carefully tune its chemical and electronic properties, which would have a huge impact in the resulting device properties that could be achieved. In particular, graphene was synthesized on copper foils using toluene or pyridine as a carbon source in a unique bubbler-assisted furnace. Subsequently, the graphene was transferred from its original copper substrate onto a SiO_2/Si substrate using a polymer-assisted wet transfer method. Oxygen plasma etching was carried out and the 2D layers were characterized both before and after the treatment. Raman spectroscopy, which is one the most important characterization techniques for 2D materials, was used to analyze the changes in the graphene after plasma treatment. Since the plasma treatment creates defects in the graphene, we observed a large increase in the "defect-induced" Raman mode of graphene, or the D-peak, in samples that were plasma treated. Thus, by varying the time of the plasma treatment, we are able to control the amount of defects in the sample which was monitored by Raman spectroscopy.

Student Author(s): Joel Schlaudt, Senior, Biology Catawba College

Mentor(s): Joseph Poston, Catawba College

Presentation: Biology (B.A.), Oral Presentations #2 (10:45 - 11:45 AM) 2221 MTSB

Ecological interactions between yellow-bellied sliders (Trachemys scripta scripta) and red-

eared sliders (T. s. elegans)

The red-eared slider (*Trachemys scripta elegans*) is popular in the pet trade. Owners release unwanted turtles in the wild, with potential impacts on wild, native turtle populations. Many studies have examined the impacts of red-eared sliders on other species in many areas around the world. However, interactions between red-eared sliders and other subspecies of *T. scripta* have not been examined as carefully. The Catawba College campus hosts a population of slider turtles. Prior to 2007, one or more red-eared sliders became established on the campus. To better understand the interactions between these two subspecies, in fall 2012 and fall 2016 the sliders were trapped and the color patterns on their plastron and on their head and neck were scored to gauge their taxonomic identity (*T.s. scripta, T.s. elegans*, or intergrades between the two subspecies). By measuring the body size and weight of turtles we calculated an index of condition. We compared the condition of turtles based on their taxonomic identity. We then compared the frequencies of phenotypic traits for turtles from 2016 with those captured in separate bouts of trapping in 2007 and 2012.

Student Author(s): Johanna Schoenecker, Senior, Environmental Science Queens University of Charlotte

Mentor(s): Jessica Braswell, Queens University of Charlotte

Presentation: Environmental Science, Oral Presentations #2 (10:45 - 11:45 AM) 2221 MTSB

Spatial Evaluation of Trees Planted by TreesCharlotte from 2012-2015 Presented as ArcGIS Storymap

TreesCharlotte is a nonprofit organization founded in 2012, whose goal it is to achieve 50% canopy cover for the city of Charlotte by 2050. Organizing community tree plantings and tree giveaways as well as educating the public about trees and tree care are means the organization uses to reach their goal. Over 10,000 trees have been planted since the foundation of TreesCharlotte and their location was recorded by address. Using ArcGIS Online, we geocoded these addresses to represent the planted trees spatially on a map of Charlotte. We used census data about ethnicity and average household income and overlapped that information with the data of planted trees. This approach revealed insightful information, and could prove useful for TreesCharlotte, as future tree planting campaigns could respond to the need for trees in downtown Charlotte, and the Northern and Eastern parts of the city, as these districts have experienced only few tree plantings. The results were implemented into a storymap in ArcGIS Online to tell the story of trees planted by TreesCharlotte with the help of spatial representations and act as an aid for future tree plantings to achieve the goal of 50% canopy cover by 2050.

Student Author(s): Melinda Schueneman, Junior, Chemistry and Applied Mathematics University of North Carolina - Asheville

Mentor(s): Sally Wasileski, University of North Carolina - Asheville

Presentation: Chemistry (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 20 1st Floor Mary Townes

Investigation of Periodic Trends in Catalytic Activity for O-H and C-H Bond Cleavage of Ethanol by Periodic Density Functional Theory

Steam reforming reactions that generate hydrogen from biomolecules using a non-precious metal catalyst are becoming ever more valuable as the need for sustainable energy production processes increase. Thirteen transition metals were examined for their catalytic ability in ethanol dehydrogenation reactions: Ag, Au, Cd, Co, Cu, Fe, Ir, Ni, Pd, Pt, Rh, Ru, and Zn, which includes both precious metal and non-precious metal catalysts. The reactions were examined using periodic density functional theory models of the catalyst surface as a (111) surface plane and reaction energies were calculated after a multi-step geometry optimization of the surface-

adsorbate system. Optimum geometries and reaction energies were determined for C-H and O-H cleavage reactions over all metals to investigate periodic trends in catalytic activity. Trends in C-C and C-O bond distances of ethanol and its dehydrogenation products, as markers of changes in intramolecular bonding, and trends in C-H and O-H reaction energies were examined and will be presented. It was found that C-H bond cleavage became more favorable when moving inward toward Pd and O-H bond cleavage became more exothermic when moving up and to the left of the periodic table, similar to established trends in the literature. Based on the reaction energetics, nickel and cobalt show the most potential as non-precious metal catalysts that could positively contribute to the sustainable production of hydrogen gas.

Student Author(s): Tyra Scott, Sophomore, Music North Carolina Central University

Mentor(s): Lenora Hammonds, North Carolina Central University

Presentation: Music, Performances (9:30 - 10:30 AM) BN Duke Auditorium

Agathe: Emotional Expression in Carl Maria von Weber's "Der Freischütz"

This research will examine composers Friedrich Kind's and Carl Maria von Weber and their opera, *Der Freischütz,* a Romantic opera first performed in Berlin at the Royal Opera on June 18, 1821. One of the arias in the opera is titled *Und ob die Wolke sie verhülle* which translates to "Through clouds obscure still shines the sun in radiant sky" and is sung by character Agathe. In this presentation, I will be researching the expression of emotions about religion, values about marriage and women's roles in German literature during the time of the composers, and the occurrence of emotions in the music and. The analysis of audio and video performances, critical literature and historical documents about the music, the role of Agathe within the opera, and themes represented in the text.

Student Author(s): Tiffany Sears, Senior, Kinesiology Pre-PT Campbell University

Mentor(s): Jennifer Bunn, Campbell University

Presentation: Exercise Science, Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 17 1st Floor Mary Townes

Wrist-Worn Physical Activity Trackers Progressively Underestimate Steps With Increasing Walking Speeds

To determine step-count accuracy of pedometers at different walking speeds. Ten recreationally active participants walked at five treadmill speeds (0.89, 1.11, 1.34, 1.56, and 1.79 m/s) for five minutes while wearing four wrist-worn activity trackers (Fitbit Charge HR®, Garmin Vivosmart HR®, Apple iWatch®, Jawbone UP3®) and the hip-worn Digi-Walker®. Each step was manually counted by a research technician, and video of each participant was also obtained to ensure accuracy. Total step count at each speed from all devices was obtained and compared to the manual step count (benchmark) using one-way ANOVA and Pearson correlation coefficient. For all five speeds, the Digi-Walker® yielded the most accurate values, averaging -0.4% difference from the benchmark counted steps, and also showed the strongest correlation, $r > .730$, $p < .05$, at every speed. The Fitbit averaged the highest percent difference of -10.2% from the benchmark of counted steps, and significantly underestimated steps at all speeds ($p < 0.05$). Garmin averaged a -2.7% step difference, Jawbone averaged a -5.3% step difference, and the iWatch showed a -7.9% step difference. All four wrist-worn devices significantly underestimated steps at the fastest speed ($p < .05$). Specifically, the Fitbit, Garmin, and Jawbone all got progressively worse with increasing speed, whereas the iWatch performed the worst at the slowest and fastest speeds. All wrist-worn devices tested tended to underestimate steps. These data indicate that wrist-worn pedometers are inaccurate even when doing the exact thing they were designed to do: count steps in a controlled manner. Because these devices are inaccurate in this setting, they remain highly questionable for accuracy in a real-world setting in which the definition of a "step" becomes less finite.

Student Author(s): Blake Seaton, Senior, Chemistry Appalachian State University

Mentor(s): Libby Puckett, Appalachian State University

Presentation: Chemistry (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 26 2nd Floor Mary Townes

Indirect determination of enzyme kinetics using capillary electrophoresis with chemiluminescence detection

A custom-built instrument combining capillary electrophoresis (CE) with chemiluminescence (CL) detection was used to study enzyme activity via electrophoretically mediated microanalysis (EMMA). The activity of the enzyme, glucose oxidase, was determined indirectly by measuring the amount of byproduct (hydrogen peroxide) formed when reacted with substrate, β-D-glucose. Instrument validation was completed by introducing luminol to the CE-CL system, allowing it to react with hydrogen peroxide in the outlet, and measuring the amount of light produced using a photon counter. A calibration curve was generated using a range of luminol concentrations and a linear relationship was discovered ($R^2 = 0.9405$). After instrument validation was complete, various concentrations of glucose oxidase were introduced into the column containing β-D-glucose to produce hydrogen peroxide, which then interacted with luminol in the outlet to produce light. After a linear ($R^2 = 0.9938$) calibration curve was generated, it was concluded that 25 U/mL glucose oxidase was the optimal concentration to use for the enzyme studies. Keeping the enzyme concentration constant at 25 U/mL, the β-D-glucose concentration was varied in order to determine kinetic constants. The K_m value for glucose oxidase was determined to be 24.8 mM. Reported K_m values for glucose oxidase reacting with β-D-glucose, at a similar pH, range from 0.3 to 337 mM. The CE-CL system proved itself to be useful for indirect kinetic studies involving enzymes that generate hydrogen peroxide.

Student Author(s): Sofia Sedergren, Senior, History and Political Science Greensboro College

Mentor(s): Allison Palmadessa, Greensboro College

Presentation: Individualized Major Program, Oral Presentations #3 (1:45 - 2:45 PM) 1234 MTSB

Framing Political Debates Based on Women's Suffrage: The Case of Great Britain, 1916-1930

This project focuses on the impact of the passage of women's suffrage on the political debate in Great Britain from 1916 to 1930 through the study of issues specifically framed for women in handbooks disseminated to women voters after the passage of partial women's suffrage in 1918 and adult suffrage in 1928. The study is focused on two research questions: 1. What political issues were framed for women in the aftermath of the passing of the Representation of People Act of 1918 and the Equal Franchise Act of 1928?; and 2. How did women's suffrage in Great Britain impact the political issues debated in Parliament and the media 1916-1930? Through a textual analysis of political information and propaganda disseminated to women as a means to educate the new constituency and win the women's vote, the topics considered central to women in the political context are extrapolated and examined, resulting in search terms used in a textual analysis of Parliamentary records and media reporting from the *Times*. Additionally, the examination of legislative action in Parliamentary debates and media reporting in the *Times* connected to the attainment of women's suffrage and issues specifically framed for women provides the basis for an analysis of potential shifts in political issues discussed in Parliament and the media as a result of women's suffrage. The analysis of Parliamentary records and media records contribute to determining the impact of women's suffrage on larger political debates. Findings from a contiguity based analysis of the three sources clarify the impact that shifts in the constituency has on political issues highlighted in political debates and, by extension,

different groups within the constituency's influence on the political system.

Student Author(s): Elizabeth Seldomridge, Senior, Exercise Science University of North Carolina - Wilmington

Austin Smith, Senior, Exercise Science, University of North Carolina - Wilmington

Haley Norris, Junior, Exercise Science, University of North Carolina - Wilmington

Mentor(s): Robert Boyce, University of North Carolina - Wilmington
Michele Parker University of North Carolina - Wilmington

Presentation: Exercise Science, Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 29 1st Floor Mary Townes

Bench Press Strength Changes Over 23 Years In Police Recruits With Gender Comparisons

Strength is a vital component in the performance of police duties to ensure the safety of officers and those they serve. Therefore, the initial strength the officers brings to the training program predicts the level of strength they will maintain throughout their careers. The purpose of this study is to evaluate bench press strength changes that occur in police recruits from 1990 to 2013 with gender comparisons. During the first week of police recruit training in a large southeastern metropolitan area, bench press strength and bench press weight ratio were evaluated in 2,460 recruits. ANOVA and Bonferroni post hoc procedures were used to evaluate data. The initial ANOVA indicated significant differences in males for both variables at $p \leq 0.05$. Males tended to increase in bench press strength from 1990 to 2007 (83.7 ± 2.0 kg to 95.9 ± 2.1 kg, p ? 0.01). Male bench press strength tended to plateau after 2007. No discernable pattern was seen in females for both variables and little change in males was observed in bench press weight ratio. Overall, males had a tendency to become stronger over time when considering their initial test scores in recruit school. However, females tended to remain at approximately the same muscular strength across the 23 years.

Student Author(s): Alana Seldon, Senior, Communication Arts Johnson C. Smith University

Mentor(s): DaKysha Moore, Johnson C. Smith University

Presentation: Liberal Studies, Oral Presentations #3 (1:45 - 2:45 PM) 1234 MTSB

Painting a portrait of women-flashbacks in time: Scandal Season One

While people frequently watch a variety of different television shows, they rarely pay attention to the hidden messages displayed within the content. This study analyzes how women are portrayed in the ABC Network drama *Scandal Season One*. The researcher developed three research questions while analyzing the drama. How are women portrayed in ABC's *Scandal Season One*? What are some of the difficulties that even powerful women on *Scandal Season One* face? And how does race play a part in the stereotypical depiction of the female characters in *Scandal Season One*? The researcher uses a thematic analysis to identify and group themes that developed throughout the season. The three themes identified are 1) *Irony, 2) Loyalty, and 3) Reputation*.

Student Author(s): Kelsey Sexton, Senior, Music Performance University of North Carolina - Charlotte

Mentor(s): Mira Frisch, University of North Carolina - Charlotte

Presentation: Music, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 63 1st Floor Mary Townes

German School of Cello Playing: Providing an Anthology of Georg Goltermann's Works for Student Cellists

The goal of this joint project with Dr. Mira Frisch, Associate Professor of Cello at UNC

Charlotte is to create an anthology and recording of select student works written by German cellist Georg Goltermann (1824-1898). There is currently a gap between the eighth and ninth levels in the standard Suzuki string method books (which span levels 1-10) used by most modern cello teachers. This gap does not promote gradual technical development and many teachers recognize that some students struggle upon reaching level 9 due to inadequate preparation. Through this project, Dr. Frisch and I will encourage cello teachers improve the overall state of cello pedagogy by providing a printed anthology and professional DVD recording of carefully selected pieces by Goltermann. Pieces chosen for our anthology feature technical skills that re-emerge in professional repertoire (sonatas, concertos, and other short pieces for cello) and will gradually introduce advanced techniques. Our Anthology will provide a selection of eight to ten pieces that are edited, printed, and recorded for teacher and student use. It can be implemented between the eighth and ninth Suzuki Books. Our project will help students to gain the technical capacity required to perform advanced passages that occur in professional cello repertoire and allow them to focus more thoroughly on the artistic merits of their performance. I will present a less advanced piece, Goltermann's Sonatina No. 3 in F Major, in a poster presentation and highlight the passages that correspond with professional repertoire, along with a short video.

Student Author(s): Jaimee Sharp, Senior, English Campbell University

Mentor(s): Elizabeth Rambo, Campbell UNiversity

Presentation: English (Literature), Oral Presentations #1 (9:30 - 10:30 AM) 1234 MTSB

Utopia, or Nightmare? John Milton's Paradise Lost and Joss Whedon's Angel

John Milton's *Paradise Lost* depicts man's fall from the garden of Eden and explores the idea of the *Felix Culpa*, or fortunate fall. The Joss Whedon created series, *Angel*, follows the story of a vampire with a soul who fights against the forces of evil and strives to help the helpless. The series has several parallels with the narrative of *Paradise Lost* which take place in the form of apocalypses, meaning the end of the world as we know it by the decline of free will and autonomous thought. These apocalypses take the idea of the *Felix Culpa* and invert it into the Infelix Culpa, meaning that rather than man's fall and gaining of knowledge bringing the promise of free will and redemption in Christ, these plots by demons seek to remove humanity's free will and bring the promise of destruction and evil. The clearest example of this from the show is Jasmine's rise to power in season 4, where she creates a utopian society by controlling people's minds and having them worship her as a benevolent deity, all the while hiding her true demonic nature and the fact that she can only survive by eating humans at a rapidly accelerating rate. She creates world peace through the destruction of free will and the taking away of knowledge, but when Winifred Burkle, Angel's colleague, is exposed to Jasmine's blood she becomes aware of Jasmine's true nature and is no longer ignorant to the evil that has taken control of the world. The parallels between the garden of Eden and the utopia Jasmine creates call into question the true difference between apocalypse and utopia, or if there even is any.

Student Author(s): Greg Sheets, Senior, Agricultural Environmental Technology North Carolina State University

Mentor(s): Ricardo Hernandez, North Carolina State University

Presentation: Botany, Oral Presentations #2 (10:45 - 11:45 AM) 2221 MTSB

Supplemental LED lighting as a potential alternative to chemical plant growth regulators in ornamental plug production

The objective of the present experiment is to use light emitting diodes (LED) as supplemental lighting to increase young plant compactness, quality, and growth rate in order to reduce the use of chemical plant growth regulators (PGR's), which are currently under an EPA risk assessment. LEDs can be manufactured with a custom spectrum to improve plant growth rate, development,

and morphology. Dianthus, geranium, and petunia, were grown in a greenhouse from seed until the plug stage under 9.2 ± 2.4 mol m^{-2} d^{-1} average solar daily light integral, 22.5 ± 2.4 °C average temperature, and 46 ± 16 % relative humidity. Plants were supplemented with additional light using LEDs and high pressure sodium lamps. The six growing treatments consisted of: 1) 19%blue-81%red photon flux LED supplemental lighting (19B-81R), 2) 6%blue-5%green-89%red photon flux LED supplemental lighting (6B-5G-89R), 3) High pressure sodium supplemental lighting (HPS), 4) no-supplemental lighting (Control), 5) 6B-5G-89R plus Paclobutrazol (6B-5G-89R+PGR), and 5) no-supplemental lighting plus Paclobutrazol (PGR). Independent of the cultivar, plants in the control and HPS treatments had undesirably greater plant height. Plants in the Control and PGR groups were significantly the least compact, and plants under 6B-5G-89R+PGR treatment generally were the most compact. Plants under supplemental lighting had significantly greater dry mass than plants in the control. LED supplemental lighting is a viable practice to increase plant compactness (greater growth rate and lower plant height) and potentially substitute the application of chemical plant growth regulators in ornamental plug production.

Student Author(s): Phillip Sheldon, Senior, Religious Studies, Sociology, History University of North Carolina - Greensboro

Mentor(s): Stephen Sills, University of North Carolina - Greensboro

Presentation: Sociology and Anthropology, Oral Presentations #4 (3:00 - 4:00 PM) 2225 MTSB

Is Mortgage Loan Discrimination Present in Guilford County? An Analysis of Available Data

Most people would like to assume that the process of a mortgage loan application is non-discriminatory. However, that may not be the case. Researchers at the Center for Housing and Community Studies, using the Home Mortgage Disclosure Act (HMDA) dataset from the years 2009 to 2014 for the geographical locations of High Point and Greensboro, demonstrate that there is a significant difference in mortgage loan denial rates between black and white borrowers. Black female borrowers, for example, are 17% more likely to be denied a mortgage loan when compared to a white male borrower. Further, this racial discrepancy is not uniform across all lending institutions. Also researched are the discrepancies in acceptance rates between black and white borrowers within lending institutions. Data tables listing which lending institutions are most inequitable, and most equitable, amongst other data, will be included in this presentation. Additional factors beyond race and ethnicity which may influence mortgage decisions will also be discussed. This research contributes to the robust literature surrounding the topic of mortgage loan discrimination demonstrating how ‘color blind’ processes are really social in nature. This research is also pertinent for those interested in systemic inequalities in the Greensboro/High Point area and designing more equitable lending.

Student Author(s): Erin Sherrill, Junior, High School Student South Iredell High School

Mentor(s): Stephanie George, East Carolina University

Presentation: Engineering - Biomedical, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 73 2nd Floor Mary Townes

Utilizing EEG to Isolate Light Sensitivity Induced Brain Activity

This study consists of utilizing an electroencephalogram (EEG) to isolate light sensitivity induced brain activity through human subject testing with seven subjects of mixed age and gender to record alpha and beta waves when exposed to light and darkness. Migraines are the 3rd most common disease in the world and when triggered by light sensitivity, those affected can suffer from a lower amount of daily productivity. In current literature there’s little connection between EEG signals and chemical imbalances that cause headaches. Testing was done to view the trends of beta wave frequencies and their correlation to brain waves that are present during chemical

imbalances such as a lack of serotonin or endorphins. Results showed trends with high beta wave frequencies in darkness and low frequencies in light, which supports the connection with the chemical imbalances that also show low beta wave frequencies. Overall, the objective of isolating light sensitivity induced brain activity by using an EEG was supported by results that showed trends that agreed with the suggested connection between chemical imbalances and light sensitivity.

Student Author(s): Anastasia Shymanovich, Senior, Sociology University of North Carolina - Greensboro

Mentor(s): Stephen Sills, University of North Carolina - Greensboro

Presentation: Sociology and Anthropology, Oral Presentations #4 (3:00 - 4:00 PM) 2225 MTSB

Social Media for Community Impact: A Case Study on Affordable Housing

Social sciences often use the media and media content to inform research. The UNCG Center for Housing and Community Studies (CHCS) has employed social media, such as Facebook, Instagram, and YouTube, to disseminate the results of research on housing and related issues in the Piedmont Triad. Local experts and political leaders were called upon to affirm the results of social scientific studies in a colloquial and concise manner making the information resonate with an audience beyond academia. The media campaign project focused on Greensboro's 2016 Affordable Housing Bond Referendum. Information provided through this campaign resulted from data collected by CHCS since 2015, as well as analysis of findings from secondary sources and partner organizations. The message of the campaign included findings on the gap in supply and demand of affordable housing stock, the low quality of rental housing available at affordable prices, the links between housing and health, and the positive impacts that the availability of affordable housing can have for the city of Greensboro. Much of the value of applied research stems from being able to employ findings to both inform the public and influence policies that can affect change. As such, this presentation is intended as a case study to highlight the value of disseminating research via non-academic channels.

Student Author(s): Dawit Sima, Senior, Pharmaceutical science North Carolina Central University

Mentor(s): Waifan Zheng, North Carolina Central University

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 20 1st Floor Mary Townes

Modeling siRNA Gene Silencing Potency Using the Partial Least Square (PLS) Regression Method

Short interfering RNA mediated gene silencing technology has been through tremendous development over the past 15 years, and has found broad applications in both basic biomedical research and pharmaceutical development. Critical to the effective use of this technology is the development of reliable computer algorithms to predict the potency of siRNAs under study. In this work, we proposed a cheminformatics approach to describe siRNA molecules. Cheminformatics descriptors have been derived for each of the 5 nucleotides (A, U, G, C, T) using the MOE (Molecular Operating Environment) program. Descriptors of a given siRNA sequence are simply the concatenation of the descriptors of its composing nucleotides. Partial Least Square (PLS) regression was employed to develop predictive models. In all cases, the models and the regression coefficients between the actual and the predicted values are recorded. In this presentation, I will discuss how the principal component limit changes and different designs of the training sets / test sets affect the quality of the models.

Student Author(s): Chetan Singalreddy, Freshman, Social Engineering East Carolina University

Mentor(s): Lori Tyler, Appalachian State University

Presentation: Public Health, Oral Presentations #3 (1:45 - 2:45 PM) 2226 MTSB

Designing Sustainable Housing for Low Income Households in Nigeria Using 3-D Printing Technology

Nigeria, an African country on the Gulf of Guinea, is currently a developing country and one of the biggest problems it faces is insufficient housing and cannot compete with the rising demand for new housing in its cities. This study was conducted in order to design an apartment complex with consideration to affordability and quality which can be used to fabricate a solution for the ever-growing need for adequate housing. Over 100 million Nigerians are currently either homeless or living in deficient homes, and the results of this study show that there is a way to provide them with one of the most basic necessities in life. Inadequate housing leads to many other problems, including the spread of crime and epidemics, and it is usually the result of decaying infrastructure in developing countries. The government of Nigeria is unable to compete with the huge deficit of housing, and the effects of this study will help push their efforts to bring sufficient housing to a struggling country.

Student Author(s): Isaac Sluder, Junior, Biology University of North Carolina - Charlotte

Mentor(s): Andrew Truman, University of North Carolina - Charlotte

Presentation: Biology (B. S.), Oral Presentations #1 (9:30 - 10:30 AM) 1221 MTSB

Understanding the role of Hsp70 and Hsp90 co-chaperone proteins in ribonucleotide reductase activity

Hsp70 and Hsp90 are molecular chaperones responsible for the folding and maturation of many proteins involved in stress response and signal transduction. Aside from these ‘client’ proteins, Hsp70 and Hsp90 also bind co-chaperones, molecules that specifically regulate their activity. Previous studies by the lab have shown that Hsp70 and Hsp90 stabilize the ribonucleotide reductase (RNR) complex. The primary function of RNR (consisting of subunits Rnr1-4) is to reduce ribonucleotide diphosphates to deoxyribonucleotide diphosphates, making RNR essential for DNA base synthesis. RNR is upregulated during times of increased nucleotide requirement, such as during DNA replication in S-phase and in response to DNA damage. RNR is a well validated anticancer target-the first small-molecule RNR inhibitor, hydroxyurea (hydroxycarbamide, HU), was approved in 1967. HU and other agents, including the nucleoside analog gemcitabine (Gemzar), remain important agents in cancer chemotherapy. It would be highly desirable to identify agents that can enhance the therapeutic benefit of RNR inhibitors without incurring additional toxicity. Although Hsp70 and Hsp90 have been both shown to regulate stability of RNR components, the co-chaperones that assist in this process remain unclear. To isolate co-chaperones that regulate RNR activity, we screened 30 yeast co-chaperone knockout mutants for sensitivity to HU on solid media, using the Rnr4 deletion mutant (rnr4) as a control. Four co-chaperone mutants, specifically ydj1, erj5, scj1 and zuo1 were found to be sensitive to HU. These four co-chaperones will be studied further to characterize their role in maintaining RNR activity. Specifically, we will use co-immunoprecipitation studies to study whether Ydj1, Erj5, Scj1 and Zuo1 regulate RNR stability through direct interaction with RNR subunits.

Student Author(s): Austin Smith, Senior, Exercise Science University of North Carolina - Wilmington

Haley Norris, Junior, Exercise Science, University of North Carolina - Wilmington

Elizabeth Seldomridge, Senior, Exercise Science, University of North Carolina - Wilmington

Mentor(s): Robert Boyce, University of North Carolina - Wilmington

Presentation: Exercise Science, Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 23 1st Floor Mary Townes

Longitudinal Study on Changes in 1.5 Mile Run Times of Police Recruits Over 18 Years

Cardiovascular endurance is an important aspect in the performance of police duties. Departments have a need to assess ability to run as it is important not only for the officer's health but also to protect citizens. PURPOSE: To evaluate patterns in cardiovascular fitness of police recruits upon entry into the police academy over 18 years including gender differences. METHOD: During the first week of police recruit training in a large southeastern metropolitan area, physical fitness levels were evaluated. This study's variable of interest was: 1.5 mile run. ANOVA, and Bonferroni post hoc procedures were used to evaluate data. RESULTS: Initial ANOVA comparisons were significant between years for both males and females (p ? 0.001). The post hoc analysis of males indicated that in the first four years 1990 to 1994, there was a significant decrease in run times (min:sec) from (12:32 ± 1:30 to 11:14 ± 1:17, $p < 0.05$). There was an increase in run times from 1994 to 2007, (11:14 ± 1:17 to 12:11 ± 1:38, p ? 0.001). As in the males, there was a significant decrease in run times for females from 1990 to 1996, (15:15 ± 2:32 to 12:25 ± 1:20, p ? 0.01). CONCLUSION: Overall, it appears in this metropolitan police department males are tending to have lower cardiovascular fitness levels as time progresses with little change in females. These recruits may be mirroring the lower cardiovascular fitness levels of the society from which they came.

Student Author(s): Brian Smith, Junior, Computer Science Appalachian State University

Mentor(s): Rahman Tashakkori, Appalachian State University

Presentation: Computer Science (B.S.), Oral Presentations #2 (10:45 - 11:45 AM) 1008 BRITE

Kinect 2.0 Skeleton and Face Tracking as a Math Education Tool

The Microsoft Kinect is a powerful tool that allows developers to record sensory information about the world around them. The developer can take advantage of the 3D skeleton and face tracking capabilities for many different purposes that include creating educational applications. This presentation focuses on a work that was conducted to utilize a Kinect 2.0 for recording 3D data on the position of a person's significant facial and skeleton features. This data can be used for recognition of human identity. The idea is that there are certain proportions between points on the body and face of a human that are unique to that specific individual, hence a tracking software can be used to determine those proportions. One of the goals of this project is to provide students a tool for studying such proportions on the human face and skeleton. To accomplish this, two software applications were created; one for recording the skeleton data and another for obtaining facial data. Both applications record positional data for the significant points they track and display their information visually in real-time. Positional data is saved as series of points in a comma separated file and an interactive 3D representation is generated that allows the user to find the distances between any two points on the face. For skeletal data, imaging software such as ImageJ, can be used to analyze data points. This presentation provides several examples in which students will be given a hands-on experience using the Kinect 2.0, and the software applications written as part of this project, to learn middle and high school math concepts.

Student Author(s): Kenya Smith, Senior, Athletic Training Catawba College

Mentor(s): James Hand, Catawba College

Presentation: Health and Physical Education, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 62 2nd Floor Mary Townes

Player Susceptibility to Cognitive Deficits Based on Playing Position and Frequency of

Headers Made

Heading the ball is an integral part of the realm of soccer. Soccer is the only sport where participants are exposed to chronic low impact head trauma through the act of purposeful heading as means to gain control of or advance the ball during play. Over the years, heading has caused quite the debate concerning short and medium-term cognitive impairments, and long-term cognitive decline as a result of repetitive microtrauma. Research states that the frequency of headers made during a single soccer season, not including practices or conditioning, shows a positive correlation with poor cognitive performance. The study was designed for evaluation of the occurrence of headers on the field (deflection, clearance, pass, shot) by intercollegiate soccer players of various positions (forward, midfield, defense, and goalkeeper) and to determine whether gender has an effect on the likelihood of head injury. The null hypothesis is that neither gender nor playing position determines susceptibility to cognitive deficits. A diagram of a soccer field was redesigned with "playing zones" and utilized to assist the investigator in noting the location in which the ball was headed on the soccer field. Zones 1-6 signify the offensive playing area, 7-9 represent midfield, and 10-15 the defensive playing area. Each time the ball was headed in a game by the observed team, a tally was made on the diagram in the respective zone that the header took place. It was also noted which playing position headed the ball the most and the types of headers that occurred.

Student Author(s): Melanie Smith, Senior, History and Sociology Greensboro College

Mentor(s): Allison Palmadessa, Greensboro College

Presentation: Individualized Major Program, Oral Presentations #4 (3:00 - 4:00 PM) 1233 MTSB

Tudor Queens 1509-1603: The Manipulation of Sexuality in the Pursuit of Power

This paper looks at the intersection of sexuality and politics as it influences eight specific Tudor Queens from 1509-1603; Catherine of Aragon, Anne Boleyn, Jane Seymour, Anne of Cleves, Catherine Howard, Katherine Parr, Mary I, and Elizabeth I. These queens are purposefully selected as during their reigns, a shift in power from women being an afterthought, to needing validation, and then being center stage arguably occurred. Guiding this research are three questions: how do these queens use sexuality as a means to attain and maintain political power in a male dominated society; how can three established theoretical frameworks be crafted together to study the intersection of power and sexuality; and is this framework useful and valid? To accomplish this study, a three step analysis was executed involving a new theoretical framework crafted specifically to examine the intersection of sexuality and politics; a framework including the works of Gramsci, de Beauvoir, and Foucault. Findings of this study are significant as there is a lack of literature on the intersection of sexuality and politics regarding Tudor Queens and the new post-modern theoretical framework developed is applicable to study the intersection of sexuality and politics in any historical era.

Student Author(s): Natalie Smith, Senior, Environmental Chemistry Appalachian State University

Mentor(s): Brett Taubman , Appalachian State University

Presentation: Chemistry (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 40 2nd Floor Mary Townes

An Investigation of the Chemical and Optical Properties of Aerosols in the Southeastern U.S.

Aerosols are solid or liquid particles suspended in the Earth's atmosphere. These particles

significantly impact the Earth's climate, making it an increasingly important area of research. Currently, viable methods for simultaneous characterization of the chemical and optical properties of aerosols are not available. This research employs a new method to characterize chemical properties of aerosols collected on quartz fiber filters from a Continuous Light Absorption Photometer (CLAP) located at the Appalachian Atmospheric Interdisciplinary Research (AppalAIR) facility in Boone, NC. The chemical characterization of the aerosols involves the direct thermal desorption of quartz fiber filters in an inlet liner of a GC-MS. The standards used to analyze the PM on the filter include anthracene, fluoranthene, fluorene, levoglucosan, cis-pinonic acid, and methacrylic acid. These standards are markers for both anthropogenic and biogenic sources including biomass burning, combustion of fossil fuels, and secondary organic aerosols from vegetation. The implications of this study will help improve climate models and identify the optical properties of particulate matter based on specific chemical signatures.

Student Author(s): Kaitlin Soden, Freshman, Biology East Carolina University

Mentor(s): Lori Tyler, Appalachian State University

Presentation: Biology (B. S.), Oral Presentations #2 (10:45 - 11:45 AM) 2221 MTSB

The Effect of Pesticides on Honeybee Gut Flora and Implications on Antimicrobial Properties of Honey

The alarming loss of 30 percent of honeybee hives each year has been largely accredited to a number of factors including varroa mites, hive beetles, and other common hive pathogens. Pesticide exposure and neonicotinoid exposure is thought to be another factor in the increase in immunoincompetence in honeybees. This study examined one way that pesticides and neonicotinoids could impact bees. Honeybee gut bacteria provide antimicrobial defenses in both honeybees and raw honey. In this study, honeybee gut bacteria was isolated, grown on agar, and then exposed to realistic concentrations of neonicotinoids and pesticides. Inhibition of gut bacteria was clearly demonstrated when exposed to this class of pesticides. Due to time restraints, my research acted primarily as a fact finding or hypothesis-generating study. These research findings strongly support the need further testing of the hypothesis that neonicotinoid pesticide exposure has a detrimental effect on the immunocompetence of honeybees by its harmful effect on the bacterial flora of honeybee hives in general, and on honeybee gut bacteria specifically.

Student Author(s): Jessica Speckman, Freshman, Biology Gaston College

Elizabeth Capps, Freshman, Biology, Gaston College

Mentor(s): Ashley Hagler, Gaston College

Presentation: Biology (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 24 1st Floor Mary Townes

Cattle Field Soil versus Unused Field Soil in Antibiotic Resistance

Does soil from farmland used for livestock production promote an increase in antibiotic resistance in environmental soil bacteria as opposed to soil obtained from an unused site? If livestock are given antibiotics, then the feces will carry the antibiotic residue into the soil, causing the soil bacteria to become resistant to antibiotics. Soil samples will be collected from two different sites. The first site will be one actively used by livestock. The second site will serve as the control and will not have been used actively by livestock. The null hypothesis will be that there is no significant difference in antibiotic resistance between the two sites. The alternative hypothesis will be that there is a significant difference in antibiotic resistance between the two sites. Trials of serial dilutions will be performed on the soil samples. Each sample dilution will be plated on LB Miller agar treated with cycloheximide, an antifungal, and incubated at 28 degrees

Celsius for 18 hours. Individual isolated colonies will then be patched and plated according to Small World protocols. Each patched colony will be tested for resistance against the following antibiotics: Ampicillin, Erythromycin, Streptomycin, and Tetracycline. Statistical analysis will be performed. Similar tests have shown an increase in resistance to both Erythromycin and Ampicillin. However, it was uncertain as to the origin of the antibiotic resistance. This research looks to compare soil samples collected from both farmland used for livestock production and farmland that is not used for livestock production.

Student Author(s): Catherine Spooner, Freshman, Computer Science Fayetteville State University

John Futrell, Freshman, Computer Science, Fayetteville State University

Lee Gibson, Freshman, Computer Science, Fayetteville State University

Samuel Cooper, Freshman, Computer Science, Fayetteville State University

Mentor(s): Bogdan Czedjo, Fayetteville State University

Presentation: Computer Science (B.S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 42 2nd Floor Mary Townes

Automated Abnormal Behavior Detection in Crowds from Multi-camera Videos

Organizations like the Department of Defense and the US Intelligence Community are continuously looking for ways to improve methods of gathering intelligence with the goal of improving public safety. Having human agents out in the field to gather data in-situ is expensive, not just in monetary terms, but also in time and human costs. One of the ways that these costs can be alleviated is to employ remote sensing through video surveillance. Coupled with object-tracking algorithms, this system would be able to provide real-time information in an area of interest. Being able to detect and track individuals autonomously will provide great benefits, with the aim of being able to detect threats and potentially avoiding a catastrophic event. Our particular research objective is to develop algorithms capable of real-time human detection in an area of interest from standalone video processing systems, as well as extracting tracks data. We are developing computer vision models for detecting humans that can be leveraged for other stationary and moving objects, such as vehicles, animals, and related objects. Our preliminary method of object detection has been to use a HAAR cascades and Local Binary Patterns as image features to train a machine-learning algorithm. However we are finding that these image features have limited accuracy in detecting our targets, namely human body shapes under challenging conditions like variation in lighting, color patterns and pose of the body, along with occlusion. Our next goal is to apply deep neural networks to improve the detection of human targets. Once we have the ability to reliably identify a target, we will begin working on a tracking algorithm.

Student Author(s): Chad Springer, Junior, Physical Education Catawba College

Mentor(s): Victor Romano, Catawba College

Presentation: Health and Physical Education, Oral Presentations #1 (9:30 - 10:30 AM) 2226 MTSB

An Alternative Form for Physical Education Assessment

Physical Education classes has long since become nothing but “free days” for students. Instead of teachers challenging students to better themselves and become more physically fit, they have allowed them to just show up and do whatever activities that they choose. Participants were chosen from students that attend Catawba College, located in Salisbury, North Carolina. There were five participants, two females and three males, with an age range from 19-29 years old.

Participants were all different in race, body types and sizes. This study utilized a modified PAR-Q was used, consisting of thirteen health-related questions and a Fitness Questionnaire that consisted of six fitness-related questions. Using these two forms it allowed a baseline for their overall health and fitness habits of the participants. After the above information was gathered through questionnaires, participants were administered a modified version of the United States Marine Corps Physical Fitness Test. This included a Pull-Up Test for males or a Flexed-Arm Hang Test for females, a timed Abdominal Crunch Test, and a 1.5 Mile Run test. This research found that a person's body weight has a negative correlation effect on certain types of physical activities. Weight has a significant correlation on the total number of pull-ups a male can do ($r = -0.957$) and the on the amount of time a female can perform the flexed-arm hang (-1). In conclusion, weight does have a potentially negative correlation when performing physical fitness assessments. In conclusion, weight does have a potentially negative correlation when performing physical fitness assessments.

Student Author(s): Alisha Sprinkle, Sophomore, Computer Science Appalachian State University

Mentor(s): Richard Elaver, Appalachian State University

Presentation: Computer Science (B.S.), Oral Presentations #1 (9:30 - 10:30 AM) 1009 BRITE

Programming Modern Design

The purpose of my research is to connect programming in 3D software to the development of physical forms with design aspects found in nature and mathematical formulas. Additive manufacturing provides the ability to produce visually appealing art pieces from the virtual models created. Contextualizing goals initially set and transferring them to a visual programming interface is key. Dependent upon the visual outcome sought, several prototype programs are generated. Extensive testing, debugging, and an essential rework to patch all errors are vital to ensuring a high success rate in virtual space before proceeding to meet the demands of the physical world. Once a conclusive visual outcome is reached, a functional understanding of 3D printing constraints and physics is needed. Determining the proper material to use is crucial because with a higher level of intricacy in design also raises the demand for higher quality material. A choice must also be made regardingsize and scale of the print so no error occurs in the actual creation process. Both of these decisions, material and scale, certify the solid will not cave in on itself and the design elements are properly supported for visual enhancement. In the success of following all of these guidelines the validity of the initial program to create the virtual model follows. The outcome is an item one can hold in the real world and appreciate for its aesthetic appeal along with a series of programs that produces variations of the same item. This increases uniqueness of the item and program and consequently the overall value of each. The scripts created for one product are also transferable to other forms in order to increase usability and functionality. A whole new world of possibilities is opened and a unique skillset is obtained.

Student Author(s): Alexandra Sprouse, Sophomore, Biology High Point University

Mentor(s): Michael Grider, High Point University

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 12 1st Floor Mary Townes

Relative Contributions of Apoptosis and Necrosis in Stroke Model

Ischemic stroke, the blockage of blood flow to the brain, is the fifth leading cause of death in America. There are currently no therapeutic treatments aimed at promoting survival of neurons following ischemia. We selected an *in vitro* model of ischemic stroke that allowed more control of experimental conditions than *in vivo* models. We culture neuron-like PC12 cells under oxygen-glucose deprivation (OGD) conditions to model a lack of blood flow to neurons following a

stroke. Additionally, in order to better elucidate the relative contribution of oxygen deprivation or glucose deprivation to neural injury, we include groups deprived of only oxygen or only glucose. We seek to identify the specific pathways through which these injuries damage the cells. Cell death in response to glucose deprivation has traditionally been demonstrated to occur primarily through apoptosis, programmed cell death. However, our data suggests that, compared to controls, glucose deprivation for 24 hours also significantly increases necrosis, the unregulated destruction of cell components. We use flow cytometry to quantify the relative participation of necrosis or apoptosis in response to each of the model injuries. We aim to develop treatments directed towards apoptosis or necrosis, as appropriate to each aspect of an ischemic stroke.

Student Author(s): Racheal Spurlin, Junior, Biochemistry North Carolina State University

Mentor(s): Colleen Doherty, North Carolina State University

Presentation: Biology (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 21 1st Floor Mary Townes

Using CRISPR/Cas9 System to Develop Switchable Gene Expression Cassettes in Arabidopsis thaliana

Abiotic stresses such as drought and heat are major causes of crop loss around the world. Understanding how plants sense and respond to environmental stresses will provide tools to improve crop yields. Genes involved in stress responses have primarily been studied in mutant plants where the gene of interest is disrupted. However, these mutants can be lethal or have pleiotropic phenotypes, affecting more than just the stress we wish to study. These pleiotropic effects make it hard to distinguish if the original mutation or a secondary effect is causing the phenotypes observed in the mutants. I am developing an inducible system with the use of the CRISPR/Cas9 to shut off the gene after the plant has fully developed with the use of a deactivated version of Cas9 which is fused to a repressor domain targeted to the gene we want to study. This deactivated-repressor Cas9 is guided to the target gene by a maximum of four guide RNAs, which either target the promoter region in four different locations, four different target genes, or a combination of the two. With this system I hope to see that the target genes are no longer induced in response to the stress treatment.

Student Author(s): Aishwarya Sriraman, Senior, Biochemistry North Carolina State University

Mentor(s): Johanna Elfenbein, North Carolina State University

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 4 1st Floor Mary Townes

Growth in cold temperature of Salmonella Typhimurium

Salmonella enterica causes millions of cases of gastrointestinal illness and hundreds of deaths in humans annually. The organism is acquired by ingestion of contaminated food and it colonizes the intestines and causes a severe inflammatory diarrhea. It can also cross the epithelial barrier to cause severe systemic disease in susceptible populations such as infants, the elderly, and the immunocompromised. *Salmonella* is a successful food-borne pathogen in part because it withstands the low temperatures involved in food preservation and storage. Prior work in our laboratory suggests that *Salmonella* produces multicopy single-stranded DNA (msDNA), an RNA-DNA hybrid molecule synthesized by the action of a reverse transcriptase. msDNA is necessary for colonization of the gastrointestinal tract, anaerobic growth, and growth at cold temperatures. However, the parts of the molecule that confer its function are unknown. I hypothesize that the length of the DNA stem portion of msDNA, consisting of a 29-base pair stem and a 4-nucleotide loop, is critical for growth in cold temperature. Mutations to the DNA stem were created that produce msDNA with shortened DNA stem. I isolated msDNA from bacterial cultures to show that most truncated mutants produce a mutant form of msDNA, as predicted. However, the abundance of msDNA is reduced when the stem is truncated. Truncated

stem mutants grown at 15°C for 48 hours grow similar to mutants lacking msDNA. The data suggest that either the DNA stem is necessary for the growth of msDNA in cold temperature or insufficient msDNA is produced to confer function in these mutants. Further mutations will be made to alter the DNA stem length and nucleotide sequence of the loop, and their growth will be assessed in cold growth in order to determine a functional role for particular nucleotides within the DNA portion of msDNA.

Student Author(s): Dawn Stancil, Senior, Biology North Carolina Central University

Mentor(s): Julie Horvath, North Carolina Central University

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 15 1st Floor Mary Townes

Identifying Microbial Life On Human Skin

A microbe is a microscopic organism; examples include bacteria, fungi, and protozoa. The purpose of this study is to characterize and identify aerobic and facultative anaerobic bacteria present on human skin by colony phenotyping and DNA sequencing. Our lab explores what lives on human skin and how our daily habits impact the microbes living there. One aspect of our research uses citizen scientists (people not trained as scientists who contribute samples and hypotheses) to conduct our research. One way to engage citizen scientists in our research is to collect skin microbial samples from them and culture them in the lab to visualize some of the microbes growing on their skin. Many of the microbes form colonies of different colors and shapes. To date, these are not easily identifiable visually. Therefore, we sought to culture microbes from human skin and then select phenotypically different microbes for sequence analysis. The bacterial 16S ribosomal RNA gene is a highly conserved gene among all bacteria and contains nine variable regions (V1-V9) that demonstrate considerable sequence diversity among all bacteria. No single variable region can be used to identify specific bacteria. Therefore, this study incorporates the use of four variable regions of the 16S rRNA gene spanning approximately 899 base pairs (V1-V4). We used the 16S rRNA sequences from individual colonies to compare to public databases (NCBI non-redundant) to determine bacterial taxonomy, typically to the genus level. We have cultured skin microbial samples from 11 humans and have identified 50 phenotypically different microbes from 20 different body sites. To date, this study has allowed us to classify 26 microbes both visually and by sequence analysis to engage our current and future citizen scientists.

Student Author(s): Rachel Stevens, Senior, Chemistry Appalachian State University

Mentor(s): Carol Babyak, Appalachian State University

Presentation: Chemistry (B. S.), Oral Presentations #1 (9:30 - 10:30 AM) 1223 MTSB

Calibration of a Passive Sampler for Quantification of Estrogens in Natural Surface Water using High Performance Liquid Chromatography and Electrospray Ionization Mass Spectrometry

Natural and synthetic estrogens feminize fish at low concentrations and have been detected in streams, groundwater, and drinking water across the United States. The streams and rivers in northwestern North Carolina provide an interesting opportunity to study headwaters that drain a variety of land uses: forested, urbanized, cattle grazing, and Fraser fir tree farms. The ultimate goal of this research is to use passive sampling—specifically the polar organic chemical integrative sampler (POCIS)—to monitor estrone (E1), estradiol (E2), and ethynylestradiol (EE2) in local headwaters. A POCIS consists of a sorbent that is sandwiched in between two polyethersulfone membranes. Before deployment in the field, however, the POCIS must be calibrated to determine the sampling rate (R_s, L/day), or the volume of water cleared of estrogen per day. We used the static renewal method to determine R_s under various conditions, including water turbulence, ionic strength, and type of sorbent. The R_s values obtained with fast stirring for

E1, E2, and EE2 were 0.202(±0.001), 0.119(±0.006), and 0.119(±0.013) L/day, respectively, and were roughly one order of magnitude lower than those reported in the literature. Our R_s values suggest, however, that the sampling rate is influenced by the characteristics of the sorbent and target estrogen, stir rate, and ionic strength. Before the POCIS is used for deployment in the field, it would be valuable to repeat the calibration experiments to gain a better understanding of how water turbulence, ionic strength, and other variables affect the sampling rate.

Student Author(s): Erin Stiers, Senior, Biology Pfeiffer University

Mentor(s): Mark McCallum, Pfeiffer University

Presentation: Biology (B. S.), Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 28 1st Floor Mary Townes

Isolation of Agrobacterium tumefaciens Bacteriophage Using a Microplate Reader

Screening of multiple soil rhizosphere samples for the presence of bacteriophage can be time consuming and inefficient. To expedite the processing of soil samples, a kinetic microplate reader protocol is being optimized for screening multiple samples for the presence of lytic bacteriophage. Using microplate reader Bio-Rad Model 680, a procedure is being developed to isolate bacteriophage that can infect *Agrobacterium tumefaciens*. *Agrobacterium tumefaciens* is a gram-negative rod-shaped bacterium that attaches itself to the roots of eudicots and causes Crown Gall Disease. A feature of *A. tumefaciens* is the Ti plasmid which useful in genetic engineering as it has the ability to transduce DNA into its host. Potentially, any isolated phage could be used to eliminate the bacterial cells after DNA has been transferred into a plant in a laboratory setting. Currently, antibiotics are used to kill bacterial cells after transduction. Because bacteriophage target specific bacterial cells, they are less likely to damage plant cells. Using a vertical pathlength photometer that measures absorbance of each well in 96-well microtitration plate, multiple samples are processed simultaneously. Screening of multiple samples should increase the potential of discovering phage than with traditional methods.

Student Author(s): Thomas Stirrat, Senior, History, Political Science Wake Forest University

Mentor(s): Nathan Plageman, Wake Forest University

Presentation: History, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 9 1st Floor Mary Townes

Rethinking Power in Colonial Congo: Boundaries, Contestation, and Acknowledgement

How did Congolese individuals experience colonial rule? Were missionaries aware of their relative powerlessness and limits on the power that they did have? Should African individuals be the focus of African history? How did ordinary Congolese individuals contest missionary authority and assert their own power in interactions with missionaries? The project that I completed over the summer was a social history of Congolese experiences during colonial rule. More specifically, I zeroed in on numerous interactions between Congolese individuals and white missionaries that took place from 1930-1935 in the Lower Congo, and Kinshasa regions of the Congo. The purpose of the research was to continue and expand on a conversation regarding Congolese experiences during colonial rule, and using religion and spirituality as a lens to do so. My argument was that Congolese individuals actively contested missionary power when they overstepped their "boundaries", regarding what was and was not acceptable behavior and action. My argument matters and has important implications for African history because it attempts to better characterize and represent how Congolese individuals used their power to contest missionary activity during colonial rule, which have too often been mischaracterized and reduced to "resistance" in the historical record. "Boundaries" and "power" more accurately and completely conceptualize ordinary Congolese experiences because they challenge the assumption that Congolese individuals were passive recipients of colonialism and instead imply that Congolese actors constrained and guided the behavior and actions of white missionaries. The aim

in using such terms is to encourage historians and lay readers to rethink their assumptions about how ordinary Congolese individuals interacted with colonial agents such as missionaries. I conclude my research with more questions, and opportunities for future research, since there is still plenty that can be explored regarding Congolese experiences during colonial rule.

Student Author(s): Joshua Strayhorn, Junior, History North Carolina Central University

Mentor(s): Tony Frazier, North Carolina Central University

Presentation: History, Oral Presentations #3 (1:45 - 2:45 PM) 2225 MTSB

This Ain't Our Church: An Analysis of Intra-Racial Tension in Chicago

In the early twentieth century, African-Americans began to migrate from the South to Northern cities such as New York and Chicago. While Southern migrants left in search of prosperity and liberty, in many cities they were met with a cruel environment where progression was not guaranteed. My research will focus on the intra-racial tension between the elite class and migrant workers in early twentieth century Chicago. This tension was caused primarily by the "old settlers," which were native black middle class Chicagoans who longed to be assimilated into the white world and culture, and the new migrants from the South. There were various push and pull factors that propelled blacks out of the South such as discrimination and lack of employment. Migration was also encouraged by the black owned newspaper, The Chicago Defender; however, upon arrival, migrants found that the newspaper constantly censured them because their behavior did not adhere to the sociability of the time. Some black elites mystified this discrimination under the guise of "bettering the race. "Many scholars have studied have studied the Great Migration and even the conflict between the classes; however, few have studied the role of churches in perpetuating this tension. This paper will explore this tension between these two groups of people and to what extent the church perpetuated and fostered this tension. Specifically, this study will examine the contrasting views on religion and leisure in the post-world war I era.

Student Author(s): Jacob Stubbs, Freshman, Accounting Appalachian State University

Mentor(s): KC Kirsten Clemens, Appalachian State University

Presentation: English (Writing), Oral Presentations #2 (10:45 - 11:45 AM) 2236 MTSB

Man is Really a Stick in the Judd

Just as any narrative art form, conflict highlights a character's journey. The conflict between man versus man is evident and crucial to the film *Ride the High Country* – a 1962 Sam Peckinpah western film starring Joel McCrea, Randolph Scott, Ron Starr, and Mariette Hartley. It tells the story of an aged duo of cowboys and their young apprentice who transfer gold from a secluded mountain town to a bank. Their journey gets even more dangerous with added conflict from both outside and inside the group. Specifically, Steve Judd (played by Joel McCrea) faces the most conflict coming from the people around him. By analyzing camera placement, movement, and framing, Judd's conflict with man is shown to be intentionally brought about by Peckinpah.

Student Author(s): Natalie Suchy, Junior, Psychology University of North Carolina - Greensboro

Mentor(s): Stuart Marcovitch, University of North Carolina - Greensboro

Presentation: Psychology, Oral Presentations #4 (3:00 - 4:00 PM) 2236 MTSB

Differences between Tablet Learning and Traditional Learning in Elementary School Children

This study investigated the effect of different learning mediums on the memory of novel information in 5- to 8-year-old children. Prior research of similar or younger age groups suggested that interactive technology is beneficial for some types of learning, such as specific

concept knowledge and math skills, but also suggested that areas like reading comprehension benefit most from face-to-face instruction. The intention of the present study is to compare learning from interactive technology (i.e., visiting a website) with face-to-face instruction for children learning new concept information. Sixty participants were randomly assigned to either a technology condition or a face-to-face condition. Participants in both conditions learned about two novel concepts, an animal and a foreign country, and after each instructional period they completed a short quiz. In the technology condition, the researcher presented participants with websites on an iPad to learn the material. In the face-to-face condition, the researcher used hard copies of the information and pictures to teach the material. In addition, parents of the participants completed a questionnaire about their child's technology use at home. Participants in the technology condition performed better on the animal quiz than participants in the face-to-face condition; however, there was no difference in the quiz on the foreign country. Taken in the context of recent technological developments and their applicability to childhood education, these results are partially consistent with previous literature suggesting that interactive technology is the more effective medium for learning, but apparent only in certain domains.

Student Author(s): Mandy Szymanski, Senior, Exercise Science High Point University

Mentor(s): Matthew Kuennen, High Point University

Presentation: Exercise Science, Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 13 1st Floor Mary Townes

Dietary Curcumin Supplementation Reduces Gastrointestinal Barrier Permeability During Exertinal Heat Stress

Exertional heat stress increases gastrointestinal barrier permeability and risk of exertional heatstroke (EHS) via a TLR4-mediated inflammatory pathway. Oral curcumin supplementation is known to inhibit both the MyD88 & TRIF-dependent pathways of TLR4 signaling. This work investigated the effect of 3d of 500mg/d Merivia® curcumin supplementation on gastrointestinal (GI) barrier permeability and systems-physiology responses to exertional heat stress in non-heat acclimated humans. Eight subjects ran (65%VO_{2max}) for 60min in a Darwin® chamber (37°C/26%RH) two times (CURCUMIN/PLACEBO). Intestinal fatty acid binding protein (I-FABP) and associated pro-inflammatory (MCP-1/TNFα/Il-6) and anti-inflammatory (Il-1ra/Il-10) cytokines were assayed from plasma collected before(PRE), after(POST), 1hr(1-POST), and 4hrs after(4-POST) exercise. Core (Tc), skin (Tsk), and mean body (Tb) temperatures; HR; and physiological strain index(PSI) were measured throughout exercise. Group differences were determined with 2-Way (Condition x Time) RM ANOVAs. Intriguingly, one of the major findings of this study was that the interaction of Condition x Time was significant ($p \leq 0.05$) for both I-FABP and Il-1ra. *Post hoc* analysis indicated the increase in I-FABP from PRE to POST (87%) and 1-POST (33%) in PLACEBO exceeded that in CURCUMIN (58% & 18%; respectively). Il-1ra also increased more from PRE to 1-POST in PLACEBO (153%) than in CURCUMIN (77%). TNFα Increased ($p=0.01$) from PRE to POST (19%) and 1-POST(24%) in PLACEBO but not in CURCUMIN. Il-10 increased ($p<0.01$) from PRE to POST (61%) and 1-POST (42%) in PLACEBO but not in CURCUMIN. The PSI, which indicates EHS risk, was also lower ($p<0.01$) in CURCUMIN from 40-60min of exercise. Collectively, these data suggest 3d curcumin supplementation reduces GI permeability and cytokine responses to exertional heat stress.

Student Author(s): Kendall Tavares, Senior, Cellular molecular biology Appalachian State University

Mentor(s): Brooke Christian, Appalachian State University

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 5 1st Floor Mary Townes

Analysis of the methods by which Mitochondria-targeted antioxidants prime adipocyte differentiation through qPCR analysis of relative expression of genes related to adipocyte differentiation

Obesity is caused by either an increase in the number of fat cells, an increase in the size of fat cells, or both. Fat cells increase in number when adipocyte precursor cells differentiate into mature fat cells, a process previously acknowledged as dependent on the presence of reactive oxygen species. Antioxidants decrease the amount of reactive oxygen species, and should in theory reduce adipocyte differentiation. Despite this, a preliminary study found that mitochondria-targeted expression of the antioxidant catalase caused adipocyte precursors to differentiate more quickly corresponding cells from wild type mice. This increase in differentiation occurred in the first 5 days but was reversed by day 7. Preliminary qRT-PCR data indicates that cells with mitochondria-targeted catalase differentiate faster due to transcriptional upregulation of genes that promote differentiation such as the master regulator PPAR?2 as well as its targets Perilipin, aP2, FASN and AdipoQ. Transcriptional downregulation of Pref-1, an inhibitor of differentiation, was also observed. Confirmation of the upregulation of these factors by western blot is in progress. These results indicate that induction of adipocyte differentiation is initially stimulated by the presence of mitochondrial catalase. The relationship between catalase and PPAR?2 is currently under investigation. Results from this study may have implications on the potential use of antioxidants as treatments for obesity.

Student Author(s): Elissa Teran, Senior, Biology Meredith College

Mentor(s): Jean Greenberg, The University of Chicago
Joanna Jelenska The University of Chicago

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 7 1st Floor Mary Townes

Activity of Effector Proteins Inside *Pseudomonas syringae*

P. syringae infects susceptible plants by secreting effector proteins into plant cells by way of the type III secretion system. The effector protein HopZ3 can modify other secreted effector proteins, such as AvrPto, by acetylating them. It is unknown where these modifications happen. We tested if HopZ3 was able to activate inside the bacteria before secretion, and if it can acetylate other effector proteins in the bacteria as well. Modification inside the bacteria before being secreted might allow the effectors to evade post translational modifications by host proteins after secretion, which may impact disease. The modification states were tested by purifying the proteins of HopZ3, HopZ3 Catalytic Mutant -CA and AvrPto and subjecting the proteins to mass spectroscopy analysis.

Student Author(s): Apoorva Thatavarty, Senior, Chemical Engineering North Carolina State University

Mentor(s): Balaji Rao, North Carolina State University

Presentation: Engineering - Chemical & Biomolecular, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 71 2nd Floor Mary Townes

Development of a "Mix and Read" Assay for Target Detection using Split-Luciferase Reconstitution

Current detection systems used to study protein-protein interactions utilize an elaborate array of chemical or biological labeling of the target for study, and thus have limitations in applications and analysis. To address the shortcomings of the typically used detection systems, such as an ELISA, the goal of this project was to develop a “mix-and-read” assay where a target protein would be detected in a single step, without the need for washes. The system is based on a luciferase complementation assay using binders derived from the Sso7d protein scaffold fused to

the components of NanoLuc split-luciferase. Luciferase is a bioluminescent enzyme that is found in many marine organism and arthropods, which scientists have dissected into two non-active components. These components, when brought into close proximity via protein-protein interactions, recombine to form the active luciferase molecule, which catalyzes a light-emitting reaction. For this protein complementation assay, Sso7d-derived binders that recognize a specific target will be fused to the N and C terminus of the split luciferase respectively. When binders are in solution with the target and the two binders bind the target, the luciferase molecule will reconstitute to its active form and with the addition of the reagent, a luminescent signal will be emitted. As a proof of concept, split components of NanoLuciferase, isolated from the deep-sea shrimp *Oplophorus gracilirostirs,* were fused to two lysozyme Sso7d binders. These preliminary findings show that lysozyme could be detected by this approach even after 3 minutes after the addition of the detection reagent, and the luminescence response increased with lysozyme concentration and incubation time. After validating the system, the next steps involve the development of a systematic approach to isolate Sso7d binders for other targets that could be used with the split luciferase model.

Student Author(s): Jeremiah Thompson, Junior, Psychology Fayetteville State University

Mentor(s): Timothy Moore, Fayetteville State University

Presentation: Psychology, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 73 2nd Floor Mary Townes

Implicit Bias in Heterosexual African-American Mate Selection

For many decades, the process of mate selection in the African-American community has been affected by the presence of skin color as well as Eurocentric beauty standards. As a result, the topic of colorism has created implicit biases and stereotypes in society. This study explores how implicit bias concerning the lightness or darkness of their own skin can have an effect on mate selection. Through the Implicit Bias Test (IAT) by Greenwald, Banaji, Nosek (1995) and a brief survey, the bias of African-American college students at Fayetteville State University will be tabulated via the D algorithm developed by Greenwald. The results will show any correlation between the participant's sex and skin tone and where their biases lie if a bias presents itself. The expected results will be a direct correlation between sex and skin tone of the participants and their bias towards the opposite sex.

Student Author(s): Danielle Thornton, Senior, Environmental Science Appalachian State University

Mentor(s): Chris Thaxton, Appalachian State University

Presentation: Environmental Science, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 59 2nd Floor Mary Townes

An Analysis of Stream Water Quality in the Upper Little Tennessee River Watershed in Rabun County, Georgia

Quantifying the effects of land use and development on water quality within a specific watershed is an important part of the process for heading toward new legislation and changes in cultural practices that ultimately lead to improvements in water quality and the health of stream ecosystems. In order to contribute to this process, this project will assess the water quality at three sites within the Upper Little Tennessee River watershed (ULTRW), over four months, to quantify the effects of varying development and land use practices, including exurbanization, on the water quality and health of streams. Specifically, this project is focused on investigating the effects of wastewater treatment plant effluent on water quality, with respect to specific conductivity, as well as its effects on the distribution of macroinvertebrates in streams in the ULTRW. Hach Hydrolab stream sensors will measure the temperature, turbidity, specific conductivity, and dissolved oxygen once every hour at each site. Grab samples will be collected

four times at each site and analyzed for anions, cations, total nitrogen, and pH. Preliminary data from this study showed that specific conductivity levels were significantly higher at the site downstream of the Dillard Wastewater Treatment Plant. We expect to find that further data collection will show the correlation between high levels of specific conductivity and wastewater treatment plant discharge events, as well as the principle analytes causing the spikes in specific conductivity at the McRary site. GIS techniques will be used to provide a link between land use practices and stream water quality. By correlating grab sample analyses with the type and quantity of macroinvertebrates found upstream and downstream of the wastewater treatment plant effluent output to the Little Tennessee, we will quantify the effects of this particular land use on the health of streams in the ULTRW.

Student Author(s): Jasmin Tindal, Senior, Chemistry Queens University of Charlotte

Sanam Fazilova, Junior, Biochemistry, Queens University of Charlotte

Juan Carrillo, Senior, Biochemistry, Queens University of Charlotte

Mentor(s): Greg Pillar, Queens University of Charlotte

Presentation: Chemistry (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 28 2nd Floor Mary Townes

Identification and Quantification of Bisphenol-A and Bisphenol-S in Thermal Receipt Paper in the Greater Charlotte Area

Bisphenol A (4,4-(propane-2,2-diyl)diphenol;BPA) is often used as a color developer in thermal receipt paper. Applied on thermal paper as a powerdery film BPA can readily absorb into the human skin where it acts as an endocrine disrupter causing genetic damage and other human health problems. Global resrictions on the use of BPA has led to the development and use of alternative bisphenol compounds such as Bisphenol S (4,4-sulfonyldiphenol; BPS). However, studies have determined that many bisphenol analogues inculding BPS posses genotoxicity similar to that of BPA. Thus, further investigation on the uses of BPA and BPS in thermal paper is warranted. In this study we collected and analyzed 52 receipts from local retained businesses in and around Charlotte using high-performance liquid chromatography (HPLC). We found BPS in 38 (73%) receipts ranging from 10.0 to 19.4 mg/g and BPA in 10 (19%) receipts ranging rom 10.3 to 21.2 mg/g. The levels collected are significantly high considering health problems have been observed with little as 2 mg of BPA in a person's blood stream. Since BPA and BPS were present on 92% of the samples tested and other studies concluded similar results, handling thermal receipt paper may lead to human exposure.

Student Author(s): Olivia Tornow, Junior, Biology and Spanish High Point University

Mentor(s): Andrew Wommack, High Point University

Presentation: Chemistry (B. A.), Oral Presentations #2 (10:45 - 11:45 AM) 1223 MTSB

Towards Further Understanding of Kinase Activity During Oxidative Stress: Synthesis of the Highly Active ERK2 Substrates Sub-D and Sub-F

Extracellular signal-regulated kinase 2 (ERK2) is a member of the mitogen-activated protein kinase family and is involved in the regulation of cell development, growth, and differentiation. The current project focus is to further study ERK2 activity in response to cellular oxidative stress. ERK2 has two ligand recruitment sites, the D-recruitment site (DRS) and the F-recruitment site (FRS), to which peptide and protein substrates bind and become phosphorylated. In a previous computational study of small molecule binding interactions, two novel peptides, Sub-D and Sub-F, were modeled in binding to the DRS and FRS within ERK2, respectively. Using a semi-automated, flow chemistry approach, peptides Sub-D and Sub-F were successfully synthesized using Fmoc-based solid-phase peptide synthesis. The identity and purity of these peptides were

confirmed through HPLC purification and mass spectrometry data. In collaboration with the Poole Lab at Wake Forest School of Medicine, initial data indicates synthetic Sub-D and Sub-F are highly active ligands for ERK2.

Student Author(s): Dustin Travels, Junior, Geology North Carolina State University

Mentor(s): Adam Lee, North Carolina State University

Presentation: Environmental Science, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 58 2nd Floor Mary Townes

Impact of Beaver Impoundments on Urban Stream Storm Events

Rapid development and urbanization has dramatically increased the amount of impervious surfaces within our cities leading to an increase in storm water discharge. This increase in discharge has led to stream bank erosion, flash flooding, and overall degradation of riparian environments within urban stream reaches. With millions of dollars being spent on urban stream restoration in attempt to reduce storm water discharge, we propose the question; could beavers impoundments be a cost effective alternative to reducing urban storm water discharge. In this study, we compared both recent and historical hydrographs of Rocky Branch Creek to investigate if the presence of a beaver impoundment reduces storm water discharge. Using Rocky Branch Creek as a control reach, we compare the impacts of recent restoration efforts and a recently constructed beaver dam on storm water discharge. This was accomplished by comparing hydrographs from pre stream restoration, post stream restoration, and post beaver dam construction during similar precipitation events. When comparing restoration efforts to post beaver dam construction, we observed approximately a 50 % reduction in storm water discharge post beaver dam construction. Our preliminary results indicate that the presence of a beaver impoundment decreased storm water discharge in Rocky Branch creek. Future research should be conducted to determine the effects of beaver impoundments on water quality, sediment loading, and riparian environments on urban stream reaches. Our findings combined with this future data will help us determine if beaver impoundments are in fact a cost effect, or enhancing feature of future urban stream restoration efforts.

Student Author(s): Carina Tudela, Senior, Biological Sciences North Carolina State University

Mentor(s): Roger Azevedo, North Carolina State University

Presentation: Psychology, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 75 2nd Floor Mary Townes

Utilizing Heart Rate Variability to Assess the Link Between Student Learning and Intelligent Tutoring Systems

Intelligent tutoring systems (ITSs) aim to enhance the learning experience of college students in comprehending complex STEM material and accentuate cognitive, metacognitive, affective and motivational (CAMM) processes. In order to assess CAMM processes, heart rate variability (HRV) was investigated due to its association with factors relating to mental stress, cognitive workload, and emotion regulation. We incorporated HRV as a step toward bridging the gap in understanding how physiological responses are associated with CAMM processes. We used MetaTutor IVH (Intelligent Virtual Human), an ITS designed to facilitate college students' cognitive and metacognitive self-regulatory processes during learning about the human circulatory system. Students participating in the IVH research study (N=33) completed a series of 18 content slides along with questionnaires and domain knowledge pre/post-tests. During each study session, data recordings included HRV, inter-beat interval (IBI), galvanic skin response (GSR), and facial expressions. HRV was analyzed in both time and frequency domains, along with data validity graphs using the software packages Kubios HRV and HRVAS. Prior analysis with these data showed that GSR events (also associated with stress, cognitive load, and affect)

occurred most during students' justifications of their answers. We plan a follow-up analysis to identify whether HRV also aligns with hypothesized moments of cognitive load and stress. If we can link challenging moments during learning to physiological measures, then we may be able to investigate and assess student performance, affect, and emotion regulation in real-time. This line of research may lead to ITSs that personalize content presentation, pedagogical strategies, and affective support.

Student Author(s): Claire Tuffey, Senior, History Wake Forest University

Mentor(s): Michele Gillespie, Wake Forest University

Presentation: Women's and Gender Studies, Oral Presentations #1 (9:30 - 10:30 AM) 2236 MTSB

The Cultural Politics of Libby Holman's 1932 Indictment for Murder

In the early summer of 1932, newlywed and highly acclaimed vocalist Libby Holman occupied a central role in a shocking and scandalous national tragedy. In the days and months that would follow the truly mysterious death of her husband, twenty-one year old tobacco heir, Z. Smith Reynolds, the vivacious celebrity would be indicted for murder, interrogated by the Winston Salem authorities, and carefully followed by the national press. Placed under a critical microscope, Libby became compelled to defend her nontraditional lifestyle, public persona, and integrity against restrictive, contemporary notions of elite, southern womanhood. In an effort to exonerate herself, Libby would eventually trivialize the modern aspects of her identity and defer completely to her father and attorney. In sacrifcing her distinctive voice and personal agency for the sake of a favorable verdict, this Broadway star's legal battle serves to exemplify the strictly gendered, hierarchal nature of Depression era southern society.

Student Author(s): Michael Tyler, Senior, Psychology North Carolina Central University

Brianna Jones, Senior, Psychology, North Carolina Central University

Mentor(s): Jonathan Livingston, North Carolina Central University

Presentation: Psychology, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 53 1st Floor Mary Townes

The Politics of Culture Identity and Self Presentation: Micro-Aggression Experienced by African Americans in the United States

People of African descent have a colorful history regarding hair styles. In the last year, we have seen an influx in the criminalization of some of these cultural norms within the Black community in America. Schools and workplaces across the United States have suspended or refused to hire persons of color due to having afros or Dreadlocks. These and other styles have been viewed as unprofessional and a distraction in classrooms and workplaces. The underlying issue in these incidents is racial discrimination. More recently, the Federal Court of Appeals decided that banning Dreadlocks from the workplace is not a form of racial discrimination. (Finley, 2016) The problem with this logic is that these styles are African based and are worn by people of color around the world. African Americans are likely to wear Dreadlocks and afros more than any other ethnic group, which would deter them from being hired. Denying one for their ethic characteristics is not legal because of The Civil Rights Act of 1964 (Tunell, 2016). The concept of dismissive behaviors inflicted by non-Black Americans toward African Americans is referred to as micro-aggression (Pierce, 1970). These actions can influence a negative perception of African characteristics to the public by claiming that Dreadlocks and afros are "unprofessional" and "unfit for the workplace." The purpose of this study examine the extent to which African Americans experience these micro-aggressions in schools and jobs due to having dreadlocks. Also, if these occurrences prevent African Americans from advancing in the workplace.

Student Author(s): Natalie Udoye, Sophomore, Criminal Justice North Carolina Central University

Mentor(s): Frank Anthony Rodriguez, North Carolina Central University

Presentation: Criminal Justice, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 33 1st Floor Mary Townes

Psychological Theory and Juvenile Gangs

The following research will analyze the mutualistic relationship between psychological theories and juvenile gang violence. Psychological theory is used to explain the distinct functions of the brain and how it directly affects human emotions. Gangs generally consist of deviant members of society connected by a shared race or location. These organized groups of criminals seem appealing to open-minded and easily impressionable youths searching for acceptance. The aspects further explored in the essay will note the various emotions in delinquents that contribute to gang involvement. Recommendations will also be presented in order to keep youth out of gang membership.

Student Author(s): Rebecca Ulrich, Junior, Biochemistry High Point University

Mentor(s): Meghan Blackledge, High Point University

Presentation: Chemistry (B. S.), Oral Presentations #3 (1:45 - 2:45 PM) 1009 BRITE

Probing the structure-activity relationship of Escherichia coli extracellular death factor

Bacteria use chemical signals for cell-to-cell communication to learn about and respond to their environment in a process called quorum sensing (QS). When dense bacterial populations encounter stress from viral invaders, nutrient deprivation, or harsh environmental conditions, quorum sensing provides a mechanism for individual bacterial cells to modify their behavior to respond appropriately to the stressor. In *E. coli*, quorum sensing modulates the MazEF toxin-antitoxin system through the QS pentapeptide *E. coli* extracellular death factor (EcEDF). Previous research determined the amino acid sequence of EcEDF and described the essential and non-essential amino acid residues for EcEDF activity through a glycine scan. The N-terminal asparagine residue (N-1) was determined to be essential for EcEDF activity. However, a more comprehensive understanding of EcEDF and the structure-activity relationship (SAR) at each amino acid is needed to better understand and manipulate EcEDF control over MazEF activity. Towards this end, a library of rationally designed analogs probing position N-1 of the EcEDF pentapeptide has been synthesized and purified. Cell-based assays will be used to evaluate the analogs for ability to promote or inhibit programmed cell death and persister cell formation in *E. coli*. Results from these assays will be further examined and used to inform second generation analogs. Evaluation of these derivatives for biological function via *in vitro* and *in vivo*assays will be presented.

Student Author(s): Jeison Valencia, Junior, Biology University of North Carolina - Pembroke

Mentor(s): Leonard Holmes, University of North Carolina - Pembroke
Sivanadane Mandjiny University of Norh Carolina - Pembroke

Presentation: Biology (B. S.), Oral Presentations #2 (10:45 - 11:45 AM) 1221 MTSB

***Heterorhabditis bacteriophora*: An Ecofriendly Biological Control Agent**

The entomopathogenic nematode, *Heterorhabditis bacteriophora*, is an environmentally safe alternative to chemical pesticides. It is half of a symbiotic relationship with the bacteria, Photorhabdus luminescens which lives in the nematode gut. *Heterorhabditis bacteriophora* has a wide range of susceptible insects making it a very effective alternative to current biological control practices. The nematode has been proven to be safe to humans, non-target insects, wildlife, fauna, and water. For this reason, as well as consumers' increasing consciousness of

health issues, *Heterorhabditis bacteriophora* should be considered as a viable alternative and researched more thoroughly.

Student Author(s): Arvind Vallabhaneni, Junior, Politicial Science, B.A. with concentration in Civic Engagement and Public Policy North Carolina Central University

Mentor(s): Rolin Mainuddin, North Carolina Central University

Presentation: International Studies, Oral Presentations #4 (3:00 - 4:00 PM) 1234 MTSB

A "Democratic Peace" in South Asia? Divergent Trajectories and the Re-Direction Toward Democracy

Although different in regard to the majority religion, the countries in South Asia are relatively similar with respect to history, tradition, and culture. Whereas the Non-Aligned Movement (NAM) is no longer relevant in the post-cold war era, South Asian Association for Regional Cooperation (SAARC) has not made much progress toward economic or political integration. In taking a "most similar systems" approach, this paper will examine the divergent trajectories in South Asia about democracy. In particular, this study will compare the democratic traditions in India and Sri Lanka with military rule in Pakistan and Bangladesh. Of course, both Pakistan and Bangladesh have embraced democracy in the recent past. Why did Pakistan and Bangladesh take a tortuous path toward democracy? What explains these countries experimenting with democracy? How viable and long-lasting will be this democratic journey? This work will address the divergent trajectories with attention to three factors: religion, political parties, and civil-military relations. As for Pakistan and Bangladesh experimenting with democracy, this study will explore the impact of the changing international environment on the regional sub-system. Whereas India and Sri Lanka reassessed their economic orientations, Pakistan and Bangladesh joined the democratic band-wagon in the post-cold war unipolar world. Given the continued or new communal identity challenges facing these emergent democracies, particularly the Shi'a-Sunni sectarian division in Pakistan and linguistic-religious tension in Bangladesh, these will be explored for their impact on the democratic journey. All these will be framed within the larger context that will ascertain the viability of a "democratic peace" in South Asia.

Student Author(s): Cory Walker, Senior, Environmental Technology and Management North Carolina State University

Alex Johnson, Senior, Environmental Technology and Management, North Carolina State University

Mentor(s): Elizabeth Nichols, North Carolina State University

Presentation: Environmental Science, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 56 2nd Floor Mary Townes

What are the effects of MAHs and PAHs on the growth of poplar tree clones?

As our country's aging infrastructure begins to fully succumb to the deterioration that time imposes, our environment will bear the burden of contamination. Phytoremediation is the use of the natural biological and chemical processes of plants to remove or detoxify chemicals in soil, water or sediment. Phytoremediation can be a key to this imminent environmental crisis, as we use naturally occurring organisms to clean and preserve the environment at a cost lower than that of traditional processes. This study utilized a Coastguard base in Elizabeth City, North Carolina on which there were leaking underground fuel storage tanks placed during WW2. In the late 1980's the site was closed as a fuel depot, and remediated using conventional mechanical techniques that eliminated approximately 40% of the fuel contamination in the ground. In 2005, the site was planted with trees to improve remedial efficacy. Pine, willow, and four different poplar clones were planted to improve the removal of subsurface fuel contamination. My research inventoried the site after 11 years by measuring the height and diameter base height of

pine, willow, poplar and coppiced poplar. Trees heights were measured using Suunto clinometers, Nikon hypsometer, or tree height poles and Lufkin Executive DBH measuring tapes were used to measure tree diameter. Tree mortality, height, and diameter were recorded using GPS Rovers and mapped using ArcGIS.

Student Author(s): WEI WANG, Senior, chemistry University of North Carolina - Pembroke

Mentor(s): Paul Flowers, University of North Carolina - Pembroke

Presentation: Chemistry (B. S.), Oral Presentations #2 (10:45 - 11:45 AM) 1223 MTSB

Design and Performance of a Microscale Spectroelectrochemical Device

Spectroelectrochemistry (SEC) is the term used to describe various experimental strategies involving spectral and electrochemical measurements of samples undergoing electrolysis. SEC techniques are well-established and utilized in various basic and applied fields. As for most chemical analysis techniques, considerable benefit can be derived from the development of measurement technologies that permit the analysis of very small samples. Currently, these "microscale" techniques are preferred or required when samples are available only in limited amounts due to cost or natural scarcity, or when they present a safety hazard when handled in large amounts (radioactive materials, extreme toxins, etc.). This poster describes the design and fabrication procedures for a SEC device that permits the analysis of sub-microliter sample volumes in both batch and flow-injection modes. Also, a summary of the performance of the device is provided as determined through measurements of spectral and electrochemical signals for standard chemical systems. This material is based upon work supported by the National Science Foundation under Grant Number 1506817.

Student Author(s): Xuechun Wang, Senior, Biomedical Engineering North Carolina State University

Mentor(s): Hong Wang, North Carolina State University

Presentation: Physics (B.S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 14 1st Floor Mary Townes

Fluorescent labeling of telomere binding proteins for single-molecule studies

Telomeres are special structures at the end of linear eukaryotic chromosomes that help to maintain the length of the DNA and protect the chromosome ends from DNA fusions and other degradation reactions. Human telomeric DNA consists of a double-stranded DNA region with ~2 to 15 kilobase pairs of TTAGGG repeats and a 3' G-rich single-stranded DNA overhang. The shelterin protein complex at telomeres consists of 6 different subunits including TRF1, TRF2, TIN2, POT1, TPP1 and RAP1. TIN2 does not directly bind to either double- or single-stranded telomeric DNA, instead it is recruited to telomeres by direct association with TRF1 and TRF2. It is well established that the TIN2 mutations cause severe dyskeratosis congenita. Despite the importance of TIN2 in maintaining telomere function and its clinical relevance, experimental data showing how TIN2 regulates the functions of TRF1 and TRF2 is still lacking. The purpose of this project is to label TIN2 with specified fluorescent dyes to enable single-molecule fluorescence microscopy studies of structure-function relationship underlying TRF1-TIN2-DNA and TRF2-TIN2-DNA interactions. The gained knowledge will help to design new therapeutical interventions to cure and manage diseases related to telomere dysfunction. So far, we have optimized the tagged TIN2 purification steps with the best elution yield.

Student Author(s): Connor Warren, Junior, Creative Writing Appalachian State University

Mentor(s): KC Kirsten Clemens, Appalachian State University

Presentation: English (Writing), Oral Presentations #2 (10:45 - 11:45 AM) 2236 MTSB

Gender Dynamics in Billy Elliot

In the film Billy Elliot, the title character undergoes numerous changes, not only in the direction that his life will take him, but also in his views of people, careers, and the world around him. As he grows in his talent within the sphere of ballet, he also begins to grow within himself. Numerous characters also make changes, such as his father and his brother, but the focus of this paper is solely on the societal effects of male stereotypes and Billy Elliot's experiences with them. This film not only explores the historical aspects of Ireland and the economic unrest that it experienced but also explores the stigma of homosexuality during that time as well. Billy, an adolescent during this time, is forced to grapple with this idea of masculinity and femininity, while also having to grapple with his personal identity.

Student Author(s): Cedric Watlington, Senior, Engineering North Carolina A&T State University

Lashondra Butler, Junior, Industrial & Systems Engineering, North Carolina A&T State University

Mentor(s): Tonya Smith-Jackson , North Carolina Agricultural & Technical State University

Presentation: Engineering - Industrial & Systems, Oral Presentations #3 (1:45 - 2:45 PM) 1009 BRITE

Augmented Cognitive Classroom Agents: Next-Generation Teaching and Learning

Smart spaces are pervasive. Recently, the emergence of advanced sensor, Internet, and device-to-device protocols has supported the development of physical environments that are not only smart, but capable of augmenting cognition of those present in the environment. This research focuses on nextGEN technologies to equalize the learning environment. We propose to structure design requirements around the concept of stereotype threat; where performance is undermined by a student's anxiety about the possibility of fulfilling negative stereotypes about classroom performance. We then propose to use technology to augment cognitive skills of professors by using augmentative cognitive systems to inform them of the presence of stereotype threat and help them engage with students in a manner that diminishes the negative impact. Focus groups with students were conducted to identity "smart" classroom requirements. Participant observation was also used as a method of capturing Stereotype to determine requirements. Students were asked to design a classroom that accommodated their learning style, dynamically facilitated relationships with their instructor, and maximized knowledge transfer? The results will be discussed. In summary, system requirements must focus on classroom interactions, since students reported interactions as the key component in active learning. Additional requirements and concepts for system design will be discussed in the presentation.

Student Author(s): Ebony Watson, Senior, Biochemistry North Carolina State University

Mentor(s): Jose Ascencio-Ibanez, North Carolina State University

Presentation: Biology (B. S.), Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 50 2nd Floor Mary Townes

A new virus found in a native shrub may be an ancestral geminivirus involved in the cassava mosaic disease in East Africa.

Geminiviruses are a large family of plant viruses with circular ssDNA genomes with replicable double-stranded intermediates which infect many crops and weeds around the globe, specifically in subtropical regions. Geminiviruses are organized into monopartite and bipartite circular ssDNA which consist of 2.5-2.9 kbp. These viruses are responsible for a large amount of crop damage worldwide and can be transmitted via insects. Cassava, Manihot esculenta, is a starchy

root crop native to Brazil and tropical areas of the Americas and then later introduced to Africa. Cassava has been infected by numerous geminiviruses, which has caused devastating losses to farmers and we are identifying alternate hosts. Deinbollia borbonica may be an alternate host for geminivirus that infects cassava. Our colleagues have purified total DNA from the symptomatic Deinbollia borbonica and performed a rolling circle amplification (RCA) and sequencing via a Roche 454 sequencer to generate a next generation library. Upon this amplification the A component of the bipartite begomovirus has been identified. We have also identified the B component and we are working to clone the virus, both the A and B components, to produce infectious clones to test back to our targets Deinbollia borbonica and cassava.

Student Author(s): Amaya Watters, Sophomore, Animal Science North Carolina State University

Mentor(s): Lisa Paciulli, North Carolina State University

Presentation: Biology (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 18 1st Floor Mary Townes

The Effects of Infants on Mother's Behavior in Coquerel's Sifakas (Propithecus coquereli): A Pilot Study

Infants exert great stress on their mothers during gestation, lactation, and after. Gestating and lactating mothers need to consume more calories every trimester, and experience an increased number of sleep disturbances. They also are more protective and aggressive than females with no offspring (Hedman *et al*. 2001). In this study, the behavior of captive mother Coquerel's sifakas *(Propithecus coquereli)* was examined. One mother with an infant, and 2 multiparous and 1 nulliparous female without infants were tested for their willingness to explore a novel object at the Duke Lemur Center. Cages were cleared of all objects and animals except for the subjects, and either a control (food bowl) or novel object (hair brush) was placed in the cage. Sifakas' responses were recorded with a Sony HD Camcorder and coded for the closest distance to the object, latency to approach the object, the number of times the object was approached, and the number of times the object was handled. Results showed that the mother with the infant approached objects more quickly and moved closer to the objects than the females without infants. This could be because the mother wanted to examine the novel object due to the protective and aggressive nature of mothers to unknown individuals and objects. Future research will include increasing the number of females with and without infants to see if a larger sample size yields similar results.

Student Author(s): Kiera Weathers, Junior, Forensic Science Fayetteville State University

Mentor(s): Khalid Lodhi , Fayetteville State University

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 55 2nd Floor Mary Townes

Isolation, Identification, and Time Course Human DNA Typing from Cimex lectularius L. (Bed Bugs) Fed on Human Blood

The goals of this study were to investigate whether sufficient amounts of human blood and DNA can be recovered from a Bed bug (Bb), Cimex lectularius L., and if the identity of a single and/or multiple individual(s) can be established by generating human genetic profile(s). Bed bugs were fed on human male blood at North Carolina State University Entomology laboratories and were frozen at 12 hrs time intervals starting 0, 12, …. up to 108 hours. Blood was extracted from each bed bug by homogenization, transferred onto Whatman® FTA cards and air dried. DNA was isolated by organic method, quantified by real-time PCR using Quantifiler® Duo Kit, and amplified using AmpFlSTR® IdentifilerFiler® Kit. Rapid Stain Identification (RSID) results

confirmed the presence of human specific Glycophorin A protein at various time points. Real-time PCR human DNA concentration ranged from less than .0112ng/µL to 0.501 ng/µL. Full or partial Short Tandem Repeats (STR) DNA profiles for all 15 STR loci plus the Amelogenin locus were typed and compared with a reference male DNA profile. Our study demonstrates that bed bugs can be used as reliable physical evidence in forensic investigations.

Student Author(s): Tamara Wells, Senior, Environmental Science North Carolina State University

Mentor(s): Theodore Shear, North Carolina State University
Thomas Kwak North Carolina State University

Presentation: Environmental Science, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 60 2nd Floor Mary Townes

Estimation of Harvest for an Artisanal Post-Larvae Goby Fishery in Puerto Rico

Fisheries for amphidromous postlarvae, most notably freshwater goby species, occur worldwide where returning migrations of postlarvae to rivers are often predictable due to strong synchrony with the lunar cycle. Although these unique fisheries can have high cultural and economic value, they have received little research attention and are commonly managed with few or no regulations. Therefore, a greater understanding of the fishery and harvest dynamics is necessary to ensure conservation and sustainability of this unique aquatic resource. Postlarval Sirajo Goby (*Sicydium* spp.) are locally referred to as cetí in Puerto Rico and are harvested in low-participation and low-technology, artisanal fisheries. Fishing for cetí occurs monthly at river mouths throughout the western and northern coasts of Puerto Rico from June to January. Our objective was to characterize the postlarval Sirajo Goby fishery and evaluate factors influencing harvest at the mouth of the Río Grande de Arecibo, Puerto Rico, where a popular cetí fishery occurs. We surveyed fishers and weighed their catch in July 2014 and 2015 to characterize the participation and harvest of this cetí fishery. We estimated Sirajo Goby harvest (total weight and individuals) and evaluated relationships of Sirajo Goby catch with effort, timing, and tide height using linear regression.

Student Author(s): Kimberly West, Senior, Chemistry Fayetteville State University

Mentor(s): Subir Nagdas, Fayetteville State University

Presentation: Chemistry (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 68 2nd Floor Mary Townes

Biochemical Characterization of Two Major Proteins of the Hamster Sperm Acrosomal Matrix

An acrosomal fraction, termed the ALM (acrosomal lamina complex) was isolated from hamster cauda epididymal spermatozoa that contain specific domains of the acrosomal matrix and an adherent detergent-insoluble complex, termed the acrosomal lamina, which is derived from the outer acrosomal membrane. By SDS-PAGE, the ALM fraction exhibited two major polypeptides of Mr=29,000 (ALM29) and Mr=22,000 (ALM22). Acrosin binds to the ALM29 polypeptide only. The objective of the present study is to investigate the binding efficiency of acrosin to the V8 protease-generated peptides of ALM29 and ALM22 polypeptides, to examine the presence of phosphate groups on both ALM29 and ALM22 polypeptides and to identify the binding competency of dephosphorylated ALM29 polypeptide to acrosin. All V8 protease-digested peptides of ALM29 and ALM22 showed immunoreactive bands when stained with anti-ALM22 antibody suggesting that all peptides are antigenically related family. Both ALM29 and ALM22 polypeptides were stripped out of the ALM complex by high pH (pH-11) extraction and were treated with alkaline phosphatase followed by immunoblot analysis. Both ALM29 and ALM22 polypeptides showed a reduction in size (~3 kDa) by alkaline phosphatase treatment. A sedimentation assay was employed to determine whether alkanine phosphate treated ALM29

polypeptide possesses acrosin binding. Dephosphorylated ALM29 polypeptide revealed a significant reduction (~50%) in acrosin binding in comparison with acrosin to a native ALM29 polypeptide. Our studies conclude that both ALM29 and ALM22 polypeptides are phosphorylated and demonstrate the role of phosphate group of ALM29 polypeptide in acrosin binding.

Student Author(s): Keven White, Senior, Religious Studies Appalachian State University

Mentor(s): Clark Maddux, Appalachian State University

Presentation: Religion, Oral Presentations #1 (9:30 - 10:30 AM) 2236 MTSB

Jesus the Rebel: How the Secret Messiah in the Gospel of Mark Functions as the Ultimate Manifistation of Resistance

By applying the concept of the hidden transcript to Mark, this postcolonial analysis reveals the Christology within the Gospel to be the ultimate manifestation of the indignant resistance towards the ruling elite. There exist both a public and hidden transcript; the former being controlled by the elite in power and the latter being kept secret by the marginalized. The public transcript is where the ruling class displays their ideology which manipulates the subordinate people. On the contrary, the hidden transcript functions as the birth of resistance and is beyond the perception of those in power. Jewish theology called on sacrifice as the primary means of appeasement to YHWH; therefore those who controlled the operations of the temple had access to power that allowed them to dominate the public transcript. The Jewish religion, interpretation by the elite priest, acted as the proper catalyst for oppression and was used to tax the peasants and fund the Roman occupation of Palestine. The Gospel of Mark is most notable for its unusual level of ambiguity, secrecy, and deception as Jesus' identity remains a mystery to nearly everyone in the narrative. Jesus constantly uses the hidden transcript to convey his message and dodge the priest. He avoids inciting a violent rebellion as recent history had proven such methods to be unsuccessful. The hidden transcript within Mark's Gospel becomes the ultimate source of resistance when it offers an alternative way to repeal the power of the temple while not rebelling under Roman law. This is accomplished through the passion narrative which allows followers of Christ to have their sins mitigated via his sacrifice and, thus, completely avoiding the temple apparatus.

Student Author(s): Alexis Wilkerson, Senior, Sociology University of North Carolina - Pembroke

Mentor(s): Sonali Jain, University of North Carolina - Pembroke

Presentation: Sociology and Anthropology, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 22 1st Floor Mary Townes

Ebony Faces: Exploring African Americans' Sentiments of Identity and Belonging

This study will fixate on the African diaspora of African Americans. In particular, the personalized identification and perceptions of belonging of African Americans will be explored. With this study I hope to contribute to society and the scholarly community by sharing knowledge that describes the African American experience personally and socially, concerning selfhood and origin association. More precisely, the objectives of this study are to investigate the following: (1) historical and cultural roots of African Americans in relation to identity, (2) the narrative of African Americans efforts with formulating an impression of self and connecting with the ancestral home of Africa, (3) Methods of remembering, re-imagining, and accepting cultural origins and its link with self-hood. The center of this research is essentially around the current culture of African Americans, notably that revolving around the dual expression and

conceptualization of identity and sense of kinship.

Student Author(s): Brianah Williams, Senior, Public Health Education North Carolina Central University

Mentor(s): La Verne Reid, North Carolina Central University

Presentation: Public Health Education, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 30 1st Floor Mary Townes

Three Evidence Based Public Health Trainings: Evaluating Pre-Post Competency Assessment Data

Evidence-based strategies (EBS) are being implemented by public health practitioners with the goal of preventing illness and addressing health disparities. The North Carolina Institute for Public Health provides trainings, conducts research, and provides technical assistance to build public health practitioners' capacity to implement EBS while working in partnership with the Comprehensive Cancer Control Collaborative of North Carolina, funded by the Centers for Disease Control and Prevention. This presentation reports findings from an evaluation of training impact from three Evidence-Based Public Health (EBPH) trainings delivered between August 2015-February 2016 to health care professionals working in local health departments and community based organizations. A set of 36 competencies were developed to assess local practitioners' perceptions of their ability to select, adapt, and implement EBS in six key areas. Training participants completed a pre-training survey to assess their perceived competence by indicating how much assistance they would need to complete actions to support the selection, adaptation, and implementation of EBS within the communities where they work. A post-training survey was administered to measure the specific skills and competencies gained from the training. The survey included actions for promoting evidence-based practice that fell within the following categories: build support and engage team, engage community, create action plan, select and adapt EBS, implement action plan, and evaluation. Data from these three EBPH trainings were compiled into a database and analyzed. A total of 109 participants completed the pre and post competency assessment survey for the three trainings. Pre and post mean, difference, and p-values were identified and associated with each of the six competencies areas. All categories indicated a significant difference in mean scores. This presentation will show the positive impact of the trainings on participants by demonstrating areas where participants felt more competent to select, adapt, and implement EBS for their communities.

Student Author(s): Shepeara Williams, Junior, Criminal Justice North Carolina Central University

Mentor(s): Frank Anthony Rodriguez, North Carolina Central University

Presentation: Criminal Justice, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 34 1st Floor Mary Townes

Socioeconomic Status and Color of Gang Membership

The focus of this study is to assess sociological theories and Black juvenile gang membership. Sociological theory serves as an influence for the assessment of gang membership among juveniles. The components of sociological theory that will be discussed include social disorganization theory, and anomie/strain theory. The research will focus on why Black gang membership is significant to juveniles, particularly in low-income environments. The focus of the paper is to analyze the impact that the environment has on juveniles to become gang members. Also, this study will identify correlations between low-income environments and Black gang membership. While this paper discusses the impact of one variable on another (environment and gang membership) it is not a direct link to their white counter part.

Student Author(s): Lawrence Willis, Senior, Chemistry Appalachian State University

Mentor(s): Dale Wheeler, Appalachian State University

Presentation: Chemistry (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 39 2nd Floor Mary Townes

Synthesis and Characterization of Novel o-Phenylenediamine Glyoxime Derivatives

Since 2015, I have been investigating the synthesis and characterization of new cobaloximes as potential hydrogen producing catalysts. The main goal of the project is to synthesize new glyoxime precursors in preparation of creating novel cobaloximes. Based upon the previous finding from former students, the target glyoximes of this current line of research have attached aniline groups to potentially enhance the catalytic properties. During the fall semester it was determined that the aniline glyoximes can be formed, but are thermally unstable and decompose before the cobaloximes using these ligands could be created. Based upon the observed decomposition, the product is likely undergoing polymerization. Consequently, the project now focuses on derivatives of o-phenylenediamine. The first glyoxime derivative investigated used o-phenylenediamine. The product created resulted from the direct addition to the glyoxime as predicted. Building upon this, other success novel derivatives have been isolated and characterized. The first of which is the 3,4-diaminotoluene derivative. This presentation will report the synthesis and characterization of three o-phenylenediamine glyoxime derivatives, two of which are novel products. These are characterized using ^{1}H and ^{13}C NMR, IR, and UV-vis.

Student Author(s): Tanquez Willis, Sophomore, Chemistry Elizabeth City State University

Mentor(s): Linda Columbus, University of Virginia

Presentation: Chemistry (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 23 2nd Floor Mary Townes

Expressing and Purifying Recombinant Opa Proteins

Neisseria gonorrhoeae and *Neisseria meningitidis* are pathogenic bacteria that infect human cells causing the diseases gonorrhea and meningitis.*Neisseria* attaches to the surface of human host cells with the help of Opacity-associated (Opa) proteins. Using plasmid DNA which codes for one variety of Opa protein, we will transform *Escherichia coli* (*E. coli*) in order to recombinantly express unfolded Opa. *E. coli* will then be lysed in order to extract its native proteins and Opa. Using a cobalt column we will purify Opa proteins from native *E. coli* proteins through a process called affinity purification. Purified Opa proteins may then be used for future studies.

Student Author(s): Jamiceia Willoughby, Sophomore, Criminal Justice North Carolina Central University

Mentor(s): Frank Anthony Rodriguez, North Carolina Central University

Presentation: Criminal Justice, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 31 1st Floor Mary Townes

The Developmental Strategies of Troubled Youth

We simply describe sociological theories as the study of human social structures. These social structures help us form our society and who we are as a whole. Where we live, how we live, and who we live with all have a major part in how our growth is defined. These different aspects usually are more impactful through family matters. The ecological model along with social disorganization theory, functionalism, social control, and anomie all will describe what is legitimate and what is not legitimate. (good and bad) Each theory has its own explanation on why crime is heavily sought out within a sociological environment. These explanations come with several sociologists who have examined their own views and also those before them.

Student Author(s): Alex Wilson, Senior, Chemistry Appalachian State University

Mentor(s): Carol Babyak, Appalachian State University

Presentation: Chemistry (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 38 2nd Floor Mary Townes

Development of Extraction Methods for the Analysis of Secretions of the Plethodon yonahlossee salamander

The *Plethodon yonahlossee* is a salamander found in the Appalachian mountain range with a large red spot on its back. The purpose of this research is to determine, through chemical analysis, if this spot has a correlation with toxic or unpalatable compounds in the defensive skin secretions of this species. The chemical analysis requires the extraction of unknown alkaloids by way of a liquid-liquid extraction method using acid-base chemistry, followed by identification and structural analysis using tandem mass spectrometry (MS) and nuclear magnetic resonance (NMR) spectroscopy, and quantification using gas chromatography-mass spectrometry (GC-MS). Since little research is known about this salamander, methods have been developed for known alkaloids, nicotine and quinolone, in the hopes of extracting similar compounds from the salamanders' secretions. To date, extraction and detection of nicotine and quinolone have been performed. These compounds will be used as internal standards in future analyses.

Student Author(s): Cheyenne Wilson, Senior, Biology Catawba College

Emily Hoffler, Sophomore, , Catawba College

Jonathan Rife, Sophomore, English, Catawba College

Mentor(s): Jay F. Bolin, Catawba College

Presentation: Biology (B. S.), Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 20 1st Floor Mary Townes

Diet Analysis of an Honors First Year Seminar Class at Catawba College using Stable Isotope Analysis

As part the of the People of the Corn - Honors First Year Seminar class we analyzed participant's diets using stable isotopic methods. Stable isotopic methods can reveal information about diet, increased 15N can indicate a higher trophic level diet, while increased 13C can reflect a reliance on a C4 plant based diet. Common C4 plants in the typical American diet are corn, sorghum, and sugar cane. Finely chopped scalp-hair samples were weighed (0.8-4.9 mg) and placed into ultraclean tin cups. Samples were analyzed for 14N:15N and 12C:13C ratios at the University of California Berkeley-Center for Stable Isotope Biogeochemistry. Students in the course generated survey questions to probe for correlations between diet and stable isotope ratios. Clear isotopic differences in 15N and 13C ratios were evident for major diet classes: omnivore, pesco-vegetarian, vegetarian, and vegan. Though low sample size precluded statistical analyses.

Student Author(s): Preston Wilson, Junior, Computer Science Appalachian State University

Christopher Smith, Senior, Computer Science, Appalachian State University

Mentor(s): Rahman Tashakkori, Appalachian State University

Presentation: Computer Science (B.S.), Oral Presentations #2 (10:45 - 11:45 AM) 1008 BRITE

Monitoring Honeybee Activity with Frequency Analysis Plots

Honeybees are among the most important organisms in the world. Many crops fully depend on the pollination honeybees provide for reproduction, and much of the food we eat wouldn't exist without them. Honeybees are also of high economic importance, and many commercial

beekeepers fully depend on them for their livelihoods. Factors, including certain pesticides and the varroa destructor mite, have ravaged the honeybee population in recent history, causing researchers to develop new methods of analysis to track the health of their beehives. One such method involves studying the sound that the honeybees make inside their beehive, in order to track the overall bee colony health and to predict any possible dangers. Honeybees produce many different sounds that signify different occurrences, and these sounds usually occur within a specific frequency range. By plotting the audio frequency spectrum, honeybee activity for that time frame can be analyzed. The amount of activity across different frequency ranges, indicated in decibel values, can give insight into hive behavior. Frequency peaks can also be discovered through these plots. Another useful tool for beehive health analysis is non-negative matrix factorization (NMF), which can be used to decompose a spectrogram into two different plots: one for time plotted against intensity, and another for frequencies plotted against intensity. These plots make it very simple to pick out anomalies within a large time frame of audio data, which can expedite the process of finding significant audio activity within a hive. The time plot describes when the abnormality happens, while the frequency plot describes the frequencies present from different theoretical sound sources. Using this information, threats to the beehive or unusual bee activity can quickly be found, so that appropriate measures can be taken.

Student Author(s): Carrisa Womble, Sophomore, Animal Science North Carolina State University

Mentor(s): Kevin Anderson, North Carolina State University
Keena Mullen North Carolina State University

Presentation: Biology (B. S.), Oral Presentations #3 (1:45 - 2:45 PM) 1233 MTSB

Characterization of milk cellular response to intramammary phytoceutical administration in cows with mastitis

Mastitis, or inflammation of the mammary gland, is a costly disease in the dairy industry. Some organic dairy producers have adopted the use of phytoceuticals, or plant-derived products, to treat mastitis due to the restrictions on conventional antibiotic use in U.S. organic dairy herds. This study evaluated how Phyto-Mast, an intramammary phytoceutical product, affected the number and types of white blood cells present in the milk of cows with mastitis. The number of cells in milk increases during mastitis as well as when foreign materials are introduced into the gland. By monitoring these cells, immune system stimulation and mammary irritation from this product can be assessed. The milk cellular response to Phyto-Mast has already been evaluated in healthy cows. At 12 and 24 hours post-treatment, total leukocyte counts (TLC), neutrophils, lymphocytes, and macrophages were elevated. At 48 hours, all were increased except for lymphocytes. However, it is unknown if the same cellular response occurs in cows with mastitis. Thirteen dairy cows with mastitis infections were managed under organic conditions, milked twice daily, and treated with two intramammary doses of Phyto-Mast administered 12 hours apart. Quarter milk samples were collected at the time of dosing, 12 hours after the first dose, and 12, 24, 48, 72, and 96 hours after the second dose. Milk leukocyte differential technology was used to measure TLC and neutrophil, macrophage, and lymphocyte levels. It is hypothesized that the cellular response in mastitic cows will resemble the responses observed in healthy cows, and preliminary data have indicated that the results are remarkably similar. If confirmed, these findings would suggest that infection status does not alter the milk cellular response to this phytoceutical product.

Student Author(s): Lewis Woodard, Senior, Biology Chowan University

Mentor(s): Corina Wack, Chowan University

Presentation: Biology (B. S.), Oral Presentations #4 (3:00 - 4:00 PM) 1008 BRITE

Effects of Salinity On Tadpole Growth and Development

Sea levels in North Carolina are currently higher than they ever have been and are still rising today (CCSP, 2009). Rising sea levels can increase the salinity levels in nearby freshwater habitats after major storm events. Frogs use these freshwater habitats to lay their eggs. Increases in salinization of these areas act as a stressor and could influence the growth and behavior of the developing tadpoles. Frogs in Puerto Rico developing in high salinities showed higher mortality, decreased mass, and increased number of developmental abnormalities (Rios-Lopez, 2008). Understanding how increased salinity levels affect amphibians is of particular importance due to the global amphibian decline. In the current study, African clawed tadpoles will be placed in a freshwater (control; 0 ppt), low salinity (2 ppt), or high salinity (8 ppt) treatment. During their development, each week the Gosner stage of development, snout-to-vent length, total length, and mass of each tadpole will be measured. Activity levels will be measured at premetamorphic, prometamorphic, and metamorphic stages. We predict that tadpoles exposed to high saline will have the greatest decline in growth and show the greatest change in locomotor activity compared to the control group.

Student Author(s): Gerry Woodland, Senior, Chemistry Fayetteville State University

Mentor(s): James Hagberg, University of Maryland

Presentation: Biology (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 66 2nd Floor Mary Townes

Effects of Downhill Running Exercise On Toll-Like Receptor 4 (TLR4) Gene

The Toll-like Receptor 4 (TLR4) belongs to the Toll-Like Receptor family which recognizes pathogen-associated molecular patterns, such as lipoproteins of Gram-negative bacteria. TLR4 gene activation leads to the production of cytokines, chemokines, and antimicrobial proteins important in the innate immune response. Among all the TRLs, TLR4 has been shown to respond highly to different exercise protocols. Previous studies show TLR4 expression was lower in resistance-trained elderly women. The purpose of this study was to assess the effect of downhill running exercise on peripheral blood mononuclear cells (PBMC) expression of the TLR4 gene in the growth and inflammatory pathways before and after an acute bout of exercise in young healthy individuals. We tested the hypothesis that TLR 4 gene expression would increase after the downhill running exercise. To this end, three participants underwent downhill running exercise once. Blood samples were taken from each participant before and immediately after the downhill running exercise for isolation of PBMCs. RNA was extracted from PBMCs and a cDNA library was constructed. The TLR4 gene was amplified by polymerase chain reaction to assess the difference in gene expression before and after exercise. Our results shows there were no significant ($p=0.255$) changes in TLR4 gene expression before and after downhill running. In conclusion, this finding suggests that the expression of TLR4 in PBMCs is not affected by downhill exercise, however more subjects are needed in order to make further conclusions. Future studies should include much larger sample sizes, a comparison of the expression of other Toll-like receptors in PBMCs before and after downhill running exercise.

Student Author(s): Anderson Woodson, Junior, Biology & Public Health Meredith College

Jasmine Williams, Senior, Biology & Chemistry, Meredith College

Miranda Daughtry, Junior, Biology, Meredith College

Mentor(s): Carolina Perez-Heydrich, Meredith College

Presentation: Biology (B. S.), Oral Presentations #1 (9:30 - 10:30 AM) 1221 MTSB

Environmental Surveillance of Zoonotic Pathogens

The objective of this research is to estimate the prevalence of zoonotic pathogens in the environment surrounding Raleigh, NC. We focused specifically on the roundworms, *Baylisascaris procyonis* and *Toxocara* spp. Humans are not natural parts of the life

cycle of these parasites, therefore, if infective eggs are accidentally ingested via contamination of the environment, the larval worms can cause significant damage to their human host. Here we present initial findings of our prevalence survey from public parks in Raleigh, NC. Soil and fecal samples were collected and processed using a zinc sulfate solution to isolate and count the number of infective eggs present in each sample. We found a relatively low overall prevalence of target parasite eggs (6.8% *B. procyonis*, 10% *Toxocara* spp.); however, further sample collection efforts are still underway. We also observed a large number of unidentified free-living nematodes in each sample. In the future, we hope to expand our project to include molecular identification of these worms and correlate pathogen-specific prevalence data with the socio-demographic composition of populations surrounding sample locations in order to identify areas and populations that are at high risk of exposure.

Student Author(s): Kirsten Woolpert, Junior, Biology University of North Carolina - Wilmington

Mentor(s): Kevin Kiser, University of North Carolina - Wilmington

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 31 1st Floor Mary Townes

Antibiotic-Producing Bacteria Discovered at Local Anne McCrary Park

The discovery of new antibiotics is becoming a growing need in the world as bacteria evolve to be immune against our medicines. With the vast amount of soil covering the Earth, more antibiotic compounds are bound to be in our soils, waiting to be discovered. With this research project, my goal was to find the type of soils that are the most diverse in their microbial activity. In doing so, I found a microbe that was producing an antibiotic that showed resistance against four of the six ESKAPE pathogens, including S. aureus, K. pneumoniae, A. calcoaceticus, and P. aeruginosa. After sequencing the 16S rRNA, I discovered that this bacterial species is Pseudomonas soli. Though it's known to produce an antibiotic compound, not much research has been done to determine what the compound is and it's effectiveness, demonstrating a need for continued study.

Student Author(s): Jaime Wright, Senior, Psychology Guilford College

Mentor(s): Richie Zweigenhaft, Guilford College

Presentation: Psychology, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 43 1st Floor Mary Townes

In Pursuit of Happiness: The Influence of Happiness-Increasing Activities on Stress and Happiness

Research has found increased stress in college students which often is associated with decreased happiness. Research suggests that some happiness-increasing activities may buffer against stress and increase happiness. This correlational study examined the relationship between happiness-increasing strategies and stress and happiness. It was predicted that there would be a positive relationship between happiness and happiness-increasing activities associated with social affiliation. A total of 53 (40 female, 13 male) college student participants completed a survey assessing stress, happiness, and frequency of happiness-increasing strategies. Results found increased happiness levels were related to a higher frequency of happiness-increasing activities associated with social affiliation (e.g., focus on maintaining relationships). Direct attempt happiness-increasing activities (e.g., smiling, acting happy, and deciding to be happy) were negatively related to stress and positively related to happiness. This study offers practical significance with results consistent with past research that suggest a common characteristic of happy people are strong social relationships.

Student Author(s): Maryah Wright, Junior, Pharmaceutical Sciences North Carolina Central University

Mentor(s): Ben Major, University of North Carolina - Chapel Hill
Brittany Bowman University of North Carolina - Chapel Hill

Presentation: Chemistry (B. S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 26 1st Floor Mary Townes

Role of Mutant NRF2 in Cell Proliferation

Antioxidants are known to attenuate the effects of reactive oxygen species. A protein called NRF2, a transcription factor, protects against oxidative stress, through antioxidant gene regulation. Normally NRF2 protein stability is regulated by ubiquitin-mediated degradation. Activation of the NRF2 defense response protects against oxidative stress maladies such as neurodegenerative disease, diabetes, and cardiovascular disease. In regards to cancer, a disease with increased stress, NRF2 signaling seems to have a dualistic role depending on the context. In lung cancer, 30% of patients have an activating mutation in the NRF2/KEAP1 pathway leading to sustained expression of NRF2. The most common mutation of NRF2 in lung cancer is point mutant E79Q. The mutation disrupts binding of KEAP1 to NRF2, leading to NRF2 stabilization and induced antioxidant gene synthesis. Since NRF2 target genes are said to be involved in cancer cell proliferation, we hypothesize that a stabilizing point mutation of NRF2 will support cell proliferation. We examined cell proliferation by generating immortalized mouse embryonic fibroblasts (MEFs) from a conditional transgenic mice which upon administration of Cre-Recombinase activates expression of NRF2 E79Q. Unfortunately we did not receive a clear consensus on the role of mutant NRF2 on proliferation due to contradictory findings between the methods used, likely due to the MEFs not being truly immortalized. Future studies include generating true immortal MEFs as well as crossing this mouse to other GEMMs to study the effect of mutant NRF2 in cancer.

Student Author(s): Olivia Wright, Junior, Statistics North Carolina State University

Mentor(s): Elliot Inman, SAS Institute

Presentation: Computer Science (B.S.), Poster Presentations #4 (3:00 - 4:00 PM) , Poster Number 2 1st Floor Mary Townes

Development of SAS Studio Custom Tasks for Data Science

This project summarizes the development of three Custom Tasks for SAS Studio. SAS Studio Tasks enable users to access and execute complicated SAS code through a point-and-click interface. Tasks use the Apache Velocity Template Language, which enables users to generate their own tasks. The project shows how that can be done, demonstrating the development process for building three Custom Tasks. One task downloads data from the United Nations Comtrade API and executes a trade flow analysis for the user-specified reporting country, partnering country, and time period. Another task allows a user to select a book from Project Gutenberg and outputs the results of a basic text parsing process. A third task simplifies the process of coding mapping by allowing a user to input data with latitude and longitude coordinates for an instant graph of the data with the specified points and labels. This projects serves two purposes: promoting use of this feature and informing development of custom task functionality and training for future versions of SAS Studio.

Student Author(s): Shannon Wright, Junior, Psychology Catawba College

Mentor(s): Sheila Brownlow, Catawba College

Presentation: Psychology, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 41 2nd Floor Mary Townes

Effects of Background Color Presentation and Word Emotionality on Recall of Text

The purpose of this experiment was to examine the joint effects of word emotionality and color on memory. A total of 24 participants (12 men, 12 women) examined 36 words (18 emotional, 18 non-emotional), drawn from those given by Rubin and Friendly (2008). These were printed in black ink on a PowerPoint slide which had either a blue, pink, or white background (n = 12 each; 6 emotional/6 non-emotional), and were arranged in one of two orders and shown twice for 3 *sec*. Participants then recalled as many words as possible and then indicated recognition of the words from a list of the actual words plus 64 foils. Recall and recognition were entered separately in 2 x 3 (Emotionality x Background Color) completely-repeated ANOVAs. Results showed a main effect of emotionality for recall, with emotional words recalled more often than non-emotional words. Recognition was impacted by background presentation color, as recognition was superior with a pink background over a blue and white background, although blue and white backgrounds produced similar recognition performances. The results of this study indicated that both color and word emotionality grab attention and assist differentially for different forms of memory.

Student Author(s): Alexander Xiong, Junior, None North Carolina School of Science and Mathematics

Mentor(s): Ewan Pritchard, North Carolina State University

Presentation: Environmental Science, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 36 1st Floor Mary Townes

Studying Cleaning Methods to Maximize Solar Energy in Underdeveloped Regions

Currently, in rural and underdeveloped regions such as sub-Saharan Africa, access to electricity is very limited. Solar energy could provide both a reliable and cheap source of electricity in such a sunny region. However, the area's dry, arid climate results in dust accumulation on solar panels, leading to major reductions in energy generation. While cleaning methods such as mechanical, nano-film and electrostatic have been studied, the performance comparison of different methods have not been done. We constructed a simulation method to compare these three methods against a control, natural passive cleaning. To determine the energy generated by each cleaning method and their dependence on environmental factors, wind, rain, panel tilt, and a zero latitude location were incorporated into the simulation. While any cleaning resulted in an extra 7384.34 kWh energy increase over a 365 day period, mechanical cleaning was the best with a 38.03% improvement and was not affected by environmental factors. However, in areas further away from the equator, electrostatic cleaning became more effective. This proposed simulation is capable of determining the cleaning methods for different situational parameters, making it very valuable in reducing costs and increasing efficiency worldwide.

Student Author(s): Michael Yanik, Senior, Environmental Science Appalachian State University

Mentor(s): William Anderson, Jr., Appalachian State University

Presentation: Environmental Science, Poster Presentations #3 (1:45 - 2:45 PM) , Poster Number 55 2nd Floor Mary Townes

Quantifying ground-surface water fluxes and heterogeneity in an urbanized mountain stream

Boone Creek is a headwater stream that feeds into the South Fork of the New River in Boone, North Carolina. Boone Creek has been studied for over a decade; however, the groundwater-surface water interactions in the aquifer have not been studied with high spatial and temporal resolution. The focus of this project is to determine the vertical groundwater flux between groundwater and surface water, which will enhance our understanding of the interactions during all phases of stream discharge: baseflow, storm, and transitions. Understanding ground-surface

water flux rates also provides insight into solutes and heat in the shallow aquifer. Temperature time-series data were collected by deploying a 3x3 grid of piezometers spaced 1m apart. Each piezometer had two iButton™ temperature sensors spaced approximately 30 cm apart; some piezometers had multiple sensors spaced 10 cm apart. Hydraulic gradient was hand-measured in the field. The temperature time-series data were analyzed in MATLAB using a script, VFlux. The script takes temperature time-series data and uses amplitude dampening and phase shift to calculate vertical flux by adapting the established methods. Combining these data with the gradient measurements, streambed hydraulic conductivity was calculated with Darcy's Law. The Hazen method was also calculated based on grain-size distribution curves quantified from core samples obtained while installing the piezometers. The results of this study enable the determination of the heterogeneity of streambed hydraulic conductivity and the vertical flux between the groundwater reservoir and the stream.

Student Author(s): Amber Young, Senior, History Fayetteville State University

Mentor(s): Paul Boaheng, Fayetteville State University

Presentation: Liberal Studies, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 66 1st Floor Mary Townes

Multiple Deployments and Their Impact on Army Wives with Different Levels of Military Exposure

This initial research was focused on how multiple military deployment affect wives that grew up in the military versus those that did not. However, through conducting this research, this essay will examine my new topic, multiple deployments and their impact on army wives with different levels of military exposure. Multiple deployments can take a toll on any relationship and sometimes it can strengthen the relationship, however there is a common trend that must be made aware. Coping, Marital Satisfaction and Stress Management can have adverse effects on marriages, but more specifically the wives. My initial hypothesis was that wives that did not have prior Military exposure (immediate family and/or prior military service themselves) would find acclimating to their husband's deployment difficult, let alone the Army lifestyle more unyielding than a wife that has prior military exposure. This study was tested through an online survey taking instrument called Survey Monkey, and the questions were self-developed. The initial hypothesis was proven.

Student Author(s): Deja Young, Senior, Psychology North Carolina Central University

Anneliese Samples, Senior, Psychology, North Carolina Central University

Stephen Gibson, Senior, Psychology, North Carolina Central University

Mentor(s): Kristen Bell Hughes, North Carolina Central University

Presentation: Psychology, Oral Presentations #4 (3:00 - 4:00 PM) 2236 MTSB

Environmental and Contextual Factors Influencing Academic Success Among African Americans

Over the past four decades, it has been debated whether historically black high schools can be effective in promoting the education of African American students. In this study, we asked if factors such as socioeconomic status, student practices, and school climate were related to student GPA. Three hundred and twenty-one (321) participants were sampled from a predominantly African American high school in the South. After analyzing the data using correlations between the factors, multiple regressions and analysis of variance, the study found that 1) school climate did not moderate the relationship between SES and GPA 2) perceptions of school climate were significantly related to GPA 3) student practices did not moderate the

relationship between SES and GPA 4) student practices were significantly related to GPA 5) school pride was significantly related to school climate. Results of this study suggest that further similar studies could lead to better understanding of factors related to increasing academic achievement within predominantly African American high school settings. Such an analysis not only has implications for providing positive research on African American academic achievement at the secondary level, but information gathered can help to shape teaching practices and school policy for historically, African American high schools. In addition, it shows the need to continue addressing the classist and preferential treatment of students in schools based on SES, neighborhoods or perceived ability.

Student Author(s): Kayla Young, Senior, Political Science Appalachian State University

Mentor(s): Tatyana Ruseva, Appalachian State University

Presentation: Human Relations, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 14 1st Floor Mary Townes

Willingness to Co-produce Public Environmental Goods

In the interest of providing public environmental goods, such as carbon storage and sequestration, it is essential to understand the conditions under which individuals are willing to engage in their co-production. This is especially relevant in the context of California's carbon offset program, which utilizes offset credits as an incentive to engage in carbon sequestration and storage through forest management. This project seeks to contribute to existing literature by assessing willingness to participate in a forest carbon offset program. Specifically, we use a 2x3x3 experimental survey design to examine the influence of framing, financial motivations, and contract length on willingness to enroll private forest land in a carbon offset program. Our sample includes 1,800 U.S. adults whose participation we solicited using Amazon's Mechanical Turk (MTurk) platform. Preliminary results indicate no significant changes in willingness to co-produce via an information cue about a ‘carbon offset program’ versus a ‘new forest management program’; rather, participants were willing to participate regardless of the framing of the program. Further, results show a positive relationship between income expectations and willingness to participate, and a negative relationship between contract length (15, 40, and 100 years) and participation. Thus, lower income expectations and longer contract lengths were noted as significant barriers to willingness to engage in forest sequestration activities. However, participants who expressed personal beliefs that climate change is ‘important’ appeared more willing to participate in spite of these barriers (i.e. income expectations, contract lengths). Thus, climate change beliefs may have an ability to mediate potential barriers to participation in public good co-production and climate mitigation activities.

Student Author(s): Paige Zalman, Senior, Music Performance University of North Carolina - Wilmington

Mentor(s): Helena Spencer, University of North Carolina - Wilmington

Presentation: Music, Oral Presentations #4 (3:00 - 4:00 PM) 2226 MTSB

Stephen Sondheim's _Sweeney Todd_: An American Anti-Opera

For much of the twentieth and twenty-first centuries, the quest for the "great American opera" has remained elusive and hotly debated. One view, expressed by prominent composers Kurt Weill and Leonard Bernstein, among others, was that the American version of opera would come not from the Metropolitan Opera, but rather from Broadway. Indeed, in recent decades numerous scholars have likened Stephen Sondheim's "musical thriller" _Sweeney Todd: The Demon Barber of Fleet Street_ (1979) to opera, due to its mostly-sung score and dark subject matter. In this project, I draw on published interviews with Sondheim, as well as analysis of the libretto and musical score, to argue _Sweeney Todd_ might be better described as an American "anti-opera" for its imitation and subversion of nineteenth- and early twentieth-century European operatic

conventions. While a select few literary and theatre scholars have suggested plot parallels between _Sweeney Todd_ and Rossini's opera _The Barber of Seville_ (1813), this project is the first to examine the musical relationships between Sondheim's score and certain canonic operas. Among my findings is a new interpretation of the Act I Contest Scene, in which Sweeney Todd defeats his rival Adolfo Pirelli in a shaving competition. Pirelli sings in the ostentatious, virtuosic manner of the boastful, charismatic Figaro from Rossini's _Barber of Seville_, whereas Todd better resembles the troubled antihero of Alban Berg's _Wozzeck_ (1925)--one of the few operas Sondheim claims to actually enjoy. Therefore, I propose these two enemy barbers embody two different national styles of European opera, and that their competition serves as a metaphorical contest between the aesthetic values of Italian and German opera. In this scene, Sondheim mocks the vocal excesses of Italian Romantic opera and champions the psychological drama of German modernist opera, perhaps suggesting his desired path forward for American musical theatre and opera.

Student Author(s): Elizabeth Zarzar, Senior, Undecided Cedar Ridge High School

Aarushi Ahuja, Junior, Undecided, Early College at Guilford

Mentor(s): Shea Tuberty, Appalachian State University

Presentation: Biology (B. S.), Oral Presentations #4 (3:00 - 4:00 PM) 1008 BRITE

Water as a Filter: An Evaluation of the Efficiency of Local Best Management Practices in Preventing Water Quality Degradation

Despite extensive efforts of the EPA to combat the issue of nonpoint source pollution, it is the primary modern water quality dilemma in the U.S. Across impervious surfaces stormwater runoff accumulates potential pollutants including sediment, nutrients from fertilizers, bacteria from waste, pesticides, metals from rooftops and roadways, petroleum by-products, and transfer of thermal pollution from paved surfaces. Structural best management practices have become a common solution to preventing the degradation of water quality in at risk waters since EPA became authorized to specify BMP Effluent Guidelines. This study evaluates the effectiveness of retention ponds in retaining metals in water, sediment, and thermal pollution before they threaten nearby bodies of water. Following a performance evaluation of water quality and suspended metal concentration data for three local retention ponds and their receiving waters, it was concluded that retention pond BMPs are successful in attenuating stormwater runoff and providing water quality treatment through storage capacity. Based on current literature, implementation of preemptive maintenance structures would be much less expensive than restoration, so attributing funding and skilled labor towards the effort of installing a monitored BMP in a growing city before a water quality issue erupts is highly recommended by the authors.

Student Author(s): Cristan Zdanski, Senior, Environmental Science North Carolina Central University

Mentor(s): Zhiming Yang, North Carolina Central University

Presentation: Environmental Science, Poster Presentations #1 (9:45 - 10:45 AM) , Poster Number 33 1st Floor Mary Townes

Correlation of Ground Level Aerosol Optical Depth and Particulate Matter

Particulate Matter (PM), especially PM 2.5, is considered to be hazardous to human health when elevated levels are exposed to the respiratory system. Traditional PM 2.5 monitoring has a very limited spatial coverage due to fixed physical locations and thus there were many attempts to employ Aerosol Optical Depth (AOD) data derived from moderate-resolution imaging spectroradiometer (MODIS) imagery as an alternative. Research relating to PM 2.5 and AOD at ground level was needed to evaluate the AOD-PM 2.5 correlation at a station level. Previous examinations using data collected on four days in the four seasons had a poor temporal

correlation but a seasonal variance in the correlations was noted. Ongoing research of archival, 2012, AOD-PM 2.5 correlation of fixed sites in North Carolina in the one kilometer (1200 meter2) range reinforced poor temporal correlation values, but when each site was examined individually the correlated values were promising. Ground level data collected by a MICROTOPS handheld Sun Photometer was used to provide a ground level AOD on a clear day and a handheld continual mass air sampling unit, METONE AEROCET, was used to provide ground level PM readings. The purpose of this study in Durham, N.C., was correlating the AOD-PM 2.5 values by site and season of the ground level data collected. The data collected was as follows: North Carolina Central University's parking deck, industrial site, residential neighborhood, high traffic intersection, and commercial/retail site. The AOD-PM 2.5 correlation by site and season was overall poor but the seasonal variance was noted.

Student Author(s): Breann Zeches, Senior, Biology Campbell University

Zachary Flaccavento, Junior, Biology, Campbell University

Mentor(s): Taek You, Campbell University

Presentation: Biology (B. S.), Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 27 1st Floor Mary Townes

Binding Studies of Pbx1-Pdx1 Fusion Transcription Factors on Human Somatostatin Promoter

Pancreatic organogenesis and cellular differentiation utilize several tissue-specific transcription factors, specifically ParaHox homeodomain proteins, which regulate somatostatin (SST). Such proteins include Pbx-1 and Pdx-1 and they are initially expressed in the ventral primordial foregut, acting as chief regulators of pancreatic morphogenesis. These proteins bind the somatostatin promoter multi-combinatorically as transcriptional enhancers and pancreatic development is arrested in the absence of those proteins. Increases of somatostatin-specific transcriptional factors are capable of initiating the proliferation of endocrine progenitor cells as a part of the cascade resembling embryogenesis and may act as a potential mechanism for treatment of pancreatic adenocarcinoma, which accounts for 95% of all diagnosed pancreatic cancers. We have created a heterodimeric Pbx1-Pdx1 fusion transcription factor and have shown increased binding specificity to ?-cell-limited somatostatin promoter sequences in an electrophoretic mobility shift assays (EMSAs). In this research, we mutated DNA sequences of Pbx1-Pdx1 fusion protein binding and tested their binding affinity to the protein. Discovering DNA sequences of maximum binding affinity to the region may pave the way to successful crystallization of the DNA-Pbx1-Pdx1 fusion protein.

Student Author(s): Suzanne Zeid, Senior, Statistics University of North Carolina - Wilmington

Mentor(s): Stephen Hill, University of North Carolina - Wilmington

Presentation: Mathematics, Poster Presentations #2 (11:00 - 12:00 PM) , Poster Number 39 1st Floor Mary Townes

Predicting Outcomes of Incoming Shelter Animals

Every thirteen seconds, a perfectly healthy, adoptable pet is euthanized in the United States. While the trend of spaying and neutering animals has become popular in recent years, there are still well over two million dogs and cats whose lives are cut short each year due to overpopulated shelters. In an effort to increase adoption rates of these animals to avoid euthanasia, many researchers have sought to find which characteristics of an animal improve and harm chances of adoptability. This research project seeks to go one step further, by creating a tool that shelters can use to approximately predict the probability of adoption of an incoming shelter animal. For example, it is a well-known understanding that animals with black fur are less likely to be adopted over lighter colored animals. But how does gender, eye color, name, age, size, breed,

etc. affect the same animal's chances of being adopted? By using adoption information from a database in Austin, Texas and analysis involving multiple regression, finding the answer is possible. Depending which of these characteristics are significantly important in terms of adoption, this tool can then be used by shelters to determine which animals are at a higher risk for euthanasia. In turn, a shelter can change their technique for adoption in order to give this high risk animal a better chance at survival – perhaps by advertising this animal more, or placing the animal in one of the first kennels in the shelter. By using past data to predict future outcomes, reducing the rate of shelter euthanasia in the United States is possible.

Student Author(s): Kendra Zhong, Senior, n/a North Carolina School of Science and Mathematics

Mentor(s): Amy Sheck, North Carolina School of Science and Mathematics

Presentation: Biology (B. S.), Oral Presentations #1 (9:30 - 10:30 AM) 1221 MTSB

Effects of Decitabine and UVA-irradiation on Cell Growth in Cancer and Normal Mouse Epithelial Cells

Cancer is often treated with chemotherapy and radiation therapy. One cancer drug, decitabine, is a demethylating agent that is thought to reduce cancer cell growth by promoting gene expression of tumor supression genes. In contrast, the effect of radiation on DNA methylation is variable and runs the gamut from demethylation to methylation to no effect. How these two treatments work together to affect cell growth has not previously been investigated. This experiment compared in vitro cell growth of mouse cancer breast epithelial cells and mouse breast epithelial cells treated with two treatments that can affect DNA methylation: ultraviolet-irradiation and decitabine. Confluence was estimated for three days after treatment. Confluence for untreated normal cells was found to be significantly greater ($p=0.0389$) than confluence for decitabine-treated normal cells, untreated cancer cells, and decitabine-treated cancer cells. These results indicate that decitabine inhibited cell growth in normal cells. As decitabine is an established cancer-combating drug, this research elucidates possible side effects of its consumption.

Morning Session Facilitators

Performances (9:30 – 10:30) – BN Duke Auditorium **Moderator: Lenora Helm Hammonds**

Oral Presentations #1 (9:30 - 10:30 AM) - 1008 BRITE **Moderator: Corey Walker**

Oral Presentations #1 (9:30 - 10:30 AM) - 1009 BRITE **Moderator: Sambit Bhattacharya**

Oral Presentations #1 (9:30 - 10:30 AM) - 1221 MTSB **Moderator: Laura Reichenberg**

Oral Presentations #1 (9:30 - 10:30 AM) - 1223 MTSB **Moderator: Megen Culpepper**

Oral Presentations #1 (9:30 - 10:30 AM) - 1233 MTSB **Moderator: Daniel Hall**

Oral Presentations #1 (9:30 - 10:30 AM) - 1234 MTSB **Moderator: Elizabeth Rambo**

Oral Presentations #1 (9:30 - 10:30 AM) - 2221 MTSB **Moderator: Carresse Gerald**

Oral Presentations #1 (9:30 - 10:30 AM) - 2225 MTSB **Moderator: Lorna Grant**

Oral Presentations #1 (9:30 - 10:30 AM) - 2226 MTSB **Moderator: Nathaniel Grove**

Oral Presentations #1 (9:30 - 10:30 AM) - 2236 MTSB **Moderator: S. Devarayasamudram**

Oral Presentations #2 (10:45 - 11:45 AM) - 1008 BRITE **Moderator: Tonya Smith-Jackson**

Oral Presentations #2 (10:45 - 11:45 AM) - 1009 BRITE **Moderator: Rachel Smith**

Oral Presentations #2 (10:45 - 11:45 AM) - 1221 MTSB **Moderator: Laura Reichenberg**

Oral Presentations #2 (10:45 - 11:45 AM) - 1223 MTSB **Moderator: Alexandra Ormond**

Oral Presentations #2 (10:45 - 11:45 AM) - 1234 MTSB **Moderator: Elizabeth Rambo**

Oral Presentations #2 (10:45 - 11:45 AM) - 2221 MTSB **Moderator: Clark Maddux**

Oral Presentations #2 (10:45 - 11:45 AM) - 2225 MTSB **Moderator: Josiah Baker**

Oral Presentations #2 (10:45 - 11:45 AM) - 2226 MTSB **Moderator: Peter Summers**

Oral Presentations #2 (10:45 - 11:45 AM) - 2236 MTSB **Moderator: Victoria Clegg**

Exhibits (10:45 – 12 noon) – 1225 MTSB **Moderator: DaKysha Moore**

Afternoon Session Facilitators

Oral Presentations #3 (1:45 - 2:45 PM) - 1008 BRITE **Moderator: Yaw Chang**

Oral Presentations #3 (1:45 - 2:45 PM) - 1009 BRITE **Moderator: Greg Buhrman**

Oral Presentations #3 (1:45 - 2:45 PM) - 1221 MTSB **Moderator: Laverne Reid**

Oral Presentations #3 (1:45 - 2:45 PM) - 1233 MTSB **Moderator: Chris Ashwell**

Oral Presentations #3 (1:45 - 2:45 PM) - 1234 MTSB **Moderator: Candace Parrish**

Oral Presentations #3 (1:45 - 2:45 PM) - 2225 MTSB **Moderator: Darren Beneby**

Oral Presentations #3 (1:45 - 2:45 PM) - 2226 MTSB **Moderator: Seronda Robinson**

Oral Presentations #3 (1:45 - 2:45 PM) - 2235 MTSB **Moderator: Mildred Pointer**

Oral Presentations #3 (1:45 - 2:45 PM) - 2236 MTSB **Moderator: Frank Rodriguez**

Oral Presentations #4 (3:00 - 4:00 PM) - 1008 BRITE **Moderator: Tonya Gerald-Goins**

Oral Presentations #4 (3:00 - 4:00 PM) - 1009 BRITE **Moderator: Ansel Brown**

Oral Presentations #4 (3:00 - 4:00 PM) - 1233 MTSB **Moderator: Calleen Herbert**

Oral Presentations #4 (3:00 - 4:00 PM) - 1234 MTSB **Moderator: W. Russell Robinson**

Oral Presentations #4 (3:00 - 4:00 PM) - 2221 MTSB **Moderator: Chris Ashwell**

Oral Presentations #4 (3:00 - 4:00 PM) - 2225 MTSB **Moderator: Sandra Rogers**

Oral Presentations #4 (3:00 - 4:00 PM) - 2226 MTSB **Moderator: Georgia Martin**

Oral Presentations #4 (3:00 - 4:00 PM) - 2236 MTSB **Moderator: Philliph Mutisya**

NC Space Grant - Alphabetical by Student Last Name

Acosta, Victoria	North Carolina Central University
Bennett, Gibson	University of North Carolina - Chapel Hill
Birchard, Mariah	Appalachian State University
Coalson, Shannon	Forsyth Community College
DiDonna, Nicolas	Vance Granville Community College
Donaghy, Caroline	Appalachian State University
Dulaney, William	Appalachian State University
Frank, Silver	Appalachian State University
Fyffe, Nykesha	Appalachian State University
Gallimore, Daniel	University of North Carolina - Asheville
Grohol, Corbin	University of North Carolina - Charlotte
Hall, Nicholas	Appalachian State University
Hood, Callie	University of North Carolina - Chapel Hill
Issa, Neveen	University of North Carolina - Pembroke
Johnson, Lauren	University of North Carolina - Charlotte
Kirse, Nathan	University of North Carolina - Asheville
Madhavan, Sarina	Duke University
Martin, John	University of North Carolina - Chapel Hill
Matchunis, Katherine	Appalachian State University
Mazzoleni, Nicholas	North Carolina State University
McAuliffe, Joel	East Carolina University
McFee, Elvis	North Carolina Central University
Migirditch, Samuel	Appalachian State University
Morgan, Julian	Duke University
Page, Ashle	North Carolina State University
Paolino, Michael	Appalachian State University
Parker, Ihasia	University of North Carolina - Pembroke
Patel, Ravi	Appalachian State University
Peek, Matthew	University of North Carolina - Asheville
Riggs, Quinlin	Appalachian State University
Schueneman, Melinda	University of North Carolina - Asheville
Van Goethem, Erika	University of North Carolina - Wilmington

Faculty Advisers

Jennifer Burris	Appalachian State University
Brian Hart	Appalachian State University
Rachel Smith	Appalachian State University / North Carolina Museum of Natural Sciences
David Sitar	Appalachian State University

Index of All Student Presenters
Alphabetical by Student Last Name

Student Presenter	Presentation Type	Discipline	Institution
Abdul-matin, Abdul-khaliq	Oral Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:00 PM 2235 MTSB	Biology (B. S.)	Central Piedmont Community College
Acosta, Victoria	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 47 2nd Floor Mary Townes	Chemistry (B. S.)	North Carolina Central University
Adams, Gabrielle	Oral Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 3:15 PM 1221 MTSB	Biology (B. S.)	North Carolina School of Science and Mathematics
Adams, Kristen	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 32 1st Floor Mary Townes	Biology (B.A.)	University of North Carolina - Wilmington
Agandi, Lorreen	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 9 1st Floor Mary Townes	Biology (B. S.)	East Carolina University
Agbai, Chiagozie	Oral Presentations #3 (1:45 - 2:45 PM) 2:00 PM - 2:15 PM 1009 BRITE	Pharmacy	North Carolina Central University
Agueda Lopez, Kleyser	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 37 2nd Floor Mary Townes	Physics (B.S.)	North Carolina Central University

Ahmidouch, Manal	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 19 1st Floor Mary Townes	Biology (B. S.)	Wake Forest University
Ahuja, Aarushi	Oral Presentations #4 (3:00 - 4:00 PM) 3:45 PM - 4:00 PM 1008 BRITE	Biology (B. S.)	Early College at Guilford
Aladeniyi, Temilade	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 67 2nd Floor Mary Townes	Engineering - Biomedical	North Carolina Central University
Albert, Eleanor	Oral Presentations #2 (10:45 - 11:45 AM) 10:45 AM - 11:00 AM 2225 MTSB	Economics	High Point University
Alexander Jr, Earl	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 45 2nd Floor Mary Townes	Computer Science (B.S.)	Central Carolina Community College
Alfonso, Elisa	Oral Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:00 PM 2236 MTSB	Spanish	East Carolina University
Allen, Alexander	Oral Presentations #1 (9:30 - 10:30 AM) 9:30 AM - 9:45 AM 2226 MTSB	Chemistry (B. S.)	University of North Carolina - Charlotte
Alsaied, Jasmin	Poster Presentations #1 (9:45 - 10:45 AM)	Engineering - Nuclear	North Carolina State University

	9:45 AM - 10:45 AM Poster 39 1st Floor Mary Townes		
Alston, April	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 80 2nd Floor Mary Townes	Public Health	Fayetteville State University
Amerson, Jamara	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 75 2nd Floor Mary Townes	Chemistry (B. S.)	Fayetteville State University
Amin, Aenia	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 74 2nd Floor Mary Townes	Psychology	East Carolina University
Amir Hakim, Khatijah	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 41 2nd Floor Mary Townes	Chemistry (B. S.)	University of North Carolina - Wilmington
An, Elvira	Oral Presentations #2 (10:45 - 11:45 AM) 10:45 AM - 11:00 AM 1221 MTSB	Biology (B. S.)	University of North Carolina - Charlotte
Anderson, Hannah	Oral Presentations #2 (10:45 - 11:45 AM) 10:45 AM - 11:00	English (Literature)	University of North Carolina - Pembroke

	AM 1234 MTSB		
Anderson, Xavier	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 36 1st Floor Mary Townes	Biology (B.A.)	North Carolina A&T State University
Arthur, Aaron	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 67 1st Floor Mary Townes	Computer Science (B.S.)	North Carolina State University
Atkinson, Blake	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 37 1st Floor Mary Townes	Mathematics	University of North Carolina - Charlotte
Augustinovic, Mario	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 3 1st Floor Mary Townes	Biology (B. S.)	University of North Carolina - Greensboro
Autry, Gabriel	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 35 1st Floor Mary Townes	Chemistry (B. S.)	North Carolina State University
Avtandilov, Artem	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 5 1st Floor Mary	Business Administration	High Point University

	Townes		
Azoro, Martina	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 57 2nd Floor Mary Townes	Biology (B. S.)	Fayetteville State University
Baba, Margaret	Oral Presentations #1 (9:30 - 10:30 AM) 10:00 AM - 10:15 AM 1234 MTSB	English (Literature)	North Carolina Central University
Baccas, Marissa	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 25 2nd Floor Mary Townes	Chemistry (B. S.)	Fayetteville State University
Bae, Andy	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 17 1st Floor Mary Townes	Physics (B.S.)	North Carolina State University
Bagley, Kristen	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 10 2nd Floor Mary Townes	Biology (B. S.)	North Carolina State University
Baldwin, Charity	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 50 2nd Floor Mary Townes	Biology (B. S.)	Fayetteville State University
Banerjee, Narendra	Poster Presentations #2 (11:00 - 12:00 PM)	Engineering - Biomedical	Elizabeth City State University

	11:00 AM - 12:00 PM Poster 56 2nd Floor Mary Townes		
Baran, Tara	Oral Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 3:15 PM 2226 MTSB	Theatre	University of North Carolina - Wilmington
Barbour, Kayla	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 78 2nd Floor Mary Townes	Elementary Education	High Point University
Barker, Helen	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 58 2nd Floor Mary Townes	Biology (B. S.)	High Point University
Batista, Nathalie	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 40 2nd Floor Mary Townes	Chemistry (B. S.)	North Carolina Central University
Beach, Jennifer	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 38 1st Floor Mary Townes	Psychology	Catawba College
Beaty, Brandon	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 18 2nd Floor Mary Townes	Biology (B. S.)	North Carolina Central University

Bell, Whitney	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 44 2nd Floor Mary Townes	Biology (B. S.)	Meredith College
Bells, Asante	Oral Presentations #2 (10:45 - 11:45 AM) 10:45 AM - 11:00 AM 1008 BRITE	Cyber Security	North Carolina A&T State University
Bennett, Gibson	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 65 2nd Floor Mary Townes	Physics (B.S.)	University of North Carolina - Chapel Hill
Bennison, Matthew	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 71 2nd Floor Mary Townes	Computer Science (B.S.)	North Carolina State University
Bhagwat, Srujan	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 76 2nd Floor Mary Townes	Engineering - Biomedical	North Carolina State University
Biondo, Nicholas	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 17 1st Floor Mary Townes	Pre-Medicine	North Carolina State University

Bishop, Andrew	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 41 2nd Floor Mary Townes	Chemistry (B. S.)	University of North Carolina - Wilmington
Blackwell, Lauren	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 34 1st Floor Mary Townes	Environmental Science	North Carolina A&T State University
Blackwood, William	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 6 1st Floor Mary Townes	Economics	Appalachian State University
Bollinger, Christopher	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 52 2nd Floor Mary Townes	Engineering - Electrical & Computer	North Carolina State University
Bonner, Alison	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 14 2nd Floor Mary Townes	Biology (B. S.)	University of North Carolina - Chapel Hill
Booth, Ryan	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 16 1st Floor Mary Townes	Pre-Medicine	Gaston College

Boothman, Callum	Oral Presentations #2 (10:45 - 11:45 AM) 11:15 AM - 11:30 AM 1009 BRITE	Individualized Major Program	High Point University
Bou-Ghazale, Lauren	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 30 2nd Floor Mary Townes	Chemistry (B. A.)	University of North Carolina - Charlotte
Bozzo, Alfred	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 48 2nd Floor Mary Townes	Game Design/ Interactive Media	High Point University
Bradshaw, Christina	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 2 1st Floor Mary Townes	Animal Science	North Carolina A&T State University
Branen, Caitlin	Performances (9:30 - 10:30 AM) 10:00 AM - 10:15 AM BN Duke Auditorium	Theatre	Campbell University
Bridges , Kenneth	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 8 1st Floor Mary Townes	Biology (B. S.)	East Carolina University
Brokaw, Kristen	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 6	Chemistry (B. S.)	High Point University

	1st Floor Mary Townes		
Brooks, Evan	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 16 2nd Floor Mary Townes	Biology (B. S.)	North Carolina State University
Brooks, Maya	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 35 1st Floor Mary Townes	Environmental Science	North Carolina A&T State University
Brotherton, Jonathan	Oral Presentations #2 (10:45 - 11:45 AM) 10:45 AM - 11:00 AM 1009 BRITE	Computer Science (B.S.)	Appalachian State University
Brown, Jancie	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 56 2nd Floor Mary Townes	Biology (B. S.)	Fayetteville State University
Brown, Kelsey	Oral Presentations #4 (3:00 - 4:00 PM) 3:30 PM - 3:45 PM 2221 MTSB	Mathematical Economics	High Point University
Buchanan, Gurney	Oral Presentations #2 (10:45 - 11:45 AM) 11:30 AM - 11:45 AM 1009 BRITE	Computer Science (B.S.)	Appalachian State University
Burgess, Andrew	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 53	Environmental Science	Appalachian State University

	2nd Floor Mary Townes		
Burroughs, Zachary	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 68 1st Floor Mary Townes	Middle Grades Education	Catawba College
Butler, Lashondra	Oral Presentations #3 (1:45 - 2:45 PM) 2:30 PM - 2:45 PM 1009 BRITE	Engineering - Industrial & Systems	North Carolina A&T State University
Butner, Asya	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 56 2nd Floor Mary Townes	Biology (B. S.)	East Carolina University
Camp, Charles	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 8 1st Floor Mary Townes	Biology (B. S.)	East Carolina University
Campbell, Timothy	Oral Presentations #2 (10:45 - 11:45 AM) 11:15 AM - 11:30 AM 1221 MTSB	Biology (B. S.)	Duke University
Cancel, Rachel	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 42 2nd Floor Mary Townes	Chemistry (B. S.)	University of North Carolina - Wilmington
Capen, Amanda	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 30 1st Floor Mary Townes	Chemistry (B. S.)	East Carolina University

Capps, Elizabeth	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 24 1st Floor Mary Townes	Biology (B. S.)	Gaston College
Cardona, Thomas	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 64 2nd Floor Mary Townes	Biology (B. S.)	Fayetteville State University
Carr, Kyara	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 37 1st Floor Mary Townes	Public Health	Fayetteville State University
Carr, Sarah	Oral Presentations #1 (9:30 - 10:30 AM) 10:15 AM - 10:30 AM 1009 BRITE	Computer Science (B.S.)	Guilford College
Carrillo, Juan	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 28 2nd Floor Mary Townes	Chemistry (B. S.)	Queens University of Charlotte
Carson, Brittany	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 59 2nd Floor Mary Townes	Environmental Science	North Carolina Central University
Carter, Elizabeth	Poster Presentations #4 (3:00 - 4:00 PM)	Biology (B. S.)	North Carolina State University

	3:00 PM - 4:00 PM Poster 48 2nd Floor Mary Townes		
Carter, Kendal	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 61 2nd Floor Mary Townes	Biology (B. S.)	East Carolina University
Casdorph, Pamela	Oral Presentations #3 (1:45 - 2:45 PM) 2:30 PM - 2:45 PM 1221 MTSB	Environmental Science	Catawba College
Casdorph, Pamela	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 32 2nd Floor Mary Townes	Chemistry (B. S.)	Catawba College
Cashwell, Leah	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 4 1st Floor Mary Townes	Biology (B. S.)	Campbell University
Champion, Hollie	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 25 1st Floor Mary Townes	Exercise Science	University of North Carolina - Wilmington
Chapman, Dalton	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 53 2nd Floor Mary Townes	Biology (B. S.)	East Carolina University

Chung, Nadjali	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 27 1st Floor Mary Townes	Chemistry (B. S.)	University of North Carolina - Greensboro
Cipriani, Ciera	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 45 2nd Floor Mary Townes	Chemistry (B. S.)	North Carolina State University
Cius, Waceline	Oral Presentations #2 (10:45 - 11:45 AM) 11:30 AM - 11:45 AM 2226 MTSB	Economics	Salem College
Coates, Noah	Oral Presentations #3 (1:45 - 2:45 PM) 2:00 PM - 2:15 PM 2226 MTSB	Public Health	High Point University
Cochran, Katherine	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 46 2nd Floor Mary Townes	Biology (B. S.)	Queens University of Charlotte
Cochran, Sean	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 31 1st Floor Mary Townes	Exercise Science	University of North Carolina - Greensboro
Codella, Enzo	Oral Presentations #4 (3:00 - 4:00 PM) 3:45 PM - 4:00 PM 2236 MTSB	Psychology	Appalachian State University
Cohenour, Joshua	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 19 1st Floor Mary Townes	Computer Science (B.S.)	Fayetteville State University

Colin, Mireya	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 30 1st Floor Mary Townes	Criminal Justice	North Carolina Central University
Collins, Ashley	Oral Presentations #1 (9:30 - 10:30 AM) 10:15 AM - 10:30 AM 1009 BRITE	Computer Science (B.S.)	Guilford College
Connor, William	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 55 2nd Floor Mary Townes	Environmental Science	Appalachian State University
Conroy, Shannon	Oral Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 3:15 PM 1009 BRITE	Biology (B. S.)	North Carolina State University
Cooper, Samuel	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 42 2nd Floor Mary Townes	Computer Science (B.S.)	Fayetteville State University
Copeland, Shauntera	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 51 2nd Floor Mary Townes	Health and Physical Education	North Carolina Central University
Couchman, Jahdiel	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 43 2nd Floor Mary Townes	Computer Science (B.S.)	Central Piedmont Community College
Courtney, Colton	Oral Presentations	Graphic Design and Digital	Appalachian State University

	#3 (1:45 - 2:45 PM) 1:45 PM - 2:00 PM 2226 MTSB	Imaging	
Craib, Christine	Oral Presentations #3 (1:45 - 2:45 PM) 2:00 PM - 2:15 PM 1008 BRITE	Mathematics	University of North Carolina - Wilmington
Crawford, Rachel	Oral Presentations #1 (9:30 - 10:30 AM) 9:45 AM - 10:00 AM 2236 MTSB	Religion	Meredith College
Crewes, Jr., Michael	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 50 2nd Floor Mary Townes	Computer Science (B.S.)	Guilford College
Crowell, Jordan	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 21 1st Floor Mary Townes	Sociology and Anthropology	University of North Carolina - Greensboro
Cuevas, Monserrat	Oral Presentations #1 (9:30 - 10:30 AM) 10:15 AM - 10:30 AM 2221 MTSB	Biology (B. S.)	University of North Carolina - Charlotte
Curry-Chisolm, Itaevia	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 6 2nd Floor Mary Townes	Biology (B. S.)	North Carolina Central University
Czejdo, Cami	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM	Computer Science (B.S.)	Fayetteville State University

	Poster 52 2nd Floor Mary Townes		
Dafgek, Jenna	Oral Presentations #3 (1:45 - 2:45 PM) 2:00 PM - 2:15 PM 1233 MTSB	Biology (B. S.)	Elon University
Darst, Brian	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 64 2nd Floor Mary Townes	Biology (B. S.)	North Carolina State University
Daughtry, Miranda	Oral Presentations #1 (9:30 - 10:30 AM) 9:30 AM - 9:45 AM 1221 MTSB	Biology (B. S.)	Meredith College
Davenport, Lindsay	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 21 1st Floor Mary Townes	Biology (B. S.)	East Carolina University
Davis, Emily	Oral Presentations #1 (9:30 - 10:30 AM) 9:45 AM - 10:00 AM 1233 MTSB	History	High Point University
Davis, Sarah	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 14 1st Floor Mary Townes	Exercise Science	Campbell University
de Jongh, Alexa	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 51	Psychology	Appalachian State University

	1st Floor Mary Townes		
Debray, Reena	Oral Presentations #3 (1:45 - 2:45 PM) 2:30 PM - 2:45 PM 2235 MTSB	Biology (B. S.)	Duke University
Denaeyer, Nicole	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 62 2nd Floor Mary Townes	Biology (B. S.)	Meredith College
Derilus, Job	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 74 2nd Floor Mary Townes	Physics (B.S.)	North Carolina Central University
DeZego, Katelyn	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 48 2nd Floor Mary Townes	Biology (B. S.)	Catawba College
Diaz-Loar, Emily	Oral Presentations #2 (10:45 - 11:45 AM) 10:45 AM - 11:00 AM 2226 MTSB	Economics	University of North Carolina - Asheville
Dixon, Cameron	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 41 2nd Floor Mary Townes	Biology (B. S.)	St. Andrews University
Dole, Mike	Poster Presentations #1 (9:45 - 10:45	Biology (B. S.)	Gaston College

	AM) 9:45 AM - 10:45 AM Poster 49 2nd Floor Mary Townes		
Donaghy, Caroline	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 44 2nd Floor Mary Townes	Chemistry (B. S.)	Appalachian State University
Dovel, Ryan	Oral Presentations #4 (3:00 - 4:00 PM) 3:15 PM - 3:30 PM 1234 MTSB	Liberal Studies	Appalachian State University
Drzewicki, Maya	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 70 2nd Floor Mary Townes	Biology (B. S.)	University of North Carolina - Wilmington
Duff, Marissa	Oral Presentations #3 (1:45 - 2:45 PM) 2:15 PM - 2:30 PM 1234 MTSB	Liberal Studies	Johnson C. Smith University
Dulaney, William	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 1 2nd Floor Mary Townes	Physics (B.S.)	Appalachian State University
Dusenge, Yves	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 35 1st Floor Mary Townes	Computer Science (B.S.)	Guilford College
Dustin, Elizabeth	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00	Biology (B. S.)	North Carolina State University

	PM Poster 29 1st Floor Mary Townes		
Early, Tara	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 47 2nd Floor Mary Townes	Environmental Science	Appalachian State University
Edmark, Sarah	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 11 1st Floor Mary Townes	Biology (B. S.)	High Point University
Edmunds, Alexia	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 46 2nd Floor Mary Townes	Criminal Justice	North Carolina Central University
Edwards, Ashley	Oral Presentations #1 (9:30 - 10:30 AM) 10:00 AM - 10:15 AM 1221 MTSB	Biology (B. S.)	Guilford College
Edwards, Joshua	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 70 2nd Floor Mary Townes	Psychology	Catawba College
Ek, Susanna	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 25 1st Floor Mary Townes	Exercise Science	University of North Carolina - Wilmington
Elder, Morgan	Poster Presentations #4 (3:00 - 4:00 PM)	Biology (B. S.)	Catawba College

	3:00 PM - 4:00 PM Poster 60 2nd Floor Mary Townes		
Ellis, David	Oral Presentations #4 (3:00 - 4:00 PM) 3:45 PM - 4:00 PM 1234 MTSB	Liberal Studies	Johnson C. Smith University
Ellis, Peyton	Oral Presentations #2 (10:45 - 11:45 AM) 11:00 AM - 11:15 AM 2226 MTSB	Economics	Salem College
ElMakawy, Sara	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 37 2nd Floor Mary Townes	Psychology	University of North Carolina - Wilmington
Faircloth, Daphne	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 19 1st Floor Mary Townes	Computer Science (B.S.)	Fayetteville State University
Fang, Chelsea	Oral Presentations #1 (9:30 - 10:30 AM) 9:45 AM - 10:00 AM 2226 MTSB	Individualized Major Program	University of North Carolina - Charlotte
Farkas, Dipatrimarki	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 57 2nd Floor Mary Townes	Environmental Science	North Carolina Central University
Farrier Mora, Jordy	Oral Presentations #2 (10:45 - 11:45 AM) 11:15 AM - 11:30	Economics	Methodist University

	AM 2226 MTSB		
Fazilova, Sanam	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 25 1st Floor Mary Townes	Chemistry (B. S.)	Queens University of Charlotte
Fazilova, Sanam	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 28 2nd Floor Mary Townes	Chemistry (B. S.)	Queens University of Charlotte
Feather, Billie	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 60 1st Floor Mary Townes	Music	North Carolina Central University
Featherston, Emily	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 33 1st Floor Mary Townes	Chemistry (B. S.)	Appalachian State University
Felton, Taylor	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 77 2nd Floor Mary Townes	Pharmacy	University of North Carolina - Pembroke
Fenn, Martin	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 54 2nd Floor Mary	Environmental Science	Appalachian State University

	Townes		
Fenwick, Grayson	Oral Presentations #1 (9:30 - 10:30 AM) 10:00 AM - 10:15 AM 1009 BRITE	Computer Science (B.S.)	Appalachian State University
Fernandez, Marisa	Performances (9:30 - 10:30 AM) 10:15 AM - 10:30 AM BN Duke Auditorium	Theatre	Appalachian State University
Finch, Deja	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 24 1st Floor Mary Townes	University Studies	North Carolina Central University
Fisher, James	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 36 1st Floor Mary Townes	Computer Science (B.S.)	Fayetteville State University
Flaccavento, Zachary	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 27 1st Floor Mary Townes	Biology (B. S.)	Campbell University
Fobbs, Karnella	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 2 1st Floor Mary Townes	Criminal Justice	Fayetteville State University
Foglesong, Kira	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM	Game Design/ Interactive Media	High Point University

	Poster 48 2nd Floor Mary Townes		
Fonseca, Briana	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 61 1st Floor Mary Townes	Music	Greensboro College
Forget, Sarah	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 28 1st Floor Mary Townes	Botany	High Point University
Frank, Silver	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 18 2nd Floor Mary Townes	Physics (B.S.)	Appalachian State University
Frazier, Rolf	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 25 1st Floor Mary Townes	Exercise Science	University of North Carolina - Wilmington
Freeman, Rae	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 16 1st Floor Mary Townes	Exercise Science	Campbell University
Frith, Josephine	Oral Presentations #1 (9:30 - 10:30 AM) 10:00 AM - 10:15 AM 2226 MTSB	Elementary Education	University of North Carolina - Wilmington
Fuchs, Joelle	Oral Presentations	Biology (B. S.)	North Carolina State

	#1 (9:30 - 10:30 AM) 9:30 AM - 9:45 AM 2221 MTSB		University
Furey, Julia	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 49 2nd Floor Mary Townes	Computer Science (B.S.)	Guilford College
Futrell, John	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 42 2nd Floor Mary Townes	Computer Science (B.S.)	Fayetteville State University
Fyffe, Nykesha	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 12 2nd Floor Mary Townes	Physics (B.S.)	Appalachian State University
Gable, Grace	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 10 1st Floor Mary Townes	Chemistry (B. S.)	University of North Carolina - Charlotte
Gainey, Caroline	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 72 2nd Floor Mary Townes	Psychology	North Carolina State University
Gallimore, Daniel	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 16 1st Floor Mary Townes	Physics (B.S.)	University of North Carolina - Asheville

Galliou, Justine	Oral Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 3:15 PM 2221 MTSB	Animal Genetics	North Carolina State University
Ganatra, Megha	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 67 2nd Floor Mary Townes	Biology (B. S.)	North Carolina State University
Garcia-Bochas, Lorenna	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 18 1st Floor Mary Townes	Public Health	Fayetteville State University
Garrett, Miranda	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 58 2nd Floor Mary Townes	Biology (B. S.)	Queens University of Charlotte
Gaskins, Ashlee	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 19 1st Floor Mary Townes	Computer Science (B.S.)	Fayetteville State University
Gerdes, Elizabeth	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 44 2nd Floor Mary Townes	Biology (B. S.)	University of North Carolina - Pembroke
Gibbs, Steven	Oral Presentations #3 (1:45 - 2:45 PM) 2:15 PM - 2:30 PM 1008 BRITE	Physics (B.S.)	Appalachian State University
Gibson, Lee	Poster Presentations #3 (1:45 - 2:45 PM)	Computer Science (B.S.)	Fayetteville State University

	1:45 PM - 2:45 PM Poster 42 2nd Floor Mary Townes		
Gibson, Stephen	Oral Presentations #4 (3:00 - 4:00 PM) 3:30 PM - 3:45 PM 2236 MTSB	Psychology	North Carolina Central University
Giordano, David	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 24 1st Floor Mary Townes	Exercise Science	University of North Carolina - Wilmington
Gladden, Kyra	Oral Presentations #2 (10:45 - 11:45 AM) 11:15 AM - 11:30 AM 1234 MTSB	English (Literature)	Appalachian State University
Goheen, Josh	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 22 1st Floor Mary Townes	Chemistry (B. S.)	Campbell University
Golding, A.J.	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 54 2nd Floor Mary Townes	Environmental Science	Appalachian State University
Gomez, Ismael	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 17 1st Floor Mary Townes	Biology (B. S.)	Nash Community College
Gordon, Jackson	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 7	Chemistry (B. S.)	Appalachian State University

	1st Floor Mary Townes		
Gordon, Robert	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 22 1st Floor Mary Townes	Biology (B. S.)	University of North Carolina - Wilmington
Gosrani, Saahj	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 69 2nd Floor Mary Townes	Chemistry (B. S.)	North Carolina State University
Gottbrecht, Danika	Oral Presentations #3 (1:45 - 2:45 PM) 2:15 PM - 2:30 PM 2236 MTSB	French and Francophone Studies	Guilford College
Grant, Arshay	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 67 2nd Floor Mary Townes	Biology (B. S.)	Fayetteville State University
Grant, Jaylin	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 22 1st Floor Mary Townes	Biology (B. S.)	Campbell University
Griffith, Kaitlyn	Oral Presentations #1 (9:30 - 10:30 AM) 9:45 AM - 10:00 AM 1223 MTSB	Chemistry (B. S.)	High Point University
Grimm, Evan	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 49 2nd Floor Mary Townes	Chemistry (B. S.)	University of North Carolina - Charlotte

Grohol, Corbin	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 64 2nd Floor Mary Townes	Engineering - Mechanical & Aerospace	University of North Carolina - Charlotte
Gunther, Katharine	Exhibits (10:45 - 12:00 PM) 11:00 AM - 11:15 AM 1225 MTSB	Studio Art	North Carolina Central University
Haase, Megan	Oral Presentations #3 (1:45 - 2:45 PM) 2:30 PM - 2:45 PM 2226 MTSB	Public Health	Summer Ventures in Science and Mathmatics
Hair, Millie	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 59 2nd Floor Mary Townes	Biology (B. S.)	North Carolina State University
Hall, Kelcie	Exhibits (10:45 - 12:00 PM) 11:45 AM - 12:00 PM 1225 MTSB	Biology (B. S.)	University of North Carolina - Wilmington
Hall, Nicholas	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 38 2nd Floor Mary Townes	Physics (B.A.)	Appalachian State University
Harris, Erika	Oral Presentations #3 (1:45 - 2:45 PM) 2:15 PM - 2:30 PM 2225 MTSB	History	Salem College
Harris, Kelly	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM	Urban Ecology	North Carolina State University

	Poster 25 1st Floor Mary Townes		
Haysley, Travis	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 53 2nd Floor Mary Townes	Biology (B. S.)	East Carolina University
Heath, Davelle	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 55 1st Floor Mary Townes	Mass Communications	North Carolina Central University
Henderson, Cory	Oral Presentations #4 (3:00 - 4:00 PM) 3:30 PM - 3:45 PM 1233 MTSB	Sociology and Anthropology	University of North Carolina - Greensboro
Henriksen, Gabrielle	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 23 1st Floor Mary Townes	Sociology and Anthropology	Wake Forest University
Henry, Charles	Oral Presentations #2 (10:45 - 11:45 AM) 10:45 AM - 11:00 AM 1008 BRITE	Cyber Security	North Carolina A&T State University
Henry, Zakiyah	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 66 2nd Floor Mary Townes	Biology (B. S.)	Winston-Salem State University
Hernandezvillasuso,	Poster Presentations	Biology (B. S.)	Fayetteville State University

Ismael	#4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 67 2nd Floor Mary Townes		
Hill, Rachel	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 7 1st Floor Mary Townes	Economics	University of North Carolina - Chapel Hill
Hilton, Rebekah	Oral Presentations #2 (10:45 - 11:45 AM) 10:45 AM - 11:00 AM 1223 MTSB	Chemistry (B. S.)	Campbell University
Hinton, Damian	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 49 2nd Floor Mary Townes	Computer Science (B.S.)	Guilford College
Hoffler, Emily	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 20 1st Floor Mary Townes	Biology (B. S.)	Catawba College
Hoffman, Audrey	Oral Presentations #4 (3:00 - 4:00 PM) 3:45 PM - 4:00 PM 1221 MTSB	Biology (B. S.)	Catawba College
Holland, Allison	Oral Presentations #2 (10:45 - 11:45 AM) 11:15 AM - 11:30 AM 2225 MTSB	Economics	High Point University
Honeycutt, Christina	Oral Presentations #4 (3:00 - 4:00 PM) 3:45 PM - 4:00 PM	Special Education	High Point University

	2225 MTSB		
Hood, Callie	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 68 2nd Floor Mary Townes	Physics (B.S.)	University of North Carolina - Chapel Hill
Hopkins, Michael	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 47 2nd Floor Mary Townes	Biology (B. S.)	North Carolina Central University
Horiates, Julia	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 51 2nd Floor Mary Townes	Biology (B. S.)	East Carolina University
Hubbell, Alex	Oral Presentations #2 (10:45 - 11:45 AM) 11:00 AM - 11:15 AM 2236 MTSB	English (Writing)	Appalachian State University
Hunt, Katelyn	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 72 1st Floor Mary Townes	Psychology	Campbell University
Hurst, Ashley	Oral Presentations #1 (9:30 - 10:30 AM) 10:00 AM - 10:15 AM 2225 MTSB	Criminal Justice	North Carolina Central University
Hutchison, Tre'Sean	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM	Chemistry (B. S.)	Fayetteville State University

	Poster 21 1st Floor Mary Townes		
Ibrahim, Dina	Oral Presentations #4 (3:00 - 4:00 PM) 3:15 PM - 3:30 PM 1008 BRITE	Biology (B. S.)	North Carolina State University
Idries, Shima	Oral Presentations #4 (3:00 - 4:00 PM) 3:15 PM - 3:30 PM 1221 MTSB	Biology (B. S.)	North Carolina State University
Ingold, Meghan	Oral Presentations #3 (1:45 - 2:45 PM) 2:00 PM - 2:15 PM 2236 MTSB	Spanish	Campbell University
Isenhour, Emilee	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 19 1st Floor Mary Townes	Biology (B.A.)	Catawba College
Issa, Neveen	Oral Presentations #4 (3:00 - 4:00 PM) 3:15 PM - 3:30 PM 2221 MTSB	Biology (B. S.)	University of North Carolina - Pembroke
Iusupova, Aiperi	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 52 2nd Floor Mary Townes	Biology (B. S.)	Duke University
Izzo, Jordan	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 49 1st Floor Mary Townes	Psychology	High Point University
Jackson, Jordan	Poster Presentations #2 (11:00 - 12:00	Biology (B. S.)	Campbell University

	PM) 11:00 AM - 12:00 PM Poster 8 2nd Floor Mary Townes		
Jackson, Kendall	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 69 2nd Floor Mary Townes	Physics (B.S.)	North Carolina Central University
Jackson, Shavonne	Oral Presentations #1 (9:30 - 10:30 AM) 10:15 AM - 10:30 AM 2225 MTSB	Criminal Justice	North Carolina Central University
Jackson, Victoria	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 26 1st Floor Mary Townes	Women's and Gender Studies	Pfeiffer University
James, Jahmil	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 8 1st Floor Mary Townes	Chemistry (B. S.)	East Carolina University
Jennette, Brittany	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 19 1st Floor Mary Townes	Computer Science (B.S.)	Fayetteville State University
Jeter, Deja	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 44 2nd Floor Mary	Criminal Justice	North Carolina Central University

	Townes		
Jewett, Braedon	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 3 1st Floor Mary Townes	Criminal Justice	Greensboro College
Johannesson, Zachary	Oral Presentations #2 (10:45 - 11:45 AM) 11:30 AM - 11:45 AM 1221 MTSB	Biology (B. S.)	University of North Carolina - Wilmington
Johnson, Alex	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 56 2nd Floor Mary Townes	Environmental Science	North Carolina State University
Johnson, Brennan	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 7 1st Floor Mary Townes	Chemistry (B. S.)	Appalachian State University
Johnson, Gareth	Oral Presentations #3 (1:45 - 2:45 PM) 2:30 PM - 2:45 PM 1008 BRITE	Mathematics	North Carolina State University
Johnson, Lauren	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 63 2nd Floor Mary Townes	Engineering - Electrical & Computer	University of North Carolina - Charlotte
Johnson, Qeashaunda	Oral Presentations #1 (9:30 - 10:30 AM) 10:15 AM - 10:30 AM	English (Literature)	Chowan University

	1234 MTSB		
Jones, Brianna	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 53 1st Floor Mary Townes	Psychology	North Carolina Central University
Jones, Caleb	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 9 1st Floor Mary Townes	Exercise Science	Campbell University
Jones, Makaela	Oral Presentations #4 (3:00 - 4:00 PM) 3:45 PM - 4:00 PM 2226 MTSB	Psychology	University of North Carolina - Chapel Hill
Jones, Zachary	Oral Presentations #3 (1:45 - 2:45 PM) 3:15 PM - 3:30 PM 1233 MTSB	Environmental Science	Catawba College
Joyce, Brendan	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 60 2nd Floor Mary Townes	Environmental Science	North Carolina State University
Juel, Robbie	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 57 2nd Floor Mary Townes	Biology (B. S.)	University of North Carolina - Pembroke
Kahric, Elvis	Oral Presentations #2 (10:45 - 11:45 AM) 11:00 AM - 11:15 AM 1008 BRITE	Computer Science (B.S.)	Methodist University
Kassab, Brandon	Oral Presentations #4 (3:00 - 4:00 PM)	Music	Western Carolina University

	3:15 PM - 3:30 PM 2226 MTSB		
Kaul, Smiti	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 10 1st Floor Mary Townes	History	Wake Forest University
Khalaf, Yazan	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 50 2nd Floor Mary Townes	Computer Science (B.S.)	Guilford College
Khan, Aysha	Oral Presentations #1 (9:30 - 10:30 AM) 9:30 AM - 9:45 AM 1008 BRITE	Mathematical Economics	University of North Carolina - Wilmington
King, Terri	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 55 1st Floor Mary Townes	Mass Communications	North Carolina Central University
Kinslow, Anna	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 25 1st Floor Mary Townes	Exercise Science	University of North Carolina - Wilmington
Kirmani, Nadia	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 59 2nd Floor Mary Townes	Engineering - Biomedical	Duke University
Kirse, Nathan	Oral Presentations	Physics (B.A.)	University of North Carolina -

	#4 (3:00 - 4:00 PM) 3:45 PM - 4:00 PM 1009 BRITE		Asheville
Knight, Savannah	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 24 1st Floor Mary Townes	Exercise Science	University of North Carolina - Wilmington
Kosco, Kelly	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 27 1st Floor Mary Townes	Zoology	North Carolina State University
Kozan, Darby	Oral Presentations #4 (3:00 - 4:00 PM) 3:30 PM - 3:45 PM 1221 MTSB	Biology (B. S.)	Guilford College
Krastev, Georgi	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 42 2nd Floor Mary Townes	Biology (B. S.)	St. Andrews University
Krishnamurthy, Arvind	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 64 1st Floor Mary Townes	Liberal Studies	University of North Carolina - Chapel Hill
Kumar, Kshitij	Oral Presentations #4 (3:00 - 4:00 PM) 3:30 PM - 3:45 PM 1009 BRITE	Environmental Science	North Carolina Central University
Kumar, Sachit	Oral Presentations #3 (1:45 - 2:45 PM) 2:00 PM - 2:15 PM	Biology (B. S.)	Appalachian State University

	1221 MTSB		
Lane, Minnie	Oral Presentations #2 (10:45 - 11:45 AM) 11:00 AM - 11:15 AM 1234 MTSB	English (Writing)	Elon University
Langley, Alexa	Oral Presentations #3 (1:45 - 2:45 PM) 2:00 PM - 2:15 PM 1221 MTSB	Biology (B. S.)	Appalachian State University
Laughner, Nathaniel	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 34 2nd Floor Mary Townes	Chemistry (B. S.)	North Carolina State University
Le, Ashley	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 27 1st Floor Mary Townes	Zoology	North Carolina State University
Lee, YeBon	Oral Presentations #1 (9:30 - 10:30 AM) 10:00 AM - 10:15 AM 1223 MTSB	Chemistry (B. S.)	Queens University of Charlotte
Leonard, Abigail	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 29 1st Floor Mary Townes	Exercise Science	North Carolina Wesleyan College
Lerner, Rachel	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM	Psychology	University of North Carolina - Chapel Hill

	Poster 76 2nd Floor Mary Townes		
Li, Alexander	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 15 1st Floor Mary Townes	Chemistry (B. S.)	University of North Carolina - Chapel Hill
Li, Hengxuan	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 18 1st Floor Mary Townes	Computer Science (B.S.)	North Carolina State University
Lile, Christopher	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 46 2nd Floor Mary Townes	Biology (B. S.)	Gardner-Webb University
Linton, Emily	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 65 2nd Floor Mary Townes	Biology (B. S.)	Campbell University
Liu, Nathaniel	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 37 2nd Floor Mary Townes	Psychology	University of North Carolina - Wilmington
Lodha, Shweta	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 42 2nd Floor Mary Townes	Pre-Medicine	Duke University
Lopera, Donny	Poster Presentations	Computer Science (B.S.)	Fayetteville State University

	#4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 19 1st Floor Mary Townes		
Lorenzen, Casey	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 19 1st Floor Mary Townes	Computer Science (B.S.)	Fayetteville State University
Lowry, Mariah	Exhibits (10:45 - 12:00 PM) 11:30 AM - 11:45 AM 1225 MTSB	Liberal Studies	Appalachian State University
Lu, Jana	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 9 1st Floor Mary Townes	Biology (B. S.)	Duke University
Lu, John	Oral Presentations #4 (3:00 - 4:00 PM) 3:45 PM - 4:00 PM 2221 MTSB	Chemistry (B. S.)	Duke University
Lugli, Kara	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 13 1st Floor Mary Townes	Chemistry (B. S.)	University of North Carolina - Charlotte
Luther, Morgan	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 31 1st Floor Mary Townes	Exercise Science	University of North Carolina - Greensboro
Madhavan, Sarina	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 15	Individualized Major Program	Duke University

	1st Floor Mary Townes		
Mahalik, Megan	Exhibits (10:45 - 12:00 PM) 10:45 AM - 11:00 AM 1225 MTSB	Studio Art	Campbell University
Maldonado, Bryant	Oral Presentations #4 (3:00 - 4:00 PM) 3:15 PM - 3:30 PM 1009 BRITE	Biology (B. S.)	University of North Carolina - Charlotte
Mandujano, Viridiana	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 60 2nd Floor Mary Townes	Biology (B. S.)	Catawba College
Manzini, Renee	Oral Presentations #1 (9:30 - 10:30 AM) 9:45 AM - 10:00 AM 2225 MTSB	Criminal Justice	Western Carolina University
Marand, Michael	Oral Presentations #3 (1:45 - 2:45 PM) 2:15 PM - 2:30 PM 1008 BRITE	Physics (B.S.)	Appalachian State University
Marey, Tierney	Oral Presentations #4 (3:00 - 4:00 PM) 3:15 PM - 3:30 PM 1233 MTSB	Sociology and Anthropology	Duke University
Marquez, Yakema	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 13 1st Floor Mary Townes	Biology (B. S.)	Robeson Community College
Martin, John	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45	Physics (B.S.)	University of North Carolina - Chapel Hill

	AM Poster 66 2nd Floor Mary Townes		
Martinez, Jesus	Oral Presentations #1 (9:30 - 10:30 AM) 10:00 AM - 10:15 AM 1009 BRITE	Computer Science (B.S.)	Appalachian State University
Matchunis, Katherine	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 1 1st Floor Mary Townes	Physics (B.S.)	Appalachian State University
Mayfield, Melissa	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 58 1st Floor Mary Townes	Psychology	University of North Carolina - Greensboro
Mazzoleni, Nicholas	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 62 2nd Floor Mary Townes	Engineering - Mechanical & Aerospace	North Carolina State University
McAuliffe, Joel	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 32 1st Floor Mary Townes	Environmental Science	East Carolina University
McClain, Caroline	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 25 1st Floor Mary	Exercise Science	University of North Carolina - Wilmington

	Townes		
McCoy, Kaela	Exhibits (10:45 - 12:00 PM) 11:15 AM - 11:30 AM 1225 MTSB	Studio Art	Campbell University
McFee, Elvis		Chemistry (B. S.)	North Carolina Central University
McGhee, Ashley	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 12 1st Floor Mary Townes	History	University of North Carolina - Asheville
McKenzie, Madeleine	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 70 1st Floor Mary Townes	Interior Design	Appalachian State University
McMillian, Minnie	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 41 1st Floor Mary Townes	Psychology	East Carolina University
Medina Nieto, Tatianaide	Oral Presentations #1 (9:30 - 10:30 AM) 10:00 AM - 10:15 AM 2221 MTSB	Biology (B. S.)	Wake Forest University
Mesa, Carmen	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 7	Biology (B. S.)	Guilford College

	1st Floor Mary Townes		
Meyenberg, Mathilde	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 21 1st Floor Mary Townes	Chemistry (B. S.)	Warren Wilson College
Migirditch, Samuel	Oral Presentations #1 (9:30 - 10:30 AM) 10:00 AM - 10:15 AM 1008 BRITE	Physics (B.S.)	Appalachian State University
Miller, Sarah	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 1 1st Floor Mary Townes	Animal Genetics	University of North Carolina - Chapel Hill
Minerali, Eni	Oral Presentations #2 (10:45 - 11:45 AM) 11:30 AM - 11:45 AM 1223 MTSB	Chemistry (B. S.)	University of North Carolina - Greensboro
Minto, Melyssa	Oral Presentations #3 (1:45 - 2:45 PM) 2:15 PM - 2:30 PM 1221 MTSB	Biology (B. S.)	Meredith College
Mitchell, Lloyd	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 13 1st Floor Mary Townes	Human Relations	Fayetteville State University
Monroe, Robert	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 28	Chemistry (B. S.)	North Carolina State University

	1st Floor Mary Townes		
Montpellier, Evan	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 40 1st Floor Mary Townes	Environmental Science	Appalachian State University
Moore, Desiree	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 54 2nd Floor Mary Townes	Biology (B. S.)	Fayetteville State University
Morgan, Julian	Oral Presentations #1 (9:30 - 10:30 AM) 9:45 AM - 10:00 AM 1009 BRITE	Computer Science (B.S.)	Duke University
Morgan, William	Oral Presentations #1 (9:30 - 10:30 AM) 10:15 AM - 10:30 AM 1233 MTSB	History	Wake Forest University
Morris, Brianna	Oral Presentations #3 (1:45 - 2:45 PM) 2:15 PM - 2:30 PM 2235 MTSB	Biology (B. S.)	Elizabeth City State University
Morrison, Courtney	Oral Presentations #2 (10:45 - 11:45 AM) 11:30 AM - 11:45 AM 2236 MTSB	English (Writing)	Appalachian State University
Morrow, Madison	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 72	Psychology	North Carolina State University

	2nd Floor Mary Townes		
Mullins, Jordan	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 4 1st Floor Mary Townes	Exercise Science	Campbell University
Murdock II, Andrew	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 45 2nd Floor Mary Townes	Biology (B. S.)	East Carolina University
Murphy, Brandon	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 65 2nd Floor Mary Townes	Biology (B. S.)	Fayetteville State University
Neequaye, Prince	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 6 1st Floor Mary Townes	Biology (B. S.)	North Carolina Central University
Nguyen, Taylor	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 27 1st Floor Mary Townes	Biology (B.A.)	North Carolina State University
Nguyen, Tiffany	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 63 2nd Floor Mary Townes	Biology (B. S.)	North Carolina Central University
Nickel, Katy	Exhibits (10:45 - 12:00 PM) 11:45 AM - 12:00 PM	Biology (B. S.)	University of North Carolina - Wilmington

	1225 MTSB		
Nienhuis, Christine	Oral Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:00 PM 1009 BRITE	Engineering - Biomedical	North Carolina A&T State University
Nogle, Jordan	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 41 2nd Floor Mary Townes	Chemistry (B. S.)	University of North Carolina - Wilmington
Norris, Haley	Oral Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM 1st Floor Mary Townes	Exercise Science	University of North Carolina - Wilmington
Norris, Haley	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 29 1st Floor Mary Townes	Exercise Science	University of North Carolina - Wilmington
Norris, Haley	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 23 1st Floor Mary Townes	Exercise Science	University of North Carolina - Wilmington
Nowland, Robert	Oral Presentations #1 (9:30 - 10:30 AM) 9:30 AM - 9:45 AM 1233 MTSB	History	University of North Carolina - Asheville
Noyola- Alonso , Karina	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 60 2nd Floor Mary Townes	Biology (B. S.)	Catawba College
Nwanguma, Steve	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00	Biology (B. S.)	North Carolina Central University

	PM Poster 24 1st Floor Mary Townes		
O'Campo, Jesse	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 11 1st Floor Mary Townes	Biology (B. S.)	University of North Carolina - Pembroke
Ochoa-Rios, Shaaron	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 68 2nd Floor Mary Townes	Biology (B. S.)	Fayetteville State University
Oufkir, Hakeem	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 36 2nd Floor Mary Townes	Chemistry (B. S.)	Wake Forest University
Page, Ashle	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 54 2nd Floor Mary Townes	Engineering - Chemical & Biomolecular	North Carolina State University
Palmer II, David	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 49 2nd Floor Mary Townes	Biology (B. S.)	Gaston College
Palmquist, Lindsey	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM	Chemistry (B. S.)	High Point University

	Poster 40 2nd Floor Mary Townes		
Paolino, Michael	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 69 2nd Floor Mary Townes	Physics (B.S.)	Appalachian State University
Parker, Elizabeth	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 28 1st Floor Mary Townes	Botany	High Point University
Parker, Ihasia	Oral Presentations #1 (9:30 - 10:30 AM) 9:30 AM - 9:45 AM 1223 MTSB	Chemistry (B. S.)	University of North Carolina - Pembroke
Parker, Kelly	Oral Presentations #1 (9:30 - 10:30 AM) 9:30 AM - 9:45 AM 1234 MTSB	English (Literature)	Appalachian State University
Parker, Taylor	Oral Presentations #1 (9:30 - 10:30 AM) 9:45 AM - 10:00 AM 2221 MTSB	Biology (B. S.)	Catawba College
Patel, Ami	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 11 1st Floor Mary Townes	Chemistry (B. S.)	University of North Carolina - Charlotte
Patel, Mitul	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 8 1st Floor Mary	Chemistry (B. S.)	East Carolina University

	Townes		
Patel, Ravi	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 33 2nd Floor Mary Townes	Physics (B.S.)	Appalachian State University
Patel, Rohan	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 65 2nd Floor Mary Townes	Biology (B. S.)	North Carolina School of Science and Mathematics
Patil, Yash	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 48 2nd Floor Mary Townes	Engineering - Chemical & Biomolecular	Enloe High School
Patton, Meghan	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 34 1st Floor Mary Townes	Exercise Science	High Point University
Payne, Kaela	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 35 1st Floor Mary Townes	Biology (B.A.)	North Carolina State University
Payne, Nicholas	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 10 1st Floor Mary Townes	Biology (B. S.)	East Carolina University
Peaks, Catrina	Poster Presentations	Biology (B. S.)	North Carolina Central

	#2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 33 1st Floor Mary Townes		University
Peek, Matthew	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 3 1st Floor Mary Townes	Computer Science (B.S.)	University of North Carolina - Asheville
Penley, Jeffrey	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 43 2nd Floor Mary Townes	Chemistry (B. S.)	University of North Carolina - Chapel Hill
Perez-Jimenez, Kiana	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 45 1st Floor Mary Townes	Psychology	University of North Carolina - Pembroke
Perez-Suarez, David	Oral Presentations #1 (9:30 - 10:30 AM) 10:15 AM - 10:30 AM 1008 BRITE	Mathematics	University of North Carolina - Greensboro
Perry, Jasmine	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 4 1st Floor Mary Townes	Biology (B. S.)	North Carolina Central University
Peterson, Benjamin	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00	Biology (B. S.)	North Carolina State University

	PM Poster 77 2nd Floor Mary Townes		
Phillips, Anna	Oral Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:00 PM 1234 MTSB	Individualized Major Program	East Carolina University
Piedrahita, Lucas	Oral Presentations #3 (1:45 - 2:45 PM) 2:00 PM - 2:15 PM 2235 MTSB	Biology (B. S.)	Appalachian State University
Pierce, Jessica	Oral Presentations #1 (9:30 - 10:30 AM) 10:00 AM - 10:15 AM 2236 MTSB	Women's and Gender Studies	Appalachian State University
Pinckombe, Patricia	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 11 1st Floor Mary Townes	History	Duke University
Poag, Evan	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 7 1st Floor Mary Townes	Biology (B. S.)	Guilford College
Ponce Romero, Andres	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 67 2nd Floor Mary Townes	Physics (B.S.)	North Carolina State University
Postich, Cody	Poster Presentations #2 (11:00 - 12:00	Biology (B. S.)	University of North Carolina - Wilmington

	PM) 11:00 AM - 12:00 PM Poster 12 2nd Floor Mary Townes		
Poteres, Elesa	Oral Presentations #4 (3:00 - 4:00 PM) 3:30 PM - 3:45 PM 1008 BRITE	Biology (B. S.)	High Point University
Powell, Matthew	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 61 2nd Floor Mary Townes	Engineering - Materials	North Carolina State University
Pranjic, Davor	Oral Presentations #2 (10:45 - 11:45 AM) 11:00 AM - 11:15 AM 1009 BRITE	Computer Science (B.S.)	Methodist University
Prestemon, Andrea	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 61 2nd Floor Mary Townes	Biology (B. S.)	North Carolina State University
Price, Holly	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 15 1st Floor Mary Townes	Exercise Science	Campbell University
Prskalo, Ena	Oral Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 3:15 PM 1233 MTSB	Sociology and Anthropology	University of North Carolina - Greensboro
Przelomski, Hannah	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00	Chemistry (B. S.)	Catawba College

	PM Poster 32 2nd Floor Mary Townes		
Pullen, Eric	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 0 2nd Floor Mary Townes	Criminal Justice	North Carolina Central University
Pulliam, Samantha	Oral Presentations #2 (10:45 - 11:45 AM) 11:30 AM - 11:45 AM 1234 MTSB	English (Literature)	Chowan University
Quillian , Emory	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 60 2nd Floor Mary Townes	Environmental Science	North Carolina State University
Rainey, Autumn	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 57 1st Floor Mary Townes	Music	North Carolina Central University
Ramirez, Mizrain	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 62 2nd Floor Mary Townes	Physics (B.S.)	North Carolina Central University
Ramsey, Brittany	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 8 1st Floor Mary	Economics	Appalachian State University

	Townes		
Reardon, Elizabeth	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 53 2nd Floor Mary Townes	Biology (B. S.)	High Point University
Rife, Jonathan	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 20 1st Floor Mary Townes	Biology (B. S.)	Catawba College
Riggs, Quinlin	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 5 1st Floor Mary Townes	Physics (B.S.)	Appalachian State University
Robbins, Gabrielle	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 63 2nd Floor Mary Townes	Biology (B. S.)	North Carolina State University
Roberts, Melissa	Oral Presentations #4 (3:00 - 4:00 PM) 3:15 PM - 3:30 PM 2225 MTSB	Sociology and Anthropology	University of North Carolina - Greensboro
Robinson, Michelle	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 31 1st Floor Mary Townes	Public Health Education	North Carolina Central University
Rodgers-Williams, Anthony	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM	Mass Communications	North Carolina Central University

	Poster 55 1st Floor Mary Townes		
Rodriguez, Renesha	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 37 1st Floor Mary Townes	Mathematics	University of North Carolina - Charlotte
Roldan, Luis	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 71 2nd Floor Mary Townes	Engineering Cooperative Program	North Carolina State University
Rolison, Benjamin	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 48 2nd Floor Mary Townes	Game Design/ Interactive Media	High Point University
Rowell, Gabriel	Oral Presentations #2 (10:45 - 11:45 AM) 11:30 AM - 11:45 AM 2225 MTSB	Economics	High Point University
Rozo Posso, Jacobo	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 7 2nd Floor Mary Townes	Biology (B. S.)	North Carolina State University
Ruiz, Georgina	Exhibits (10:45 - 12:00 PM) 11:45 AM - 12:00 PM 1225 MTSB	Biology (B. S.)	University of North Carolina - Wilmington

Rust, Christian	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 46 2nd Floor Mary Townes	Engineering - Chemical & Biomolecular	North Carolina State University
Ryu, Emily	Oral Presentations #1 (9:30 - 10:30 AM) 9:45 AM - 10:00 AM 1008 BRITE	Mathematical Economics	Appalachian State University
Sacchere, Ryan	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 51 2nd Floor Mary Townes	Biology (B. S.)	Gaston College
Safin, Justin	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 52 2nd Floor Mary Townes	Biology (B. S.)	East Carolina University
Saha, Indrani	Oral Presentations #3 (1:45 - 2:45 PM) 2:30 PM - 2:45 PM 2225 MTSB	Individualized Major Program	Duke University
Samples, Anneliese	Oral Presentations #4 (3:00 - 4:00 PM) 3:30 PM - 3:45 PM 2236 MTSB	Psychology	North Carolina Central University
Sangha, Gurnoor	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 50 2nd Floor Mary Townes	Engineering - Biomedical	East Carolina University

Sarnor, Crystal	Oral Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:00 PM 1221 MTSB	Biology (B. S.)	Chowan University
Sasfy, Daniel	Oral Presentations #2 (10:45 - 11:45 AM) 11:00 AM - 11:15 AM 2225 MTSB	Economics	Methodist University
Saygbe, Gabrielle	Oral Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 3:15 PM 1234 MTSB	Liberal Studies	Johnson C. Smith University
Scales, Shania	Oral Presentations #1 (9:30 - 10:30 AM) 9:30 AM - 9:45 AM 2225 MTSB	Criminal Justice	North Carolina Central University
Scanlon, Hannah	Oral Presentations #1 (9:30 - 10:30 AM) 9:45 AM - 10:00 AM 2226 MTSB	Individualized Major Program	University of North Carolina - Charlotte
Schenck, Aleaha	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 32 1st Floor Mary Townes	Chemistry (B. S.)	North Carolina Central University
Schlaudt, Joel	Oral Presentations #2 (10:45 - 11:45 AM) 11:00 AM - 11:15 AM 2221 MTSB	Biology (B.A.)	Catawba College
Schoenecker, Johanna	Oral Presentations #2 (10:45 - 11:45 AM) 11:30 AM - 11:45 AM 2221 MTSB	Environmental Science	Queens University of Charlotte

Schueneman, Melinda	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 20 1st Floor Mary Townes	Chemistry (B. S.)	University of North Carolina - Asheville
Scott, Tyra	Performances (9:30 - 10:30 AM) 9:45 AM - 10:00 AM BN Duke Auditorium	Music	North Carolina Central University
Sears, Tiffany	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 17 1st Floor Mary Townes	Exercise Science	Campbell University
Seaton, Blake	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 26 2nd Floor Mary Townes	Chemistry (B. S.)	Appalachian State University
Sedergren, Sofia	Oral Presentations #3 (1:45 - 2:45 PM) 2:00 PM - 2:15 PM 1234 MTSB	Individualized Major Program	Greensboro College
Seldomridge, Elizabeth	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 29 1st Floor Mary Townes	Exercise Science	University of North Carolina - Wilmington
Seldomridge, Elizabeth	Oral Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM 1st Floor Mary Townes	Exercise Science	University of North Carolina - Wilmington
Seldomridge, Elizabeth	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM	Exercise Science	University of North Carolina - Wilmington

	Poster 23 1st Floor Mary Townes		
Seldon, Alana	Oral Presentations #3 (1:45 - 2:45 PM) 2:30 PM - 2:45 PM 1234 MTSB	Liberal Studies	Johnson C. Smith University
Sexton, Kelsey	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 63 1st Floor Mary Townes	Music	University of North Carolina - Charlotte
Sharp, Jaimee	Oral Presentations #1 (9:30 - 10:30 AM) 9:45 AM - 10:00 AM 1234 MTSB	English (Literature)	Campbell University
Sheets, Greg	Oral Presentations #2 (10:45 - 11:45 AM) 10:45 AM - 11:00 AM 2221 MTSB	Botany	North Carolina State University
Sheldon, Phillip	Oral Presentations #4 (3:00 - 4:00 PM) 3:30 PM - 3:45 PM 2225 MTSB	Sociology and Anthropology	University of North Carolina - Greensboro
Sherrill, Erin	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 73 2nd Floor Mary Townes	Engineering - Biomedical	South Iredell High School
Shymanovich, Anastasia	Oral Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 3:15 PM 2225 MTSB	Sociology and Anthropology	University of North Carolina - Greensboro

Sima, Dawit	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 20 1st Floor Mary Townes	Biology (B. S.)	North Carolina Central University
Singalreddy, Chetan	Oral Presentations #3 (1:45 - 2:45 PM) 2:15 PM - 2:30 PM 2226 MTSB	Public Health	East Carolina University
Sluder, Isaac	Oral Presentations #1 (9:30 - 10:30 AM) 9:45 AM - 10:00 AM 1221 MTSB	Biology (B. S.)	University of North Carolina - Charlotte
Smith, Austin	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 23 1st Floor Mary Townes	Exercise Science	University of North Carolina - Wilmington
Smith, Austin	Oral Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM 1st Floor Mary Townes	Exercise Science	University of North Carolina - Wilmington
Smith, Austin	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 29 1st Floor Mary Townes	Exercise Science	University of North Carolina - Wilmington
Smith, Brian	Oral Presentations #2 (10:45 - 11:45 AM) 11:30 AM - 11:45 AM 1008 BRITE	Computer Science (B.S.)	Appalachian State University
Smith, Christopher	Oral Presentations #2 (10:45 - 11:45 AM)	Computer Science (B.S.)	Appalachian State University

	11:15 AM - 11:30 AM 1008 BRITE		
Smith, Kenya	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 62 2nd Floor Mary Townes	Health and Physical Education	Catawba College
Smith, Melanie	Oral Presentations #4 (3:00 - 4:00 PM) 3:45 PM - 4:00 PM 1233 MTSB	Individualized Major Program	Greensboro College
Smith, Natalie	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 40 2nd Floor Mary Townes	Chemistry (B. S.)	Appalachian State University
Soden, Kaitlin	Oral Presentations #2 (10:45 - 11:45 AM) 11:15 AM - 11:30 AM 2221 MTSB	Biology (B. S.)	East Carolina University
Speckman, Jessica	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 24 1st Floor Mary Townes	Biology (B. S.)	Gaston College
Spooner, Catherine	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 42 2nd Floor Mary Townes	Computer Science (B.S.)	Fayetteville State University
Springer, Chad	Oral Presentations #1 (9:30 - 10:30 AM) 10:15 AM - 10:30 AM	Health and Physical Education	Catawba College

	2226 MTSB		
Sprinkle, Alisha	Oral Presentations #1 (9:30 - 10:30 AM) 9:30 AM - 9:45 AM 1009 BRITE	Computer Science (B.S.)	Appalachian State University
Sprouse, Alexandra	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 12 1st Floor Mary Townes	Biology (B. S.)	High Point University
Spurlin, Racheal	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 21 1st Floor Mary Townes	Biology (B. S.)	North Carolina State University
Sriraman, Aishwarya	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 4 1st Floor Mary Townes	Biology (B. S.)	North Carolina State University
Stancil, Dawn	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 15 1st Floor Mary Townes	Biology (B. S.)	North Carolina Central University
Stevens, Rachel	Oral Presentations #1 (9:30 - 10:30 AM) 10:15 AM - 10:30 AM 1223 MTSB	Chemistry (B. S.)	Appalachian State University
Stiers, Erin	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 28	Biology (B. S.)	Pfeiffer University

	1st Floor Mary Townes		
Stirrat, Thomas	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 9 1st Floor Mary Townes	History	Wake Forest University
Strayhorn, Joshua	Oral Presentations #3 (1:45 - 2:45 PM) 2:00 PM - 2:15 PM 2225 MTSB	History	North Carolina Central University
Stubbs, Jacob	Oral Presentations #2 (10:45 - 11:45 AM) 10:45 AM - 11:00 AM 2236 MTSB	English (Writing)	Appalachian State University
Suchy, Natalie	Oral Presentations #4 (3:00 - 4:00 PM) 3:15 PM - 3:30 PM 2236 MTSB	Psychology	University of North Carolina - Greensboro
Szymanski, Mandy	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 13 1st Floor Mary Townes	Exercise Science	High Point University
Tavares, Kendall	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 5 1st Floor Mary Townes	Biology (B. S.)	Appalachian State University
Teran, Elissa	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 7 1st Floor Mary Townes	Biology (B. S.)	Meredith College
Thatavarty, Apoorva	Poster Presentations	Engineering - Chemical &	North Carolina State

	#3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 71 2nd Floor Mary Townes	Biomolecular	University
Thomason, Ashley	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 72 1st Floor Mary Townes	Psychology	Campbell University
Thompson, Jeremiah	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 73 2nd Floor Mary Townes	Psychology	Fayetteville State University
Thompson, Kelly	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 29 1st Floor Mary Townes	Biology (B. S.)	North Carolina State University
Thornton, Danielle	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 59 2nd Floor Mary Townes	Environmental Science	Appalachian State University
Tindal, Jasmin	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 28 2nd Floor Mary Townes	Chemistry (B. S.)	Queens University of Charlotte
Tornow, Olivia	Oral Presentations #2 (10:45 - 11:45	Chemistry (B. A.)	High Point University

	AM) 11:00 AM - 11:15 AM 1223 MTSB		
Travels, Dustin	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 58 2nd Floor Mary Townes	Environmental Science	North Carolina State University
Tudela, Carina	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 75 2nd Floor Mary Townes	Psychology	North Carolina State University
Tuffey, Claire	Oral Presentations #1 (9:30 - 10:30 AM) 10:15 AM - 10:30 AM 2236 MTSB	Women's and Gender Studies	Wake Forest University
Tyler, Michael	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 53 1st Floor Mary Townes	Psychology	North Carolina Central University
Udoye, Natalie	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 33 1st Floor Mary Townes	Criminal Justice	North Carolina Central University
Ulrich, Rebecca	Oral Presentations #3 (1:45 - 2:45 PM) 2:15 PM - 2:30 PM 1009 BRITE	Chemistry (B. S.)	High Point University

Valencia, Jeison	Oral Presentations #2 (10:45 - 11:45 AM) 11:00 AM - 11:15 AM 1221 MTSB	Biology (B. S.)	University of North Carolina - Pembroke
Vallabhaneni, Arvind	Oral Presentations #4 (3:00 - 4:00 PM) 3:30 PM - 3:45 PM 1234 MTSB	International Studies	North Carolina Central University
Vontas, Kyriakos	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 37 1st Floor Mary Townes	Mathematics	University of North Carolina - Charlotte
Walker, Cory	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 56 2nd Floor Mary Townes	Environmental Science	North Carolina State University
WANG, WEI	Oral Presentations #2 (10:45 - 11:45 AM) 11:15 AM - 11:30 AM 1223 MTSB	Chemistry (B. S.)	University of North Carolina - Pembroke
Wang, Xuechun	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 14 1st Floor Mary Townes	Physics (B.S.)	North Carolina State University
Warren, Connor	Oral Presentations #2 (10:45 - 11:45 AM) 11:15 AM - 11:30 AM 2236 MTSB	English (Writing)	Appalachian State University

Watlington, Cedric	Oral Presentations #3 (1:45 - 2:45 PM) 2:30 PM - 2:45 PM 1009 BRITE	Engineering - Industrial & Systems	North Carolina A&T State University
Watson, Ebony	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 50 2nd Floor Mary Townes	Biology (B. S.)	North Carolina State University
Watters, Amaya	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 18 1st Floor Mary Townes	Biology (B. S.)	North Carolina State University
Weathers, Kiera	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 55 2nd Floor Mary Townes	Biology (B. S.)	Fayetteville State University
Weh, Henrique	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 43 2nd Floor Mary Townes	Computer Science (B.S.)	Central Piedmont Community College
Wells, Tamara	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 60 2nd Floor Mary Townes	Environmental Science	North Carolina State University
West, Kimberly	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 68 2nd Floor Mary Townes	Chemistry (B. S.)	Fayetteville State University

White, Keven	Oral Presentations #1 (9:30 - 10:30 AM) 9:30 AM - 9:45 AM 2236 MTSB	Religion	Appalachian State University
Whiting, Philip	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 36 1st Floor Mary Townes	Computer Science (B.S.)	Fayetteville State University
Wilkerson, Alexis	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 22 1st Floor Mary Townes	Sociology and Anthropology	University of North Carolina - Pembroke
Williams, Brianah	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 30 1st Floor Mary Townes	Public Health Education	North Carolina Central University
Williams, Jasmine	Oral Presentations #1 (9:30 - 10:30 AM) 9:30 AM - 9:45 AM 1221 MTSB	Biology (B. S.)	Meredith College
Williams, Shepeara	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 34 1st Floor Mary Townes	Criminal Justice	North Carolina Central University
Willis, Lawrence	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 39 2nd Floor Mary Townes	Chemistry (B. S.)	Appalachian State University

Willis, Tanquez	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 23 2nd Floor Mary Townes	Chemistry (B. S.)	Elizabeth City State University
Willoughby, Jamiceia	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 31 1st Floor Mary Townes	Criminal Justice	North Carolina Central University
Wilson, Alex	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 38 2nd Floor Mary Townes	Chemistry (B. S.)	Appalachian State University
Wilson, Cheyenne	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 20 1st Floor Mary Townes	Biology (B. S.)	Catawba College
Wilson, Preston	Oral Presentations #2 (10:45 - 11:45 AM) 11:15 AM - 11:30 AM 1008 BRITE	Computer Science (B.S.)	Appalachian State University
Winnicki, Liv	Performances (9:30 - 10:30 AM) 10:15 AM - 10:30 AM BN Duke Auditorium	Theatre	Appalachian State University
Womble, Carrisa	Oral Presentations #3 (1:45 - 2:45 PM) 2:30 PM - 2:45 PM 1233 MTSB	Biology (B. S.)	North Carolina State University

Woodard, Lewis	Oral Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 3:15 PM 1008 BRITE	Biology (B. S.)	Chowan University
Woodland, Gerry	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 66 2nd Floor Mary Townes	Biology (B. S.)	Fayetteville State University
Woodson, Anderson	Oral Presentations #1 (9:30 - 10:30 AM) 9:30 AM - 9:45 AM 1221 MTSB	Biology (B. S.)	Meredith College
Woolpert, Kirsten	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 31 1st Floor Mary Townes	Biology (B. S.)	University of North Carolina - Wilmington
Wright, Jaime	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 43 1st Floor Mary Townes	Psychology	Guilford College
Wright, Maryah	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 26 1st Floor Mary Townes	Chemistry (B. S.)	North Carolina Central University
Wright, Olivia	Poster Presentations #4 (3:00 - 4:00 PM) 3:00 PM - 4:00 PM Poster 2 1st Floor Mary Townes	Computer Science (B.S.)	North Carolina State University
Wright, Shannon	Poster Presentations	Psychology	Catawba College

	#1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 41 2nd Floor Mary Townes		
Xiong, Alexander	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 36 1st Floor Mary Townes	Environmental Science	North Carolina School of Science and Mathematics
Yanik, Michael	Poster Presentations #3 (1:45 - 2:45 PM) 1:45 PM - 2:45 PM Poster 55 2nd Floor Mary Townes	Environmental Science	Appalachian State University
Young, Amber	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 66 1st Floor Mary Townes	Liberal Studies	Fayetteville State University
Young, Deja	Oral Presentations #4 (3:00 - 4:00 PM) 3:30 PM - 3:45 PM 2236 MTSB	Psychology	North Carolina Central University
Young, Kayla	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 14 1st Floor Mary Townes	Human Relations	Appalachian State University
Zalman, Paige	Oral Presentations #4 (3:00 - 4:00 PM) 3:30 PM - 3:45 PM 2226 MTSB	Music	University of North Carolina - Wilmington

Zarzar, Elizabeth	Oral Presentations #4 (3:00 - 4:00 PM) 3:45 PM - 4:00 PM 1008 BRITE	Biology (B. S.)	Cedar Ridge High School
Zdanski, Cristan	Poster Presentations #1 (9:45 - 10:45 AM) 9:45 AM - 10:45 AM Poster 33 1st Floor Mary Townes	Environmental Science	North Carolina Central University
Zeches, Breann	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 27 1st Floor Mary Townes	Biology (B. S.)	Campbell University
Zeid, Suzanne	Poster Presentations #2 (11:00 - 12:00 PM) 11:00 AM - 12:00 PM Poster 39 1st Floor Mary Townes	Mathematics	University of North Carolina - Wilmington
Zhong, Kendra	Oral Presentations #1 (9:30 - 10:30 AM) 10:15 AM - 10:30 AM 1221 MTSB	Biology (B. S.)	North Carolina School of Science and Mathematics