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REVEAL

Main Campus Student Center
April 4th–8th, 2022

#RCAW22 Research & Creative Achievement Week

ECU

We would like to give special thanks to:

- Dan Elliott, MFA, Associate Professor, School of Art & Design for guiding his students in the development of RCAW artwork.
- Our 2022 artist, Reno Strickland, BFA for the program artwork including the cover design, posters, and website. Reno currently works at Pilot John International, Greenville NC.
- We would also like to recognize graduate student Anja Burcak for her development and management of this program book.

EVENT SPACES

Alice Crawford Ballroom (Ballroom C) 235C
Ballroom A 235A
Ballroom B 235B
Black Box Theater 200
Meeting Room. 206
Meeting Room. 234
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Meeting Room. 237
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STUDENT AFFAIRS

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Dr. Jesse R. Peel LGBTQ Center. 209
Student Government Association 223

Main Campus Student Center – 2nd floor map

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Planning Committee

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

Donna Kain, Department of English, Thomas Harriot College of Arts & Sciences

Kathleen Cox, Associate Dean, Graduate School

KT Harcourt-Medina, Department of Human Development and Family Science, College of Health Human Performance

Yvonne Kao, Graduate Assistant, Department of English

Christyn Dolbier, Department of Psychology, Thomas Harriot College of Arts & Sciences

Rich Franklin, Assistant Dean, Brody School of Medicine

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

Marquerite Bond, Graduate School

Anja Burcak, Graduate Assistant, Graduate School

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

Heather Mahany, Division of Research, Economic Development and Engagement

We Appreciate the Support from Our Campus Partners!

Jennifer Harrell and Beth Bengala, Centra Reservations Office, Division of Student Affairs

Annette Kariko, Continuing and Professional Education, Division of Research, Economic Development, and Engagement

Pam Hopkins, School of Communication, College of Fine Arts & Communication

Amy Curtis, Joyner Library

Monday – April 4

Graduate Student Oral Presentations
8:15 AM – 5:00 PM
Rooms 249, Ballroom A,
Ballroom B

Graduate Student Poster Presentations – Virtual
Link for Online Poster Sessions

Postdoctoral Scholar & Dental Resident Posters - Virtual
11:00 AM – 1:00 PM
Link for Online Poster Sessions

Tuesday – April 5

International Scholar and Student Symposium
8:15 AM – 5:00 PM
Black Box Theater

Wednesday – April 6

Undergraduate Student Oral Presentations
8:15 AM – 5:00 PM
Rooms 249, 253, Ballroom A, Ballroom B

Undergraduate Student Poster Presentations – Virtual
Link for Online Poster Sessions

Thursday – April 7

College of Education Faculty & Student Research Showcase

3:00 – 6:00 PM – Virtual Only

Link for Showcase Event

Friday – April 8

Innovation & Entrepreneurship Showcase Event
1:00 – 3:00 PM ***Virtual Only***
Link for Showcase Event

Monday – April 11

Awards Luncheon – Invitation Only
Main Campus Student Center Ballrooms

International Scholars' & Students' Symposium

April 5, 2022

2:30-2:40

Opening Remarks: Dr. Nehad Elsawaf - International Scholars' Symposium Chair and Organizer.

Session 1: Session Chair- Dr. Nehad Elsawaf

2:45- 3:05

Simulation of Mixed Traffic Network with Human Driving and Autonomous Vehicles, Jinkun Lee, Department of Engineering, East Carolina University, Greenville, NC, 27858 , Coleman Ferrell, Department of Engineering, East Carolina University, Greenville, NC, 27858, Matthew Carroll and Rui-Wu, Department of Computer Science, East Carolina University, Greenville, NC, 27858

3:05-3:25

A Collection Process and Cost Estimating Calculator for Applications of Disposable Face Masks in Asphalt Pavements, Md Hasibul Hasan Rahat, MBA, Carol Massarra,, George Wang, , and Jodi Farrington,, Department of Construction Management, East Carolina University, Greenville, NC, 27858

3:25-3:45

Is there a correlation between the drawing aptitude and manual skills of dental students? Hanan Elgendy, Xiaoxi Cui, Todd Watkins, Department of General Dentistry, School of Dental Medicine, East Carolina University, NC, 27858 and Michelle McQuistan, Department of Preventive & Community Dentistry, University of Iowa College of Dentistry and Dental Clinics.

3:45 PM-4:00 PM BREAK

Session 2: Session Chair Dr. Nehad Elsawaf

4:00-4:20

Wind and Flood Vulnerability Index for Residential Buildings, Carol C. Massarra, Department of Construction Management, East Carolina University, Greenville, NC, 27858

4:20-4:40

A case report of "Hereditary Angioedema", a rare genetic disorder emphasizing the burden of the disease, Yousef Taha, Thomas Harriot College of Arts and Sciences, East Carolina University, Greenville, NC, 27858 and Omar Taha, Brody school of Medicine, East Carolina University, Greenville, NC, 27858.

4:40-5:00

Exploring the Role and Experiences of Child Life Specialists on Short Term Medical Missions and Developing Capacity Building Efforts, Priti P. Desai, Human Development and Family Science Department, College of Health and Human Performance, East Carolina University, Greenville, NC, 27858 and Emily Backes Brock, The Children's Health Care of Atlanta, Atlanta, GA,

5:00 -Concluding remarks- Dr. Nehad Elsawaf

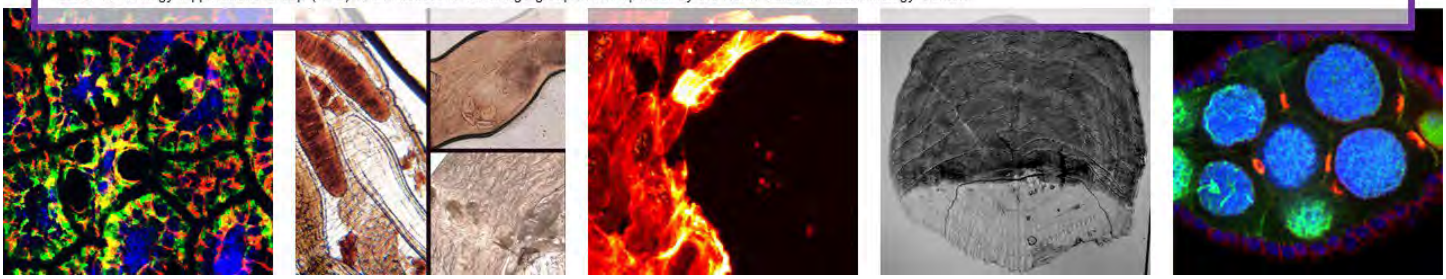
Capturing the Art of Science Image Competition

3ND ANNUAL "CAPTURING THE ART OF SCIENCE" IMAGE COMPETITION

HOSTED BY LASER TAG*

This event celebrates the beauty of scientific discovery. Entries are judged on aesthetics, originality, and relation to the described science. This year's judges include Allison Danell (Dean of the Thomas Harriot College of Arts and Sciences), Dan Elliott (Associate Professor in the School of Art and Design) Trista Reis Porter (Executive Director of Greenville Museum of Art), and Matthew Scully (owner of the Scullery). This event raises visibility of the numerous ongoing imaging efforts occurring in research labs across campus. Winning images will be shared with the community at the Scullery during May and can also be viewed on social media (Twitter @ECLaserTag and Instagram lasertag_2020).

*Laser Technology Applications Group (TAG) is an intellectual exchange group that is sponsor by the North Carolina Biotechnology Center.



Innovation & Entrepreneurship Showcase Event

April 8, 1:00 – 3:00 PM [Link to Attend]

Intersection: Arts@Science

Intersection: Arts@Science

https://symposium.foragerone.com/rcaw2022/live-sessions

2:05 PM	*Borim Song*	*Data Visualization: Students' Practices*
2:15 PM	*Zach Palma*	*Relative Hearing of Musicians and Non-Musicians*
2:25 PM	*Emily Hall*	*Pork Has a Poop Problem*
2:35 PM	*Gerald Weckesser*	*Wonder of Windsor Chair*
2:45 PM	*Adam Berman*	*Modern Plant Blindness: Rediscovering of Flora Through Printmaking*
2:55 PM	*Nicholas Hesson*	*Calling from Italy (working title)*

Mentor List

Thank you to all the mentors for supporting your students!

Abdel-Rahman, Abdel-Rahman
Abdel-Salam, Tarek M
Ables, Elizabeth Tweedie
Aileru, Azeez
Akpan, Uduak Stella
Allen, William E
Anderson, Eric Shawn
Asch, Rebecca G
Aziz, Shahnaz
Baker, Michael Drew
Balanay, Jo Anne Goot
Banerjee, Sambuddha
Bee, Beth Anne
Bell, Natasha Lynn
Beltran-Huarac, Juan
Black, Kristin Zenee
Blake, Beth A
Blakeslee, April Monica Houghton
Bolin, Linda Prior
Bowman, Josie Martin
Brewer, Kori Louise
Brewer, Michael Scott
Bright, Kawanna Michelle
Briley, Patrick Minton
Bryson, Sara
Burch, Ashley
Burns, Colin Sanderson
Campbell, Lisa
Cavanagh, John
Chambers, Crystal Renee
Christensen, Timothy W
Clark, Patricia A
Clemens, Stefan
Collins, John
Corbett, Robin
Corns, Robert
Daneri, Juan Jose
Das, Bhibha Mayee
DeWitt, Jamie C
DeWitt, Regina
Dickerson, Anne
Dickerson, Daniel Lee
Donica, Denise
Driscoll, Virginia Darnell
Eagle, John Scott
Eamon, Thomas Floyd
Egan, Kathleen Louise
Elmore, Cindy J
Eppler, Marion A
Etheridge, James Randall
Ewen, Charles R
Feder, Helena M
Filho, Faete
Fisher-Wellman, Kelsey Howard
Forbes, Thompson Hollingsworth
Fraley, Todd A
Garcia, Brandon L
Gardner, Catherine M
George, Stephanie
Geraldeli, Saulo
Geyer, Christopher
Gittman, Rachel Kelley
Golden, Jean Ann
Graber, Theodore G
Green, Erick Y
Habeeb, Christine
Hall, Tana Louise
Hallberg, Christy Alexander
Hand, Mark Charles
Hannan, Johanna
Hart, Stephanie
Hegde, Archana
Herndon, Nic
Hodge, Elizabeth Baker
Horn, Patrick Jacob
Howard, Gregory Edward
Hu, Xin-Hua
Huang, Yilei
Hudson, Nathan E
Hughes, Robert Murray
Hur, Misun
Irons, Paige Latham
Jubran, Hanna
Jung, Jae Won
Kane, Melinda D
Kearney, Gregory Dale
Keiper, Brett
Kipp, Aaron Marshall
Knox, David H
Kovar, Cheryl L
Lagomasino, David
Lamb, Richard Lawrence
Larson, Kim L
Lazorick, Suzanne
Lazure, Timothy
Lee, Jinkun
Lee, Joseph G
Lee, Mi Hwa
Lee, Myon Hee
Lee, Tammy D
Lewis, Travis Earl
Li, Yong-Qing
Lin, Chia-Cheng
Lin, Ziwei
Liu, Haiyong
Liu, Yang
Lu, Qun
Maher, Derek F
Manda, Alex Kapolo
Mansfield, Kyle David
Massarra, Carol
McCarlie, Van Wallace
McClung, Joseph Matthew
McKinnon, Jeffrey

McRae, Susan B
Medina, Almitra
Militello, Matthew
Miller, James Kirk
Mizelle, John Christopher
Murata, Ramiro Mendonca
Murray, Nicholas P
Narayan, Siddharth
Nassehzadeh-Tabrizi, Moha
Neufer, Peter D
Normoyle, Catherine Lucille
Oakley, Christopher A
O'Driscoll, Michael A
Offenbacher, Adam Richard
Pajski, Jason John
Pan, Xiaoping
Peralta, Ariane Legaspi
Perry, Jamie L
Perry, Megan A
Pokhrel, Lok R
Powell, Shannon Baker
Prokopowicz, Gerald J
Puckett, Heidi Leigh
Quick, Linda Ann
Rasdorf, Mark Edward
Raupp, Jason Thomas
Reed, Jonathan Mark
Reid, Jonathan A
Reis, Pamela Jones
Richards, Stephanie Lynn
Richardson, Mark Douglas
Rider, Patrick Michael
Roberson, Donna W
Roberson, Evan Michael
Rocha, Edson R
Roop, Roy M
Roper, Rachel L
Rothermich, Kathrin
Rowe, William Jason
Rulifson, Roger
Ryan, Teresa Jean
Sartore, Melanie L
Sastre, Lauren Rogers
Schacht, Ryan Nicholas
Schwartz, Abby
Schwartz, Catherine Stein
Siegel, David J
Smith, Aimee West
Soule, Eric Kendall
Sousan, Sinan
Spangenburg, Espen Eric
Spuches, Anne M
Sriramula, Srinivas
Stage, Virginia Carraway
Surkar, Swati Manoharrao
Swift, Alison D
Sylcott, Brian
Szatmari, Erzsebet Maria
Thomas, Amber F
Thompson, Brittany Myles
Wright
Tillman, Janet D
Tisnado, James R
Tran, Tuan D
Turbeville, Lauren Shuler
Vahdati, Ali
Vance Chalcraft, Heather D
Vermiglio, Andrew J
Virag, Jitka Amira Ismail
Vohra, Nasreen A
Walcott, Christy Mangione
Walker, Marianna M
Weckesser, Gerald
Wells, Angela Franks
Wheeler, Michael D
Yang, Li
Yeager, Emily Pauline
Yun, Joonkoo
Zhu, Yong

Graduate Oral Presentation by Category and Room Location

BALLROOM A

PRESENTER	CATEGORY	Number	Start	End	Date
Belcher, Heather	Biomedical Sciences	GO1	8:30AM	8:45AM	Monday, April 4
Bunner, Wyatt	Biomedical Sciences	GO2	8:45AM	9:00AM	Monday, April 4
Dorgham, Mohammed	Biomedical Sciences	GO3	9:00AM	9:15AM	Monday, April 4
Hagen, James	Biomedical Sciences	GO4	9:15AM	9:30AM	Monday, April 4
Jaimes, Felicia	Biomedical Sciences	GO5	9:30AM	9:45AM	Monday, April 4
Marie, Mona	Biomedical Sciences	GO6	9:45AM	10:00AM	Monday, April 4
Minchew, Everett	Biomedical Sciences	GO7	10:15AM	10:30AM	Monday, April 4
		BREAK	**10:30AM**	**10:45AM**	
Nik Akhtar, Shayan	Biomedical Sciences	GO8	10:45AM	11:00AM	Monday, April 4
Satterwhite, Emily	Biomedical Sciences	GO9	11:00AM	11:15AM	Monday, April 4
Schaub, Mandee	Biomedical Sciences	GO10	11:15AM	11:30AM	Monday, April 4
Theobald, Drew	Biomedical Sciences	GO11	11:30AM	11:45AM	Monday, April 4
Gajjar, Gita	Biomedical Sciences	GO12	11:45AM	12:00PM	Monday, April 4
Belcher, Wesley	Biomedical Sciences	GO13	12:00PM	12:15PM	Monday, April 4
Salem, Fatema	Biomedical Sciences	GO14	12:15PM	12:30PM	Monday, April 4
		LUNCH	**12:30PM**	**1:30PM**	
Driver, Robert	Natural Sciences	GO55	1:30PM	1:45PM	Monday, April 4
Garcia, Christopher	Natural Sciences	GO56	1:45PM	2:00PM	Monday, April 4
Geesin, Megan	Natural Sciences	GO57	2:00PM	2:15PM	Monday, April 4
Osunkwor, Offormata	Natural Sciences	GO61	2:15PM	2:30PM	Monday, April 4
Trackenberg, Stacy	Natural Sciences	GO62	2:30PM	2:45PM	Monday, April 4
Mendenhall, Todd	Natural Sciences	GO60	2:45PM	3:00PM	Monday, April 4
		BREAK	**3:00PM**	**3:15PM**	
Kirby, Nicholas	Natural Sciences	GO58	3:15PM	3:30PM	Monday, April 4
MacKay, Noah	Natural Sciences	GO59	3:30PM	3:45PM	Monday, April 4
Albright, Anna	Natural Sciences	GO53	3:45PM	4:00PM	Monday, April 4
Carver, Jonathan	Natural Sciences	GO54	4:00PM	4:15PM	Monday, April 4
Woodard, Nina	Natural Sciences	GO63	4:15PM	4:30PM	Monday, April 4
Kussman, Alexis	Natural Sciences	GO64	4:30PM	4:45PM	Monday, April 4

BALLROOM B

Earl, Briana	Fine Arts	GO26	9:00AM	9:15AM	Monday, April 4
Kim, Joogab	Fine Arts	GO27	9:15AM	9:30AM	Monday, April 4
Rhodes-Pruitt, John	Fine Arts	GO28	9:30AM	9:45AM	Monday, April 4
Scalamoni, Loraine	Fine Arts	GO29	9:45AM	10:00AM	Monday, April 4
Stanley, Haleigh	Fine Arts	GO30	10:00AM	10:15AM	Monday, April 4
Swan, Lindsay	Fine Arts	GO31	10:15AM	10:30AM	Monday, April 4
		BREAK	**10:30AM**	**10:45AM**	
Zichettella, Morgan	Fine Arts	GO32	10:45AM	11:00AM	Monday, April 4
Zidek, Christopher	Fine Arts	GO33	11:00AM	11:15AM	Monday, April 4
Bennett, Sina	Fine Arts	GO34	11:15AM	11:30AM	Monday, April 4
Graves, Karena	Fine Arts	GO35	11:30AM	11:45AM	Monday, April 4
Beblo, Julienne	Fine Arts	GO36	11:45AM	12:00PM	Monday, April 4
Booker, Emily	Fine Arts	GO37	12:00PM	12:15PM	Monday, April 4
		LUNCH	**12:15PM**	**1:30PM**	
Gaines, Michael	Fine Arts	GO38	1:30PM	1:45PM	Monday, April 4
Hall, Emily	Fine Arts	GO39	1:45PM	2:00PM	Monday, April 4
Prevette, Thaddeus	Fine Arts	GO40	2:00PM	2:15PM	Monday, April 4
Hesson, Nicholas	Fine Arts	GO41	2:15PM	2:30PM	Monday, April 4
Naimo, Anthony	Fine Arts	GO42	2:30PM	2:45PM	Monday, April 4
		BREAK	**2:45PM**	**3:00PM**	
Bullington-Miller, Jordan	Education	GO15	3:00PM	3:15PM	Monday, April 4
Dixon, Jocelyn	Education	GO16	3:15PM	3:30PM	Monday, April 4
Gordon, Julian	Education	GO17	3:30PM	3:45PM	Monday, April 4
Lucas, Deborah	Education	GO18	3:45PM	4:00PM	Monday, April 4
~~Panneton, Bruce~~	~~Education~~	~~GO19~~	~~4:00PM~~	~~4:15PM~~	~~Monday, April 4~~
Rohrbaugh, Joanna	Education	GO20	4:15PM	4:30PM	Monday, April 4
Webb, Rolie	Education	GO21	4:30Pm	4:45PM	Monday, April 4

ROOM 249

Amin, Mona	Human Health	GO43	8:30AM	8:45AM	Monday, April 4
Delgado, Kimberly	Human Health	GO44	8:45AM	9:00AM	Monday, April 4
Dunn, Monica	Human Health	GO45	9:00AM	9:15AM	Monday, April 4
Owusu, Nanaobaayaa	Human Health	GO46	9:15AM	9:30AM	Monday, April 4
Poythress, Haley	Human Health	GO47	9:30AM	9:45AM	Monday, April 4
Simpson, Kelsey	Human Health	GO48	9:45AM	10:00AM	Monday, April 4
Sorensen, Rachel	Human Health	GO49	10:00AM	10:15AM	Monday, April 4
Tahmasebifard, Neda	Human Health	GO50	10:15AM	10:30AM	Monday, April 4
Turner, Isiah	Human Health	GO51	10:30AM	10:45AM	Monday, April 4
White, Timothy	Human Health	GO52	10:45AM	11:00AM	Monday, April 4
		BREAK	**11:00AM**	**11:15AM**	
Carroll, Matthew	Engineering	GO22	11:15AM	11:30AM	Monday, April 4
Tapas, Mahesh	Engineering	GO23	11:30AM	11:45AM	Monday, April 4
Tso, Georgette	Engineering	GO24	11:45AM	12:00PM	Monday, April 4
Philips, James	Engineering	GO25	12:00PM	12:15PM	Monday, April 4
		LUNCH	**12:15PM**	**1:30PM**	
Cutler, Lauren	Social Sciences	GO65	1:30PM	1:45PM	Monday, April 4
Downs, Lydia	Social Sciences	GO66	1:45PM	2:00PM	Monday, April 4
Miller, Ashley	Social Sciences	GO67	2:00PM	2:15PM	Monday, April 4
Skinner, Trevor	Social Sciences	GO68	2:15PM	2:30PM	Monday, April 4
Xu, Yicheng	Social Sciences	GO69	2:30PM	2:45PM	Monday, April 4
Lowery, Daniel	Social Sciences	GO70	2:45PM	3:00PM	Monday, April 4
Wentzel, Lindsay	Social Sciences	GO71	3:00PM	3:15PM	Monday, April 4

Graduate Oral Presentation Index by Student Last Name

Monday April 4

Presenter Name	Number	Room	Start	End	Title
Albright, Anna	GO53	Ballroom A	3:45PM	4:00PM	Gradients in Success: Impact of wave energy and predation on oyster reef restoration
Amin, Mona	GO43	Rm 249	8:30AM	8:45AM	Impact of Race on Outcomes in Melanoma
Beblo, Julienne	GO36	Ballroom B	11:45AM	12:00PM	In the Studio to in situ : The potential use of clay to support marine growth
Belcher, Heather	GO1	Ballroom A	8:30AM	8:45AM	Evaluating the Use of Turbidimetry for Analyzing Fibrin Fibers
Belcher, Wesley	GO13	Ballroom A	12:00PM	12:15PM	Analysis on Different Selections of Fiducial's Centroids Lung Tumor Tracking Ability
Bennett, Sina	GO34	Ballroom B	11:15AM	11:30AM	Grounded
Booker, Emily	GO37	Ballroom B	12:00PM	12:15PM	The Art of Perception
Bullington-Miller, Jordan	GO15	Ballroom B	3:00PM	3:15PM	A Redefinition of Self: The Design, Implementation, and Impact of a Career Exploration Course for Students on Academic Probation
Bunner, Wyatt	GO2	Ballroom A	8:45AM	9:00AM	Identifying the roles of Rab10 signaling in the brain
Carroll, Matthew	GO22	Ballroom B	11:15AM	11:30AM	Simulation of Traffic Network Performance with Human driving and Autonomous Vehicles
Carver, Jonathan	GO54	Ballroom A	4:00PM	4:15PM	Metalloprotease Adamts9 is critical for the development and maintenance of ovarian follicles in zebrafish
Cutler, Lauren	GO65	Rm 249	1:30PM	1:45PM	Trauma-Informed Care: Can It Be Reliably Observed in Staff Working with Youth?
Delgado, Kimberly	GO44	Rm 249	8:45AM	9:00AM	Nursing Staff's Role in Detecting Urinary Tract Infection in Nursing Homes: An Integrative Review
Dixon, Jocelyn	GO16	Ballroom B	3:15PM	3:30PM	Connecting Kindergarten Readiness and Food-based Learning in the Head Start Preschool Classroom
Dorgham, Mohammed	GO3	Ballroom A	9:00AM	9:15AM	The Effects of m6A RNA Modifications on Breast Cancer Progression and EMT
Downs, Lydia	GO66	Rm 249	1:45PM	2:00PM	The Significance of a Dugout Canoe to People of the Past and Present
Driver, Robert	GO55	Ballroom A	1:30M	1:45PM	Olfactory receptor repertoire evolution during the radiation of birds
Dunn, Monica	GO45	Rm 249	9:00AM	9:15AM	The Impact of Race and Ethnic Identity on Body Dissatisfaction in College age Females
Earl, Briana	GO26	Ballroom B	9:00AM	9:15AM	Developing My Archive: On Being

Gaines, Michael	GO38	Ballroom B	1:30PM	1:45PM	Kodokushi: Ageing, Loneliness, and Death in the LGBTQ Community
Gajjar, Gita	GO12	Ballroom A	11:45AM	12:00PM	Two eIF4E isoforms regulate distinct mRNAs and affect one another in germ cells
Garcia, Christopher	GO56	Ballroom A	1:45PM	2:00PM	Laser and X-Ray Source Characterization for Optically Stimulated Luminescence
Geesin, Megan	GO57	Ballroom A	2:00PM	2:15PM	Assessing a novel, biodegradable oyster breakwater substrate's ability to reduce shoreline erosion and stimulate salt marsh expansion seaward
Gordon, Julian	GO17	Ballroom B	3:30PM	3:45PM	Instruction of Mass Casualty Assessment and Management with Simulation Based Learning is Beneficial to Graduate Health Science Students
Graves, Karena	GO35	Ballroom B	11:30AM	11:45AM	Fish Dreams
Hagen, James	GO4	Ballroom A	9:15AM	9:30AM	Leveraging intrinsic mitochondrial bioenergetics to target chemoresistant acute myeloid leukemia
Hall, Emily	GO39	Ballroom B	1:45PM	2:00PM	Information & Action Campaign on the Adverse Impact of Swine Concentrated Animal Feeding Operations in Eastern North Carolina
Hesson, Nicholas	GO41	Ballroom B	2:15PM	2:30PM	Immortalizing Vestiges of the Dead
Jaimes, Felicia	GO5	Ballroom A	9:30AM	9:45AM	Combating antibiotic resistance: Investigating the structure-function relationship of clinical mutations of Acinetobacter baumannii response regulator
Kim, Joogab	GO27	Ballroom B	9:15AM	9:30AM	Korean Onggi that confronts American circumstance regarding Clay body and Firing
Kirby, Nicholas	GO58	Ballroom A	3:15PM	3:30PM	Fabricating Rapid Transient Recombinant Expression and Affinity Chromatography Systems for Human Fibrinogen
Kussman, Alexis	GO64	Ballroom A	4:30PM	4:45PM	Analysis of a Combined Drain and Active-Pumping Stormwater Management System in a Coastal Aquifer Setting
Lowery, Daniel	GO70	Rm 249	2:45PM	3:00PM	Arrrchaeological Conservation: Preserving the Queen Anne's Revenge and Other Artifacts
Lucas, Deborah	GO18	Ballroom B	3:45PM	4:00PM	CHILDREN OF WAR: PREPARING MILITARY DEPENDENTS FOR HIGHER EDUCATION BY PROVIDING COMPREHENSIVE, FOCUSED SUPPORT TO IMPROVE EDUCATION OUTCOMES
MacKay, Noah	GO59	Ballroom A	3:30PM	3:45PM	The shear viscosity of quark-gluon plasma under anisotropic scatterings
Marie, Mona	GO6	Ballroom A	9:45AM	10:00AM	GPR4 promotes colitis associated colorectal cancer development

Mendenhall, Todd	GO60	Ballroom A	2:45PM	3:00PM	A semi-analytical method for calculating the QCD phase diagram trajectories of relativistic nuclear collisions
Miller, Ashley	GO67	Rm 249	2:00PM	2:15PM	Assessing North Carolina Pre-K Teachers' Perceived Preparedness to Work with Chronically Ill Children from Low-Income Communities
Minchew, Everett	GO7	Ballroom A	10:15AM	10:30AM	Hypoxia resistance is an inherent phenotype of the flexor digitorum brevis muscle.
Naimo, Anthony	GO42	Ballroom B	2:30PM	2:45PM	Trash Magic: A Wastelander's Guide to Collage
Nik Akhtar, Shayan	GO8	Ballroom A	10:45AM	11:00AM	SPATIAL DYSREGULATION OF RHO GTPASES IN ALZHEIMERS DISEASE BRAIN IN HUMAN AND IN TRANSGENIC MOUSE MODEL
Osunkwor, Offormata	GO61	Ballroom A	2:15PM	2:30PM	Safe havens and hotspots; ionizing radiation in Martian subsurface and its influence on the survival of ancient life
Owusu, Nanaobaayaa	GO46	Rm 249	9:15AM	9:30AM	Solar Ultraviolet (UV) Radiation Exposure in Outdoor Working Environment During Cold Months
Panneton, Bruce	GO19	Ballroom B	4:00PM	4:15PM	TARGETED MARKETING TO THE UNDERSERVED: EXAMINING THE FACTORS THAT INFLUENCE COLLEGE INTENT AND CHOICE FOR MINORITY MALE HIGH SCHOOL STUDENTS IN EDGECOMBE COUNTY, NORTH CAROLINA
Philips, James	GO25	Ballroom B	12:00PM	12:15PM	Bibliographic Reference Classification in Archival Data using Supervised Machine Learning and Grammatical Features
Poythress, Haley	GO47	Rm 249	9:30AM	9:45AM	The Use of Visual Supports for Individuals with Autism Spectrum Disorder: Can Visual Supports Improve Driving Performance?
Prevette, Thaddeus	GO40	Ballroom B	2:00PM	2:15PM	The Story of Ayon: A Sculptural Monomyth
Rhodes-Pruitt, John	GO28	Ballroom B	9:30AM	9:45AM	Information-Media the Transference of Information
Rohrbaugh, Joanna	GO20	Ballroom B	4:15PM	4:30PM	Beyond Sacred Stacks : interactive wellness initiatives in open academic and medical library spaces and students' role in supporting each other's emotional and spiritual wellbeing
Salem, Fatema	GO14	Ballroom A	12:15PM	12:30PM	The Effect of Lactate and Protons on Normal and Transformed Cells
Satterwhite, Emily	GO9	Ballroom A	11:00AM	11:15AM	RNA Methyltransferase METTL16s Effect on Cell Cycle
Scalamoni, Loraine	GO29	Ballroom B	9:45AM	10:00AM	Young Love and the Dichotomy of Innocence, Joy and Pain
Schaub, Mandee	GO10	Ballroom A	11:15AM	11:30AM	Central Sensorimotor Changes After Peripheral Nerve Injury: Effects of Adjuvant Treatment with Dopaminergics and Morphine

Simpson, Kelsey	GO48	Rm 249	9:45AM	10:00AM	SOUL Food Study: Sistas Fighting Overweight and Obesity Diseases
Skinner, Trevor	GO68	Rm 249	2:15PM	2:30PM	An analysis of the relationship between occupational category and workplace aggression: Workaholism as a potential moderator
Sorensen, Rachel	GO49	Rm 249	10:00AM	10:15AM	Feasibility and Usability of a Virtual Reality System for Children with Cerebral Palsy (CP)
Stanley, Haleigh	GO30	Ballroom B	10:00AM	10:15AM	Coping with Separation and Loss: Life Without My Twin Sister
Swan, Lindsay	GO31	Ballroom B	10:15AM	10:30AM	A Process for Healing
Tahmasebifard, Neda	GO50	Rm 249	10:15AM	10:30AM	Attributes that Increase Vulnerabilities to Reduced Human Milk Feeding Outcomes Among Babies with Cleft Lip and Palate Admitted to the NICU
Tapas, Mahesh	GO23	Ballroom B	11:30AM	11:45AM	To Develop a Hydrological Model for Eastern North Carolina
Theobald, Drew	GO11	Ballroom A	11:30AM	11:45AM	Kinin B1 receptor blockade prevents hydrogen peroxide-induced oxidative stress in primary hypothalamic neurons
Trackenberg, Stacy	GO62	Ballroom A	2:30PM	2:45PM	Assessing faunal community composition in newly restored seagrass beds across a depth gradient
Tso, Georgette	GO24	Ballroom B	11:45AM	12:00PM	Wave attenuation across high-relief and low-relief oyster reef breakwaters constructed in a narrow tidal creek
Turner, Isiah	GO51	Rm 249	10:30AM	10:45AM	Python Script for Overarm Motion Analysis Using 3D Motion Capture Data
Webb, Rolie	GO21	Ballroom B	4:30Pm	4:45PM	EXAMINING THE IMPACT OF IMPLEMENTING EFFECTIVE ONBOARDING ON BEGINNING TEACHER AND NEW HIRE TURNOVER IN A TITLE I ELEMENTARY SCHOOL
Wentzel, Lindsay	GO71	Rm 249	3:00PM	3:15PM	Plum Pudding in Provincetown: Investigation of Historic Whaling Operations of E.E.K. Cook Co. (1837-1879)
White, Timothy	GO52	Rm 249	10:45AM	11:00AM	Comparison of Traditional Versus Non-Traditional Distance Education Students' Motives for Engaging in Physical Activity
Woodard, Nina	GO63	Ballroom A	4:15PM	4:30PM	Borrowing ecological principles: Influence of Substrate Orientation on Free-Living and Parasite Diversity
Xu, Yicheng	GO69	Rm 249	2:30PM	2:45PM	Assessing nuisance flooding risks and green infrastructure in Charleston Peninsula
Zichettella, Morgan	GO32	Ballroom B	10:45AM	11:00AM	River Rat
Zidek, Christopher	GO33	Ballroom B	11:00AM	11:15AM	A Shift in Process: Traditional Painting Applications with Integrated Technology

Graduate Poster Presentations by Category

ON SYMPOSIUM AT https://symposium.foragerone.com/rcaw2022/presentations

PRESENTER	CATEGORY_1	Number	Start	End	Date
Byrum, Rachel	Biomedical Sciences	GP01	01:00PM	02:00PM	Monday, April 4
Cooper, John	Biomedical Sciences	GP02	01:00PM	02:00PM	Monday, April 4
Hampton, Joseph	Biomedical Sciences	GP03	01:00PM	02:00PM	Monday, April 4
Kanber, Mohammad	Biomedical Sciences	GP04	01:00PM	02:00PM	Monday, April 4
Pallas, Wrenn	Biomedical Sciences	GP05	01:00PM	02:00PM	Monday, April 4
Sabu, Stephiya	Biomedical Sciences	GP06	01:00PM	02:00PM	Monday, April 4
Williams, Jordan	Biomedical Sciences	GP07	01:00PM	02:00PM	Monday, April 4
Boykov, Ilya	Biomedical Sciences	GP08	02:00PM	03:00PM	Monday, April 4
Aryal, Makunda	Biomedical Sciences	GP09	02:00PM	03:00PM	Monday, April 4
Bhandari, Shiva	Biomedical Sciences	GP10	02:00PM	03:00PM	Monday, April 4
Cribb, Connor	Biomedical Sciences	GP11	02:00PM	03:00PM	Monday, April 4
Hopersberger, Dariel	Biomedical Sciences	GP12	02:00PM	03:00PM	Monday, April 4
Jones, Mariah	Biomedical Sciences	GP13	02:00PM	03:00PM	Monday, April 4
Jones, Zachary	Biomedical Sciences	GP14	02:00PM	03:00PM	Monday, April 4
Montgomery, Mclane	Biomedical Sciences	GP15	03:00PM	04:00PM	Monday, April 4
Park, Youngyong	Biomedical Sciences	GP16	03:00PM	04:00PM	Monday, April 4
Pinaire, Alexander	Biomedical Sciences	GP17	03:00PM	04:00PM	Monday, April 4
Ross, Mason	Biomedical Sciences	GP18	03:00PM	04:00PM	Monday, April 4
Ubah, Chukwudi	Biomedical Sciences	GP20	03:00PM	04:00PM	Monday, April 4
Elangovan, Aravind	Biomedical Sciences	GP21	03:00PM	04:00PM	Monday, April 4
Alexander, Samantha	Education	GP22	09:00AM	10:00AM	Monday, April 4
Duckworth, Holly	Education	GP25	09:00AM	10:00AM	Monday, April 4
Geistman, Kayla	Education	GP27	09:00AM	10:00AM	Monday, April 4
Jain, Nupur	Education	GP38	01:00PM	02:00pm	Monday, April 4
Etheridge, Jason	Education	GP39	01:00PM	02:00pm	Monday, April 4
Hinton, Tiffany	Education	GP41	01:00PM	02:00pm	Monday, April 4
Jackson, Trisha	Education	GP42	01:00PM	02:00pm	Monday, April 4
Shivar, Ashley	Education	GP43	01:00PM	02:00pm	Monday, April 4

ON SYMPOSIUM AT https://symposium.foragerone.com/rcaw2022/presentations

PRESENTER	CATEGORY_1	Number	Start	End	Date
Stroud, Dusk	Education	GP44	01:00PM	02:00pm	Monday, April 4
Gilmore, Charles	Education	GP46	01:00PM	02:00pm	Monday, April 4
Arthur, Jessica	Education	GP23	04:00PM	04:45PM	Monday, April 4
Fletcher, Tiffany	Education	GP26	04:00PM	04:45PM	Monday, April 4
Haigler, Chrystal	Education	GP28	04:00PM	04:45PM	Monday, April 4
Labbe, Katie	Education	GP29	04:00PM	04:45PM	Monday, April 4
Lambert, Jennifer	Education	GP30	04:00PM	04:45PM	Monday, April 4
McComb, Ruthann	Education	GP31	04:00PM	04:45PM	Monday, April 4
Diehl, Kristen	Education	GP24	04:45PM	05:15PM	Monday, April 4
Parker, Freda	Education	GP32	04:45PM	05:15PM	Monday, April 4
Seymour, Sarah	Education	GP33	04:45PM	05:15PM	Monday, April 4
Sowers, Mattie	Education	GP34	04:45PM	05:15PM	Monday, April 4
Van Noske, Theresa	Education	GP35	04:45PM	05:15PM	Monday, April 4
McCray, Christina	Education	GP36	04:45PM	05:15PM	Monday, April 4
Parish, Myranda	Education	GP37	04:45PM	05:15PM	Monday, April 4
Acero Molina, Andres Leonardo	Engineering	GP47	01:00PM	02:00pm	Monday, April 4
Dimbath, Elizabeth	Engineering	GP48	01:00PM	02:00pm	Monday, April 4
Harr, David	Engineering	GP49	01:00PM	02:00pm	Monday, April 4
Middleton, Shea	Engineering	GP50	01:00PM	02:00pm	Monday, April 4
Rahat, Md. Hasibul Hasan	Engineering	GP51	01:00PM	02:00pm	Monday, April 4
Wheeler, Mackenzie	Engineering	GP52	01:00PM	02:00pm	Monday, April 4
Johnsen, Christine	Human Health	GP53	03:00PM	04:00PM	Monday, April 4
Michaud, Kenneth	Human Health	GP54	03:00PM	04:00PM	Monday, April 4
Williams, Belle	Human Health	GP55	03:00PM	04:00PM	Monday, April 4
Mitchum, Emily	Human Health	GP56	03:00PM	04:00PM	Monday, April 4
Knowles, Caroline	Human Health	GP57	03:00PM	04:00PM	Monday, April 4
Wilson, Mary Hannah	Human Health	GP58	03:00PM	04:00PM	Monday, April 4
Sivadanam, Supriya	Human Health	GP59	04:00PM	05:00PM	Monday, April 4
Gilbert, Imani	Human Health	GP60	04:00PM	05:00PM	Monday, April 4
Nelson, Taylor	Human Health	GP61	04:00PM	05:00PM	Monday, April 4

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PRESENTER	CATEGORY_1	Number	Start	End	Date
Rouse, Lesha	Human Health	GP62	04:00PM	05:00PM	Monday, April 4
Schleif, Eshan	Human Health	GP63	04:00PM	05:00PM	Monday, April 4
Snodgrass, Taylor	Human Health	GP64	04:00PM	05:00PM	Monday, April 4
Willard, Samantha	Human Health	GP65	04:00PM	05:00PM	Monday, April 4
Carvajal, Pablo	Natural Sciences	GP66	09:00AM	10:00AM	Monday, April 4
Easterling, Elise	Natural Sciences	GP67	09:00AM	10:00AM	Monday, April 4
Hagemeier, Haley	Natural Sciences	GP68	09:00AM	10:00AM	Monday, April 4
Nichols, Quentin	Natural Sciences	GP69	09:00AM	10:00AM	Monday, April 4
Snedeker, Marcus	Natural Sciences	GP70	09:00AM	10:00AM	Monday, April 4
Cone, Bridget	Social Sciences	GP71	09:00AM	10:00AM	Monday, April 4
Frey, Kaitlin	Social Sciences	GP72	09:00AM	10:00AM	Monday, April 4
Garas, Lydia	Social Sciences	GP73	09:00AM	10:00AM	Monday, April 4
Jones, Shawn	Social Sciences	GP74	09:00AM	10:00AM	Monday, April 4
Stewart, Jalynn	Social Sciences	GP75	09:00AM	10:00AM	Monday, April 4
Waters, Brianna	Social Sciences	GP76	10:00AM	11:00AM	Monday, April 4
Congema, Marianne	Social Sciences	GP77	10:00AM	11:00AM	Monday, April 4
Lee, Miranda	Social Sciences	GP78	10:00AM	11:00AM	Monday, April 4
Broadway, Clayton	Social Sciences	GP79	10:00AM	11:00AM	Monday, April 4
Johnson, Angela	Social Sciences	GP80	10:00AM	11:00AM	Monday, April 4
Ruiz, Michelle	Social Sciences	GP81	10:00AM	11:00AM	Monday, April 4
Abrams, Alicia	Technology and Computer Sciences	GP82	02:00PM	03:00PM	Monday, April 4
Mehta, Ashwinee	Technology and Computer Sciences	GP83	02:00PM	03:00PM	Monday, April 4
Navaei, Maryam	Technology and Computer Sciences	GP84	02:00PM	03:00PM	Monday, April 4
Rezaei, Mehrdad	Technology and Computer Sciences	GP85	02:00PM	03:00PM	Monday, April 4
Chivela, Fernando	Technology and Computer Sciences	GP86	02:00PM	03:00PM	Monday, April 4

Graduate Poster Index by Student Last Name

Monday April 4

ON SYMPOSIUM AT https://symposium.foragerone.com/rcaw2022/presentations				
Presenter Name	Number	Start	End	Title
Abrams, Alicia	GP82	02:00PM	03:00PM	Expanding the Galaxy Universe of CartograPlant
Acero Molina, Andres Leonardo	GP47	01:00PM	02:00pm	A Review of Literature in UAV Research on Construction Management: 2016-2021
Alexander, Samantha	GP22	09:00AM	10:00AM	Happy Handwriting: The Effectiveness of Virtual Handwriting Instruction
Arthur, Jessica	GP23	09:00AM	10:00AM	The Effectiveness of Games in Learning Chemical Nomenclature
Aryal, Makunda	GP09	02:00PM	03:00PM	Vacuum Enhancement Raman Scattering
Bhandari, Shiva	GP10	02:00PM	03:00PM	Estimation of elastostatic forces in lungs and its application in radiotherapy
Boykov, Ilya	GP08	02:00PM	03:00PM	In situ quantification of mitochondrial bioenergetics reveals disparate OXPHOS kinetics between mouse colorectal cancer cells and healthy tissues
Broadway, Clayton	GP79	10:00AM	11:00AM	B Sweet Social Media
Byrum, Rachel	GP01	01:00PM	02:00PM	Serum Renin-Angiotensin System Biomarkers in (mRen2)27 transgenic form of Hypertension
Carvajal, Pablo	GP66	09:00AM	10:00AM	Media Response to Outbreaks of Zika and Dengue in the United States: Can Health Education via Social Media be Improved to Protect Public Health?
Chivela, Fernando	GP86	02:00PM	03:00PM	Analysis of Patient Portal Utilization in an Academic Medical Center: A Retrospective Study
Cone, Bridget	GP71	09:00AM	10:00AM	Urban-rural homogeneity in morbidity and mortality throughout the life course in the southeastern U.S
Congema, Marianne	GP77	10:00AM	11:00AM	Hydrotherapy Use and Maternal-Infant Outcomes
Cooper, John	GP02	01:00PM	02:00PM	ND-PEGylated Star-Like Magnetic Nanoparticles As Magneto-Mechanical Actuators to Treat
Cribb, Connor	GP11	02:00PM	03:00PM	Is CuxR the missing link between CdG signaling and Brucella virulence?
Diehl, Kristen	GP24	09:00AM	10:00AM	The Introduction of Scientific Argumentation Will Develop Students' Critical Thinking Skills as Related to Ethical Issues surrounding a National DNA database

Dimbath, Elizabeth	GP48	01:00PM	02:00pm	Reconciling the Mechanical Properties of Lung Tissue using Computational Modeling
Duckworth, Holly	GP25	09:00AM	10:00AM	Middle School Student' s Social Media Use Leading to Detention
Easterling, Elise	GP67	09:00AM	10:00AM	Quantifying the contributions of mesopelagic fishes to the biological pump in the North Pacific Subtropical Gyre using stable isotope techniques
Elangovan, Aravind	GP21	03:00PM	04:00PM	Managing fiducial shadowing during Cyberknife treatments
Etheridge, Jason	GP39	01:00PM	02:00pm	Why di they stay?: Capturing Student Voice to Identify Best Retention Practices on an HBCU Campus
Fletcher, Tiffany	GP26	09:00AM	10:00AM	Citizen Science: Changing Student' s Understanding of Data Collection, Interpretation and Analysis
Frey, Kaitlin	GP72	09:00AM	10:00AM	Utilizing Photovoice to Help Students Understand and Reflect on the Impact of COVID-19
Garas, Lydia	GP73	09:00AM	10:00AM	Motivational drivers of Heavy Work Investment: Intercultural comparison between USA and Middle East
Geistman, Kayla	GP27	09:00AM	10:00AM	Stress and Coping in Education: Implications for the Covid-19 Pandemic and Beyond
Gilbert, Imani	GP60	04:00PM	05:00PM	Using 3D Dynamic Magnetic Resonance Imaging To Describe Velopharyngeal Function in Healthy Adults
Gilmore, Charles	GP46	01:00PM	02:00pm	PROVIDING TRANSFER STUDENT CAPITAL TO VERTICAL TRANSFER-TRACK STUDENTS IN A STUDENT SUCCESS COURSE: AN ACTION RESEARCH STUDY
Gonyea, Jennifer	GP40	01:00PM	02:00pm	Learning a Trade: Increasing Success Rates of African American Males in Gateway English and Math Courses in Trade Programs at Wilson Community College
Hagemeier, Haley	GP68	09:00AM	10:00AM	Parasite Diversity in the Invasive Asian shorecrab, Hemigrapsus sanguineus , on the Eastern Coast of the United States
Haigler, Chrystal	GP28	09:00AM	10:00AM	Teacher Perceptions on Elementary Science Instruction and Perceived Barriers to Instruction
Hampton, Joseph	GP03	01:00PM	02:00PM	Optimization of Nanoparticle-GelMA Hydrogels for Endodontic Restorative Application
Harr, David	GP49	01:00PM	02:00pm	Increasing Creative Output by Visually Enhancing Engineering Design Tools
Hinton, Tiffany	GP41	01:00PM	02:00pm	Becoming A Better Ally: Improving the Social Experiences of Lesbian, Gay, Bisexual, Transgender, and Queer students at an Historically Black Institution in Northeastern North Carolina
Hopersberger, Dariel	GP12	02:00PM	03:00PM	An Uncharacterized Exopolysaccharide is Linked to Brucella Virulence

Jackson, Trisha	GP42	01:00PM	02:00pm	STRENGTHENING MENTORING: FACILITATING RELATIONSHIP BUILDING BETWEEN LOW-INCOME AND FIRST-GENERATION STUDENTS AND FACULTY AND STAFF MENTORS AT A LAND GRANT UNIVERSITY
Jain, Nupur	GP38	01:00PM	02:00pm	Utilizing Art as an Educational Tool to Discuss Healthy Relationships With Children and Adolescents
Johnsen, Christine	GP53	03:00PM	04:00PM	Is a 6-week in-person program effective for improving handwriting legibility, speed, and self-percpetion for 6-7 year-old students?
Johnson, Angela	GP80	10:00AM	11:00AM	Enhancing Ethnic and Racial Diversity and Inclusion in Theses and Dissertations in Clinical Psychology Doctoral Programs
Jones, Mariah	GP13	02:00PM	03:00PM	PUF-9/Pumilio and G2/M cell cycle regulators suppress GLP-1/Notch signaling-mediated tumorigenesis in C. elegans.
Jones, Shawn	GP74	09:00AM	10:00AM	The Tar-Pamlico River Basin Blue Economy Corridor
Jones, Zachary	GP14	02:00PM	03:00PM	Spectrophotometric study of turbid and artery phantoms for modeling of photoplethysmography process
Kanber, Mohammad	GP04	01:00PM	02:00PM	Magnetic Control of the Endolthelium Permeability via Magneto-Mechanical Actuation using Iron Oxide Nanoparticles
Knowles, Caroline	GP57	03:00PM	04:00PM	Food packaging decontamination with novel nano-antimicrobial
Labbe, Katie	GP29	09:00AM	10:00AM	Factoring motivation in escape rooms for middle school Science students.
Lambert, Jennifer	GP30	10:00AM	11:00AM	The Effect of Learning Science Outdoors on Motivation in Fourth Graders
Lee, Miranda	GP78	10:00AM	11:00AM	A Safe Place Online: The Case Study of @Curvy.
McComb, Ruthann	GP31	10:00AM	11:00AM	PBL and Plate Tectonics: How will the effects of project based learning on a traditional high school plate tectonics unit address student misconceptions and inform student attitudes about science?
McCray, Christina	GP36	10:00AM	11:00AM	African American students in Honors level Science classes
Mehta, Ashwinee	GP83	02:00PM	03:00PM	Automated Dental Aesthetics with Machine Learning
Michaud, Kenneth	GP54	03:00PM	04:00PM	Risk Assessment Need for Japanese Encephalitis Virus in Hog Farms in North Carolina
Middleton, Shea	GP50	01:00PM	02:00pm	Efficient Semi-Automatic Workflows for Segmenting the Lung Lobes and Lesions in CT Images of COVID-19 Patients: Application to Full Inspiration and Full Expiration
Mitchum, Emily	GP56	03:00PM	04:00PM	The Relationship Between IADL and Naturalistic Driving Performance: Indications for Mild Cognitive Impairment Detection
Montgomery, Mclane	GP15	03:00PM	04:00PM	Optimized protocol for the isolation and bioenergetic phenotyping of mouse colon mitochondria.

Navaei, Maryam	GP84	02:00PM	03:00PM	Machine Learning in Software Development Life Cycle: A Comprehensive Review
Nelson, Taylor	GP61	04:00PM	05:00PM	Mental Health and Feeding Styles in Parents of Formula-Fed Infants
Nichols, Quentin	GP69	09:00AM	10:00AM	Striped Bass Egg Survey Shows Similar Modes of Variability with Different Sampling Schedules
Pallas, Wrenn	GP05	01:00PM	02:00PM	High glucose increases apoptosis and decreases nerve growth promoting survival of sympathetic pelvic neurons.
Parish, Myranda	GP37	10:00AM	11:00AM	Impact of Lexia Core 5 on the Comprehension of Plant Life Cycle in Kindergarten
Park, Youngyong	GP16	03:00PM	04:00PM	Genetic and chemical control of the differentiation/dedifferentiation decision in C. elegans germline
Parker, Freda	GP32	10:00AM	11:00AM	Self-Regulated Learning in a Flipped Classroom
Pinaire, Alexander	GP17	03:00PM	04:00PM	Morphology based Diffraction Imaging Study of Apoptosis in MCF-7 Cells
Rahat, Md. Hasibul Hasan	GP51	01:00PM	02:00pm	Convert Single-Use Mask to a Modifier to Improve Asphalt Pavement Rutting Resistance
Rezaei, Mehrdad	GP85	02:00PM	03:00PM	Recommender systems using reinforcement learning algorithm
Ross, Mason	GP18	03:00PM	04:00PM	Dual Modality Ion Trapping for Single Charged Microparticles
Rouse, Lesha	GP62	04:00PM	05:00PM	Exploring the School Nurse's Knowledge, Experiences and Role in Trauma-Informed Care: Implications for School Nurse Practice.
Ruiz, Michelle	GP81	10:00AM	11:00AM	Acculturation and Acculturative Discrepancies among Latinas
Sabu, Stephiya	GP06	01:00PM	02:00PM	Understanding inhibitory efficacy of novel nanobubbles and nanoparticles against nosocomial infections
Schleif, Eshan	GP63	04:00PM	05:00PM	Examining Effective Velopharyngeal Ratio in Healthy Children using Magnetic Resonance Imaging
Seals, Nathaniel	GP19	03:00PM	04:00PM	Unraveling the role of multiple neuraminidases involved in sialylated glycan utilization by Bacteroides fragilis for in vivo survival
Seymour, Sarah	GP33	10:00AM	11:00AM	Student Attitude about Social-Emotional Learning
Shivar, Ashley	GP43	01:00PM	02:00pm	We Are Not Eighteen: Welcoming Non-traditional Students On Campus
Sivadanam, Supriya	GP59	04:00PM	05:00PM	The Effect of Early Use of Hydrocortisone on the Prevention of Bronchopulmonary Dysplasia in Preterm Neonates
Snedeker, Marcus	GP70	09:00AM	10:00AM	Thesis Origins: Investigating OSL and Potential Related Project Ideas

Snodgrass, Taylor	GP64	04:00PM	05:00PM	Non-Governmental Organizations Involved in Global Cleft Care: Impact of COVID-19
Sowers, Mattie	GP34	10:00AM	11:00AM	Perceptions of Virtual Simulations
Stewart, Jalynn	GP75	09:00AM	10:00AM	Mortuary Archaeology of the 19th to 20th century Rhem Family Vault in New Bern, North Carolina
Stroud, Dusk	GP44	01:00PM	02:00pm	FACE THE FACTS: IDENTIFYING POTENTIAL SOCIOECONOMIC BARRIERS THAT IMPACT SUCCESS FOR STUDENTS ENROLLED AT LENOIR COMMUNITY COLLEGE.
Tyndall, Krystal	GP45	01:00PM	02:00pm	A SENSE OF BELONGING: EXAMINING THE IMPACT OF A SOCIAL EMOTIONAL FRAMEWORK ON STUDENT CONNECTEDNESS WITH SIXTH-GRADE MALES
Ubah, Chukwudi	GP20	03:00PM	04:00PM	Addressing hospital associated infections with novel nano-antimicrobial.
Van Noske, Theresa	GP35	10:00AM	11:00AM	Evaluating the Impact of Modified Problem Based Learning on Low-Achieving Students
Waters, Brianna	GP76	10:00AM	11:00AM	Ghosting: Reasons from the Ghoster and Reactions from the Ghosted
Wheeler, Mackenzie	GP52	01:00PM	02:00pm	Mechanical Failure of Human Fetal Membrane Tissues in Premature Birth
Willard, Samantha	GP65	04:00PM	05:00PM	Early Ambulation Among Persons Following aSurgical Procedure in Eastern North Carolina
Williams, Belle	GP55	03:00PM	04:00PM	Effects of Gender Stereotypes on Club Sports Participation
Williams, Jordan	GP07	01:00PM	02:00PM	Toward mitigating nosocomial infections with surface functionalized nano-antibacterial agent.
Wilson, Mary Hannah	GP58	03:00PM	04:00PM	Intravelar and Extravelar Length Following Palatal Re-repair: A Comparison of the Furlow Double-Opposing Z-plasty and Buccal Myomucosal Flaps

Presentations can be accessed on

https://symposium.foragerone.com/rcaw2022/presentations

Undergraduate Poster Presentations by Category

ON SYMPOSIUM AT https://symposium.foragerone.com/rcaw2022/presentations

PRESENTER	CATEGORY	Number	Start	End	Date
Amin, Paree	Biomedical Sciences	UP001	09:00AM	10:00AM	Wed., April 6
Coalson, Hannah	Biomedical Sciences	UP002	09:00AM	10:00AM	Wed., April 6
Czika, Wesley	Biomedical Sciences	UP003	09:00AM	10:00AM	Wed., April 6
Elberfeld, Lauren	Biomedical Sciences	UP004	09:00AM	10:00AM	Wed., April 6
Hardeman, Jordan	Biomedical Sciences	UP005	09:00AM	10:00AM	Wed., April 6
Jefferson, Brittany	Biomedical Sciences	UP006	09:00AM	10:00AM	Wed., April 6
Monroe, Emily	Biomedical Sciences	UP007	10:00AM	11:00AM	Wed., April 6
Phipps, Mary	Biomedical Sciences	UP008	10:00AM	11:00AM	Wed., April 6
Puthuparampil, Joyel	Biomedical Sciences	UP009	10:00AM	11:00AM	Wed., April 6
Schulz, Anna	Biomedical Sciences	UP010	10:00AM	11:00AM	Wed., April 6
Shelat, Ishani	Biomedical Sciences	UP011	10:00AM	11:00AM	Wed., April 6
Sholar, Molli	Biomedical Sciences	UP012	10:00AM	11:00AM	Wed., April 6
Slade, Raven	Biomedical Sciences	UP013	11:00AM	12:00PM	Wed., April 6
Teague, Steven	Biomedical Sciences	UP014	11:00AM	12:00PM	Wed., April 6
Whitley, McKenzie	Biomedical Sciences	UP015	11:00AM	12:00PM	Wed., April 6
Willis, Thomas	Biomedical Sciences	UP016	11:00AM	12:00PM	Wed., April 6
Hollowell, Wallace	Biomedical Sciences	UP017	11:00AM	12:00PM	Wed., April 6
Juhl, Benjamin	Biomedical Sciences	UP018	11:00AM	12:00PM	Wed., April 6
Jung, Lauren	Biomedical Sciences	UP019	11:00AM	12:00PM	Wed., April 6
Clavijo, Abigail	Community Engagement	UP020	04:00PM	05:00PM	Wed., April 6
Hendrix, Khadijah	Community Engagement	UP021	04:00PM	05:00PM	Wed., April 6
Haynes, Hannah	Community Engagement	UP022	04:00PM	05:00PM	Wed., April 6
Felts, Jenna	Community Engagement	UP023	04:00PM	05:00PM	Wed., April 6
Baker, Erin	Education	UP024	03:00PM	04:00PM	Wed., April 6
Banister, Willaya	Education	UP025	03:00PM	04:00PM	Wed., April 6
Byrd, John	Education	UP026	03:00PM	04:00PM	Wed., April 6

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PRESENTER	CATEGORY	Number	Start	End	Date
Clevenger, Lindsey	Education	UP027	03:00PM	04:00PM	Wed., April 6
Dixon, Hannah	Education	UP028	03:00PM	04:00PM	Wed., April 6
Linder, Kayleigh	Education	UP029	04:00PM	05:00PM	Wed., April 6
McCoy, Ava	Education	UP030	04:00PM	05:00PM	Wed., April 6
McKinney, Katelyn	Education	UP031	04:00PM	05:00PM	Wed., April 6
Reed, Elisabeth	Education	UP032	04:00PM	05:00PM	Wed., April 6
Ha, Joseph	Engineering	UP033	10:00AM	11:00AM	Wed., April 6
Jacobson, Grace	Engineering	UP034	10:00AM	11:00AM	Wed., April 6
Paul, Elliot	Engineering	UP035	10:00AM	11:00AM	Wed., April 6
Peele, Wyatt	Engineering	UP036	10:00AM	11:00AM	Wed., April 6
Southern, Kaitlin	Engineering	UP037	10:00AM	11:00AM	Wed., April 6
Sowers, Hannah	Engineering	UP038	11:00AM	12:00PM	Wed., April 6
Warren, Leah	Engineering	UP039	11:00AM	12:00PM	Wed., April 6
Drummond, Deja	Engineering	UP040	11:00AM	12:00PM	Wed., April 6
Vose, Avery	Engineering	UP041	11:00AM	12:00PM	Wed., April 6
Beebe, Katja	Fine Arts	UP042	03:00PM	04:00PM	Wed., April 6
Ferretiz, Alejandra	Fine Arts	UP043	03:00PM	04:00PM	Wed., April 6
Hall, Skyler	Fine Arts	UP044	03:00PM	04:00PM	Wed., April 6
Hock, Jordan	Fine Arts	UP045	03:00PM	04:00PM	Wed., April 6
Pope, Raley	Fine Arts	UP046	03:00PM	04:00PM	Wed., April 6
Vaughn, Rachel	Fine Arts	UP047	03:00PM	04:00PM	Wed., April 6
Wattenbarger, Josiah	Fine Arts	UP048	03:00PM	04:00PM	Wed., April 6
Deatherage, Isabella	Fine Arts	UP049	03:00PM	04:00PM	Wed., April 6
Berry, Madison	Human Health	UP050	01:00PM	02:00PM	Wed., April 6
Chichester, Zachary	Human Health	UP051	01:00PM	02:00PM	Wed., April 6
Cunningham, Ava	Human Health	UP052	01:00PM	02:00PM	Wed., April 6
Gogineni, Anish	Human Health	UP053	01:00PM	02:00PM	Wed., April 6
Johansen, Lauren	Human Health	UP054	01:00PM	02:00PM	Wed., April 6
March, Sarah	Human Health	UP055	01:00PM	02:00PM	Wed., April 6
Mooring, Ronald	Human Health	UP056	01:00PM	02:00PM	Wed., April 6
Morgan, Anna	Human Health	UP057	02:00PM	03:00PM	Wed., April 6

ON SYMPOSIUM AT https://symposium.foragerone.com/rcaw2022/presentations

PRESENTER	CATEGORY	Number	Start	End	Date
Shepherd, Morgan	Human Health	UP058	02:00PM	03:00PM	Wed., April 6
Tharmar, Aparna	Human Health	UP059	02:00PM	03:00PM	Wed., April 6
Tiet, Alex	Human Health	UP060	02:00PM	03:00PM	Wed., April 6
Watkins, Rachel	Human Health	UP061	02:00PM	03:00PM	Wed., April 6
Williams, Savanna	Human Health	UP062	02:00PM	03:00PM	Wed., April 6
Wilson, Avery	Human Health	UP063	02:00PM	03:00PM	Wed., April 6
Mansfield, Payne	Humanities	UP064	09:00AM	10:00AM	Wed., April 6
Morrison, Mikenna	Humanities	UP065	09:00AM	10:00AM	Wed., April 6
Riddick-Cherry, Imani	Humanities	UP066	09:00AM	10:00AM	Wed., April 6
Mullis, Justin	Humanities	UP067	09:00AM	10:00AM	Wed., April 6
Dickerson, Joseph	Interdisciplinary Innovation	UP068	09:00AM	10:00AM	Wed., April 6
Ferro, Alexis	Interdisciplinary Innovation	UP069	09:00AM	10:00AM	Wed., April 6
Mauzy, Heather	Interdisciplinary Innovation	UP070	09:00AM	10:00AM	Wed., April 6
Pigg, Hunter	Interdisciplinary Innovation	UP071	09:00AM	10:00AM	Wed., April 6
Aceituno, Derek	Natural Sciences	UP072	10:00AM	11:00AM	Wed., April 6
Butts, Cooper	Natural Sciences	UP073	10:00AM	11:00AM	Wed., April 6
Costa, Hannah	Natural Sciences	UP074	10:00AM	11:00AM	Wed., April 6
Davis, Julie	Natural Sciences	UP075	10:00AM	11:00AM	Wed., April 6
Fulcher, Jennifer	Natural Sciences	UP076	10:00AM	11:00AM	Wed., April 6
Gill, Surinder	Natural Sciences	UP077	10:00AM	11:00AM	Wed., April 6
Gorman, Rebekah	Natural Sciences	UP078	11:00AM	12:00PM	Wed., April 6
Hill, Madison	Natural Sciences	UP079	11:00AM	12:00PM	Wed., April 6
Ifill, Kyle	Natural Sciences	UP080	11:00AM	12:00PM	Wed., April 6
Martinez-Santoyo, Ivan	Natural Sciences	UP081	11:00AM	12:00PM	Wed., April 6
Moss, Nona	Natural Sciences	UP082	11:00AM	12:00PM	Wed., April 6
Roye, Catarina	Natural Sciences	UP083	11:00AM	12:00PM	Wed., April 6
Salazar, Brianna	Natural Sciences	UP084	01:00PM	02:00PM	Wed., April 6
Shah, Param	Natural Sciences	UP085	01:00PM	02:00PM	Wed., April 6

ON SYMPOSIUM AT https://symposium.foragerone.com/rcaw2022/presentations

PRESENTER	CATEGORY	Number	Start	End	Date
Shah, Shivam	Natural Sciences	UP086	01:00PM	02:00PM	Wed., April 6
Shields, Agne	Natural Sciences	UP087	01:00PM	02:00PM	Wed., April 6
Smith, Dawsyn	Natural Sciences	UP088	01:00PM	02:00PM	Wed., April 6
Falk, Taylor	Natural Sciences	UP089	01:00PM	02:00PM	Wed., April 6
Flinchum, Evin	Social Sciences	UP091	01:00PM	02:00PM	Wed., April 6
Jones, Haleigh	Social Sciences	UP092	01:00PM	02:00PM	Wed., April 6
Kustka, Emily	Social Sciences	UP093	01:00PM	02:00PM	Wed., April 6
Malham, Shae	Social Sciences	UP094	01:00PM	02:00PM	Wed., April 6
Philbrook, Lily	Social Sciences	UP095	01:00PM	02:00PM	Wed., April 6
Porter, Sarah	Social Sciences	UP096	02:00PM	03:00PM	Wed., April 6
Schroeder, Alexis	Social Sciences	UP097	02:00PM	03:00PM	Wed., April 6
Sharif, Suhaima	Social Sciences	UP098	02:00PM	03:00PM	Wed., April 6
Shepard, Peyton	Social Sciences	UP099	02:00PM	03:00PM	Wed., April 6
Starrett, Cameron	Social Sciences	UP101	02:00PM	03:00PM	Wed., April 6
Thomas, Peyton	Social Sciences	UP102	03:00PM	04:00PM	Wed., April 6
True, Hannah	Social Sciences	UP103	03:00PM	04:00PM	Wed., April 6
Villani, Sophia	Social Sciences	UP104	03:00PM	04:00PM	Wed., April 6
Zahra, Abdul	Social Sciences	UP105	03:00PM	04:00PM	Wed., April 6
Braxton, Sydney	Social Sciences	UP106	03:00PM	04:00PM	Wed., April 6

Postdoctoral Scholar & Dental Resident Poster Schedule

Monday April 4

ON SYMPOSIUM AT https://symposium.foragerone.com/rcaw2022/presentations

PRESENTER	CATEGORY_1	Number	Start	End	Date
Thomas, Sheila	Biomedical Sciences	PD01	11:00AM	11:30AM	Monday, April 4
Abuna, Gabriel	Biomedical Sciences	PD02	11:00AM	11:30AM	Monday, April 4
Barton, Ian	Biomedical Sciences	PD04	11:00AM	11:30AM	Monday, April 4
Schmidt, Cameron	Biomedical Sciences	PD05	11:30AM	12:00PM	Monday, April 4
Swami Vetha, Berwin Singh	Biomedical Sciences	PD06	11:30AM	12:00PM	Monday, April 4
Bahmani, Fatemeh	Engineering/Biomed	PD08	11:30AM	12:00PM	Monday, April 4
Zhang, Xiaoxia	Education/ Human Health	PD07	12:00PM	12:30PM	Monday, April 4
Wambui, David	Human Health	PD09	12:00PM	12:30PM	Monday, April 4
Simmers, Deborah	Human Health	PD10	12:00PM	12:30PM	Monday, April 4
Xiong, Lin	Natural Sciences	PD011	12:30PM	01:00PM	Monday, April 4
Charles, Sean	Natural Sciences	PD012	12:30PM	01:00PM	Monday, April 4
Al-Attabi, Zaid	Natural Sciences	PD013	12:30PM	01:00PM	Monday, April 4

Postdoctoral Scholar & Dental Resident Poster Schedule by Last Name

Monday April 4

Presenter Name	Number	Start	End	Title
Abuna, Gabriel	PD02	11:00AM	11:30AM	New selective anti-Streptococci strategy for managing dental caries
Al-Attabi, Zaid	PD013	12:30PM	01:00PM	Evaluating the impact of inter-tidal wetlands on storm surge flooding and damages in Galveston Bay: Case Study of Hurricane Ike
Bahmani, Fatemeh	PD08	11:30AM	12:00PM	Fluid-Structure Interaction Simulation of Pulmonary Hypertension in Patients under Hemodialysis
Barton, Ian	PD04	11:00AM	11:30AM	Novel H-NS-like Protein MucR is Essential for Coordinating Virulence Gene Expression During Host-Association Through Silencer/Counter-Silencer Interactions
Charles, Sean	PD012	12:30PM	01:00PM	Mangrove Forests have gained area, but lost carbon since 1985: the benefits of stability to put down roots from a postdoc perspective
Schmidt, Cameron	PD05	11:30AM	12:00PM	Metabolic Network Dynamics Underly Motility Pattern Changes During Sperm Capacitation in Mice
Simmers, Deborah	PD10	12:00PM	12:30PM	Missed appointments in an orthodontic clinic, dental student clinics
Swami Vetha, Berwin Singh	PD06	11:30AM	12:00PM	Functional Significance of Angiotensin Receptors in the Neuroplasticity of (mRen2)27 transgenic model of Hypertension
Thomas, Sheila	PD01	11:00AM	11:30AM	Elucidating the structure and function of a novel class of complement inhibitors of the Lyme disease agent
Wambui, David	PD09	12:00PM	12:30PM	Sarcoidosis Mortality in North Carolina
Xiong, Lin	PD011	12:30PM	01:00PM	Estimating the performance of GEDI and ICESat-2 in mangrove forests of south Florida
Zhang, Xiaoxia	PD07	12:00PM	12:30PM	Influence of Quality High School Physical Education on Physical Activity

Undergraduate Oral Presentations by Category and Room Location

BALLROOM A

PRESENTER	CATEGORY	Number	Start	End	Date
Aldridge, Hailey	Biomedical Sciences	UO1	8:30AM	8:45AM	Wednesday, April 6
Cavaliere, Nicole	Biomedical Sciences	UO2	8:45AM	9:00AM	Wednesday, April 6
DeVitto, Evan	Biomedical Sciences	UO3	9:00AM	9:15AM	Wednesday, April 6
Farrow, Sophia	Biomedical Sciences	UO4	9:15AM	9:30AM	Wednesday, April 6
Fennie, Kathryn	Biomedical Sciences	UO5	9:30AM	9:45AM	Wednesday, April 6
Harmon, Megan	Biomedical Sciences	UO6	9:45AM	10:00AM	Wednesday, April 6
Islam, Marzuq	Biomedical Sciences	UO7	10:00AM	10:15AM	Wednesday, April 6
		BREAK	**10:15AM**	**10:30AM**	
Johnston, Caroline	Biomedical Sciences	UO8	10:30AM	10:45AM	Wednesday, April 6
Lunsford, Amaia	Biomedical Sciences	UO9	10:45AM	11:00AM	Wednesday, April 6
Lynch, Spencer	Biomedical Sciences	UO10	11:00AM	11:15AM	Wednesday, April 6
Ormond, Abigail	Biomedical Sciences	UO11	11:15AM	11:30AM	Wednesday, April 6
Painter, Jennifer	Biomedical Sciences	UO12	11:30AM	11:45AM	Wednesday, April 6
Pentakota, Ananya	Biomedical Sciences	UO13	11:45AM	12:00PM	Wednesday, April 6
Stoll, Ethan	Biomedical Sciences	UO14	12:00PM	12:15PM	Wednesday, April 6
		LUNCH	**12:15PM**	**1:30PM**	
Cobb, Faith	Engineering	UO15	1:30PM	1:45PM	Wednesday, April 6
McDougal, Maycie	Engineering	UO16	1:45PM	2:00PM	Wednesday, April 6
Pakulniewicz, Zachary	Engineering	UO17	2:00PM	2:15PM	Wednesday, April 6
Sutton, Joshua	Engineering	UO18	2:15PM	2:30PM	Wednesday, April 6
Wilson, Nia	Engineering	UO19	2:30PM	2:45PM	Wednesday, April 6
Lowe, Alex	Engineering	UO20	2:45PM	3:00PM	Wednesday, April 6

BALLROOM B

Defranco, Francesca	Social Sciences	UO53	8:30AM	8:45AM	Wednesday, April 6
Lewis, Phillip	Social Sciences	UO54	8:45AM	9:00AM	Wednesday, April 6
Story, Spencer	Social Sciences	UO55	9:00AM	9:15AM	Wednesday, April 6
Thornton, Hannah	Social Sciences	UO56	9:15AM	9:30AM	Wednesday, April 6
Cavanaugh, Megan	Social Sciences	UO57	9:30AM	9:45AM	Wednesday, April 6
Brinkley, Ethan	Social Sciences	UO58	9:45AM	10:00AM	Wednesday, April 6

Rogers, Harrison	Social Sciences	UO59	10:00AM	10:15AM	Wednesday, April 6
Batt, Holly	Social Sciences	UO60	10:15AM	10:30AM	Wednesday, April 6
Raleigh, Shaelyn	Social Sciences	UO61	10:30AM	10:45AM	Wednesday, April 6
Warren, Rylie	Social Sciences	UO62	10:45AM	11:00AM	Wednesday, April 6
		BREAK	**11:00AM**	**11:15AM**	
Kamath, Soumya	Humanities	UO42	11:15AM	11:30AM	Wednesday, April 6
Merlos-Pulley, Genevieve	Humanities	UO43	11:30AM	11:45AM	Wednesday, April 6
Teodorescu, Alexander	Humanities	UO44	11:45AM	12:00PM	Wednesday, April 6
Tomas, Teresa	Humanities	UO45	12:00PM	12:15PM	Wednesday, April 6
		LUNCH	**12:15PM**	**1:30PM**	
Daub, Caroline	Natural Sciences	UO46	1:30PM	1:45PM	Wednesday, April 6
De La Garza, Jose	Natural Sciences	UO47	1:45PM	2:00PM	Wednesday, April 6
Halatek, David	Natural Sciences	UO48	2:00PM	2:15PM	Wednesday, April 6
Hemingway, Nathalie	Natural Sciences	UO49	2:15PM	2:30PM	Wednesday, April 6
Kerkan, Alexa	Natural Sciences	UO50	2:30PM	2:45PM	Wednesday, April 6
Savitski, Taylor	Natural Sciences	UO51	2:45PM	3:00PM	Wednesday, April 6
Long, Jessica	Natural Sciences	UO52	3:00PM	3:15PM	Wednesday, April 6

ROOM 249

Gardner, Grace	Fine Arts	UO21	9:15AM	9:30AM	Wednesday, April 6
Hemedinger, Marguerite	Fine Arts	UO22	9:30AM	9:45AM	Wednesday, April 6
Lee, Kirby	Fine Arts	UO23	9:45AM	10:00AM	Wednesday, April 6
Martschenko, Evan	Fine Arts	UO24	10:00AM	10:15AM	Wednesday, April 6
McKeown, Charles	Fine Arts	UO25	10:15AM	10:30AM	Wednesday, April 6
Palma, Zachary	Fine Arts	UO26	10:30AM	10:45AM	Wednesday, April 6
		BREAK	**10:45AM**	**11:00AM**	
Rangar, Amrina	Fine Arts	UO27	11:00AM	11:15AM	Wednesday, April 6
Waldon, Elijah	Fine Arts	UO28	11:15AM	11:30AM	Wednesday, April 6
Wynne, Elizabeth	Fine Arts	UO29	11:30AM	11:45AM	Wednesday, April 6
Lloyd, Alexis	Fine Arts	UO30	11:45AM	12:00PM	Wednesday, April 6
Talieh, Abeanju	Fine Arts	UO31	12:00PM	12:15PM	Wednesday, April 6
		LUNCH	**12:15PM**	**1:30PM**	
Abhulimen, Onolunosen	Human Health	UO32	1:30PM	1:45PM	Wednesday, April 6
Bonen-Clark, Rebecca	Human Health	UO33	1:45PM	2:00PM	Wednesday, April 6
Chaaban, Omar	Human Health	UO34	2:15PM	2:30PM	Wednesday, April 6

Chan, Elizabeth	Human Health	UO35	2:30PM	2:45PM	Wednesday, April 6
Cheek, Jackson	Human Health	UO36	2:45PM	3:00PM	Wednesday, April 6
Ethridge, Julianna	Human Health	UO37	3:00PM	3:15PM	Wednesday, April 6
Farber, Sydney	Human Health	UO38	3:15PM	3:30PM	Wednesday, April 6
Fogarty, Luke	Human Health	UO39	3:30PM	3:45PM	Wednesday, April 6
Mays, Kamie	Human Health	UO40	3:45PM	4:00PM	Wednesday, April 6
Modi, Vedika	Human Health	UO41	4:00PM	4:15PM	Wednesday, April 6

Undergraduate Oral Presentation Index by Student Last Name

Wednesday April 6

Presenter	Number	Room	Start	End	Title
Abhulimen, Onolunosen	UO32	Rm 249	1:30PM	1:45PM	EphrinA1/ EphA expression changes during cardiomyocyte development and disease
Aldridge, Hailey	UO1	Ballroom A	8:30AM	8:45AM	Higher-Order Associative Learning Impairments in Mice with Rab10 Protein
Batt, Holly	UO60	Ballroom B	10:15AM	10:30AM	COVID-19's Impact on Head Start Teachers' Relationships, Health Behaviors, and Stress Levels
Bonen-Clark, Rebecca	UO33	Rm 249	1:45PM	2:00PM	Perceived Relationship Experiences Among Adolescents and Young Adult Women: Reproductive Coercion Pilot Study
Brinkley, Ethan	UO58	Ballroom B	9:45AM	10:00AM	The Powers of North Carolinas Second Executive: Discovering if the Lieutenant Governor Should be Designated more Power under the Constitution
Cavaliere, Nicole	UO2	Ballroom A	8:45AM	9:00AM	Effects of Geraniol, Linalool, and Citronellal on virulence factors of Candida
Cavanaugh, Megan	UO57	Ballroom B	9:30AM	9:45AM	Excessive Social Media Use and Your Executive Functioning
Chaaban, Omar	UO34	Rm 249	2:15PM	2:30PM	Filtration Efficiency of Top 10 Best-Selling Adult Masks Compared to the N95 Respirator
Chan, Elizabeth	UO35	Rm 249	2:30PM	2:45PM	Urinary Tract Infection (UTI) Epidemiology in United States Neonatal Intensive Care Units
Cheek, Jackson	UO36	Rm 249	2:45PM	3:00PM	Can Trauma be an Opportunity to Identify and Treat Non-Injury Medical Conditions in Young Adults?
Cobb, Faith	UO15	Ballroom A	1:30PM	1:45PM	Applicationsof LiDAR to acoustic surface impedance measurements
Daub, Caroline	UO46	Ballroom B	1:30PM	1:45PM	Assessing and Developing Protocols for Purifying Fibrinogen From Human Blood Plasma
De La Garza, Jose	UO47	Ballroom B	1:45PM	2:00PM	3D Modeling of Fibrinogen's D region using Cryogenic Electron Microscopy
Defranco, Francesca	UO53	Ballroom B	8:30AM	8:45AM	The Economic Trajectory of Juvenile Deliquency
DeVitto, Evan	UO3	Ballroom A	9:00AM	9:15AM	BIOMECHANICAL DIFFERENCES IN LIFTERS WITH PRE-EXISTING INJURIES DURING THE SNATCH EXERCISE
Ethridge, Julianna	UO37	Rm 249	3:00PM	3:15PM	Neuromotor Control Differences in the Upper Extremity Between Those With and Without Rheumatoid Arthritis

Farber, Sydney	UO38	Rm 249	3:15PM	3:30PM	Health and Wellness: Biofeedback Interventions in Mitigating Stress in Nursing Students
Farrow, Sophia	UO4	Ballroom A	9:15AM	9:30AM	Angiotensin-Converting Enzyme 2 Expression in Ovariectomized Rat Kidney: Effects of Ethanol and Estradiol
Fennie, Kathryn	UO5	Ballroom A	9:30AM	9:45AM	The Effect of Listener Group and Masker Condition on Auditory Working Memory
Fogarty, Luke	UO39	Rm 249	3:30PM	3:45PM	Caregiver Oral Health Literacy, Pediatric Oral Health: A Systematic Review
Gardner, Grace	UO21	Rm 249	9:15AM	9:30AM	"Untitled" A One Act Play
Halatek, David	UO48	Ballroom B	2:00PM	2:15PM	The Production and Cell Viability Testing of 15d-PMJ 2 -arvanil as a Potential Cancer Therapuetic
Harmon, Megan	UO6	Ballroom A	9:45AM	10:00AM	PFAS Behavior Effects
Hemedinger, Marguerite	UO22	Rm 249	9:30AM	9:45AM	Singing: The Human Connection
Hemingway, Nathalie	UO49	Ballroom B	2:15PM	2:30PM	Physiological Relevance of Gene Expression Changes during Aging Associated with Declining Physical Function
Islam, Marzuq	UO7	Ballroom A	10:00AM	10:15AM	pH-Detection Bandages
Johnston, Caroline	UO8	Ballroom A	10:30AM	10:45AM	Adamts9 in Ocular Development in Humans and Zebrafish
Kamath, Soumya	UO42	Ballroom B	11:15AM	11:30AM	The role of utterance length and working memory capacity on second language (L2) Spanish listening comprehension
Kerkan, Alexa	UO50	Ballroom B	2:30PM	2:45PM	Characterizing Brucella FtrB: A novel cupredoxin
Lee, Kirby	UO23	Rm 249	9:45AM	10:00AM	Teaching Children Kindness through puppetry
Lewis, Phillip	UO54	Ballroom B	8:45AM	9:00AM	The Efficacy of Teen Court on Juvenile Recidivism, Suspensions and School Climate
Lloyd, Alexis	UO30	Rm 249	11:45AM	12:00PM	Find A Friend PSA
Long, Jessica	UO52	Ballroom B	3:00PM	3:15PM	Refining artificial incubation of chicken eggs: laying season and not size affects incubation period of eggs laid by multi-generational crossbred chickens
Lowe, Alex	UO20	Ballroom A	2:45PM	3:00PM	GeoServer Integration of Analyses and Results' Visualization for CartograPlant
Lunsford, Amaia	UO9	Ballroom A	10:45AM	11:00AM	Simulated type II diabetes alters ephrinA1-epha (EFNA1/EPHA) expression in human inducible pluripotent stem cell-derived cardiomyocytes (hiPSC-CMs)
Lynch, Spencer	UO10	Ballroom A	11:00AM	11:15AM	A New Model for Fibrinolysis - The End of a 50 Year Debate

Martschenko, Evan	UO24	Rm 249	10:00AM	10:15AM	Hexatonic Collections and Thematic Development in Frederic Rzewski's Four Pieces for Piano
Mays, Kamie	UO40	Rm 249	3:45PM	4:00PM	Infusion Med Spas: Oversight, Ownership, and Consumer Safety
McDougal, Maycie	UO16	Ballroom A	1:45PM	2:00PM	Characterization of Reproductive Materials
McKeown, Charles	UO25	Rm 249	10:15AM	10:30AM	Love and Loss: A Reading from "Dead Air"
Merlos-Pulley, Genevieve	UO43	Ballroom B	11:30AM	11:45AM	Latino Higher Education Success in Sampson County Community College, NC
Modi, Vedika	UO41	Rm 249	4:00PM	4:15PM	Acceptability and Perceptions of Medically Tailored Food Bags by Rural, Pregnant, Food Insecure Pregnant Patients through the MOTHeRS Project.
Ormond, Abigail	UO11	Ballroom A	11:15AM	11:30AM	The Effect of Semantic Interference on Speech Perception in Noise Ability
Painter, Jennifer	UO12	Ballroom A	11:30AM	11:45AM	Differences in Neurological Connectivity Between Right and Left Limb Dominant Individuals in Implicit Motor Sequence Learning
Pakulniewicz, Zachary	UO17	Ballroom A	2:00PM	2:15PM	An Experimental Study on the Dynamics of Binder Drops Impacting on a Powder Surface in Binder Jetting Additive Manufacturing
Palma, Zachary	UO26	Rm 249	10:30AM	10:45AM	Comparing High Frequency Perception, Standard Pitch Range & Relative Pitch Perception of Pianists and Vocalists
Pentakota, Ananya	UO13	Ballroom A	11:45AM	12:00PM	FACS Validation of Cell Specific Recombination in Novel Mouse Model
Raleigh, Shaelyn	UO61	Ballroom B	10:30AM	10:45AM	Merit Scholarships; Are They Accessible for All Students?
Rangar, Amrina	UO27	Rm 249	11:00AM	11:15AM	Writing a Fiction Novel and it's Many Benefits
Rogers, Harrison	UO59	Ballroom B	10:00AM	10:15AM	The Conflicting Effects of Subsidies are They Always Beneficial
Savitski, Taylor	UO51	Ballroom B	2:45PM	3:00PM	Gaining insights on the effects of sea level rise and coastal storms on septic systems in Nags Head North Carolina through historical permit records
Stoll, Ethan	UO14	Ballroom A	12:00PM	12:15PM	Altered Fibrinolysis by Fluorophore Labeling
Story, Spencer	UO55	Ballroom B	9:00AM	9:15AM	Whose history matters? An examination of Black vs White cemetery loss
Sutton, Joshua	UO18	Ballroom A	2:15PM	2:30PM	Characterization of Heartbeat Parameters in Drosophila Introduced to a Western Diet
Talieh, Abeanju	UO31	Rm 249	12:00PM	12:15PM	Visualizing the Fruit of the Spirit

Teodorescu, Alexander	UO44	Ballroom B	11:45AM	12:00PM	Teotography - A photo collection of North Carolina's wilderness, wildlife and culture surrounding coastal areas
Thornton, Hannah	UO56	Ballroom B	9:15AM	9:30AM	Perception and Evaluation of Antisocial Behaviors
Tomas, Teresa	UO45	Ballroom B	12:00PM	12:15PM	Political and religious iconography in medieval European art and architecture.
Waldon, Elijah	UO28	Rm 249	11:15AM	11:30AM	Respect the Theater Space
Warren, Rylie	UO62	Ballroom B	10:45AM	11:00AM	Mapping The Landscape of Educational Research Dissemination Through Social Media
Wilson, Nia	UO19	Ballroom A	2:30PM	2:45PM	Exploring the effects of the variability of the vertical temperature gradient on acoustic propagation modeling
Wynne, Elizabeth	UO29	Rm 249	11:30AM	11:45AM	One Good Road

Undergraduate Poster Presentation Index by Student Last Name

Wednesday April 6

ON SYMPOSIUM AT https://symposium.foragerone.com/rcaw2022/presentations				
Presenter Name	Number	Start	End	Title
Aceituno, Derek	UP072	10:00AM	11:00AM	Aging of Adult Southern Flounder (Paralicthys lethostigma) with Otoliths from North Carolina Estuaries
Amin, Paree	UP001	09:00AM	10:00AM	A Swiss Army Knife approach to targeted EFNA1 therapeutic proteins
Baker, Erin	UP024	03:00PM	04:00PM	Decimal Misconceptions in Elementary Math through the eyes of Preservice Teachers
Banister, Willaya	UP025	03:00PM	04:00PM	Philosophy of Entrapments/Stings
Beebe, Katja	UP042	03:00PM	04:00PM	A comparative analysis of hearing levels between collegiate musicians; instrumentalists vs vocalists
Berry, Madison	UP050	01:00PM	02:00PM	Adverse Childhood Experiences and Reproductive Traumas of Infertility and Pregnancy Loss
Braxton, Sydney	UP106	03:00PM	04:00PM	Why Accounting?: Factors influencing students' choice of major.
Butts, Cooper	UP073	10:00AM	11:00AM	Population Characteristics of Alewife Spawning in Lake Mattamuskeet, 2015-2016
Byrd, John	UP026	03:00PM	04:00PM	Leadership Development in Undergraduate Nursing Students
Chichester, Zachary	UP051	01:00PM	02:00PM	Quantitative content analysis of diversity and representation in preventive health-related images for health education materials
Clavijo, Abigail	UP020	04:00PM	05:00PM	Pitt Perspective; fostering community conversation in Pitt County.
Clevenger, Lindsey	UP027	03:00PM	04:00PM	Undergraduates' Argumentation Skills Differ with the Aspect of Argumentation and Lab Exercise Considered
Coalson, Hannah	UP002	09:00AM	10:00AM	Mitochondrial alterations accompany forced differentiation in acute promyelocytic leukemia cells. Mitochondrial alterations accompany forced differentiation in acute promyelocytic leukemia cells.
Coe, Leila	UP090	01:00PM	02:00PM	Do Bikers and Pedestrians Feel Safe in Greenville, NC Streets Where NCDOT Considers Them Safe?
Costa, Hannah	UP074	10:00AM	11:00AM	Investigating the causes of hatching failure of Eastern Bluebird eggs
Cunningham, Ava	UP052	01:00PM	02:00PM	The Relationship between Speech Recognition in Noise Ability & Listening Effort
Czika, Wesley	UP003	09:00AM	10:00AM	Investigating the Role of CG34367, CG8046, and CG4415 in Germline Stem Cell Renewal and Oocyte Production
Davis, Julie	UP075	10:00AM	11:00AM	Estimating Spawning Times of North Carolina Paralichthys lethostigma
Deatherage, Isabella	UP049	03:00PM	04:00PM	The Impact "Influencers" Have On People

Dickerson, Joseph	UP068	09:00AM	10:00AM	Computational Study of the Performance of an Oscillating Surge Wave Energy Converter under Different Ocean Wave Conditions
Dixon, Hannah	UP028	03:00PM	04:00PM	The Advantages of Executive Processing in Bilingual Students
Drummond, Deja	UP040	11:00AM	12:00PM	Assesment of Recycled and Manufactured Adsorptive Materials to Reduce Phosphorous Wastewater Loads
Elberfeld, Lauren	UP004	09:00AM	10:00AM	Characterizing the role of Mkp3, a negative regulator of the Ras/MAPK pathway, in germline stem cell self-renewal
Falk, Taylor	UP089	01:00PM	02:00PM	Toxic Metal Interactions with EF-Hand Peptides: A Lead-207 NMR Study
Felts, Jenna	UP023	04:00PM	05:00PM	Community Health Information-Sharing by Latino Palliative Care Lay Advisors
Ferretiz, Alejandra	UP043	03:00PM	04:00PM	Comparing the hearing of college age muscians vs non-musicians.
Ferro, Alexis	UP069	09:00AM	10:00AM	Greening of Industries in North Carolina using Pollution Prevention Techniques
Flinchum, Evin	UP091	01:00PM	02:00PM	Efficacy in ROTC: Leader-follower congruence
Fulcher, Jennifer	UP076	10:00AM	11:00AM	The shear viscosity of quark-gluon plasma in full equilibrium
Gill, Surinder	UP077	10:00AM	11:00AM	Environmental and Sediment Microbiome Effects on Salt Marsh Cordgrass Restoration Efforts
Gogineni, Anish	UP053	01:00PM	02:00PM	Electronic Cigarette Users Harm Perceptions of Secondhand Exposure and Electronic Cigarette Use in Vehicles With Adults and Children
Gorman, Rebekah	UP078	11:00AM	12:00PM	Investigation of Putative Copper Chaperone and Its Role in Producing an Unusual Plant Lipid
Ha, Joseph	UP033	10:00AM	11:00AM	Energy Conversion Hardware in the Loop Software and Hardware Implementation using OPAL-RT FPGA Simulator and Power Electronics Building Blocks
Hall, Skyler	UP044	03:00PM	04:00PM	A Look Inside Different Cultures Through Art
Hardeman, Jordan	UP005	09:00AM	10:00AM	The Rational Design of an Actin Localization Peptide
Haynes, Hannah	UP022	04:00PM	05:00PM	Leadership and technology use among adolescents at a Boys & Girls Club in eastern North Carolina
Hendrix, Khadijah	UP021	04:00PM	05:00PM	We asked, patients answered: Preferences for a produce rx program
Hill, Madison	UP079	11:00AM	12:00PM	Examining Parasite Escape in European Green Crabs (Carcinus maenas) in Invasive North American Populations
Hock, Jordan	UP045	03:00PM	04:00PM	Sculpting with Carbon Fiber: Waterfall
Hollowell, Wallace	UP017	11:00AM	12:00PM	Does High Intensity Interval Training in Older Mice Restore Age-Related Alterations to Activity Patterns?
Ifill, Kyle	UP080	11:00AM	12:00PM	Applying a new method for stickleback color pattern analysis with preliminary results from Apeltes quadracus
Jacobson, Grace	UP034	10:00AM	11:00AM	Lean Thinking and Practical Applications in small NC Manufacturers

Jefferson, Brittany	UP006	09:00AM	10:00AM	Efficacy of Targeted Formulations of EFNA1 in a Murine Model of Acute Cardiac Ischemia
Johansen, Lauren	UP054	01:00PM	02:00PM	Detection of SARS-CoV-2 in Dorms Through HVAC System
Jones, Haleigh	UP092	01:00PM	02:00PM	Development of interprofessional competencies following a simulated home visit: A qualitative study of students written reflections
Juhl, Benjamin	UP018	11:00AM	12:00PM	Anoxic protective abilities of ephrinA1 and androgens
Jung, Lauren	UP019	11:00AM	12:00PM	Understanding the Interaction of Ftz-f1 and Ecdysone Signaling in Escort Cells
Kustka, Emily	UP093	01:00PM	02:00PM	Exploration of Interest and Development of Intergenerational Facilities in Pitt County
Linder, Kayleigh	UP029	04:00PM	05:00PM	Machine Learning Classification of Hemodynamics to Predict Science Student Learning Outcomes in Real-Time During Virtual Reality and Online Learning Sessions
Malham, Shae	UP094	01:00PM	02:00PM	The Mental Health Effects of Assisted Reproductive Technology
Mansfield, Payne	UP064	09:00AM	10:00AM	Transgender-Focused Clothing Drive
March, Sarah	UP055	01:00PM	02:00PM	Exploring the Use of Heart Rate Variability in Coronavirus Disease 2019
Martinez-Santoyo, Ivan	UP081	11:00AM	12:00PM	Long-term nutrient enrichment effects on greenhouse gas production in a coastal plain wetland
Mauzy, Heather	UP070	09:00AM	10:00AM	Edible Landscape Initiative
McCoy, Ava	UP030	04:00PM	05:00PM	Equity in Education: Impacts of the Project I⁴Participation on School Leader and Teacher Practice
McKinney, Katelyn	UP031	04:00PM	05:00PM	Mentoring in Nursing Education
Monroe, Emily	UP007	10:00AM	11:00AM	The pHAST and the Fluorescent: Measuring Extracellular pH with an Acid-Sensing Tag
Mooring, Ronald	UP056	01:00PM	02:00PM	JUUL Misleading Emissions Report
Morgan, Anna	UP057	02:00PM	03:00PM	Describing behaviors of participants during a Virtual Dementia Tour™: A secondary descriptive analysis
Morrison, Mikenna	UP065	09:00AM	10:00AM	Patriarchy & Oppression: An Expression of Religion
Moss, Nona	UP082	11:00AM	12:00PM	An Ongoing Study of Simulating Life on Mars through Microbes Isolated from an Ophiolite Deposit
Mullis, Justin	UP067	09:00AM	10:00AM	Unveiling Meaning: The Pitt County Confederate Soldiers' Monument and Lost Cause Sentiment
Paul, Elliot	UP035	10:00AM	11:00AM	Implementation of an In Silico Modeling Pipeline for Bone Remodeling in Microgravity
Peele, Wyatt	UP036	10:00AM	11:00AM	Cryo-EM Sample Preparation Using Ultrasonic Vibrations
Philbrook, Lily	UP095	01:00PM	02:00PM	Racial Justice and Black Lives Matter Protests in North Carolina: Does Racial and Socioeconomic Inequality Lead to More Violent Demonstrations and Police Intervention in Protests?
Phipps, Mary	UP008	10:00AM	11:00AM	Centaurinα1-Bid signaling in Alzheimer’s disease progression
Pigg, Hunter	UP071	09:00AM	10:00AM	Numerical Analysis of Oscillating Wave Surge Converters Under Extreme Sea Conditions

Pope, Raley	UP046	03:00PM	04:00PM	A comparison of high-frequency hearing levels between formal and informal musicians
Porter, Sarah	UP096	02:00PM	03:00PM	Communication and Learning in Natural Environments: Generalization and Collaboration between Speech-Language Pathologists, Educators and Families
Puthuparampil, Joyel	UP009	10:00AM	11:00AM	Investigating the role of adamts9 in early oocyte development in zebrafish (Danio rerio)
Reed, Elisabeth	UP032	04:00PM	05:00PM	Menstrual Maintenance Education in North Carolina's Healthful Living Standards
Riddick-Cherry, Imani	UP066	09:00AM	10:00AM	UterUS: Changing the Perception of Menstrual Health on College Campuses
Roye, Catarina	UP083	11:00AM	12:00PM	Impact of Temperature and Salinity on Southern Flounder Interannual Abundance in Estuaries
Salazar, Brianna	UP084	01:00PM	02:00PM	Variability of Zooplankton Diversity and Abundance in Beaufort Inlet, NC
Schroeder, Alexis	UP097	02:00PM	03:00PM	Do the comments we receive on our performance change our motivation? A look at how our base motivation plays a role in how feedback affects our level of motivation to complete a task.
Schulz, Anna	UP010	10:00AM	11:00AM	Design and application of an immobilized protein kinase
Shah, Param	UP085	01:00PM	02:00PM	Genotype Determination of Lipid Redox Mutants in Plants
Shah, Shivam	UP086	01:00PM	02:00PM	Temperature and pH-Dependence of the Interconversion of Gamma-Hydroxyvaleric Acid and Gamma-Valerolactone
Sharif, Suhaima	UP098	02:00PM	03:00PM	for Romantic Partner or Relationship
Shelat, Ishani	UP011	10:00AM	11:00AM	Nicotine Dependent Behaviors: Trans-Generational Effects of Nicotine in Caenorhabditis elegans
Shepard, Peyton	UP099	02:00PM	03:00PM	Prospective and Retrospective Metamemory: A Comparison of College Students Global, Category-level and Item-level Judgments of Learning
Shepherd, Morgan	UP058	02:00PM	03:00PM	The Relationships Among Nursing Students Stress, Post-Traumatic Stress Disorder, and Caring Behaviors During the COVID-19 Pandemic
Shields, Agne	UP087	01:00PM	02:00PM	Patching Purine Potholes in DNA with Fluorescent Analogs
Sholar, Molli	UP012	10:00AM	11:00AM	Vitamin B12 Regulation of PUFA Synthesis
Slade, Raven	UP013	11:00AM	12:00PM	Impact of insecticide exposure method on susceptibility/resistance in Aedes albopictus mosquitoes
Smith, Dawsyn	UP088	01:00PM	02:00PM	Assessing Rates of Consumption in Newly Restored Seagrass Beds Across a Depth Gradient
Somma, Kristen	UP100	02:00PM	03:00PM	Needs Assessment for a Physical Activity Intervention for Caregivers
Southern, Kaitlin	UP037	10:00AM	11:00AM	COMPUTATIONAL MODELING OF ARTERIOVENOUS FISTULA HEMODYNAMICS IN PULMONARY HYPERTENSION PATIENTS
Sowers, Hannah	UP038	11:00AM	12:00PM	Comparing Fibrin Structure in Blood Clots Impacted by Flow Rate.
Teague, Steven	UP014	11:00AM	12:00PM	EphrinA1-Fc Injection Effectiveness in Cardiomyocytes Post Myocardial Infarction with Relation to Timing of

				EphrinA1-Fc Injection in Reperfusion and Nonreperfused iPSC-CMs.
Tharmar, Aparna	UP059	02:00PM	03:00PM	The Effect of Demographic Variables and Risk Factors on HIV Outcomes: An Analysis
Thomas, Peyton	UP102	03:00PM	04:00PM	Honors Educators: Faculty Perceptions of Teaching HNRS 2000 and 3000
Tiet, Alex	UP060	02:00PM	03:00PM	Association between electronic cigarette use behaviors inside of vehicles, age, and harm perceptions of secondhand electronic cigarette exposure
True, Hannah	UP103	03:00PM	04:00PM	ACE's and Friendship Difficulties
Vaughn, Rachel	UP047	03:00PM	04:00PM	Gender Difference Between Music Majors on High-Frequency Hearing
Villani, Sophia	UP104	03:00PM	04:00PM	Examining the extent to which cannabis provisions have been incorporated into new or existing city-level social host ordinances in California and Colorado
Vose, Avery	UP041	11:00AM	12:00PM	Next Generation Balance Test for Vestibular Hypofunction
Warren, Leah	UP039	11:00AM	12:00PM	Segmentation and processing of COVID-19 lung 4D-CT images
Watkins, Rachel	UP061	02:00PM	03:00PM	Adaptation of a modified Diet Quality Index to quantify healthfulness of food-related toy sets
Wattenbarger, Josiah	UP048	03:00PM	04:00PM	Exploring Musical Heritage: Composition and Performance of an Original Jazz Ballad
Whitley, McKenzie	UP015	11:00AM	12:00PM	Neural Correlates of Balance Training in Children
Williams, Savanna	UP062	02:00PM	03:00PM	Impact of Covid-19 on Animal Assisted Therapy in Pediatric Oncology
Willis, Thomas	UP016	11:00AM	12:00PM	Neurophysiological evidence for task differences during the processing of emotional speech and vocalizations
Wilson, Avery	UP063	02:00PM	03:00PM	Loneliness in the Adult Population
Zahra, Abdul	UP105	03:00PM	04:00PM	A scoping review of trends over time in LGB tobacco use disparities

Graduate Oral Presentation Abstracts

GO1

Evaluating the Use of Turbidimetry for Analyzing Fibrin Fibers

Heather Ann Belcher

Mentor: Hudson, Nathan E

The formation of a fibrin fiber network provides the structural backbone of blood clots. In many pathological diseases, these networks contain altered fiber thickness and density, so it is important to be able to rapidly and accurately characterize fibrin features. One way of determining the diameter of fibrin fibers is by using light scattering theory for randomly oriented, thin, cylindrical rods to analyze turbidimetry data. Turbidimetry is a measure of the loss of light intensity through a sample due to scattering at various wavelengths. There are several approaches that use turbidimetry to solve for fiber diameter, each making different simplifications and assumptions of full light scattering theory. The validity of the approximations used in each of these approaches has not been investigated, and the accuracy of the fitting parameters has not been tested against experimental data under a range of physiologically relevant conditions. This work evaluates the accuracy of the commonly utilized turbidimetric approaches by comparing them to full light scattering theory, and by comparing the acquired diameters to those obtained using other experimental techniques.
A theoretical dataset of turbidity values was created based on full light scattering theory for fixed fiber length and diameter values corresponding to those of physiological conditions. The dataset was then fit with equations from each of the different turbidimetric approaches to extract the fiber diameter. The diameters arrived at through fitting were compared to the diameter values used to create the dataset. This evaluated how well the turbidimetric models matched full light scattering theory. The turbidimetric approaches were also fit to experimental data at various protein concentrations to determine fiber diameter. Fibrin samples of the same concentrations were imaged and analyzed using electron and super-resolution fluorescence microscopy. The diameter values obtained using the different methods were compared to determine the accuracy of the turbidimetric models. It was found that the utility of all three turbidimetric approaches investigated are limited to certain values of fiber length, diameter, and the wavelength range used for the turbidimetry measurements.

GO2

Identifying the roles of Rab10 signaling in the brain

Wyatt Bunner

Mentor: Szatmari, Erzsebet Maria

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Taylor Landry
East Carolina University, Department of Kinesiology

OBJECTIVES: Reduced level and activity of the small GTPase Rab10 lead to retaining of normal cognitive function even in the face of dementia (“cognitive resilience”). To understand the mechanisms of Rab10-dependent neuroresilience, we created Rab10 conditional KO mice. As Rab10 -/- is embryonic lethal, our studies were performed on Rab10+/- mice.

METHODS: Behavioral testing: Open Field, Object in Place, Morris Water Maze, Novel Object Recognition, trace Eye Blink Conditioning. Immunofluorescence: coronal brain sections stained with anti-NeuN antibody to evaluate the effect of Rab 10+/- on brain morphology. Transcriptome profiling: gene expression analysis using the nCounter neuropathology panel. qPCR: to validate transcriptome profiling. Western blotting: to evaluate Rab10 reduction in the brain of Rab10+/- mice and to validate transcriptome profiling. RESULTS AND CONCLUSIONS: Phenotypical characterization of Rab10+/- mice show increased body weight only in female Rab10+/- mice, that is consistent with the metabolic role of Rab10. A battery of behavioral testing revealed that Rab10+/- mice perform better in a hippocampus-dependent spatial task (Object in Place test), while their performance in trace Eye Blink Conditioning (EBC) was impaired. Brain expression of 880 genes involved in neurodegeneration was analyzed with the NanoString Neuropathology panel. Rab10+/- mice show higher activation scores of pathways associated with neuronal metabolism; structural integrity; neurotransmission and neuroplasticity compared to their Rab10+/+ littermates. Lower activation scores were observed for pathways involved in neuroinflammation and aging. Among the differentially expressed genes (DEG) were: Stx2, Stx1b, Vegfa, Lrrc25 (downregulated); and Prkaa2, Syt4 and Grind2d (upregulated). Transcriptome profiling was validated by qPCR and Western Blot analysis.
Our findings indicate that Rab10 signaling differentially controls the brain circuitry of self-motivated and conditioned behavior. Moreover, transcriptomic, and biochemical characterization of these mice identified Glutamate Ionotropic Receptor NMDA Type Subunit 2D as a potential mediator of Rab10+/- behavioral phenotypes.

GO3

The Effects of m6A RNA Modifications on Breast Cancer Progression and EMT

Mohammed G Dorgham

Mentor: Mansfield, Kyle David

Metastatic breast cancer is the number two killer cancer in women in the United States. The 5-year survival rate drops drastically as the cancer progresses and late diagnosis require drastic and less efficient treatments. Despite these facts, little is known on the regulation that causes this metastatic cancer to be come to become so aggressive as well as invasive. In recent years, it has become clear that posttranscriptional regulation plays a key role in the aberrant gene expression underlying malignancy and metastasis. The mRNA posttranscriptional modification N6-methyladenosine (m6A) is involved in many post-transcriptional regulation processes including mRNA stability and translational efficiency. It has been reported to be involved in many different cancer types, including breast cancer, as well as Epithelial to Mesenchymal Transition (EMT) as a mode of progression of these cancer types. Currently there is data to suggest that m6A is both a tumor suppressor and facilitator for progression and migration in several cancer types including breast cancer. The most studied complex for carrying out the m6A modification is METTL-3-METTL-14-WTAP complex with the METTL-3 being the protein responsible for catalytic activity. We have used Crispr-Cas9 to knock down METTL-3 in three breast cancer cell lines representing different stages of progression (MCF10A, MCF10AT1 and MCF10CA1H). Interestingly, knockout of METTL-3 in the non-malignant MCF10A caused them to increase proliferation while decreasing migration capacity. Decreased METTL-3 in the HRas G12V-transformed MCF10AT1 had little to no effect on proliferation and increased migration capacity. In the highly malignant MCF10CA1H line, knockout of METTL-3 actually decreased malignancy as indicated by decreased migration, and proliferation. Several EMT targets have been shown to explain the change in varying

phenotypes in the different cell lines such as Vimentin and E-Cadherin. Further studies are now underway to determine the impact of METTL-3 knockout on the EMT pathway and identify pathway members that are regulated by m6A.We are also investigating the effect on apoptosis as well as m6A levels of other METTL3 targets.

We believe that by understanding how changes in m6A lead to phenotypic changes in cancer cells we may potentially be able to manipulate this mRNA modification as a novel breast cancer treatment.

GO4

Leveraging intrinsic mitochondrial bioenergetics to target chemoresistant acute myeloid leukemia

James T Hagen

Mentor: Fisher-Wellman, Kelsey Howard

James T Hagen1,2, Thomas Green1,2, Joseph M. McClung1,2, and Kelsey H Fisher-Wellman1,2

1Department of Physiology, Brody School of Medicine, East Carolina University, Greenville, United States. 2East Carolina Diabetes and Obesity Institute, East Carolina University, Greenville, United States.

For over four decades, AML patients have been treated with a regimen of cytotoxic chemotherapeutics, colloquially referred to as induction therapy. While induction therapy can achieve temporary complete remission rates between 60-80%, most of these patients will relapse. Relapse is particularly prevalent in older patients, where limited tolerability for induction therapy, combined with unfavorable tumor biology confers a dismal prognosis. Improving AML patient prognosis necessitates the development of novel treatments. In AML, as in other cancers, novel treatments are almost always preceded by new biological discoveries. Using in-house mitochondrial diagnostics, herein we describe the discovery of a novel oxidative phosphorylation (OXPHOS) dependency, unique to AML mitochondria, that effectively demarcates chemosensitive from chemoresistant AML. Specifically, in chemoresistant AML, despite increases in the number of mitochondria per cell (i.e., increased mitochondrial volume), most of the chemoresistant mitochondrial network cannot perform OXPHOS. Inhibition of OXPHOS requires extramitochondrial ATP, suggesting that AML OXPHOS inhibition is mediated by the uptake of ATP across the mitochondrial outer membrane. Indeed, knocking down the outer membrane adenylate exchanger voltage dependent anion channel 1 (VDAC1) partially restored AML OXPHOS. Restoring AML OXPHOS blunted cell proliferation, suggesting that AML dissemination is supported by OXPHOS inhibition linked to VDAC1. Interestingly, a VDAC1 interacting polyphenolic compound, curcumin, also reversed ATP-dependent OXPHOS inhibition, resulting in AML cytotoxicity. Similar single-agent cytotoxicity was observed using a variety of phytochemicals, suggesting that the anti-leukemic effects attributable to phytochemicals may be mediated by the ability of these compounds to reverse ATP-dependent OXPHOS inhibition. Taken together, these data highlight ATP-dependent OXPHOS inhibition as an actionable bioenergetic feature intrinsic to chemoresistant AML.

GO5

Combating antibiotic resistance: Investigating the structure-function relationship of clinical mutations of Acinetobacter baumannii response regulator PmrA

Felicia Jaimes

Mentor: Cavanagh, John

Felicia Jaimes, Morgan Milton, Richele Thompson, John Cavanagh
Department of Biochemistry & Molecular Biology, Brody School of Medicine, East Carolina University

Developing a novel approach that addresses the alarming resistance to antibiotics is imperative for global health. Multi-drug resistant Acinetobacter baumannii is currently among the leading causes of nosocomial infection. The ability of A. baumannii to

resist harsh conditions and antibiotics is facilitated by Two Component Systems (TCSs) that enables A. baumannii to sense and adapt to changes within their environment. TCSs are the most widespread signal transduction system present in bacteria; these systems offer a specific bacterial target for drug intervention due to their notable absence in mammals. The PmrAB system is among the TCSs within A. baumannii's arsenal. Investigations into resistance mechanisms have revealed that PmrAB plays a critical role in antibiotic resistance. Clinically isolated mutations of the response regulator PmrA have increased resistance to a variety of antibiotics. Employing the use of techniques such as X-ray crystallography we have dissected PmrA mutants, further exploring the structure-function relationship of these point mutations. Using other methods of biochemical characterization such as measuring DNA binding activity and overall molecular stability we have been able to tease out how these point mutations affect activity. Elucidating the structures of PmrA and clinically relevant mutants will allow us to understand and combat growing antibiotic resistance.

GO6

GPR4 promotes colitis associated colorectal cancer development

Monca Marie

Mentor: Yang, Li

Mona A. Marie1, Edward Sanderlin 1, Alexander Hoffman 1, Swati Satturwar2, Heng Hong2,3, Sun Ying 2, Li V. Yang1
Department of Internal Medicine1, Department of Pathology2, Brody School of Medicine, East Carolina University, USA, 3 Department of Pathology, Wake Forest University, USA

GPR4 is a member of the proton-sensing G-protein coupled receptors family. It is mainly expressed on endothelial cells, where it confers a proinflammatory role through regulating endothelial cell adhesion, blood vessel permeability, leukocyte infiltration, and angiogenesis. In mouse models, we and others have shown that inhibiting GPR4 ameliorates inflammatory bowel disease (IBD). IBD is characterized by excessive bowel inflammation caused by immune dysregulation. Patients with long-standing IBD are at high risk for developing colitis-associated colorectal cancer (CAC). Interestingly, GPR4 expression upregulation was detected in the intestinal tissues of IBD and colorectal cancer patients.
Moreover, the elevation in GPR4 expression levels was correlated with a poor prognosis for colorectal cancer patients. Herein, we studied the role of GPR4 in colitis-associated colorectal cancer (CAC) by inducing CAC in GPR4 knockout (KO) and wild-type (WT) mice using azoxymethane (AOM)/dextran sulfate sodium (DSS). Our findings show that the tumor burden in the CAC model was higher in WT mice than GPR4 KO mice when treated with AOM/DSS. Blood vessel density was significantly higher within WT mouse colon tumors than GPR4 KO mice. GPR4 KO tumors showed a significant increase in tumor necrosis compared to WT tumors. Body weight loss, fecal blood/diarrhea score, and mesenteric lymph node size were aggravated in WT mice compared to GPR4 KO mice treated with AOM/DSS. Our data demonstrate that GPR4 increases intestinal inflammation and angiogenesis, enhancing tumor development in the CAC mouse model, suggesting that GPR4 inhibition may reduce the risk of developing colitis-associated colorectal cancer.

GO7

Hypoxia resistance is an inherent phenotype of the flexor digitorum brevis muscle.

Everett Minchew

Mentor: Spangenburg, Espen Eric

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Everett C. Minchew, Adam J. Amorese, Michael D. Tarpey, Cameron A. Schmidt, Shawna L. McMillen, Emma J. Goldberg, Zoe S. Terwilliger, Andrew T. Readyoff, Carol A. Witczak, Jeffrey J. Brault, Dale Able, Joseph M. McClung, Kelsey H. Fisher-Wellman, Espen E. Spangenburg

Skeletal muscle is one of the largest mammalian organ systems that enables locomotion and movement through force generation. Mechanical force is generated by contraction of muscle cells, which is dependent upon the presence of molecular oxygen (O2). Inadequate O2 bioavailability (i.e., hypoxia) is detrimental to muscle morphology and contractile function, and in chronic cases can result in muscle wasting. Importantly, modern therapeutics and surgical approaches have proven largely ineffective to rescue skeletal muscle from hypoxic damage. In an effort to generate novel approaches to enhance muscle survival during hypoxia, our lab has identified a mammalian skeletal muscle that maintains physiological structure and function in a completely hypoxic environment. Using mouse models of in vivo hindlimb ischemia and ex vivo muscle hypoxia exposure, we observed complete preservation of membrane integrity and force production in the flexor digitorum brevis (FDB). In contrast, the extensor digitorum longus (EDL) and soleus muscles suffered structural damage and loss of force-producing capacity following the same insults. An unbiased proteomics assessment identified significantly higher expression of a transmembrane glucose transporter (GLUT1) in the FDB as compared to the EDL and soleus. To further investigate the previously unknown FDB phenotype, we employed loss- and gain-of-function experiments surrounding GLUT1. Skeletal muscle-specific deletion of GLUT1 impaired the FDB's ability to retain its phenotype as evidenced by an accelerated loss of force output during hypoxia exposure. GLUT1 is responsible for importing both glucose and the oxidized form of ascorbic acid (DHA). To test the sufficiency of GLUT1 to attenuate hypoxia-induced damage, we used an AAV to overexpress GLUT1 in the EDL and manipulated concentrations of glucose and DHA. However, all conditions failed to prevent the loss of force production of the EDL during hypoxia exposure. Collectively, our results demonstrate that GLUT1 is necessary for the FDB phenotype, but insufficient to rescue other skeletal muscles from functional decline in a hypoxic environment.

GO8

SPATIAL DYSREGULATION OF RHO GTPASES IN ALZHEIMER'S DISEASE BRAIN IN HUMAN AND IN TRANSGENIC MOUSE MODEL

Shayan Nik Akhtar

Mentor: Lu, Qun

Shayan Nik Akhtar, Yi Zhu, and Qun Lu
Department of Anatmoy and Cell Biology.

Background: Alzheimer disease (AD) is histopathologically characterized by brain accumulation of amyloid plaques, neurofibrillary tangle formation, and loss of synapses. The small GTPases of Rho family such as RhoA, Rac1 and Cdc42 play an important role in neural plasticity by regulating synaptic actin and spine dynamics. However, the functions of these proteins in AD are complicated. To understand their contributions in AD pathogenesis, it is important to investigate the relationship between the expression of Rho GTPases and their functional states in signaling.

Methods: We characterized the spatial dysregulation of Rho GTPases in human AD brains and that of 16-month aged Triple Transgenic (3xTg-AD) mouse model carrying mutations in amyloid precursor protein, tau protein, and presenilin. Mouse brains were fixed in PFA and then transferred to 30% sucrose solution, followed by OCT embedding. For human brains, the paraffin-embedded tissues were collected from age and gender matched AD and Non-Dementia (ND) patients. Phosphorylated Rho GTPase antibodies were used as signaling indicators for immunofluorescence microscopy.

Results: We observed altered phospho-RhoA (S188) and phospho-Rac/Cdc42(S71) expression and distribution in human, wild type (WT), and 3xTg-AD mouse brains. In the hippocampal CA3 region and dentate gyrus (DG), pRac/Cdc42 immunostaining showed increased punctate staining in 3xTg-AD compared to WT mice. For CA3 pRhoA immunostaining scored a slightly lower level of expression in 3xTg-AD compared to WT. In the CA2 region, pRac/Cdc42 immunostaining was perinuclear in

WT and diffused in 3xTg-AD, whereas the pRhoA immunostaining pattern was similar between WT and 3xTg-AD. In the CA1 region, pRac/Cdc42 immunostaining showed perinuclear as well as dendritic localization in WT and 3xTg-AD, while pRhoA immunostaining between WT and 3xTg-AD was similar. In human brains, there was no significant difference in pRhoA in cortex between ND and AD whereas pRac/Cdc42 was slightly reduced in AD cortex. However, while Rac signaling was increased, Cdc42 signaling was reduced in AD compared to ND cortex. Rac signaling is increased in AD DG compared to ND whereas the differences in Cdc42 signaling in DG were not significant. In the cerebellum pRhoA and pRac/Cdc42 expression was decreased in AD compared to ND.

Conclusion: Small GTPases of Rho family are differentially dysregulated in different areas of the brain in AD patients as well as in AD mouse brains.

GO9

RNA Methyltransferase METTL16's Effect on Cell Cycle

Emily Satterwhite

Mentor: Mansfield, Kyle David

Recently identified Methyltransferase-like 16 (METTL16) is an enzyme responsible for binding and depositing a methyl group on the N6position of adenosine (m6A) in several different RNA targets. However, only a few of these targets have been intensely studied, including messenger RNA MAT2A, the long noncoding RNA MALAT1, and the small nuclear RNA U6. Methylation of RNA can cause a change in its stability and its ability to interact with other proteins, overall fine-tuning the role of the RNA in cellular processes. There are several RNA methyltransferases in human cells, however METTL16 is the only m6A RNA methyltransferase considered to be essential for life and commonly shows aberrant expression in various cancer types. We chose to investigate each domain of the METTL16 protein to determine which is essential for life, and to determine which RNAs are affected by loss of a particular domain. We have produced several METTL16 mutants that deactivate a certain domain, namely: the N-terminal RNA-binding domain, the methyltransferase domain, and the C-terminal RNA-binding domain. Cell lines were produced to stably express the mutated METTL16 and CRISPR-Cas9 was used to remove the native METTL16 from the mutated cell line genomes. After production, the cell lines were examined to determine the mutated METTL16's behavior, namely it's RNA-binding ability, RNA methylation ability, cellular location, and expression level. It was determined the methyltransferase mutant showed very low RNA methylation, however it also bound RNA less than expected. Therefore, we are currently in the process of producing a second methyltransferase mutant which will bind RNA as the wild-type does, but still does not methylate RNA. Using EdU Click-iT technology and flow cytometry, we examined the mutated METTL16 cell lines occupancy times in the phases of the cell cycle. We also examined apoptosis rates of these cells. We observed significant differences between the mutated METTL16 cell lines. Specifically, the METTL16 mutant cell lines we produced showed lower occupancy time in the G1 phase and higher occupancy time in the S phase. We are currently performing further experiments with them to determine the cause of these effects. Determination of METTL16's role in cell cycle will reveal the mechanism through which it promotes cancer progression.

GO10

Central Sensorimotor Changes After Peripheral Nerve Injury: Effects of Adjuvant Treatment with Dopaminergics and Morphine

Schaub, Mandee

Mentor: Clemens, Stefan

Mandee Kate Schaub and Stefan Clemens, Ph.D.
East Carolina University, Department of Physiology

Chronic neuropathic pain (CNP) affects 12-15% of Americans and often results from an injury to the peripheral or central nervous system. Current CNP treatment is rarely effective in providing long-term

analgesia. We have previously shown in an animal model of centrally induced CNP (spinal cord injury), that adjuvant application of the dopamine (DA) D3 receptor agonist pramipexole (PPX) with morphine restored analgesia in animals that no longer responded to morphine alone. Here we tested this novel drug combination in a clinically more relevant model of peripherally induced CNP, to explore if similar effects could be achieved.
Male mice (C57BL/6, 10 weeks old) were subjected to a unilateral sciatic nerve ligation (SNL), with the contralateral side serving as control. Using a Hargreaves system, thermal pain withdrawal reflex latencies were measured on both sides under control and drug treatment conditions (i.p. injections of PPX and/or morphine). We found that neither morphine (2 mg/kg) nor PPX (0.5 mg/kg) led to recovery of thermal pain withdrawal reflexes in this peripheral model of CNP. However, combining both drugs fully restored reflex latencies to control levels. Additionally, reducing the morphine dose by 50% in the combination also fully restored reflex latencies. Furthermore, the combination drug maintained its effects over time with animals showing no signs of tolerance or increased dose to maintain effect.

These data show that combination treatment of morphine with a dopamine agonist can achieve pain relief in a peripherally induced CNP model that has become morphine tolerant, similar to our previous findings in the centrally induced CNP model. We suggest that our new pharmacological approach has the potential to serve as a novel treatment tool for CNP regardless of its origin.

GO11

Kinin B1 receptor blockade prevents hydrogen peroxide-induced oxidative stress in primary hypothalamic neurons

Drew Theobald

Mentor: Sriramula, Srinivas

Drew Theobald and Srinivas Sriramula
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Introduction: Oxidative stress has been indicated as a major factor that contributes to chronic inflammatory pathologies and cellular injury. Although mild oxidative stress protects the body from infection and diseases, excessive production of reactive oxygen species (ROS) in the brain has been implicated in the pathogenesis of neurogenic hypertension. We previously showed that the Kinin B1 receptor (B1R) expression is upregulated in the hypothalamic neurons of hypertensive mice and contributes to hypertension in part by increasing oxidative stress. B1R blockade blunted oxidative stress and attenuated the development of hypertension. However, the direct relationship between oxidative stress and B1R activation in neurons has not been explored. Exposure to hydrogen peroxide (H_2O_2), a known reactive oxygen species, is widely used to induce oxidative stress and inflammation in cellular models. In this study, we investigated whether H_2O_2 treatment can induce B1R activation using mouse neonatal primary hypothalamic neuronal cultures.
Methods: Primary hypothalamic neurons were cultured from neonatal mouse pups. The neuronal morphology was confirmed using immunofluorescence staining with a neuron specific marker MAP2 (microtubule associated protein 2). Primary neurons were treated with H_2O_2 (10 µM), and B1R expression was quantified using western blot and immunofluorescence staining. ROS production was measured using the DHE assay after treating the primary neurons with H_2O_2 in the presence or absence of R715 (10 µM; B1R specific peptide antagonist).
Results: Immunofluorescence and western blot quantification revealed that H_2O_2 treatment of neurons

for 24 hours increased B1R protein expression in primary neurons. H2O2 treatment of neurons significantly increased ROS production as indicated by elevated DHE fluorescence. Pretreatment with R715 prior to H2O2 stimulation of neurons prevented the increased ROS production.
Conclusions: Our data supports the hypothesis that B1R can be upregulated in part by excessive reactive oxygen species production, and that B1R antagonism can prevent H2O2-induced oxidative stress. Together, this data suggests that B1R blockade may serve as a potential therapeutic agent in preventing excessive reactive oxygen species induced damage in the hypothalamic neurons of the brain.

GO12

Two eIF4E isoforms regulate distinct mRNAs and affect one another in germ cells

Gita Arvind Gajjar

Mentor: Keiper, Brett

mRNA translational regulation is an important step in protein synthesis in cell differentiation processes. During gametogenesis undifferentiated germ cells progress through multiple developmental stages as they differentiate into mature gametes. Translational control of mRNAs plays an essential role in germ cell gene regulation, particularly as mRNAs move from nucleus to perinuclear granules and eventually to ribosomes. Understanding the biochemistry of germline mRNA interactions with the cap binding protein eukaryotic Initiation Factor 4E (eIF4E) and RNA-binding proteins will help us understand both positive and negative translational control modes that drive germ cell fates by modulating new protein expression. Two major eIF4E isoforms are abundant in the C. elegans germline. IFE-1 and IFE-3 are known to interact selectively with subsets of mRNAs and each appears to have a different role in germ cell fate. IFEs are modulated by interaction with repressive binding 4E-interacting proteins (4E-IPs); IFE-1 by PGL-1 and IFE-3 by IFET-1. Each localize as a complex on adjacent, but distinct, perinuclear granules. The IFE-3 isoform plays a role in switch from spermatogenesis to oogenesis. Here we describe changes in localization of fluorescently tagged IFEs in the complete absence of the other isoform. Gonads of ife-3 mutant hermaphrodites adopt a masculinized phenotype, and the IFE-1-expression pattern becomes similar to males. However, its normal association with P granules is diminished. Gonads are narrow and the rachis less evident. IFE-1 is known to have an important role in spermatogenesis; null mutant worms are unable to produce mature sperm. Hermaphrodite gonads lacking ife-1 show pronounced enlargement in the transition zone. IFE-3 is more in a dispersed pattern in the rachis rather than the tight centralized association with lattice-like structures in control oogenic gonads. We do not have an immediate explanation for the marked changes in gonad morphology by reciprocal loss of each IFE isoform. We will explore the structure of their respective germ granules using mutations in the VASA/GLH-1 helicase found more centrally in P granules as well as the 4E-IP themselves. We will follow the routing of mRNAs held dormant by these granules through their activation and binding of ribosomes.

GO13

Analysis on Different Selections of Fiducial's Centroids Lung Tumor Tracking Ability

Wesley Andrew Belcher

Mentor: Jung, Jae Won
Physics Department

Abstract: Lung cancer is one of the most fatal types of cancer that affects people globally. The usual treatment for cancer is surgery. The lung tumor and part of or the whole lung can be removed. Often surgery is not an option for lung cancer patients. The next treatment option for non-small cell cancer is radiation. Radiation treatment is very complicated for lung cancer. The complication comes from respiratory induced tumor motion. As a patient breathes their lungs inflate and deflate causing the tumor to move. This creates a complexity in radiation therapy. To ensure the tumor is constantly being irradiated by the treatment beam the

beam either needs to be enlarged or the motion needs to be compensated for. It is important to limit the radiation dose to healthy tissue to keep organ function. Therefore, motion compensation is important. A common motion management technique is to use fiducials placed in and around the tumor to track tumor motion. This technique does not require patients to be capable of performing breath holding. Fiducial marker correlated tracking relies on marker motion matching that of the tumor. This study consisted of 27 patients and 102 fiducials and included both primary and metastatic tumor cases. 20 of the patients had upper lung tumors and 7 had lower lung tumors. The gross tumor volume (GTV) was contoured by the prescribing radiation oncologist and the fiducials were contoured. Once all objects have been contoured their center of mass (COM) were found assuming uniform density. With all COMs found every possible centroid was found and were analyzed to see which ones were closest to the GTV's COM and which one matched the tumors motion the best. The centroid that was closest to the GTV's COM was closer than the tracked centroid (4.1 +/- 1.2 mm) and the centroid that matched the GTV's motion best had less discrepancy in motion than the tracked centroid (0.23 +/- 0.05 mm). The number of fiducials used for tracking and in each of these centroids was also compared. It was also analyzed to see how many of these centroids were the same.

GO14

The Effect of Lactate and Protons on Normal and Transformed Cells

Fatema B Salem

Mentor: Yang, Li

Rapidly growing cancer cells and tissues adapt to a lack of nutrients and energy supply through increasing rates of anaerobic glycolysis (the Warburg effect). As a result, lactic acid is produced in large amounts and transported across the cell membrane through special symporters. Lactic acid is a strong acid and therefore will dissociate to lactate ions and protons at physiological pH 7.4. The two components of lactic acid have tumor-promoting effects, and lactate uptake in tumor cells occurs in a pH-dependent manner, besides, the important role as oncometabolite in the metabolism of cancer cells. It was found that High lactate levels in the serum and the inability to normalize those levels have been strongly correlated with unfavorable outcomes in cancer patient care, which makes lactate no longer considered a waste product of anaerobic glycolysis. The high levels of secreted lactate promote acidosis in the tumoral microenvironment, which favors metastasis and angiogenesis. The accumulation of lactate and protons in the extracellular region of the tumor cells is a hallmark of cancer. This accumulation prevents intracellular acidification, as cancer cells prefer a more alkaline internal microenvironment that enhances DNA replication. The reveal of the actual role of lactate in carcinogenesis will support more accurate and effective therapeutic approaches for cancer. In this project, the effect of lactate and protons on Endothelial and cancer cells migration behavior will be studied by investigating the biological pathways and transduction signaling proteins related to the Endothelial cells' migration and cancer cells' metastasis. We hypothesize that Lactate in conjunction with protons affects normal and cancer cell migration. This occurs by altering the feedback regulation for the proteins involved in the biological pathway that controls the migration of the cells, and thus controls cancer cells development. We will determine the effects of different lactate and proton levels on cell migration for normal and transformed cells, besides Investigating the biological mechanism through which endothelial and cancer cells' migration is regulated under various concentrations of lactate and protons. Some of our preliminary results showed changes in several phenotype characteristics such as cell morphology and length of cell protrusions during migration, besides changes in cellular migration rate when treated with different lactate concentrations.

GO15

A Redefinition of Self: The Design, Implementation, and Impact of a Career Exploration Course for Students on Academic Probation

Jordan Chance Bullington-Miller

Mentor: Siegel, David J

Students on academic probation are among the most vulnerable populations within higher education. Research indicates that following a semester of academic difficulty, students experience diminished self-efficacy and a decline in academic motivation. Evidence from a growing body of career development literature indicates that career exploration increases self-efficacy, improves decision-making, and enhances academic performance. Studies have explored the impacts of academic recovery programs and career development experiences as mutually exclusive interventions. No existing study previously explored the intersection of the two. This mixed methods case study assessed the impact of a career exploration course for students on academic probation. It examined the impact of the course on career self-efficacy and academic motivation, the value students assigned to such a course, and their experiences within it.
The study explored the experiences of 15 students on or at risk of academic probation. Qualitative data suggested that career exploration contributed to increased confidence for students on probation. Quantitative data demonstrated statistically significant increases in the five competencies of career self-efficacy (occupational information, goal selection, planning, problem solving, and self-appraisal). Academic motivation declined in all three extrinsic motivation constructs and two intrinsic constructs (EM: external regulation, introjected, and identified; IM: toward accomplishment, and to know) with an increase in intrinsic motivation: to experience stimulation. However, the change in academic motivation was not statistically significant overall. Additional research is necessary to understand the predictive and mediating factors that contribute to the decline of academic motivation for students on academic probation.

GO16

Connecting Kindergarten Readiness and Food-based Learning in the Head Start Preschool Classroom

Jocelyn Bayles Dixon

Mentor: Stage, Virginia Carraway

Background: While food-based learning (FBL) has been cited as the most effective way to increase children's preference and consumption of vegetables in the preschool classroom, teachers face barriers such as limited time or competing priorities. Integration of FBL with other learning domains is one promising solution; however, research is needed to understand teachers' use and perception of integrative FBL experiences.

Objective: Explore common experiences of Head Start (HS) teachers use and integration of FBL with science learning activities in a preschool HS classroom.

Study Design, Setting, Participants: 35 in-depth semi-structured telephone interviews were conducted with HS teachers from 16 counties across the three regions of North Carolina. All interviews were audio recorded and transcribed verbatim.

Measurable Outcome/Analysis: Phenomenology was used to guide study design/analysis. Researchers identified significant statements through open coding which were grouped into themes. Interrelated themes were condensed and presented in a model depicting the "what" and "how" of teachers' experiences.

Results: Participants were 94% female, 40.8 years (SD 10.06), and predominantly white (52.9%) and Black/African American (44.1%). Researchers identified 5 primary themes: (1) How Teachers integrate FBL; (2) Perceptions of Successful FBL; (3) Motivators; (4) Barriers; and (5) Connection to Kindergarten Readiness. Teachers described most frequently utilizing FBL during mealtimes. However, when FBL occurred outside of mealtime, unhealthy foods were often used. Teachers stated they felt successful when children were engaged and willing to try a new food. Teachers reported several

motivators (e.g., improving health) and barriers (e.g., food waste) to integrating FBL. Some teachers saw a connection between FBL and kindergarten readiness while others did not.

Conclusions: Teachers are trying to engage children in FBL but may need additional training focused on FBL best practices, as well as resources to improve FBL integration in ways that promote kindergarten readiness.

GO17

Instruction of Mass Casualty Assessment and Management with Simulation Based Learning is Beneficial to Graduate Health Science Students

Julian Gordon

Mentor: Brewer, Kori Louise

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In recent years, both undergraduate and graduate health sciences curricula have trended toward an increase in the use of Simulation-Based Learning (SBL) to augment traditional lecture-based education. Emergency Medicine has been keen to embrace this model, with residency programs frequently utilizing SBL to teach key skills - especially those not routinely encountered in everyday practice, such as the management of mass casualty scenarios (MCS). While MCS training is common in graduate medical and military education, such training can also offer valuable teaching opportunities for preclinical students in medical and health sciences programs.
This study assessed the utilization of simulation-based learning to improve the knowledge of health sciences students in the management of mass casualty scenarios. During a four-hour session, faculty instructed students on topics pertinent to MCS management - including triage, airway management, vascular access, hemorrhage management, and chemical decontamination. Students completed a seven question exam assessing their knowledge of mass casualty medical management both before and after the session. Pre- and post-quiz scores were compared using a one-way paired t-test and are given via mean scores plus or minus standard error of mean. Students also indicated their satisfaction via a 5-point Likert scale.
Eighteen participants completed both the SBL scenario as well as pre- and post-scenario assessments: eleven were second-year students in a Physician Assistant master's program and seven were first- and second-year allopathic medical students. All were in the preclinical phase of their respective educational programs. Average knowledge scores showed significant improvement from a pre-event score of 72.5 +/- 5.7% to a post-event score of 91.7 +/- 2.4% with a p-value of 0.005. All participants indicated “agree” or “strongly agree” regarding enjoyment, increased knowledge, and an enhanced learning experience as compared to traditional lectures. The mean enjoyment score on the survey was 4.84 out of 5, with a score of 5 indicating “strongly agree”.
Our data indicate that simulation-based learning is an effective tool for teaching clinical skills relevant to mass casualty scenario management. This supports the growing body of evidence highlighting the effectiveness of SBL, as well as its approbation by learners. Future studies will assess retention of knowledge and clinical skills gained through mass casualty scenario SBL.

GO18

CHILDREN OF WAR: PREPARING MILITARY DEPENDENTS FOR HIGHER EDUCATION BY PROVIDING COMPREHENSIVE, FOCUSED SUPPORT TO IMPROVE EDUCATION OUTCOMES

Deborah Lucas

Mentor: Puckett, Heidi Leigh

Since 2001, over two million children have experienced having one or both of their parents deployed (Tunac de Pedro et al., 2018). There is significant research that shows that "military children experience tremendous psychological strain as a result of stressful military related life events" (Tunac de Pedro et al., 2011, p. 567). The research that currently exists focuses on childhood experience and intervention at the K-12 level. Research on best practices for supporting military children in higher education could form the foundation of how colleges and universities can provide similar support. The young adults who were not yet in kindergarten when the attacks of 9/11 occurred are now entering higher education. Their needs have not simply vanished with the awarding of a high school diploma, and these young adults are trying to cope with an entirely new educational environment without the support that they have previously experienced.

This study focused on supporting the children of military service members in higher education by developing students' self-advocacy and providing academic support for these students while they were concurrently enrolled in high school and college. The intent of the interventions discussed in this study was to provide those students with the tools they need to successfully navigate veteran-focused resources on college campuses and to self-advocate for the resources they need to be successful. The findings presented in this study provide the foundation for recommendations for further research and intervention.

While this study may not have been conducted across a broad institutional manner, the findings demonstrate that implementing a course curriculum and providing focused interventions show that student success is related to focused intervention and a student's feelings of validation. This study further shows that students who are military dependents have a clear sense of that identity and what it means to themselves and to their community. I have argued throughout this study that there needs to be focused attention on military dependents in higher education. Even with the end of America's longest war, there is still a generation of young people whose lives are marked by their parent's sacrifice and service. The very least that we as a nation, and especially those of us who are educators, can do is to make every effort to validate these student's experiences and to support them as they pursue their academic goals.

GO19

TARGETED MARKETING TO THE UNDERSERVED: EXAMINING THE FACTORS THAT INFLUENCE COLLEGE INTENT AND CHOICE FOR MINORITY MALE HIGH SCHOOL STUDENTS IN EDGECOMBE COUNTY, NORTH CAROLINA

Bruce E. Panneton

Mentor: Chambers, Crystal Renee

This qualitative study investigates some of the real and perceived barriers that African American, male Edgecombe County high school students face when considering college enrollment after high school. "Uncertainty" and "frustration" were revealed as the main barriers that these students face when considering post-secondary enrollment. Participants indicated uncertainty related to college major, college cost, paying for college, student loans, money, and self-efficacy. Participants indicated frustration related to course choices in college programs, mathematics classes, and high school GPA not being a real indicator of their ability. The study design included semi-structured group interviews of African American, male, Edgecombe County high school students. Participant responses to interview questions were thematically analyzed.

Responses from study participants, as well as subsequent meetings and conversations with key stakeholders and inquiry partners, show that there are

opportunities to improve the college approach to recruiting students from this demographic. Clearly defined educational pathways (from high school through college), job market analysis incorporated with program/degree marketing, financial aid literacy initiatives for both students and parents, and intentional recruiting visits to area high schools are all tools that this study has indicated may help create more post-secondary opportunities for more African American male high students in the Edgecombe Community College service area. The findings will be used to inform marketing, outreach, and recruiting strategies at Edgecombe Community College to attempt to address the significantly lower enrollment of this market segment.

GO20

Beyond Sacred Stacks: interactive wellness initiatives in open academic and medical library spaces and students' role in supporting each other's emotional and spiritual wellbeing

Joanna Rohrbaugh

Mentor: Bright, Kawanna Michelle

Library and Information Science studies published since 2017 contain a plethora of investigations for wellness initiatives in closed academic and medical library spaces such as rooms; non-interactive wellness initiatives promoting self-care/individual wellbeing such as meditation; inferences that academic and medical library staff, as wellness initiatives creators or facilitators, solely support students' wellbeing.
This study will investigate interactive wellness initiatives at two East Carolina University libraries: Messages of Unity Exhibit, in a corridor of James Y. Joyner Library; Community Messages Whiteboard, in a corridor of William E. Laupus Health Sciences Library. Ethnographies of these open space, interactive wellness initiatives will include an examination of the influence of Judeo-Christian faith traditions in the messages' content and context, which may also inhibit these wellness initiatives' inclusivity of diverse religious and spiritual practices represented in ECU's Main and Health Sciences campus populations. Interviews will be conducted with the Engagement and Programs Coordinator, curator of the Messages of Unity Exhibit, and Engagement and Assessment Coordinator, curator of the Community Messages Whiteboard, and surveys administered to Joyner Library and Laupus Library staff. Through findings derived from the ethnographies, interviews, and surveys, this study will offer insights regarding interactive wellness initiatives in open academic and medical library spaces supporting students' wellbeing, particularly its emotional and spiritual aspects. Its findings will also offer insights regarding students from main and health sciences campus populations supporting other care/communal wellbeing, particularly its emotional and spiritual aspects. Through acknowledging the students' role, as contributors to the outcomes of wellness initiatives in academic and medical library spaces, future interactive wellness initiatives may: yield students and staff co-creating wellness initiatives; increasingly promote inclusion of diverse religious and spiritual practices represented in college student populations; collectively contribute to wellness outcomes' effectiveness.

GO21

EXAMINING THE IMPACT OF IMPLEMENTING EFFECTIVE ONBOARDING ON BEGINNING TEACHER AND NEW HIRE TURNOVER IN A TITLE I ELEMENTARY SCHOOL

Andi Webb

Mentor: Lewis, Travis Earl

Teacher retention has been a growing nationwide concern for years that has exponentially worsened as a result of the COVID-19 global pandemic. Schools serving students from low socioeconomic backgrounds tend to be most negatively affected by high rates of teacher turnover.. This study examined the impact of implementing effective onboarding on beginning teachers and new hires in a Title I elementary school in an effort to reduce teacher turnover. A mixed methods action research design was utilized whereby an onboarding program was implemented across three phases of improvement using the Plan, Do, Study, Act

model. Data was collected using surveys and interviews with the teacher participants. Teacher preparation, teacher retention, benefits and compensation, mentor support, onboarding, and self-efficacy were factors analyzed. Teacher and staff turnover continued to occur throughout each phase of the study. The findings indicate that while the onboarding program implemented had a positive effect on the participants, the results were inconclusive overall due to the numerous confounding variables that arose and could not be controlled by the scholarly practitioner.

GO22

Simulation of Traffic Network Performance with Human driving and Autonomous Vehicles

Matthew Carroll

Mentor: Lee, Jinkun

Matthew James Carroll, Dr. Rui Wu (Computer Science), Coleman Ferrell, Dr. Jinkun Lee (Engineering)

As autonomous driving capability such as self-driving has become a standard technology in major automobile manufacturers, the future of fully autonomous vehicles seems to change current traffic systems and traffic management strategies. In particular, the advanced sensor-based self-driving algorithm and the capability of data sharing between connected vehicles may enable each autonomous vehicle to drive with a minimum distance between cars at high speed which was not possible before. Since the transformation of the current road traffic network into a fully connected autonomous driving network will be a gradual progress depending on the penetration rate of autonomous vehicles, the road traffic network may show a transient system behavior. We are interested in understanding and predicting this transient system behavior to maintain or improve the performance of the road traffic network during this transitional period. We investigate the traffic network performance by simulating it with various vehicle models that capture the behavior of conventional and autonomous vehicles and identify key factors of the autonomous vehicle model that may impact the traffic flow during the transitional period toward a fully connected system.

GO23

To Develop a Hydrological Model for Eastern North Carolina

Mahesh Ramesh Tapas

Mentor: Etheridge, James Randall

Mahesh Ramesh Tapas
Randall Etheridge
Julie Miller
Zeke Holloman
Brian Hinckley

The coastal region of North Carolina is regularly affected by tropical storm systems. It is important to examine the response of a watershed to these extreme events as they are expected to become more frequent in the future. The Tar-Pamlico River drains into the Pamlico Sound. These bodies of water have been the site of fish kills for multiple decades and there has been catastrophic flooding in the watershed multiple times over the same period. Gaining an understanding of how nutrient cycling and flooding may change with more frequent extreme events is important for preparing for the future.
This study uses the Soil and Water Assessment Tool (SWAT+) to model the flow and nitrogen export from the Tar-Pamlico River to the Pamlico Sound. Our current model uses a warmup period of 4 years, is calibrated for six years, and validated for three years. The hydrological portion of the model was calibrated by comparing observed and simulated flow values using the Nash-Sutcliffe efficiency (NSE) coefficient and adjusting the appropriate model parameters to maximize the NSE.Similar calibration was carried for nitrogen loading. This presentation will describe the first observations based on model results.

GO24

Wave attenuation across high-relief and low-relief oyster reef breakwaters constructed in a narrow tidal creek

Georgette L. Tso

Mentor: Narayan, Siddharth

Georgette Louise Tso, Coastal Studies. Dr. Siddharth Narayan, Coastal Studies. Dr. Rachel Gittman, Biology. Anna Albright, Biology. Janna Haddad, UNC.

Oyster reefs are valued as nature-based coastal defenses for their ability to attenuate waves, meaning the reduction of incoming wave heights and energies. Oyster reefs that are successful at attenuating waves can reduce coastal erosion, protect marsh vegetation, reduce risk of flooding, and protect vulnerable coastal communities against the threat of sea-level rise. Oyster reefs are also valued for their numerous ecological ecosystem services, which include water filtration, increasing local primary production, and buffering against estuarine acidification. Unfortunately, it is difficult to achieve both wave attenuation success and ecological success when deploying oyster reef breakwaters. Reefs that sit at higher elevations relative to the local tidal range are more effective at wave attenuation, but oyster reefs that sit at lower elevations are more ecologically successful since oysters require long inundation times to thrive, thus posing a design optimization problem. Twelve oyster reef breakwater sites were built in Taylor's Creek, NC, a narrow tidal creek with frequent boating activity. The oyster reef breakwaters differed in height: four low-relief (1 foot) oyster reef breakwaters, four high-relief (2 feet) oyster reef breakwaters, and four control (no reef) sites were built. Wave gauges were deployed landward and seaward of each oyster reef from September-November of 2021. Spectral analysis was used to calculate wave heights and energies from the raw pressure data collected by the wave gauges. Percent wave attenuation calculated across different oyster reef treatments will be used to develop guidance on what height oyster reefs should be built relative to local tidal ranges for maximum wave attenuation capabilities.

GO25

Bibliographic Reference Classification in Archival Data using Supervised Machine Learning and Grammatical Features

James Philips

Mentor: Nassehzadeh-Tabrizi, Moha

Bibliographic references are integral to scholarly discourse in humanities disciplines. While prior work has focused on reference extraction and parsing, little research has investigated the classification of footnotes containing bibliographic citations and author commentary using supervised machine learning methodologies. Using an historiographic dataset drawn from the JSTOR humanities archive, we train and compare the performance of a suite of single and hybrid machine learning classifiers on a novel, previously unexplored reference classification task. Moreover, as a part of this analysis, we compare the performance of traditional features and novel, grammatical features drawn from natural language processing. Our work demonstrates the superiority of hybrid models for classification of scholarly footnotes containing historiographic bibliographic references, the transferability of features from reference extraction to this research problem, and the viability of training machine learning models for this task utilizing novel, grammatical feature sets.

GO26

Developing My Archive: On Being

Briana Earle

Mentor: Wells, Angela Franks

My current visual research examines personal experiences surrounding homesickness and nostalgia. For most of history, nostalgia and homesickness have been linked together even though they differ. Nostalgia is a longing for a time, while homesickness is a longing for a place. Where we come from is an integral part of our being, but what we become nostalgic for also shapes what we become. My work explores the idea of photographs existing as a substitution for memory and how photographic manipulation can change how we remember events. Photography lets me explore and recontextualize my exalted memory surrounding my transition from South Dakota to North Carolina. This method allows me to reclaim control over what I want to remember. Centering imagery around home and routine allows viewers to connect openly to various physical and emotional landscapes. Viewers are encouraged to participate in the transfer and re-constructions of these personal memories. My work challenges us to focus on and appreciate small moments we are surrounded by and how they shape our outward attitudes and understandings of what we consider home.

GO27

Korean Onggi that confronts American circumstance regarding Clay body and Firing

Joogab Kim

Mentor: Tisnado, James R

Onggi, a Korean traditional storage vessel, has been used to store Korean fermented foods for thousands of years. Onggi tradition has gradually evolved along with dwelling, food, soci-culture, philosophy, and religion through interaction of Koreans. In particular, onggi was added as one of the Korean Heritages from National Research Center of Cultural Heritage, so it has become a symbol of Korean culture, and an artistic form.
In my research, I am combining the Korean tradition of onggi jars with American contemporary art. While researching, I discrovered two issues that stand in the way of a smooth merging of onggi and American artistic intent. First, onggi traditional vessels were born in the Korean penninsula where potters used native clay from their local residence. It is nearly impossible to find the exact clay in America. Second, onggi is usually bigger than any other ceramic forms so that it needs to be fired at a certain temperature in a wood-kiln. Thus, recognizing a certain temperature and managing the kiln process in an ECU facility are important for my creative activities. In conclusion, recycled clay that other students used works well to make onggi, because it provides enough plasticity and refractoriness that onggi clay requires. Second, I figured out what the temperature range that is suitable for sintering onggi jars without cracking when fired in a wood-kiln is roughly cone 7 or 8(2264 or 2305 °F), but not over 9(2336 °F), and onggi jars also need an oxidation or neutralized kiln environment.

GO28

Information-Media the Transference of Information

John Cannon Rhodes-Pruitt

Mentor: Eagle, John Scott

Information transfer is a process that happens all around us and yet, we often overlook its fundamental importance in the way we perceive and understand our world. I address the problem of visually representing this idea through the use of origami, cyanotype, and traditional drawing techniques. I blend these media together to create visual metaphors that touch on the act of transference itself rather than using them to represent specific content. In my work, such content is becoming less relevant as I explore the ways the information can be obtained, manipulated, obfuscated, and ultimately revealed to an audience.

GO29

Young Love and the Dichotomy of Innocence, Joy and Pain

Loraine Scalamoni

Mentor: Eagle, John Scott

Loraine Scalamoni

Love is a subject artists of all genres have been exploring for centuries. My work addresses the pain experienced in love using the visual symbol of the cactus representing male or female genitalia, and the ability it has to create pain. Cacti are often plants that can literally create pain by pricking with a long thorny spine or fine haired glochid. Even the use of the word "prick" can be viewed as the poke of a sharp object or as a slang word for the penis as well as a contemptible man. By positioning my figures in playful poses and using cactus as a sexual symbol, I am playfully investigating the dichotomy of feminine innocence versus the association of pain in love and impurity of sexual activity.

GO30

Coping with Seperation and Loss: Life Without My Twin Sister

Haleigh Stanley

Mentor: Wells, Angela Franks

I have only known life with my twin sister by my side. I thought we would be together always. Recently we separated for graduate school, and we are both struggling learning to live alone and living without one another. Being an identical twin and separating after twenty-five years of living together is an experience I hoped would never come. My photographs focus on loss, death, and separation to help me cope with the separation from my sister. My work depicts these feelings but also shows the many ways people grieve and experience loss.

GO31

A Process for Healing

Swan, Lindsay

Mentor: Tisnado, James R

Lindsay Danielle Swan

My research and artwork visually explore and document complex post-traumatic stress disorder, dissociative amnesia, and depersonalization-derealization disorder which can develop in survivors after experiencing long term sexual abuse. While creating art, I am excavating long dormant traumas and examining feelings of self-blame, shame, and stigmatization. I consider myself an explorer of my own cerebral landscape, visually documenting my experiences with dissociation, what I call the “dream world”.
Learning how to fix that which seems broken beyond repair has drawn me into working with clay and ceramics as a medium. Hand building through coil and slab techniques offers a tactile sense of control before the work goes through a trial by fire. Opening a kiln is the pivotal moment where I discover what has survived unscathed or is cracked and broken. Through trial and error, I have found what feels like my biggest failures end up becoming my most treasured works. Working with a clay body is symbolic to my life experiences as a survivor, and in many ways is identical to the process of healing. By finding the courage to share my story, it is my desire to shed the last remnants of my victimization and become a voice of hope for other survivors.

GO32

River Rat

Morgan Williams Zichettella

Mentor: Wells, Angela Franks

The marsh, what is it about this brackish, swamp-like area that is so attractive? This environment emulates gnarly gases, is filled with death and erosion, yet has a thriving and resilient ecosystem. Its eerie beauty and mystery captivate you. There is an odd limbo, a memory of something that once was and yet, still is. An environment continually changing, the marsh is full of the past, present, and future. This bizarre swampy wetland was my playground as a child. I grew up chasing fiddler crabs, building palm frond forts, crabbing from the neighborhood dock, being a river rat. I feel peace when I'm kayaking in the river surrounded by sawgrass, breathing in the salt air, and feeling the warm kiss of the sun on my face—the stillness. There's mutual respect and understanding amongst all who share this ecosystem. My current research studies the personal connection to saltwater and its associated ecosystem. River Rat tells the story of the coastal environment I grew up in—the importance of the water, marshland ecosystems, and how we all coexist. I collaborate with nature by using the saltwater from the areas I photograph. The photographs provide a visual representation of the respect and understanding between all who share this ecosystem and continues the dialogue of how water is more than a resource. Coastal wetlands, salt marshes, mangroves, and sawgrass, store a quarter of the carbon found in the earth's soil despite only covering 5% of the planet's land area. These barriers protect and provide for us while self-sustaining their ecosystem. This series captures the beauty and fragility of this beloved and often overlooked ecosystem.

GO33

A Shift in Process: Traditional Painting Applications with Integrated Technology

Christopher Zidek

Mentor: Eagle, John Scott

The first wall art appeared tens of thousands of years ago. Romans would write protest poems and their names on public walls. In America, it began with hobos scribbling on trains when they would hop from town to town. Then in the 1960’s it started appearing on walls in Philadelphia, quickly spreading to New York where it became much more elaborate and complex, turning into its own movement. These pieces were roughly planned in blackbooks (what graffiti artists call their sketchbooks) then applied to a wall. In the early 2000’s, with the advent of digital rendering becoming more relevant, the line between digitized artwork and physically painted work began to be blurred. I utilize this fusion of technology and analog application in my own work to create work that is for both galleries and the public. In doing so I hope to explore the area beyond the modern muralism movement while still applying the angular clean lines and visual abstraction of the modern graffiti movement.

GO34

Grounded

Sina Bennett

Mentor: Tisnado, James R

Sina Bennett

My creative research leads me to exploring the relationship the natural world has with the human body as well as the mind. I am looking at the connections plants form with each other through mycelium. Mycelium is a thread-like network created by fungi made of hyphae and is often found in forest floors. I am interested in exploring the ways that roots connect themselves into the earth and the metaphorical ways that can be used to describe the human experience. The research I am doing is about the relationship between plants and humans.

GO35

Fish Dreams

Karena B Graves

Mentor: Jubran, Hanna

In my family, some dreams have spiritual meanings and prophetic connections between the subconscious and conscious reality. Anthony Shaftons research suggests that this symbolic relationship to dreaming is common among Black American families. I am researching this commonality by first examining my own familial tradition of fishing and experiences with dreams about fish that consistently prophesied family pregnancies. My aim is to bring awareness to the relationship between fishing and dreams in Black American culture by creating a series of mixed media sculptures. By creating these sculptural installations, I have accomplished my goal.

GO36

In the Studio to in situ: The potential use of clay to support marine growth

Julienne Beblo

Mentor: Tisnado, James R

Many marine organisms require a hard substrate onto which they can attach and grow. In an effort to create hard substrate to sustain, rebuild, and study marine habitats, many materials have been used to serve as artificial reefs or substrates in marine environments. These materials typically include flat ceramic tiles, PVC pipes, expanded vermiculite, acrylic sheets, and marine-grade concrete. Often times, when studying marine growth, the forms of artificial substrate used are flat, geometric surfaces that are not as complex as naturally formed marine substrates. In an effort to examine the use of clay sculptures as a possible substrate, multiple structures were created in the ceramic studio. The pieces included organic and three-dimensional forms that mimicked textures found in the ocean. They were then deployed in a coastal study site for three months. Upon removal, the resulting level of marine growth on the pieces created in the clay studio indicated that this material and its associated forms may serve as a viable option for marine substrates which promote and sustain marine organisms.

GO37

The Art of Perception

Emily Booker

Mentor: Lazure, Timothy

When we understand that every individual has undergone their own unique experiences that shapes the way they understand the world and those they interact with, we can appreciate that everyone has a different framework through which they view the world: their own lens of perception. These unique lenses of perception determine not only what we see, what we choose to focus on, and what stands out to us, but how we interpret those experiences and their importance to us as individuals. Without meaning to, our subjective perceptions influence our understanding of reality, causing conflict when we don't recognize that others may view the world in a different way. References such as philosophers, artists, and small object makers who have explored similar ideas of perception, perspective, and reality in their work are influencing my research. In my own work, I am exploring similar concepts of perception, obscured information, the vulnerability of memory, and the subjectivity of something most assume to be an objective understanding of the world.

GO38

Kodokushi: Ageing, Loneliness, and Death in the LGBTQ Community

Michael Gaines

Mentor: Wells, Angela Franks

Every day I am reminded of the realities of life, that my immediate family is getting older, that I have been single for far longer than I like to admit, and that social media is having a negative impact on my mental health. During the onset of the Covid pandemic, one of the first projects I made confronted the isolation, depression, and anxiety I felt being confined to my apartment. As the pandemic has continued and I have gotten older, a realization has crept from my subconscious to my conscious, that I may very well die alone. The Japanese have a term for this, kodokushi, or "lonely death," and it has become my greatest fear. As an older gay man with no children of my own, or any nieces or nephews, I think about who will be left to carry on my memory? Who will remember me? A friend once joked that the only reason I want to be buried in a mausoleum is because I want a monument to myself. He wasn't entirely wrong – this acknowledges an innate human desire to leave an impact, to be remembered for something. It also helps to explain my fascination with old cemeteries. As places of quiet contemplation, I can get lost in thought as I study the architecture and landscape of the cemetery, as well as admiring the artistry of funerary symbolism. By reading headstones and paying respects to these strangers, I enact my own ritual of remembrance for those who did not have anyone to carry on their own legacies. All of this has led me to begin questioning my own need for remembrance, and through my creative work and research I am beginning to unpack these fears and confront my own mortality.

GO39

Information & Action Campaign on the Adverse Impact of Swine Concentrated Animal Feeding Operations in Eastern North Carolina

Emily Hall

Mentor: Normoyle, Catherine Lucille

Swine Concentrated Animal Feeding Operations (CAFOs) detrimentally impact the environment and neighboring communities wherever the facilities are sited. Due to the availability of low-cost land, the low political power of rural populations, and massive state-level deregulation by industry-friendly members of the General Assembly, swine CAFOs are frequently sited in Eastern North Carolina. These industrial pork production facilities yield myriad issues, with little benefit outside of corporate profits. Swine CAFOs

contaminate the air, water, and soil surrounding the facilities. The pollution generated by these operations adversely impacts the physical and mental well-being of neighboring populations. Quality of life deteriorates, property values decline, and wealth is extracted from the surrounding community. Nearly all the detrimental impacts of CAFOs can be attributed to a single source: the waste management system. The large number of pigs grown in confined settings generates 10 billion gallons of fecal slurry annually in our state. All this pork poop is a problem. This research seeks to educate, inform, and inspire action in members of our community. Over the course of approximately six months, informative material regarding the negative impact of CAFOs is being distributed on the campus of ECU, in the surrounding community, and online. Efficacy of the campaign in terms of awareness raising is ongoing, and consists of collecting survey data, evaluating webpage analytics, conducting interviews, and investigating social media metrics. This research also consists of reviewing the literature, evaluating the problem from an environmental justice perspective, and determining effective methods to establish audience buy-in. This project will culminate in a community-wide "No Pork Pledge" on April 18, 2022. The project will launch a call-to-action to commit to one day of taking the pork off our forks. Follow-up investigation will evaluate the successes and failures of the campaign to educate, inform, and initiate action.

GO40

The Story of Ayon: A Sculptural Monomyth

Thaddeus R Prevette

Mentor: Jubran, Hanna

My research follows the monomythical structure of Joseph Campbell's "The Hero's Journey". The Story of Ayon is a sculptural representation of a hero journeying into a world of the unknown, then returning victorious after overcoming trials and tribulations, while combining inspirations from both Western and Eastern mythologies. Ayon is a warrior pursuing a dragon, who overcomes the trials of the wilderness, and is guided towards a realization of change from aggression to tranquility. For me, making these sculptural vessels, dragons, and murals have become a therapeutic process by using thin strips of steel to weave a consistent pattern that invokes a sense of permanence, structural integrity, and tranquility.

GO41

Immortalizing Vestiges of the Dead

Nicholas Hesson

Mentor: Lazure, Timothy

Grief is a slow process of unfolding emotions and reintegration; it is full of powerful feelings linked towards the connections we have between people past and present. I explore the sentimental attachment to the physical form of a person and how we chose to represent, remember, and memorialize those who have passed through enameled objects and jewelry. In this presentation, I will address how I utilize various iconography to create urns, shrines, and vessels to hold the memories of people. Evidence will be provided from various cultural and religious traditions that support the importance of burial practices throughout the world. Rituals around death play an important role in the mourning process and overcoming grief. It is through these societal rituals that we celebrate the life and death of our loved ones. Death only ends a life, not the relationship with that life, I embrace the taboo dialogue that is often surrounding this subject by manifesting the symbolic representation of the spirit in these objects. I investigate how we interact with what we hold sacred and how we create and carry those connections.

GO42

Trash Magic: A Wastelander's Guide to Collage

Anthony Naimo

Mentor: Lazure, Timothy

This document analyzes salvage punk aesthetics in apocalyptic science-fantasy media as a vehicle to explore themes of environmental justice in found-object junk art. This genre of art shares a commonality with the visual language of salvage-punk design: fabricating novel creations by repurposing scavenged materials. A key factor here is that said materials, often pieces of discarded trash, are being used for something other than their original purpose. Rather than allowing the material to accumulated indefinitely in a landfill, it is being reintroduced into daily life under a newly defined context. Junk is gifted with newfound utility. As if by alchemical influence, junked materials solve and coagulate as newly purposed constructions. Under salvage punk ideology, an individual is empowered to discover novel, sustainably engineered solutions to everyday problems by repurposing locally sourced salvage goods in place of purchasing a newly produced commodity. The contents of this analysis will reflect on how I utilize junk in my own artwork. I love to imagine my materials for what they could be: dinged-up spaceships, plasma rifles built from scrap, and I find exceptional joy in the rendering of robots. I work with junk to advocate for locally managed, sustainable solutions in engineering and conservation. To build the land of tomorrow, we must implement the wisdom of yesterday with the materials of today.

GO43

Impact of Race on Outcomes in Melanoma

Mona Amin

Mentor: Vohra, Nasreen A

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Cutaneous melanoma is the fifth most common cancer in the United States. Despite a recent decline in death rate, racial minorities continue to experience disparate outcomes. We sought to examine the impact of race on overall survival in melanoma patients.
Melanoma Participant User File data (2010-2017) obtained from National Cancer Database (NCDB) were analyzed via SPSS version 27. Only patients with AJCC 7th edition staging were included. Because the overwhelming majority (98.6%) of all patients were Non-Hispanic Whites (NHW), we grouped together Black, Hispanic, and other races (RO). Covariates analyzed included Charlson-Deyo Score, insurance status, income, percentage without high school degrees, and histology. Kaplan-Meier was used to estimate overall survival and factors were included in a Cox proportional hazard model. Of 393,023 patients, 384,677 were NHW (98.6%) and 5,346 were RO (1.4%). Compared to NHW, RO are diagnosed at later stages (S): S0 (28% vs 25.5%), SI (45.3% vs 33.1%), SII (13.1% vs 17%), SIII (8.9% vs 15.1%), SIV (4.7% vs 9.3%). RO are more likely to come from lower SES than NHW (16.1% vs. 8.4%), and more likely to present with Melanoma NOS and acral lentiginous melanoma (56.5% vs. 51.6%, 11.7 vs. 1.0%). Compared to NHW, RO are less likely to have private insurance or Medicare (48.9% vs. 46.7%, 43.8% vs. 37.3%) and more likely be uninsured (1.8% vs 4.4%). On univariate analysis, mean overall survival was significantly lower in RO than NHW populations for stage III patients: 74.9 (95% CI, 70.97 to 78.95) vs. 83.2 (95% CI, 82.49 to 109.6), p <001 while not being significantly different for stage I, II and IV. Cox

Regression shows Hazard Ratios are greatest in Stage III & IV: 4.119 (95% CI, 4.003 to 4.239), 17.078 (95% CI, 16.615 to 17.555). It is unclear why overall survival in stage III patients is different in NHW compared to RO. This observation is likely multifactorial and may be related to later stages at diagnosis, differences in tumor biology or social determinants of health. Our results suggest more research is needed to understand why nodal involvement (stage III) results in significantly lower survival for non-white populations.

GO44

Nursing Staff's Role in Detecting Urinary Tract Infection in Nursing Homes: An Integrative Review

Kimberly Delgado

Mentor: Roberson, Donna W

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Annually, 50-70% of nursing home (NH) residents are administered at least one antibiotic. Despite evidence-based protocols, of the antibiotics prescribed, 75% were prescribed inappropriately, and 50% were the wrong drug, dose, or duration with urinary tract infection (UTI) being the most common indication. In NHs, nursing staff spend a significant amount of time with the residents and are usually the first to recognize a change in condition. The purpose of this integrative review was to examine the state of the science to determine NH nursing staff's impact on the prescriptive process related to the identification and report of signs and symptoms indicative of UTI. This integrative review was conducted following Whittemore and Knafl's recommended methodology; level of evidence and quality were analyzed using Johns Hopkin's nursing evidence-based practice guidelines. We used an a priori process to analyze non-experimental and experimental data and enhance rigor while reducing bias. In this review of 19 articles published between 2011 and 2020, three common themes were identified using constant comparative analysis: elements of antibiotic stewardship in NHs, nursing's influence on prescriptive decision-making, and nursing staff's antibiotic stewardship responsibilities. In addition, while the prescriber was recognized as an expert in UTI management, the nursing staff in NHs were the individuals who recognized changes and communicated the residents' needs to the prescribers. Further research must clarify the nursing staff's role(s) in detecting UTIs and their decision-making before reporting changes to the prescriber. Using this study as a foundation, future studies which include LPNs and CNAs may have a notable impact on NH regulations, education, and nursing scope and standards of practice.

GO45

The Impact of Race and Ethnic Identity on Body Dissatisfaction in College age Females

Monica Dunn

Mentor: Das, Bhibha Mayee

BACKGROUND:Most of the research conducted on body dissatisfaction (BD) has primarily studied White females and their drive for thinness; this research is limited and less generalizable because it lacks representation of diverse racial populations in the US. Therefore, the purpose of this exploratory study was to assess how race impacts a woman's body image.
METHODS: Female college students between the ages of 18-25 years were recruited to take an online survey. Demographic and body image questionnaires were used. An independent t-test was used to analyze the impact of race on BD. A linear regression model was used to assess the impact of demographic data on BD.

RESULTS: Participants (N = 314; 21.81+/-2.05 years; 33.1% Non-White) had an average BMI of 25.30+/-6.14 kg/m2. After separating the sample by race (White females versus Non-White females), BD was assessed. BD is scored from 1 to 5 with lower scores indicating higher BD. White females (n=192) scored 3.16 +/- 0.71 while Non-White females (n=98) scored 3.19 +/- 0.71 (p=.722); thus, there was no significant difference between BD in White versus Non-White females. Race (B=-.23, p<797) was not shown to significantly influence body image, however, females with a higher BMI had a higher level of BD (B=-.035, p<001). Additionally, females in which a majority of their friends engage in health/fitness activities had higher levels of BD (B=-.26, p<01) with an adjusted R-Square of 0.02 (F(4, 285) = 4.88, p<001).
CONCLUSION: BD impacts woman of multiple races, it is specifically elevated in women of higher BMI and women associating with physically active friends. Future research studies should examine qualitative reasons why females who associate with physically active friends have higher levels of BD.

GO46

Solar Ultraviolet (UV) Radiation Exposure in Outdoor Working Environment During Cold Months

Nanaobaayaa O Owusu

Mentor: Balanay, Jo Anne Goot

Professions that are predominantly based outdoors have the risk of workers being exposed to solar ultraviolet (UV) radiation every day and during every season. Multiple studies have been conducted on outworkers' UV exposure during spring and summer months, but studies detailing their UV exposure during winter months are rare. The purpose of this study was to assess the UV exposure of groundskeepers employed at East Carolina University (ECU) during cold seasons (fall, winter, spring) compared to that in the summer season and to determine if UV exposure during cold seasons exceeds the Threshold Limit Values (TLVs) set by the American Conference of Governmental Industrial Hygienists (ACGIH) as occupational exposure limits. Area monitoring of UV radiation was conducted to measure the UV effective irradiance (UVeff) using a weatherproof erythema UV detector and a digital data-logging radiometer. Ambient temperature was also collected using the OSHA-NIOSH Heat Safety Tool app. Data was collected for one year in order to have data for every season. Data analysis was conducted using analysis of variance (ANOVA) to compare UVeff by month and season, and using Pearson test to analyze the strength and direction of the correlation between UVeff and ambient temperature. Results showed that the hourly and daily UV exposures exceeded the 1-hr and 8-hr TLVs, respectively, during the cold months. The hourly TLV exceedance percentages for November, December, January and February were 78.0%, 62.7%, 73.4% and 74.3%, respectively. December had the lowest hourly (0.0020 +/- 0.0018 mW/cm2) and daily (0.0020 +/- 0.0006 mW/cm2) mean UVeff but 62.7% and 100% of the hourly and daily data still exceeded the 1-hr and 8-hr TLVs. The seasonal average UVeff for summer (0.0095 +/- 0.0025 mW/cm2) is significantly higher than that for winter (0.0034 +/- 0.0017 mW/cm2). Overall, the UVeff positively correlates with the ambient temperature as expected. Our study findings demonstrate that groundskeepers and other outdoors workers, as well as the general public, should continue to use preventive measures to reduce UV exposures during the cold months to reduce risk to UV-related adverse health effects.

GO47

The Use of Visual Supports for Individuals with Autism Spectrum Disorder: Can Visual Supports Improve Driving Performance?

Haley Poythress

Mentor: Dickerson, Anne

Driving is a valued instrumental activity of daily living that often signifies a transition to increased independence for young adults. Furthermore, this independence is associated with a higher likelihood of participating in work, educational, leisure, and social occupations. While most people get a license as a teen, individuals with Autism Spectrum Disorder (ASD) obtain their license at a lower rate than typically developing peers due to differences in motor skills, visual processing, and cognition. This is often due to individuals with ASD having increased difficulty with visual attention, visual scanning, eye gaze, and hazard perception.
Occupational therapists play a vital role in providing specialized, evidence-based interventions to support occupational performance for individuals with ASD. Specifically, visual supports are used to provide visual and/or tangible information to improve an individual's understanding of an activity and are supported in the ASD clinical guidelines. However, there is a lack of research in their effectiveness for driving intervention. One specialty designed visual support intervention for driving is Drive Focus. Drive Focus is an interactive app designed to target visual attention, scanning and hazard detection while driving. Thus, this study tests the effectiveness of using this visual support as an occupational therapy intervention to improve driving performance in individuals with ASD using eye tracking technology and observational assessments of driving performance. Analyses will determine if there is a significant difference in driving performance following six 45-minute Drive Focus intervention sessions. Specifically, eye tracking technology will be used to determine how long it took a participant to find a hazards, the amount of time looking at a hazard, and how many times a participant looks at a specific hazard in pre- and post-simulated drives with eye tracking technology. These results combined with observational driving performance assessments will assist occupational therapists in understanding the effectiveness of visual supports as a strategy to assist in improving independence in driving for teenagers/young adults with ASD.

GO48

SOUL Food Study: Sistas Fighting Overweight and Obesity Diseases

Kelsey Simpson

Mentor: Das, Bhibha Mayee

Introduction: Nearly 80% of Black women are either overweight or obese, leading to higher rates of chronic disease and premature mortality. Physical activity and nutrition are two key behaviors to addressing overweight and obesity. Intensive lifestyle interventions (ILIs) are one method to promote physical activity and a healthful diet. ILIs, however, are not as effective in Black women. It is important to identify ILI characteristics that may resonate with the Black female population. One such strategy is Photovoice, which is a method to reach people in a community to use their voices through pictures.
Methods: Participants (N=14) were Black women who live or work in Pitt County, between the ages of 25-64 years, and with a had a BMI ≥ 25 kg/m2. Recruitment included attendance at community events, local churches contacts, flyers, Listservs, social media posts, and word of mouth. Participants participated in the PhotoVoice session in Fall 2021. Content analyses conducted to develop themes from the PhotoVoice sessions to develop the tailored ILI.
Results: Twelve themes were identified for physical activity and eighteen themes were identified for nutrition with some overlapping themes. Sample themes for physical activity including, workplace physical activity encouragement, hair care, childcare, classes, motivation, faith based. Sample themes for nutrition were meal planning, healthier versions of unhealthy foods, and meal prep programs. The

overarching themes from both nutrition and physical activity are included reframing mindset, socialization, lack of representation, advertisements, and accountability.
Discussion: Findings demonstrate that Black women desire culturally relevant physical activity and nutrition programming that focuses on faith and community. Future research should examine the impact of an ILI designed for Black women by Black women on weight, physical activity levels, and diet quality.

GO49

Feasibility and Usability of a Virtual Reality System for Children with Cerebral Palsy (CP)

Rachel Sorenson

Mentor: Donica, Denise

When working with children with cerebral palsy (CP), it is important to recognize neuroplasticity principles in the creation of therapeutic intervention plans, as motor repetitions are important for long-term learning (Coker-Bolt & DeLuca, 2013). Typical treatment includes 1 therapy session/week and a home program with reportedly low levels of compliance. A virtual reality system was developed with these principles in mind to increase compliance through a more motivating home supplemental program (Lillo-Navarro et al., 2015). This study explored the feasibility and usability of a virtual reality system, RecoVR, focusing on motor repetitions for children with CP. Specifically this study explored if the RecoVR was an engaging supplemental therapeutic activity, if children had a positive experience with the system, and if parents had a positive experience facilitating its use.
Children between the ages of 6-15 years old (n=5) were recruited and were required to have some active motion at the shoulder and elbow and be able to follow two-step directions. Participants were screened (SHUEE, MUUL, and initial questionnaire) to ensure eligibility criteria was met, then trained on the set-up and use of the system. Each participant's family took the system home for the child to play 1 hour/day 5 days/week for 4 weeks. Repetitions and time were recorded by the system each use. Participants completed the NASA-TLX after each use to determine perceived workload (play experience) and parents completed a weekly questionnaire on their experience using Likert-style questions. Following the 4 weeks, the parent and participant were interviewed in-person regarding their experiences to support the data collected.
Participants with high usage (n=2) had low to moderate severity levels of CP, completed more repetitions (avg=11,789), and had more time engaged with the system (avg=649 min), compared to those with low usage, repetitions (avg=45) and time (avg=20 min). None of the participants reported a high perceived workload, (avg=24.4-60.9) on a 0-100 scale, meaning this therapeutic activity likely fit the just-right challenge and needs of their therapy goals. High system satisfaction, ≥4.0 on a 0-5 scale, was found among parents of participants who had high usage and were more engaged playing the system. Preliminary data suggests RecoVR may be a beneficial supplemental therapeutic activity that allows more repetitions of the affected extremity for children with low to moderate CP.

GO50

Attributes that Increase Vulnerabilities to Reduced Human Milk Feeding Outcomes Among Babies with Cleft Lip and Palate Admitted to the NICU

Neda Tahmasebifard

Mentor: Briley, Patrick Minton

Neda Tahmasebifard
Jamie L. Perry
Patrick M. Briley

Objective: The purpose of this study was to compare intrinsic and extrinsic factors among infants admitted to a neonatal intensive care unit (NICU) with cleft lip and palate (CLP), as a function of human milk feeding status at discharge.
Method: Data collected on mothers and their infants admitted to the NICU with CLP from the 2018 National Vital Statistics System were used for this study. Chi-

square tests of independence were used to compare categorical variables among two groups of infants admitted to the NICU with CLP – those who did and did not receive human milk feeding at discharge. Independent samples t tests were used to compare continuous variables.
Results: The sample included 660 infants admitted to the NICU with CLP, of which 353 were infants who received human milk feeding at discharge. significant differences were found between the two groups on the following variables: marital status, mother's education, maternal smoking record, total numbers of prenatal care visits, multiparity record, gestational age, gestational weight, and assissted ventilation for more than six hours.
Conclusion: Results indicated that as a function of human milk feeding at discharge, mothers and their infants admitted to the NICU with CLP exhibit differences across a variety of intrinsic and extrinsic factors. These findings further our understanding of this sample of mothers and infants with CLP, while potentially identifying determinants to human milk feeding. This study provides insight into mother and infant characteristics that are most vulnerable to not breastfeeding.

GO51

Python Script for Overarm Motion Analysis Using 3D Motion Capture Data

Isiah Turner

Mentor: Rider, Patrick Michael

Human movement kinematics is an important focus within biomechanics with diverse purposes and applications. Due to functional complexity, large computational demands and diversity in protocols, the collaboration of software tools is important to help progress the understanding of human movement through biomechanics. Although the field has a large open-source community with software tools that help visualize human movement, there is a lack of open-source tools that analyze human movement. 3-dimensional upper extremity movements specifically lack open-source software that analyzes complex functional movement such as overarm throwing. Therefore, the goal of this project is to develop a script that performs upper extremity analysis of motion capture data. The motion capture data used is from an open-source study that had individuals with no prior overarm throwing experience throw over several sessions. Each participant completed 15 dominant and 15 nondominant hand throws with a baseball with a goal of throwing as fast as possible. The motion capture was taken with 10 Vicon infrared cameras (T-10, T-40, Oxford Metrics Ltd., UK) and the data from the sessions are exported as csv files. The script is developed using Python along with libraries that aid data analysis and visualizing the data. Pandas, matplotlib and numpy are the major modules that the script uses to interact with the motion capture data. The code will calculate individual upper extremity segment angles to calculate the joint angles, visualize segment angles, visualize joint angles and visualize the segment angles changing over time by combining the segments on a figure. This software will be used for basic overarm throwing analysis and will allow the user to get a summary of the motion. Coaches and researchers that are interested in overarm throwing would find it useful because it visualizes and calculates throwing metric data, which will allow for a deeper understanding of the individual's throwing biomechanics.

GO52

Comparison of Traditional Versus Non-Traditional Distance Education Students' Motives for Engaging in Physical Activity

T. Isaac White

Mentor: Das, Bhibha Mayee

INTRODUCTION: Approximately 33% of undergraduates do not meet physical activity (PA) and public health guidelines and thus may not experience the benefits of PA. Research indicates higher levels of intrinsic motivation, addressed within the framework of Self-Determination Theory (SDT), predicts greater levels of adherence to PA. Course-based PA interventions using

SDT may facilitate intrinsic motivation among undergraduates. Global health events have led universities to increase use of online, distance education (DE), courses. DE courses are also a tool for non-traditional students, over 30 years, to earn a degree. DE course-based interventions have been shown to effectively promote PA. Research on the need to modify DE PA course-based interventions based on student ages is limited. The aim of the analysis was to assess motivational differences between non-traditional and traditional DE students in a PA course-based intervention. METHODS: Students in a 16-week DE PA course-based intervention completed an online survey as part of an ongoing research project. Measurements included the BREQ-3 and the MPAM-R. BREQ-3 scores are from 0 to 4 while MPAM-R scores are from 1 to 7, higher scores indicate higher levels of motivation. RESULTS: Participants (N=11; 63.6% White) ranged in age from 20 to 47 (30.8+/-9.7) years, 54.5% were employed full-time. Non-traditional students (n=6) were 37.9+/-6.9 years, traditional students (n=5) were 22.2+/-2.2 years. Traditional and non-traditional students scored highest on the MPAM-R appearance subscale (6.3+/-.5, 5.4+/-1.2, respectively). The BREQ-3 Identified Regulation subscale scored the highest among traditional and non-traditional students (3.5+/-.6, 2.5+/-.9, respectively). No significant differences were observed at a p-value of 0.05; to examine potential differences present, the p-value was expanded to 0.10. A significant difference was observed (p=0.08) for Identified Regulation. The subscale of Introjected Regulation came close to reaching significance (p=0.11). No additional significant differences were observed. CONCLUSION: Results indicate there may not be a difference between traditional and non-traditional DE students' reasons for engaging in PA. It may not be necessary to modify DE course-based PA intervention based on ages of participants. Further research, with a larger sample, on the motivation behind PA behaviors of traditional and non-traditional DE students is warranted.

GO53

Gradients in Success: Impact of wave energy and predation on oyster reef restoration

Anna Albright

Mentor: Gittman, Rachel Kelley

Anna Moore Albright, Rachel Gittman, Jana Haddad, Georgette Tso, April Blakeslee, Michael McCoy, Siddharth Narayan, Nina Woodard, Emory Wellman.

Oyster reefs (Crassostrea virginica) form biogenic habitats that modify wave dynamics and ameliorate stress for community associates, effectively increasing estuarine biodiversity and function. Because of their ecological and economic importance, numerous restoration attempts have been made, with some exceeding project goals while others completely failed. These disparities in success between restoration projects points to a lack of understanding of how abiotic and biotic factors influence the production of oyster reefs, leading to trial and error approaches without underpinning the community ecology dynamics. In order to resolve these knowledge gaps, I asked the following questions: 1) How does wave energy and reef relief affect oyster abundance? 2) How does wave energy and reef relief mediate predation on oysters? I hypothesize that 1) Oyster density will increase with increasing wave energy until the average wave energy surpasses 500 J/m, above which oysters will not be present. Furthermore, I expect that oyster abundance will be higher on high relief breakwaters compared to low relief. 2) I hypothesize that sites with higher wave energy will experience less predation and that low relief breakwaters will experience more predation. To assess how reef crest height affects oyster abundance, we constructed oyster breakwaters of two different reliefs (high vs. low). After, I conducted post-construction monitoring of oyster reef characteristics every three months for one year. Along with this, I constructed and deployed wave gauges along the shoreline to measure how wave energy impacts oyster abundance. For research question 2, I conducted a manipulative field experiment using predation assays to quantify

predation rates with different caging treatments to assess how reef crest height and wave energy mediate predation on oysters. Using a combination of observational data with manipulative experimentation, I will be ale to tease apart potential mechanisms explaning the patterns observed in oyster reef restoration projects using short term experimental techniques. Understanding the relative importance of wave energy and predation on oyster abundance is key for developing successful strategies for restoring this essential habitat and enhancing the value of North Carolina shorelines.

GO54

Metalloprotease Adamts9 is critical for the development and maintenance of ovarian follicles in zebrafish

Jonathan Carver

Mentor: Zhu, Yong

Development and maintenance of a functional gonad is essential for fertility and reproduction in animals. Limited reports suggest that the members of a disintegrin and metalloproteinase with thrombospondin type-1 motifs (Adamts) family regulates the natural age of menopause and are involved in ovarian and uterine diseases in humans. However, the underlying mechanisms and pathways are still unclear. We discovered the majority of our adult Adamts9 KO fish were either male or an intersex phenotype, with few adult female progenies observed. Further, female Adamts9 KO fish had dramatically underdeveloped ovaries and high rates of infertility in comparison with wildtype (WT) siblings matched by age and size. The male sex bias could be observed in newly matured adult adamts9-/- fish around 90 days post fertilization (dpf) compared to WT siblings (Standard Length [SL]: 19-33mm). Surprisingly, adamts9-/- had no effect on primary sex determination in juvenile fish. Juvenile KO fish at 35 to 56dpf had a normal sex ratio compared with WT siblings following their primary sex determination (SL: 8-23mm). Intriguingly, we observed defects in early folliculogenesis. These adamts9-/- fish had less oogonia at 14-21dpf (SL: 5-10mm) and reduced number and size of diplotene Stage IB follicles at 35dpf (SL: 7-23mm). Interestingly, all follicles were arrested in Stage IB through mid-juvenile stage (56dpf) in adamts9-/-, whereas ovarian follicles in WT and heterozygous siblings continue their development into later stages of oogenesis (Stage II) (SL: 8-23mm). Beyond 70dpf, only slight growth of ovarian tissue and few maturing follicles are observed in adamts9-/- fish, and the male sex bias progressively becomes more severe over the adult lifespan indicating sex reversal (SL: 15-32mm). Our results suggest that Adamts9 is a key protein for normal development of ovarian follicles, follicle survival, and female sex phenotype maintenance in zebrafish.

GO55

Olfactory receptor repertoire evolution during the radiation of birds

Robert Driver

Mentor: Brewer, Michael Scott

Olfaction plays a critical role in animal behavior and ecology. In birds, olfaction is used in foraging, kin recognition, and mate choice. Odorants are detected by olfactory receptors (ORs), and the number of ORs in a species' genome can be used to derive total genomic repertoire counts. The size of the OR repertoire can infer the importance of smell in a species' behavior and ecology. I found that bird OR genomic repertoire counts previously reported in the literature underestimated the number of ORs, missing hundreds of avian-specific ORs located on unmapped scaffolds. I have examined the genomic OR repertoires of over 20 bird species spanning avian diversity to characterize the gains and losses, and selective pressures, of ORs and OR repertoires during bird evolution. A reduction of ORs in the Neoaves clade, which includes the majority of extant birds, is furthered by a second reduction in the Passerine lineage. These dynamic shifts in OR repertoire size may illustrate a varied reliance on olfaction in different bird families.

GO56

Laser and X-Ray Source Characterization for Optically Stimulated Luminescence

Christopher Garcia

Mentor: DeWitt, Regina

Optically Stimulated Luminescence (OSL) is a method used to determine the amount of natural radiation a rock or sediment sample has stored over time. This stored radiation is reset when the sample is exposed to light (i.e. optically stimulated). The sample will release the stored energy in the form of luminescence and this OSL signal is a direct measure of the stored energy. Current OSL instruments use a light source that exposes the entire sample to light, and the luminescence intensity is recorded, making it impossible to retain any spatial information.

An instrument developed in our lab uses a different approach: A narrow laser beam is scanned over the rock surface and luminescence is recorded for every point (pixel) separately. The image is then created by combining the pixels. Four different lasers can be selected. A 50kV X-Ray source is used to determine the relationship between the given radiation dose and the measured luminescence signal. The goal of the work presented here is to characterize the output of the X-Ray source and lasers. Experiments were carried out to determine the irradiation area, energy output and uniformity of the X-Ray beam, as well as the penetration depth into the rock.

Lasers were characterized with respect to the size and power of each laser spot, their efficacy in releasing the stored energy from the sample, and their penetration depth. In the presentation the experiments will be described and results will be discussed.

GO57

Assessing a novel, biodegradable oyster breakwater substrate's ability to reduce shoreline erosion and stimulate salt marsh expansion seaward

Megan Geesin

Mentor: Gittman, Rachel Kelley

Megan Geesin, Dr. Rachel Gittman

Salt marshes are highly productive systems that provide a variety of ecosystem services including shoreline stabilization, water purification, carbon sequestration, and nursery habitat to important fisheries species and wildlife. A variety of human impacts including climate change, coastal development, and pollution threaten salt marshes. The rate of sea level rise (SLR) along the coast of North Carolina in the twentieth century was 3.0-3.33mm/yr, and this rate is expected to increase during the 21st century. Studies have shown that in some regions, marsh species are migrating landward with SLR which could reduce the extent of salt marshes if coastal development halts landward migration. A common method of protecting salt marshes from SLR includes installing fringing oyster reefs. Because oyster reefs can attenuate waves, they are able to reduce shoreline erosion and accrete sediments allowing salt marshes to expand seaward.

The shoreline along Taylor's Creek (TC) in the Rachel Carson North Carolina National Estuarine Research Reserve is eroding at a rate of 1 to 2m/yr and is experiencing a rate of SLR of 3.1mm/yr. To study the ability of a novel substrate to recruit oysters and protect salt marshes from erosion, the Gittman lab constructed oyster breakwaters using the biodegradable substrate, Oyster CatcherTM along a 425m stretch of TC in July of 2020. The site consists of 4 high-relief oyster breakwaters (15m*1.5m*0.4m) (LxWxH), 4 low-relief oyster breakwaters (15m*1.5m*0.2m) and 4 control sites with no breakwaters.The salt marsh grass percent cover, stem density, and marsh edge location and elevation change have been monitored at this site to determine if there are differences between shoreline sections with high-relief oyster breakwaters, low-relief oyster breakwaters, and control sites. Analyses of this data will determine if the oyster breakwaters are successfully accreting sediment and stimulating salt marsh expansion seaward. It is expected that erosion rates will be lowest and salt marsh percent cover, stem density, and expansion seaward will be greatest at sites with high-

relief oyster breakwaters as predation rates are expected to be greater on low-relief oyster breakwaters, and it is expected that control sites will experience the highest erosion rates, and lowest salt marsh percent cover, stem density, and expansion seaward.

GO58

Fabricating Rapid Transient Recombinant Expression and Affinity Chromatography Systems for Human Fibrinogen

Nicholas Kirby

Mentor: Hudson, Nathan E

Blood coagulation during an injury occurs due to the structural integrity of fibrin fibers. Forming an insoluble, mesh-like network, these fibers help to hinder blood loss. With elasticity rivaling rubber, fibrin's biomaterial utility is well-noted, however, underdeveloped. This is due to the costly, and time-consuming creation of stable cell expression systems of fibrinogen (fgn), fibrin's soluble precursor. Similarly, current purification practices for this homodimeric three polypeptide chain protein follow lengthy procedures, and require large amounts of sample with low recovery. This work seeks to develop expense- and time-conscious techniques for fibrinogen expression and purification by creating the first transient fgn expression system and an affinity-based peptide coupled resin column.
Transient expression of HEK Expi293 cells was performed using two different recombinant fgn plasmid systems, and two different transfection reagents (Expifectamine and PEI). Each plasmid encoded all three fgn chains, with one a single, complex plasmid jointly encoding the chains and the other a three-plasmid system, with each plasmid encoding a single chain. Protein expression levels were monitored over 5 days using western blotting and sandwich ELISA assays, with subsequent PEI:DNA ratio optimization. For developing a purification practice, column coupling of a high affinity synthetic peptide to resin was confirmed through Coomassie Blue gel staining. Fibrinogen specificity was determined through chromatography elution trials using commercial fgn and similar negative control tests with a separate scrambled peptide column, while reproducibility was assessed over 9 runs using the same column and conditions. With a fully fabricated and reliable column, its ability to isolate fgn from plasma was then evaluated.
The resulting transient expression system produced comparable fgn yields between transfection reagents and plasmid systems despite their differences in cost and probability of successful insertion, respectively. With effective column coupling and high fgn specificity, our robust column was found to isolate highly pure and fully-functional fgn from blood plasma. This work produced an effective and lower-cost alternative to stable cell creation, as well as an affinity-based approach showing high fgn specificity, established fidelity between runs, and substantial purity from plasma isolated fgn, with future implications of advancing fibrin's biomaterial applications.

GO59

The shear viscosity of quark-gluon plasma under anisotropic scatterings

Noah MacKay

Mentor: Lin, Ziwei

Quark-gluon plasma (QGP) is a state of matter formed from relativistic heavy-ion collisions and also in the early universe. The quarks and gluons as quasi-free particles resemble an expanding viscous liquid under extremely high temperatures and densities. In a recent study, one of us [1] numerically obtained the shear viscosity of the QGP in full equilibrium under isotropic scatterings (where the differential scattering cross section is a constant) and anisotropic scatterings. Analytically, a 2012 report [2] considered two methods to obtain the QGP viscosity: a modified relaxation-time approximation method and the Chapman-Enskog (CE) method. It shows that the CE method better agrees with the numerical Green-Kubo values for the viscosity under anisotropic scatterings. In this work, we correct the typos in the published viscosity equation from the CE method [2]. We further find that the CE method of

viscosity agrees well with the numerical values obtained from the Green-Kubo relation [1] for both isotropic and anisotropic scatterings. This lays the foundation for us to extend the viscosity calculation to a QGP in partial equilibrium instead of full equilibrium.

[1] X.L. Zhao, G.L. Ma, Y.G. Ma and Z.W. Lin, Physical Review C 102, 024904 (2020).
[2] S. Plumari, A. Puglisi, F. Scardina and V. Greco, Physical Review C 86, 054902 (2012).

GO60

A semi-analytical method for calculating the QCD phase diagram trajectories of relativistic nuclear collisions

Todd Mendenhall

Mentor: Lin, Ziwei

The finite nuclear thickness affects the energy density ε(t) [1] and conserved-charge densities [2] such as the net-baryon density nB(t) produced by the primary NN interactions during heavy ion collisions. While the nuclear thickness effects are small at high collision energies when compared to the standard Bjorken model of the initial state, they are large at low collision energies where the nuclear transit time is comparable to the parton formation time. Because the temperature T(t) and chemical potentials μ(t) of the dense matter can be extracted from the densities [2], one must include the nuclear thickness to accurately determine the T-μB trajectories in the QCD phase diagram of relativistic nuclear collisions at low to moderate energies such as those used in the RHIC-BES program. In this talk, I will discuss our semi-analytical model which includes the nuclear thickness effect and its results on the densities ε(t), nB(t), nS(t), and nQ(t). Next, I will show the extracted T(t), μB(t), μS(t), and μQ(t) for a quark-gluon plasma using either quantum statistics or Boltzmann statistics. Then, I will present our results on the T-μB trajectories, highlighting how the trajectories depend on the chosen statistics and the nuclear thickness in relation to the possible location of the critical end point (CEP). Finally, I will show how this semi-analytical model can be useful to researchers who study high density physics and search for the CEP.

References:
[1] T. Mendenhall and Z. W. Lin, Phys. Rev. C 103 024907 (2021).
[2] T. Mendenhall and Z. W. Lin, arXiv:2111.13932 [nucl-th].

GO61

Safe havens and hotspots; ionizing radiation in Martian subsurface and its influence on the survival of ancient life

Offormata Osunkwor

Mentor: DeWitt, Regina

Mars was once warmer and wetter and given the current inhabitable surface conditions, the Martian subsurface is considered a primary target for the search for dormant life. If microbial life has once existed on Mars, various environmental factors would have influenced the survival of dormant life and preservation of DNA. Among these are safe havens and hot spots in the radiation environment. In my work I used computer models to characterize these microscopic variations of ionizing radiation in the subsurface and their impact on dormant life. My presentation has two major parts:
(1) Experimental validation of computer models: I used Optically Stimulated Luminescence (OSL) dosimetry to measure local dose variations in well-defined analog samples and compared the results to the dose distribution from Geant4 Monte Carlo models of the said samples.
(2) Variation of radiation and survival probabilities in the Martian subsurface: Using the same Monte Carlo code, I modelled the microscopic radiation distribution in the Martian subsurface using information from some landing sites on Mars, Martian meteorites on Earth and Martian subsurface permafrost. The distributions were further analyzed to obtain survival probabilities and probabilities of DNA preservation for some well-known extremophiles on earth.
In the presentation, I will compare experimental and Monte Carlo results for the analog samples, and I will

discuss the limitation of the methods. I will also present the Monte Carlo models for selected Martian subsurface regions. I will discuss their implications for how long microorganisms can survive dormancy on Mars and how long their DNA can be preserved.

GO62

Assessing faunal community composition in newly restored seagrass beds across a depth gradient

Stacy Trackenberg

Mentor: Gittman, Rachel Kelley

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Seagrass meadows provide valuable habitat for faunal communities. Accelerating loss of seagrass has subsequently prompted increased restoration efforts. While minimum and maximum depths for successful seagrass restoration are known, data linking restoration depth to restoration success and faunal community assembly are lacking. To investigate how depth impacts restoration success and faunal community assembly, we restored beds of Halodule wrightii at subtidal and intertidal locations near Harkers Island, North Carolina. Bi-monthly from June through October 2021, we monitored seagrass expansion in the restored plots and sampled faunal abundances and squid-pop consumption rates in restored plots, bare sand, and natural seagrass controls. Our intertidal restoration plots had a higher proportion of survived clumps than subtidal plots. We found higher faunal abundances in seagrass control plots compared to intertidal restored and bare control plots. Within our restored and control plots our shallow control plots had the highest faunal abundances. We found lower consumption rates of squid-pops in intertidal plots with lowest consumption in the restored intertidal plots. Seagrass is a critical habitat for economically important fishes in North Carolina. Greater understanding of the degree to which restoration depth impacts fish communities will provide insight into how best to sustain and enhance habitat functions.

GO63

Borrowing ecological principles: Influence of Substrate Orientation on Free-Living and Parasite Diversity

Nona Woodard

Mentor: Gittman, Rachel Kelley

Nina Woodard, Rachel K. Gittman, April M.H. Blakeslee

Understanding the causes and consequences of recruitment and survival of organisms within a community are important goals of population and community ecology. Organism distribution is shaped by environmental factors. For example, in the rocky intertidal, abiotic and biotic forces shape species distribution. This paradigm of the rocky intertidal is what sets the upper and lower distribution for species, and thus, may potentially serve as a model system for other ecosystems. Community stability is dependent on an assemblage's ability to resist or acclimate to changes caused by these forces. "Lessons learned" regarding forces that regulate assembly in rocky intertidal habitats could be examined in biogenic habitats, serving as a restoration guide. Eastern oyster populations have declined in estuaries along the US Atlantic coast and efforts have been made to restore habitat to reclaim services provided by oysters. Past efforts have explored how substrate composition, reef height, and environmental factors affect oyster development. Few studies have explored how the effects of substrate orientation can directly affect oyster development as well as reef biodiversity. Biodiversity is an essential indicator of the overall success and health of an ecosystem. The structural complexity of an oyster reef offers refuge for species from predation and desiccation, benefits similarly found in the rocky intertidal. Thus, changes to orientation may affect habitat availability and complexity, subsequently affecting species diversity and survival. Additionally, recent work shows the importance of parasites as part of diversity, but their role in reef systems is still largely

unknown. With these gaps in knowledge, we are working on a more in-depth study to determine the roles of orientation and complexity on reef associated community development. Currently, our work focuses on quantifying free-living and parasite species richness and abundance both landward and seaward of high- and low-relief restored reefs. Thus far, the seaward side of high-relief restored oyster reefs support higher crustacean species richness and abundance than the landward side, while fish species abundance has been found to be greater on the seaward side of low-relief sites. Lastly, sessile species biomass is greater on the seaward side of reefs than the landward side. This indicates that substrate orientation and reef-relief may indeed have an influence on community assembly and free-living diversity.

GO64

Analysis of a Combined Drain and Active-Pumping Stormwater Management System in a Coastal Aquifer Setting

Alexis Kussman

Mentor: Manda, Alex Kapolo

This study investigated the flood-mitigation efficacy of a combined drain and active-pumping strategy in a coastal environment. The lower elevation and higher water table associated with coastal regions make these areas susceptible to groundwater flooding during high precipitation events; therefore, proficient flood-mitigation strategies are crucial for ameliorating flood-related impacts on coastal communities. The subsurface stormwater management system was assessed under various precipitation scenarios simulated using a transient three-dimensional finite-difference model set in the coastal town of Pine Knoll Shores, North Carolina. Results from the simulations suggest that a combined active-pumping and drain system presents a viable option for reducing the risk of groundwater flooding in coastal regions.

GO65

Trauma-Informed Care: Can It Be Reliably Observed in Staff Working with Youth?

Lauren Cutler

Mentor: Golden, Jean Ann

Lauren Cutler (MA/SSP), George Cherry, Jr. (Neuroscience), Michelle Martells (Psychology), & Petra Ngwa (Psychology)
Jeannie Golden, Mentor (Psychology)

When youth who have been traumatized exhibit challenging behaviors, staff responses to these behaviors need to be trauma-informed so as not to retraumatize youth, escalate their behaviors, or cause them emotional harm. The mentor has co-authored and implemented a training program for staff who work with youth who have been traumatized and exhibit challenging behaviors. Unable to find any observational measurement systems for observing trauma-informed interactions between staff and youth, the mentor and her graduate student developed a checklist of trauma-informed behaviors and operationally defined those behaviors with examples as well as descriptions of non-trauma informed behaviors. Three undergraduate psychology research students were trained as observers, memorizing the definitions and examples, completing a fill-in-the-blanks test, and practicing observing and recording behaviors for 14 hours to obtain high interobserver agreement. The mentor and graduate student role-played staff-youth interactions and the observers recorded frequencies of behaviors in pairs observing simultaneously and independently. Observers obtained high percentages of agreement on some behaviors, lower percentages on others. Ways of improving reliability will be discussed. Data will be provided of observer-recorded behaviors in role-plays of actual staff who work with youth before and after they participated in the trauma-informed training program.

GO66

The Significance of a Dugout Canoe to People of the Past and Present

Lydia K. Downs

Mentor: Oakley, Christopher A

The purpose of this thesis is to examine the significance of canoe No.SOR0001 and the impacts that it has on the Coharie Tribe of North Carolina. This will involve compiling an artifact biography of the canoe including its creation, use, abandonment, rediscovery, excavation, preservation, adoption into the Coharie Tribe, and its final curation. There will be a special focus on the more contemporary period from the canoe's rediscovery to present to fully understand how an artifact such as this can help preserve the spiritual connection between modern people and their ancestors. Reseach methods include obtaining oral histories from tribal members and the state archeaolgist, collecting information from the North Carolina State Archives, and creating a photogrammetry model of the canoe.

GO67

Assessing North Carolina Pre-K Teachers' Perceived Preparedness to Work with Chronically Ill Children from Low-Income Communities

Ashley Miller

Mentor: Hegde, Archana

Many children in the U.S. face issues related to chronic illness, including living in poverty, which can undermine their health and academic success. Given the pervasiveness of childhood chronic illness and poverty, along with their potential impacts on academic success, it remains important to understand the implications of different chronic illnesses and teachers' perceptions of those conditions, specifically asthma, cancer, and diabetes. Chronic illness and poverty produce a cyclical effect on one another, which can exacerbate health and financial outcomes without effective intervention. Moreover, stigmatization regarding socioeconomic status may affect social and physical factors in schools, thus undermining academic success. Nonetheless, teachers often report a lack of preparedness in supporting children with chronic illnesses. Within the literature, there is a dearth of information assessing children under the age of 5 and the interconnection between poverty and chronic illness in preschools. The inability of young children to manage their condition without adult assistance underlies the need for prepared teachers. The main purpose of the study is to assess NC Pre-K teachers' perceived preparedness to support students with chronic illness and from low-income families. We address the gaps in the literature by surveying NC Pre-K teachers to examine the following research questions: (1) how prepared and knowledgeable do NC Pre-K teachers feel to support children with chronic illness in general? (2) how prepared and knowledgeable do NC Pre-K teachers feel to support children with asthma, cancer, and diabetes? (3) how prepared and knowledgeable do NC Pre-K teachers feel to support children from low-income communities? and (4) what supports and resources do NC Pre-K teachers currently have and need to better work with children with chronic conditions and/or from low-income communities? This research study will utilize a survey comprised of both open- and close-ended questions. The results of the study have the potential to inform early childhood teacher training and professional development programs and practices. NC Pre-K teachers serve as vital members of the educational community, working with children under the age of five who have chronic conditions and/or are from low-income families. As such, it remains important to assess their level of preparedness in supporting these children and investigate the resources and supports they need to be effective.

GO68

An analysis of the relationship between occupational category and workplace aggression: Workaholism as a potential moderator

Trever Skinner

Mentor: Aziz, Shahnaz

In the current study, we are investigating the relationship between occupational category and workplace aggression, as well as the potential moderating influence of workaholism. Work environments are ever-changing and differ between blue- and white-collar employees. The work environment hypothesis emphasizes the role of workplace contextual and environmental factors (e.g., occupational category) on workplace aggression (Salin, 2015). Workaholism was chosen as a potential moderator for this relationship due to its relationship to increased work stress (Aziz et al., 2010), a correlate of workplace aggression (Glomb, 2002). The current study utilizes self-report measures of workplace aggression and workaholism, as well as an analysis of participant job descriptions to determine their occupational category (blue- or white-collar). The studies sample consists of full-time faculty and staff at a large, southeastern university. If workaholism is found to moderate the relationship between occupational category and workplace aggression, this will provide incentive for companies to further encourage work-life balance to reduce the risk of workplace aggression and incidents of counterproductive work behavior (a form of workplace aggression).

GO69

Assessing nuisance flooding risks and green infrastructure in Charleston Peninsula

Yicheng Xu

Mentor: Narayan, Siddharth

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Due to sea-level rise (SLR), coastal areas of the U.S. are facing the increasing threat of nuisance flooding (NF). In the Charleston area, the frequency of annual flooded days has increased 600% since 2000. Urban vegetation is essential to community health and reducing flooding risk by minimizing surface runoff and its contributions to the quality of life. Because this "green infrastructure" often occurs in public spaces and is a public good, it is important that it is accessible to all communities. To better understand how the flood reduction benefits of green infrastructure may be distributed, this study seeks to answer the following research question: How does green infrastructure coverage correlate spatially with the risk of NF? This study defined NF risk by combining distributions of NF–related road closures and NOAA's NF zones. Green infrastructure coverage was defined by the area’s percentage of green space and accessibility to the nearest parks. Next, a spatial correlation analysis between NF risk areas and green infrastructure coverage was conducted. Results suggest that all green infrastructure areas are uniformly distributed throughout the Charleston Peninsula’s regardless of the degree of NF risk. Higher NF risk areas do not have more green infrastructure. Higher risk areas should increase vegetation coverage and better park accessibility to increase flooding mitigation. These results have implications to help the city promote its flooding resilience by strategically implementing more urban green spaces in higher NF risk areas.

GO70

Arrrchaeological Conservation: Preserving the Queen Anne's Revenge and Other Artifacts

Daniel A. Lowery

Mentor: Ewen, Charles R

Archaeological excavation is an extremely important step for the preservation of history, but what happens to an artifact after it is excavated? Conservation is the next course of action, and it is essential for ensuring that artifacts are well cared for and do not degrade after being removed from terrestrial or maritime environments. The condition of every artifact must be assessed as well as their material types so that the safest and most effective treatment is selected for their preservation. The Queen Anne's Revenge Conservation Lab in Greenville, North Carolina is one such place where this crucial work is conducted. The purpose of this paper is twofold: first, it will detail the numerous conservation skills one can acquire as an intern at the QAR Lab including but not limited to air scribing, artifact photography, solution testing/monitoring, desalination, data recording, and radiography. Second, this paper will record the conservation steps that several metal artifacts from the Brunswick Town/Fort Anderson State Historic Site went through in order to highlight the considerations and actions that must be taken to preserve artifacts from the archaeological record.

GO71

Plum Pudding in Provincetown: Investigation of Historic Whaling Operations of E. & E.K. Cook & Co. (1837-1879)

Lindsay Wentzel

Mentor: Raupp, Jason Thomas

Despite whale oil flickering out of public demand following the 1859 discovery of petroleum, American whaling operations continued to innovate hunting strategy and vessel usage, while broadening and diversifying maritime assets and identity in an effort for self-preservation. This paper aims to evaluate this period of decline in the industry during the late 19th century by analyzing the whaling history of Provincetown, Massachusetts and the 1879 fall of E. & E. K. Cook & Co.'s maritime industry, fishing, and whaling "empire". Among other efforts, their multifunctional use of vessels and a strategic shift towards "plum-pudding" voyages to hunting grounds in the Atlantic, such as those around North Carolina, offer insight into the impact of Northern whalers on Southern fisheries. Addressed through archaeological survey, historical research, and behavioral analysis, this paper discusses specific technological modifications and business adaptations implemented in response to the broader maritime landscape of a dying industry.

Graduate Poster Presentation Abstracts

GP01

Serum Renin-Angiotensin System Biomarkers in (mRen2)27 transgenic form of Hypertension

Rachel Byrum

Mentor: Aileru, Azeez

Rachel E Byrum, Berwin Singh S Vetha, PhD and Azeez Aileru, PhD; FAHA

Introduction: Hypertension is a polygenic condition in which high blood pressure leads to cardiovascular complications, kidney failure and cerebral damage. The (mRen2)27 transgenic rat model of hypertension is characterized by overexpression of mouse Ren-2d gene in brain and adrenal gland, with a reduction in kidney renin. The (mRen2)27 rodent represents a model of hypertension in which the genetic basis for the disease is known but the mechanism responsible for elevated blood pressure remains elusive. However, alterations in the efficacy of sympathetic ganglionic transmission exist in these animals and are consistent with an important role in the neural control of arterial pressure. Both hypertension and sympathetic ganglionic alterations were reversed by an angiotensin converting enzyme (ACE) inhibitor, captopril, suggesting a role for endogenous angiotensin II (AngII) in the exaggerated nerve activities. The components of Renin-Angiotensin System (RAS) trigger complex signaling pathways and cellular processes that mediate and maintain ganglionic transmission and high blood pressure. The main pressor component of the RAS, AngII, exists in many local organs and tissues. In many cases, local actions of the RAS complement the actions of systemic or peripheral RAS, but appear to be regulated, independent of the serum RAS. Objective: is to quantify the circulating levels of the RAS components; AngII, renin and ACE in this model of hypertension. Methods: Serum AngII and ACE activities of rat's serum was performed in duplicate by AngII Enzyme Immuno Assay Kit and ACE activity assay kit were measured in the blood serum, equilibrated to the room temperature. In 96-well fluorescence plate 40µL of assay buffer was mixed with 10µL of serum and to that 50µl of substrate was added. Results: Serum AngII in HnSD was greater (0.51+/-0.1 pg/mL) than that measured in (mRen2)27 hypertensive (0.12+/-0.05 pg/mL; *p<0.05; n=5). Serum Renin concentration in HnSD (146+/-10 ng/mL; n=6) was greater versus measured in (mRen2)27 rat (76.3+/-14 ng/mL; n=7; *p<0.05). Serum concentration of ACE is also greater in HnSD (0.9+/-0.008 nmol) than in (mRen2)27 rat (0.72+/-0.03 nmol; n=4; *p<0.05). Conclusion: The circulating level of AngII, ACE and renin are inversely proportional to the sustained blood pressure possibly a result of unregulated actions of systemic RAS, independent of the local RAS actions at the level of sympathetic synaptic transmission.

GP02

ND-PEGylated Star-Like Magnetic Nanoparticles As Magneto-Mechanical Actuators to Treat

John Cooper

Mentor: Beltran-Huarac, Juan

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Iron oxide nanoparticles (IONPs) are well studied and have been shown to have good biocompatibility, as well as unique biological and chemical properties. By modifying their size, shape, and surface structure, it is possible to improve their magnetic response and when activated by an external magnetic field they serve as magnetic-mechanical actuators (MMA) to treat cancer. This can be achieved by internalizing nanoparticles within specific cancer cells and translating mechanical torques generated from a low-frequency, alternating magnetic field (AMF) into mechanical motion. To test this, star shaped superparamagnetic IONPs were coated with nitro-dopamine polyethylene glycol (ND-PEG). The use of ND-PEG as a surface coating increases cellular uptake, prevents particle agglomeration, and exhibits better biocompatibility than commercial magnetic nanoformulations. Size and shape of bare IONPs were characterized using transmission electron microscopy (TEM). Effective coating of the nanoparticles was verified using FTIR. Hydrodynamic size was determined using dynamic light scattering (DLS). Uptake of IONPs within various breast cancer cell lines was measured

with ICP-MS. Cell viability and proliferation were assayed using Presto-Blue and CellTiter 96 Proliferation Assay. Star like morphology is confirmed from visual appraisal of TEM images. The particle diagonal cross section was measured to be 27.8+/-0.7 nm. FTIR spectra confirmed the presence of the ND-PEG conformation in the coated particles. The hydrodynamic size of ND-PEG-IONPs, collected from DLS data, is 135.7+/-0.8 nm. Consistency of hydrodynamic size over time and at various pH values indicates that the nanoplatform will be stable in a variety of tumor environments. Polydispersity index data and stability studies indicate that ND-PEG IONPs are colloidally stable and do not agglomerate; lack of agglomeration contributes to ready cellular uptake and distribution. Cell viability and proliferation assays of LCC6 breast cancer cells internalized with star-IONPs demonstrate a significant decrease in cell survival after exposure to AMF, as compared to normal cells under the same conditions, which exhibited no significant decrease in proliferation rate. Initial experiments demonstrate that MMA of ND-PEG-IONPs can effectively target and destroy cancer cells in-vitro. We anticipate this technology may represent an alternative to treat breast cancer non-invasively and has the potential for translation in the clinic.

GP03

Optimization of Nanoparticle-GelMA Hydrogels for Endodontic Restorative Application

Joseph Hampton

Mentor: Geraldeli, Saulo

Joseph Hampton, Gabriel Abuna, Mackenzie Wheeler, Saulo Geraldeli

Purpose: To evaluate the elastic modulus and flexural strength of hot and cold hydrogel setting mechanisms when doped with bioglass nanoparticles in the short-term.

Methods - A bioglass nanoparticle, 40S5 (0.1% w/v), was mixed with gelMA, PBS (10% w/v), and lithiumphenyl-2,4,6-trimethylbenzoylphosphinate (LAP) (0.5% w/v) as photocuring polymerization agent. GelMA solution was used to prepare cylindrical samples (6 mm diameter x 3 mm thickness) for two groups: heat set (N=6) and cold set (N=6). Heat set (HS) was immediately light cured (20 J/cm,2Valo) at 50 ℃ for 20 seconds. Cold set (CS) was left at 4 ℃ for 30 minutes before being light cured (Valo). Samples were immersed in water or simulated body fluid (SBF) for 21 days and 1 day prior to testing. Control sets were immersed in SBF. Samples were submitted to a compressive test to obtain elastic modulus and flexural strength.

Results - After 1 day, CS-control samples averaged an elastic modulus (E) of 2.51 MPa and a flexural strength (FS) of 0.20 MPa. CS-SBF displayed E - 2.97 MPa and FS - 0.23 MPa. CS-H2O: E - 3.33 MPa and FS - 0.27 MPa. HS-control: E - 1.54 MPa and FS - 0.10 MPa. HS-SBF: E - 1.16 MPa and FS - 0.08 MPa. HS-H2O: E - 2.19 MPa and FS - 0.14 MPa. Following 21 days, CS-control: E - 3.96 MPa and FS - 0.31 MPa. CS-SBF: E - 5.23 MPa and FS - 0.43 MPa. CS-H2O: E - 5.78 MPa and FS - 0.48 MPa. HS-control: E - 1.29 MPa and FS - 0.11 MPa. HS-SBF: E - 1.62 MPa and FS - 0.12 MPa. HS-H2O: E - 1.73 MPa and FS - 0.13 MPa.

Conclusions: Cold set hydrogels exhibit a higher elastic modulus and flexural strength than heat set and thus, are stiffer.

GP04

Magnetic Control of the Endolthelium Permeability via Magneto-Mechanical Actuation using Iron Oxide Nanoparticles

Mohammad Kanber

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Cancer treatment is one of the major health problems that burdens the society. According to the latest publication of the American Cancer Society, the cancer mortality rate has reached 32% in 2021. Tumor hypoxia is one of the main cancer complications, where solid tumors grow and start showing larger resistance to

therapy because cancer cells change their behavior and remodel their extracellular matrix. Extracellular remodeling involves the development of abnormal vasculature that can be twisted leading to a dead end and subsequent back blood pressure flow. This imposes limitation on drug therapy due to the heterogeneous tumor hypoxic microenvironment. One way to overcome this problem is to disrupt the calcium dependent adherens junctions that connect the endothelial layer and allow drug passage. We hypothesize that the direct treatment of magnetic nanoparticles (MNPs) can induce endothelial permeability. However, this direct treatment can cause uncontrolled leakiness and subsequent tumor migration, thus prompting the appearance of new metastatic sites. In this research, we use ND-PEGylated superparamagnetic iron oxide nanoparticles (ND-PEG SPIONs) to disrupt the human mammary vascular endothelial cell monolayer in vitro. We control the magnetic activity of ND-PEG SPIONs using non-heating alternative magnetic fields. Intracellular ND-PEG SPIONs can assemble near cytoskeleton and induce hypostress, which can affect cellular integrated and VE-Cadherin proteins and in turn the adherens junctions. Our findings indicate the controlled mechanical motion induced over the ND-PEG SPIONs by magnetic torques can disrupt these junctions and enable the passage of therapeutic drugs. This approach can also have the potential to avert cancer migration. This magnetic control provides a remotely controlled drug delivery method harnessing the physics and biology of endothelial adherens junction. This approach can open a new avenue for targeted drug delivery to specific anatomic regions within the body for a broad range of disease interventions.

GP05

High glucose increases apoptosis and decreases nerve growth promoting survival of sympathetic pelvic neurons.

Pallas, Wrenn

Mentor: Hannan, Johanna

Wrenn D. Pallas, Elena S. Pak, Johanna L. Hannan

Diabetes mellitus (DM) is a common disorder that causes progressive damage to the autonomic nervous system leading to erectile dysfunction (ED). While the pathophysiology of smooth muscle and endothelial penile dysfunction have been characterized, the molecular basis of neurogenic ED in DM remains to be elucidated. This study examined the impact of high glucose on the survival of parasympathetic, sympathetic and nitrergic neurons and apoptosis in primary cultured neurons from major pelvic ganglion (MPG). We also assessed co-culture of healthy Schwann cells and pelvic neurons from type 1 diabetic rats.

The data indicates that high glucose promotes a decrease in the number of erectile promoting parasympathetic/nitrergic neurons and an increase in sympathetic neurons that promote a contractile/flaccid penile state. Furthermore, there is a decrease in the overall number of neurons, neurite length, number of neurite branches and increased apoptosis in high glucose conditions. Interestingly, co-culture with healthy Schwann cells was able to rescue neuritogenesis in diabetic neurons. Culturing primary pelvic neurons under conditions of high glucose can be used as a tool to elucidate how to protect the erectile promoting neurons from cell death to lead to new therapeutic strategies for diabetic men suffering from ED.

GP06

Understanding inhibitory efficacy of novel nanobubbles and nanoparticles against nosocomial infections

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Nosocomial infections, also called hospital-acquired infections (HAIs), are caused by multidrug-resistant organisms (MDROs), particularly in the healthcare settings such as hospitals and nursing homes and have emerged as a new burden on healthcare systems and patients admitted to the Intensive Care Unit. According to the CDC, an estimated 1 in 31 hospital patients have an HAI on any given day and leads to approximately 75,000 deaths per year in the United States. Globally, HAIs are also a problem, especially in low-income and developing countries. Common antibiotics are losing their efficacy against HAIs/MDROs and thus a need for novel antibacterial agents is warranted. This study aims to examine how Escherichia coli, as a model MDRO, responds to surface modified silver nanobubbles (AgNBs), nanoparticles (AgNPs) and antibiotics, alone and in combination, using the Kirby-Bauer Disk Diffusion susceptibility protocol. Our preliminary results showed that AgNBs and AgNPs both had similar antibacterial potency when used alone; when combined with Ampicillin, AgNPs demonstrated higher potency compared to AgNBs. On the other hand, when combined with Kanamycin, AgNBs demonstrated higher potency compared to AgNPs. Further, Ampicillin alone was nontoxic to E. coli up to 40 µg/ml, whereas Kanamycin could effectively inhibit bacterial growth at a low dose of 10 µg/ml. Additional experiments are underway, and we hope to include new data in the poster. Taken together, it can be inferred that common antibiotics that are less effective when combined with nanomaterials could result in synergistic effects, thereby significantly inhibiting the MDRO growth and survival and may serve as a new treatment modality to mitigating rising HAIs in the US and globally.

GP07

Toward mitigating nosocomial infections with surface functionalized nano-antibacterial agent.

Jordan Williams

Mentor: Pokhrel, Lok R

Rising nosocomial infections is an emergent public health issue as common antibiotics, such as Ampicillin and Kanamycin, are becoming less effective against bacterial infections. Nosocomial infections are caused by multidrug-resistant organisms (MDROs), specifically gram-negative bacteria, of the Enterobacteriaceae family, and are associated with significant mortality and morbidity rates, creating huge economic burdens to hospitals and patients. Patients admitted to the intensive care unit (ICU) are most likely to develop infections due to prolonged exposure to hospital environments, declining immune systems, and contact with invasive medical devices. Hence, innovative antibacterial treatments are needed to control the growing nosocomial infections. In this study, amino-functionalized silver nanoparticles (NH2 -AgNPs) were synthesized and employed as a novel antimicrobial agent against Escherichia coli and Pseudomonas aeruginosa. To test the hypothesis that synergistic effects will occur when NH2 -AgNPs are combined with common antibiotics (Ampicillin and Kanamycin), the standard Kirby-Bauer Disk Diffusion test was used. Our results revealed that NH2 -AgNPs were more toxic to E. coli when combined with Ampicillin or Kanamycin. Moreover, higher synergistic effects were observed with NH2 -AgNPs and kanamycin combination. Experiments are underway to test the efficacy of NH2 -AgNPs and antibiotics against P. aeruginosa, the results of which will be included in the poster. As we determine LC50s for NH2 -AgNPs, we hope to perform detailed microscopic analysis to decipher its mode of action (MoA) against these two common MDROs. These pilot results suggest that our novel NH2 -AgNPs in combination with antibiotic Kanamycin may serve as a new treatment modality to mitigate nosocomial infections caused by antibiotic-resistant bacteria in the hospital setting.

GP08

In situ quantification of mitochondrial bioenergetics reveals disparate OXPHOS kinetics between mouse colorectal cancer cells and healthy tissues

Ilya Boykov

Mentor: Fisher-Wellman, Kelsey Howard

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Relative to cell of origin, many cancer cells satisfy their heightened energetic/anabolic demands by upregulating mitochondria. As such, targeting mitochondrial oxidative metabolism (i.e., oxidative phosphorylation; OXPHOS) to combat cancer is aggressively being investigated using a variety of small-molecule inhibitors. Aside from the few drugs specifically formulated against mutant dehydrogenases, most all mitochondrial-targeted compounds similarly disrupt energy transduction in both non-cancerous and cancerous mitochondria. Although cancer's heightened mitochondrial metabolism is assumed to constitute a therapeutic window relative to adjacent normal tissue, such comparisons fail to account for the body's preeminent oxidative organs (e.g., heart, muscle, brain). In this context, the magnitude of the therapeutic window for targeting mitochondrial OXPHOS in cancer remains unclear. To address this knowledge gap, we developed a methodological workflow designed to integrate in situ functional readouts of mitochondrial flux with mass-spectrometry-based proteomics. This allowed us to, for the first time, directly quantitate both total respiratory capacity and OXPHOS kinetics on both a per cell and per mitochondrion basis. Experiments were performed in permeabilized colorectal cancer (CRC) cells (e.g., CT26.WT) with results being compared to either permeabilized mouse colon or cardiac myofibers. Despite minimal differences between CRC cells and normal mouse colon, both total respiratory capacity and OXPHOS conductance were >5-fold higher in cardiac myofibers relative to either colon sample. Importantly, fold elevations in cardiac OXPHOS kinetics persisted even upon normalization to mitochondrial content. To further investigate our findings, we used an in vivo colorectal cancer mouse model to compare OXPHOS kinetics of colon tumor vs healthy colon tissue. We found that, when normalized to tissue weight, tumor tissue showed a decrease in OXPHOS conductance when compared to healthy tissue. Operating on the assumption that in situ evaluation of both total respiratory capacity and OXPHOS kinetics predicts OXPHOS reliance in vivo, indiscriminate OXPHOS inhibitors are likely constrained by systemic OXPHOS toxicity in vivo.

GP09

Vacuum Enhancement Raman Scattering for low concentrated liquid samples

Makunda Aryal

Mentor: Li, Yong-Qing

Vacuum enhanced Raman spectroscopy was developed for the detection of different molecules at lower concentration in aqueous medium. In this technique, the desired volume of liquid sample was kept in the sample holder connected to vacuum pump and after turning the vacuum on the liquid solvent is slowly evaporates leaving behind the analyte molecules on the bottom of the sample holder. Rhodamine B, Bovine Serum Albumin and glucose was tested and was able to detect at a concentration which cannot be detected with normal Raman method. Enhancement factor depends on the size of the sample holder and volume of the liquid used. For 6 mm diameter and 100 µl of glucose, enhancement factor of 2*103 was achieved. Also, quantification of ciprofloxacin in urine was achieved and the limit of detection was 2 µg/ml. When combine with SERS, the detection limit was decreased by a factor of 4. Also, we have shown the technique is very useful for the detection of molecules dissolve in the highly background solvent.

GP10

Estimation of elastostatic forces in lungs and its application in radiotherapy

Shiva Bhandari

Mentor: Jung, Jae Won

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Respiratory motion has been considered one of the largest sources of uncertainty in the radiotherapy of lung cancers. Because of this motion, the elasticity of lungs changes. Force exerted due to the change in elasticity can be determined, and hence can be used to track the elasticity of the lungs after radiotherapy treatment.

A four-dimensional Computed Tomography scan of the lungs at different respiratory phases are obtained. Taking the full exhale phase as a reference phase, and performing deformable image registration the deformation vector fields (DVF) for different phases are obtained. Using these DVF the displacement of specific points in the lungs are found for all phases with respect to the reference phase. Assuming lungs as an elastic medium, the force is calculated from this displacement using the elastic balance equation f = KD, K being the elastic constant.

The force exerted on the lungs was found to be more during the peak inspiration as compared to the peak expiration. Moreover, the force was more at the lower region of the lungs as compared to the other regions. This is because of the larger displacement in those regions. The forces calculated at different regions of the lungs quantifies the amount of motion due to respiration and determines the elasticity of the lungs. The determination of force in the lungs before and after radiotherapy helps to track the elasticity of the lungs due to the presence and absence of a tumor and identify the torques for any implanted markers.

GP11

Is CuxR the missing link between CdG signaling and Brucella virulence?

Connor Cribb

Mentor: Roop, Roy M

Bis-(3',5')-cyclic diguanylic acid, also known as cyclic-di-GMP (CdG) is an endogenous signaling molecule that plays important roles in the basic physiology and virulence of many bacteria. CdG functions in three ways, by binding to effector proteins, binding to transcriptional regulators, or binding to riboswitches and modulating their activity. The latter two effect gene transcription while the former modulates protein function. Diguanylate cyclases (DGCs) produce CdG from two GTP molecules, while phosphodiesterases (PDE) degrade it. The regulated activities of these enzymes allow CdG to serve as a powerful second messenger in bacteria.

Previous work has demonstrated a link between CdG signaling and Brucella virulence (Petersen et al., 2011 J. Bacteriol. 193:5683-5691), but the genetic regulators that mediate this link have not been identified. The recent discovery and characterization of the CdG-responsive UDP-xylose regulator (CuxR) in Sinorhizobium meliloti, a close phylogenetic relative of Brucella, has provided a possible clue in this regard (Schäper et al., 2017. Proc. Natl. Acad. Sci. USA 114:E4822-E4831). The DNA-binding activity of this AraC-type transcriptional activator is dependent on CdG-binding and CuxR controls the expression of genes encoding an arabinose-based exopolysaccharide known as APS in S. meliloti in a CdG-responsive manner.

The genes encoding CuxR and those involved in the biosynthesis of APS reside in a single genetic locus in S. meliloti that is conserved in Brucella. Derivatives of virulent strain B. abortus 2308 with null mutations in the cuxR and aps genes are currently being constructed to determine if - a) CuxR mediates CdG signaling in Brucella; b) if CuxR regulates expression of the Brucella aps genes, and c) if the cuxR and/or aps genes are required for the wild-type virulence of B. abortus 2308 in mice and cultured mammalian cells. In addition to providing important insight into the specific role that CdG signaling plays in Brucella virulence, these studies also have the potential to define a link between exopolysaccharide (EPS) production and virulence in these bacteria. This is an exciting possibility because although Brucella strains have been shown to have the genetic capacity to produce EPSs, it is unknown if these

extracellular polymers play a role in the pathogenesis of the brucellae in their mammalian hosts.

GP12

An Uncharacterized Exopolysaccharide is Linked to Brucella Virulence

Dariel Hopersberger

Mentor: Roop, Roy M

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

GP13

PUF-9/Pumilio and G2/M cell cycle regulators suppress GLP-1/Notch signaling-mediated tumorigenesis in C. elegans.

Mariah Jones

Mentor: Lee, Myon Hee

Mariah Elizabeth Jones
Myon-Hee Lee
Youngyong Park
Savannah Lipski

Germline stem cells (GSCs) are defined by their dual capacity for both self-renewal and the generation of a continuous supply of gametes through differentiation. A complex regulatory network including singaling pathways, cell cycle regulation, and gene expressional regulation, controls the balance between self-renewal and differentiation. Moreover, abberrant regulation of this network can result in either loss of GSCs or uncontrolled germ cell proliferation, leading to germline tumors. Although significant progress has been made in dissecting the molecular mechanisms of each type of regulation, the mechanisms by which these controls are linked during germline development and tumorigenesis, remain a major challenge.

Our project addresses two fundamental molecular controls of germline development. First, how does extrinsic singnaling pathways establish a balance of germline proliferation and differentiation? Second, how do intrinsic regulators maintain this balance in the germline proliferation? Specifically, we focus on GLP-1/Notch signaling-mediated germline proliferation using the nematode Caenorhabditis elgans as a model system. The C. elegans germline has provided a vast framework for educational and scientific research resources because of the simplicity of the worm, its well-characterized genetic background, and powerful experimental tools. Although C. elegans are primitive and small, they share many fundamental molecular and

cellular regulatory mechanisms with more advanced organisms, including humans.

Using a combination of bioinformatics, genetics, cell biology, and biochemical approaches, we have indentified several regulators that regulate GLP-1/Notch-mediated germline proliferation. Those include PUF-9/Pumilio RNA regulator and G2/M cell cycle regulators (WEE-1.3,CYB-3, and CDK-1). Our futher genetic data indicate that the PUF-9 and WEE-1.3 proteins may inhibit GLP-1/Notch-mediated germline proliferation, by inhibiting CYB-3/CDK-1 activity. These results speculate that PUF-9 and WEE-1.3/CYB-3/CDK-1 may act as a novel supressor of GLP-1/Notch-mediated tumorigenesis in the C. elegans germline. Indeed, all regulators we propose to investigate are all broadly conserved and expressed in vertebrate and invertebrate germlines. We therefore suggest that simliar molecular circuitry may control germline development in other organisms, including humans.

GP14

Spectrophotometric study of turbid and artery phantoms for modeling of photoplethysmography process

Zachary Jones

Mentor: Hu, Xin-Hua

Photoplethysmography (PPG) has long been explored and applied to characterize blood in humanperipheral artery signals of light scattered by tissues with pulse oximetry representing the first PPGdevices widely used in clinic and residential settings Despite these successes, the fundamental process of light-tissue interaction underlying PPG signals remains poorly understood. The long-term goal of thisdissertation research is to quantitatively characterize the light-tissue interaction and its relation to the PPG signals. In this dissertation study, we will develop an experimental system for measurement of diffuse reflectance, diffuse transmittance and forward transmittance signals from turbid samples and artery phantoms between 460 nm and 1000 nm in wavelength. An existing Monte Carlo code will be modified for inverse determination of optical parameters of artery phantoms. With these results, a PPG model based on the rigorous radiative transfer theory will be developed through this project to clearly understand the light-tissue interaction underlying PPG signals and extract artery parameters from the spectral dependence of optical parameters.

GP15

Optimized protocol for the isolation and bioenergetic phenotyping of mouse colon mitochondria.

Mclane Montgomery

Mentor: Fisher-Wellman, Kelsey Howard

Determining how alterations in metabolism contribute to human pathophysiology often involves in-vitro characterization of tissue-derived mitochondria. Due to tissue-specific heterogeneity, isolation of mitochondria from distinct tissues requires optimization. Herein, we set out to optimize both the isolation and bioenergetic characterization of mitochondria derived from mouse colon. A key technical challange with isolating mitochondria from mouse colon is the tendency of isolated mitochondria, once concentrated in potassium buffer, to form aggregates. We hypothesized that aggregation of colon mitochondria may be driven by contaiminating mucus. Because mucus is enriched with high molecular weight proteoglycans (e.g., hyaluronic acid), we reasoned that colon mitochondria yields may be improved by the inclusion of hyaluronidase. Supplementing mitochondrial isolation buffer with hyaluronidase (4mg/mL) both improved total mitochondria yields and minimized mitochondrial aggregation. Having solved the technical hurdle of mitochondrial aggregation, we leveraged an in-house bioenergetic phenotyping workflow to evaluate the following bioenergetic indices in normal mouse colon: 1) maximal uncoupler (e.g., FCCP) stimulated respiration; 2) oxidative phosphorylation (OXPHOS) kinetics using the creatine kinase clamp technique; 3) and ATP/O stoichiometry (i.e., the ratio of ATP produced per oxygen consumed). Although the data generated were specific to normal colon mitochondria, such data establishes the requisite (healthy) basline for eventual comparisons to mouse colorectal cancer mitochondria.

GP16

Genetic and chemical control of the differentiation/dedifferentiation decision in C. elegans germline

Youngyong Park

Mentor: Lee, Myon Hee

Youngyong Park, Matthew Gaddy, Mariah Jones, Swana Kuang, Myon Hee Lee

Using the nematode C. elegans germline as a model system, we reported that PUF-8 (a PUF RNA-binding protein) and LIP-1 (a dual-specificity phosphatase) repress the dedifferentiation of spermatocytes into mitotic cells (termed “spermatocyte dedifferentiation”) at least in part by inhibiting MPK-1 (an ERK MAPK homolog) activation. To gain insight into the molecular competence for spermatocyte dedifferentiation, we compared the germline phenotypes between two compound mutants - puf-8(q725); lip-1(zh15) with a high MPK-1 activity and puf-8(q725); fem-3(q20gf) with a low MPK-1 activity. Both mutants exhibited similar germline phenotype at 20°C, but puf-8(q725); lip-1(zh15) mutants developed germline tumors more aggressively than puf-8(q725); fem-3(q20gf) mutants at 25°C. This result suggests that MPK-1 activation in the absence of PUF-8 is critical to induce spermatocyte dedifferentiation. This idea was confirmed by treatment of puf-8(q725); fem-3(q20gf) mutant worms with Resveratrol, which has been known to stimulate MPK-1 activation. Our results show that 100 mM RSV significantly induced spermatocyte dedifferentiation at 25°C with aging. Therefore, we conclude that MPK-1 activation is required to promote spermatocyte dedifferentiation in the absence of PUF-8. Since PUF-8 and MPK-1 are broadly conserved, we therefore suggest that similar molecular mechanisms may control cellular dedifferentiation in other organisms, including humans.

GP17

Morphology based Diffraction Imaging Study of Apoptosis in MCF-7 Cells

Alexander Pinaire

Mentor: Hu, Xin-Hua

Alexander Molyneaux Pinaire

Cross-polarized diffraction image pairs (pDIs) are flow cytometry measurements from the perpendicular (s-) and parallel (p-) polarized scattered light off single cells. A cell’s diffraction image pair contains optical patterns distinct to that cell’s morphology. Deep Neural Networks (DNNs) are capable of learning these patterns and classifying pDIs from different cell types into their respective groups. Cell groups of more similar morphologies require more robust methods to extract and differentiate the image features embedded in their diffraction image patterns. Using unsupervised learning methods to determine the cell group labels before application of the DNN could improve the network performance. A clustering algorithm was used on pDIs from viable and apoptotic Michigan Cancer Foundation 7 (MCF-7) cells to perform an initial classification before learning with the DNN. This tandem method classified the MCF-7 pDI dataset into early-apoptotic, late-apoptotic and viable groups.

GP18

Dual Modality Ion Trapping for Single Charged Microparticles

Mason Ross

Mentor: Li, Yong-Qing

Aravind Elangovan

The ability to trap and stabilize particles allows us to further study their composition as well as their physical properties. Electrodynamic ion traps confine charged particles in free space using time-varying electric fields, and optical trapping holds an object in place based on light-induced gradient force or photophoretic force. Here, we describe a dual trap that combines the electrodynamic ion ring trap and laser trap for long-term storage of single charged microparticles in an air environment. Using these two modalities in conjunction enables us to increase stabilization of the trapped ion for the observation of its Brownian motion and study its physical properties through Raman spectroscopy.

GP19

Unraveling the role of multiple neuraminidases involved in sialylated glycan utilization by Bacteroides fragilis for in vivo survival

Nathaniel Seals

Mentor: Rocha, Edson R

Nathaniel L Seals
Anita Parker
Dr. Edson Rocha

Bacteroides fragilis is a commensal organism of the large intestine that can cause an infection of the peritoneal cavity following intestinal perforation that culminates in the formation of an abscess; these abscesses typically require antibiotic therapy and surgical drainage, but often respond poorly to antibiotics. To survive in the peritoneal cavity, B. fragilis has developed the ability to utilize host N-linked glycans from glycoproteins as a source of carbon and energy at extraintestinal sites. One of the many strategies B. fragilis employs to accomplish this is the encoding of four neuraminidase homologs: NanH1-4. Neuraminidases are responsible for the cleavage of terminal sialic acid residues from sialylated glycans and it represents a committed initial step in the systematic degradation of N-linked glycans. To understand the role of B. fragilis NanHs in pathophysiology, enzymatic activities were measured using purified recombinant NanHs. The four recombinant neuraminidases, named rNanH1-4, were shown to have differing activities that were pH, Ca2+, and sialyl-linkage specific. rNanH1 was shown to have approximately 6-, 60-, and 6000-fold higher specific activity than rNanH3, rNanH2 and rNanH4 respectively. Several known neuraminidase inhibitors were tested against these enzymes and it was found that the plant derived curcuminoids bisdemethoxycurcumin and demethoxycurcumin showed inhibition of most of these enzymes at IC50 levels of <30 µM.

In an attempt to further establish the importance of these enzymes, null mutants were constructed. In order to establish the most important genes for survival in vivo, these strains were grown in Bacteroides defined medium with rat serous fluid (DMSerum) and bovine fetuin (DMFet) as the sole source of carbon in each culture condition, respectively. In both DMSerum and DMFet, NanH1 was found to be indispensable for growth, growing similarly to the strain lacking all four neuraminidases (ΔnanH1-4). Similarly, the complementation of nanH1 into the ΔnanH1-4 strain rescued the growth phenotype. In our mouse intestinal colonization model, ΔnanH1-4 exhibited a 0.5-log-fold growth defect when grown in competition with the wild-type strain. A modest growth defect was seen in for the ΔnanH1 mutant strain and growth increases were seen for ΔnanH2 and ΔnanH3/4 when in competition with the wild type strain. These results point to a potential synergistic cooperation between the neuraminidases encoded by B. fragilis.

GP20

Addressing hospital associated infections with novel nano-antimicrobial.

Chukwudi Ubah

Mentor: Pokhrel, Lok R

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Hospital acquired infections (HAIs), also called nosocomial infections, are of public health concern as current antibiotics are becoming obsolete due to bacterial pathogens becoming resistance toward antibiotics. Growing body of research suggests nanotechnology potential to avert bacterial resistance through multivalent mode of action leading to cell wall damage. In this study, we tested the inhibitory efficacy and mode of action (MoA) of positively-charged 5 nm amino-functionalized silver nanoparticles (NH2 -AgNPs) and compared with negatively-charged 45 nm citrate-functionalized AgNPs (Citrate -AgNPs), and Ag+ ions were used as a positive control. Luria-Bertani broth assay was performed using E. coli K12 as a pathogenic surrogate for HAIs to assess growth inhibition over the period of 72 hrs. using an UV-Vis spectrophotometer, and results were confirmed with electron microscopy. Our results showed at 10 µg Ag/mL, NH2 -AgNPs were bactericidal via cell wall damage, Citrate -AgNPs were nontoxic, and Ag+ ions were bacteriostatic against E. coli. In addition, adherent fimbriae expression was

inhibited with NH2 -AgNPs (0.5-10 µg/mL) or Ag+ ions (only at 10µg/mL) treatments, but with Citrate -AgNPs (0.5-10 µg/mL) adherent fimbriae were fully expressed. These findings suggest that, unlike negatively-charged larger size (45 nm) Citrate -AgNPs, positively-charged small size (5 nm) NH2 -AgNPs may serve as a potent bactericidal agent to address the growing HAIs and antibiotic resistance amongst bacteria, promoting patient health and safety.

GP21

Managing fiducial shadowing during Cyberknife treatments

Aravind Elangovan

Mentor: Corns, Robert

A Cyberknife is a linear accelerator mounted on the end of a robotic arm that is designed to treat lung tumors. To treat, the system must track the tumor by tracking the fiducials along the breathing cycle. These fiducials are implanted in the lung which follows a path parallel to the tumor. Occasionally, depending on the location of the tumor and the motion of the lung, these fiducials may obscure each other at certain phases of the breathing cycle disrupting the treatment - increasing treatment time among other things. One possible solution is to position the patient with a rolled shoulder instead of laying them flat on the couch. This shoulder roll may change the relative positions of the markers with respect to the imaging system so that all fiducials are visible. A special support is used to roll the left or right shoulder a 10° rotation. A 10° roll can be simulated in patient images by moving a virtual source and imager with a rotation in the opposite direction. The markers can be tracked virtually and the relative shifts in their positions are noted. The results of this study will inform the design for the patient support and move this concept towards a clinical trial. By decreasing the treatment time, patient movement errors due to any discomfort caused by the mechanical ventilation will decrease and lead to a more accurate treatment.

GP22

Happy Handwriting: The Effectiveness of Virtual Handwriting Instruction

Samantha Alexander

Mentor: Donica, Denise

Taylor Morgan Faircloth
Samantha Ray Alexander
Taylor Morgan Faircloth
Denise Donica

In today's ever-advancing technological climate, and especially with the pertinent impact that COVID-19 has had on increasing technology use, it is more critical than ever to understand the effectiveness of technology-based handwriting intervention. School-aged children have several main occupations; while play and leisure make up a fair portion of their occupational participation, their ‘work' consists of school and education. Occupational therapists focus on handwriting intervention to facilitate and support their participation in school, which is largely dependent on their ability to successfully write, especially in earlier elementary grades. Approximately 10-30% of children struggle with handwriting and have suffered, as a result, in their academic performance. By the age of six, children with typically developing handwriting skills should be able to copy simple shapes like triangles, print their name, and copy a good portion of lower and uppercase letters. This means that most children should have functional handwriting skills by roughly first or second grade.

Our study implemented a 6-week virtual handwriting program for self-referred elementary school students aged 5-7 years old with handwriting difficulties. The study focused on improving the handwriting legibility and handwriting skill self-perception of the participants. Each week, the participants logged onto Cisco WebEx to attend a 75-minute long session. Beginning with a 15-minute group session that allowed the students to engage in a high-energy activity while reviewing materials from the previous week, they then participated in two 30-minute small group sessions where they were taught the formation of various letters and techniques they could use to assess and critique their own handwriting. The students were instructed to focus on either 2 or 3 lowercase letters of the alphabet each session, working to identify and print each letter

with each week building on the previous week's knowledge.

Our research study is vital to enhancing the participants' education in school. By utilizing our occupational therapy skills through this program, we are aiding in the prevention of the potential need for additional occupational therapy services in the school setting. In doing this, we are ensuring that the likelihood for the participants to be pulled out of the classroom to receive services and miss vital instruction time is decreased, thus maximizing the level of education they receive.

GP23

The Effectiveness of Games in Learning Chemical Nomenclature

Jessica Arthur

Mentor: Lee, Tammy D

Chemical nomenclature is a foundational topic that many students will find difficult (Gupta, 2019). Games can be used as an effective form of learning for students in improving learning outcomes, motivation, and engagement (Sousa Lima et al., 2019). The question this research seeks to answer is "does the use of games increase the effectiveness of learning chemical nomenclature?"To answer this question, one group of eleventh grade students will engage in a variety of games to practice naming compounds and another group of students will practice nomenclature using conventional methods. This is a pseudo-controlled study as group and student randomization was not possible. Pre and posttests will be administered to each group, and mean scores compared to determine if games increased learning outcomes. It is expected that the treatment group's score (low-performing group) will be the same or marginally higher than the control group.

GP24

The Introduction of Scientific Argumentation Will Develop Students' Critical Thinking Skills as Related to Ethical Issues surrounding a National DNA database

Kristen Diehl

Mentor: Lee, Tammy D

The research being performed will incorporate scientific argumentation into a study based upon ethical issues surrounding DNA and genetics. Scholars will partake in scientific argumentation as a means of constructing arguments for both sides of a socio-scientific issue. The hypothesis is scholars will develop a more foundational understanding of DNA and genetics while exploring the ethical issue of the creation of a National DNA database. A guided lab, "Inquiries in Science: Biology, Investigating Forensics", will be completed within the classroom. It is expected that scholars will understand the correlation between a crime scene and DNA evidence. Scholars will use the evidence to construct a scientific argument that would be in favor of a national DNA database or opposed to a national DNA database. The goal is by implementing scientific argumentation within the classroom, scholars will develop a better understanding of DNA and genetics while strengthening their critical thinking skills.

GP25

Middle School Student's Social Media Use Leading to Detention

Holly Duckworth

Mentor: Lee, Tammy D

Recent events centered around risky behaviors attributed to social media challenges have raised attention to the effect the social media challenges are having on adolescents. A study that measures the popularity of social media platforms among adolescents in detention may provide further insight. A seven-question inquiry addressing social media use will be administered to 391 middle school students to determine preferred media platforms. Student responses who are serving detention will be compared to student responses who are not serving detention. Further analysis may determine a link between behavior, gender, and/or popular social platforms. This study will test the hypothesis that there is a relationship with the type and time spent on popular social media platforms to behaviors. It is also anticipated that

female's platform preferences will be different than males' and the time spent on those platforms will be independent. The results could identify major media influences on adolescents.

GP26

Citizen Science: Changing Student's Understanding of Data Collection, Interpretation and Analysis

Tiffany Fletcher

Mentor: Lee, Tammy D

Citizen science programs are gaining popularity in communities and within the classroom. Citizen science programs allow citizens to support scientific research by providing data on specific ongoing research. This research project will address the question on if participation in citizen science programs can alter science practices of collecting, analyzing and interpreting data in students. Students in a high school biology class will take part in collecting data for a tree phenology program. Students will be tasked with collecting data, reporting data and making their own analysis of the data for several weeks. To analyze results of the research project, a sample group of students will be interviewed to determine if their perceptions on data collection, analysis and interpretation have changed by participating in the citizen science program. A pre and post assessment will be used to determine if students have developed the science practices of collecting, analyzing and interpreting data.

GP27

Stress and Coping in Education: Implications for the Covid-19 Pandemic and Beyond

Kayla Geistman

Mentor: Hegde, Archana

While there is existing evidence of the prevalence of burnout among those in the field of education, the Covid-19 pandemic introduced a new chronic stressor that affects every aspect of the school environment and contributes to the occurrence of psychological distress among educators. At least 124,000 US public and private schools were interrupted by the pandemic (Education Week, 2020), yet each teacher experienced unique challenges and opportunities in their personal and professional life. Using the transactional theory of stress and coping as the theoretical framework, this study explored experiences of North Carolina (NC) Pre-K teachers involved in the Early Educator Support (EES) program (N=251) documenting how the pandemic impacted professional and personal relationships as well as the impact on participants' physical, social, emotional, and mental health. A qualitative descriptive design was utilized in order to collect insight on a complex, ambiguous, and emotionally laden topic. Seven key themes emerged from the data: 1) positive impact, 2) negative impact, 3) increase in anxiety across different areas of well-being, 4) support needed from outside sources, 5) no change, 6) support received through the EES program, and 7) support needed through the EES program. Implications suggest how educational settings can respond to the challenges of the Covid-19 pandemic and beyond.

GP28

Teacher Perceptions on Elementary Science Instruction and Perceived Barriers to Instruction

Chrystal Haigler

Mentor: Lee, Tammy D

The National Science Teaching Association stated in a 2019 position statement that research shows that schools devote significantly less time on science learning than other subjects such as math and reading/language arts (NSTA 2019). Within that same report it was stated that "high-quality elementary science education is essential for establishing a sound foundation of learning in later grades, instilling a wonder of and enthusiasm for science that lasts a lifetime"(NSTA, 2019). This study seeks to identify barriers that limit the effectiveness of elementary teachers in the teaching of science. In an effort to reform science instruction within an elementary school these perceived barriers must be identified so that possible solutions can be explored. This research will be conducted through two methods. The first being a survey of all K-5 classroom teachers within the school and the second being a set of interviews with a smaller

population of classroom teachers across grade levels and with varying levels of experience. This research will serve as the foundation for an action plan that will seek to improve science instruction within the school that the research is conducted. Possible barriers may include limited instructional time along with a hyper focus on math and reading instruction. Other possible barriers may include resource availability, teachers lack of expertise in science content as well as lack of knowledge in best teaching practices for science instruction.

GP29

Factoring motivation in escape rooms for middle school Science students.

Katie Labbe

Mentor: Lee, Tammy D

Escape rooms are defined as a live version game played with a team that involves puzzles and clues (Vidergor, 2021). Team players collaborate to complete tasks in 1 or more rooms with a time limit and an end goal in mind. Educational escape rooms could provide a motivating, critical thinking challenge activity to increase engagement and motivation in students while "maintaining positive attitudes and fostering high self-efficacy"(Gómez-Urquiza, 2019). The purpose of this study is to assess motivation in middle school science students at various times throughout their escape room experience. The rationale for this study is to assess middle grade science students' motivation during the escape room experience as there are significantly less studies on this age range with escape room instructional activities. Students will be administered a questionnaire both before and after their experience to assess their motivation levels. The group of students participating in the study are 7th graders amongst 6 different science classes. Students are of varying abilities, ranging from low to high in each class. The expected goal is to find a significant increase in motivation in the findings after the questionnaire is administered when the escape room activity is over.

GP30

The Effect of Learning Science Outdoors on Motivation in Fourth Graders

Jennifer Lambert

Mentor: Lee, Tammy D

Motivation is a key aspect in engaging students in learning and creating interest in learning is a powerful motivator. Developing an interest in science concepts can be encouraged through making topics relevant and applicable to real life. The aim of this research study is to discover the effects of learning outdoors on motivation through the use of Project Learning Tree. This project's research question is: What impact does teaching using Project Learning Tree have on student motivation to learn about habitats? A qualitative framework was adapted and data will be collected from two fourth grade classrooms in the form of pre- and post-surveys, observations, and unstructured interviews. The expectation of this study is that the 4th grade students will find interest in learning outdoors with the Project Learning Tree program and intern their motivation will increase.

GP31

PBL and Plate Tectonics: How will the effects of project based learning on a traditional high school plate tectonics unit address student misconceptions and inform student attitudes about science?

Ruthann McComb

Mentor: Lee, Tammy D

The first goal of this study is to uncover and address student misconceptions regarding plate tectonics utilizing a project based learning (PBL) method. The second goal is to measure the effects of PBL on student attitudes about science. Research shows that students engaged in their learning have greater content retention and a more positive attitude about that subject. Data will be collected by using a triangulation mixed method design on pre-and post-tests for concept analysis and a modified CLASS inventory for student attitudes in science. Qualitative data from pre-and post-tests will be analyzed via coding and inductive analysis. The CLASS inventory uses a Likert-style scale for which the median and standard deviation will be calculated.

Results will show how addressing misconceptions, student engagement in PBL, and the effects on student attitudes in science change through the study. Hopefully both attitudes and aptitude about plate tectonics record positive growth.

GP32

Self-Regulated Learning in a Flipped Classroom

Freda Parker

Mentor: Lee, Tammy D

The global learning of the twenty-first century is being transformed and shaped by the uptake of digital communication tools and networked applications; along with the changing characteristics, needs, and demands of students. With today's technology, students must develop the skills to become self-regulated and take control of their learning experience. Incorporating the flipped classroom approach is one way that technology can be used to help students become better at regulating themselves. Using mixed constant comparative research design will allow the comparison of different types of data throughout the study. The design will allow a clear picture of the positive and negative impacts of using the flipped-classroom approach to transform students into self-regulated learners. The research will show that using the flipped classroom will have a positive impact on students becoming self-regulated learners for the twenty-first-century learning environment, giving students the ability to be successful in post-secodary classes.

GP33

Student Attitude about Social-Emotional Learning

Sarah Seymour

Mentor: Lee, Tammy D

This study investigates student attitudes towards Social-Emotional Learning that came to the attention of schools during 2020. Schools introduced SEL to help students cope with the Covid-19 pandemic life-changing events. Social-Emotional development was in peril prior to the pandemic, after this time it will take systematic, intentional, and intensive efforts to get social-emotional learning back on track (Rosanbalm, 2021). Students from a rural high school in North Carolina will participate in this study to determine student attitude of how useful social-emotional lessons are in their lives. The purpose of this research is to understand the overall student attitude of SEL so schools can make decisions about the incorporation of SEL programs at the secondary school level. Schools will need SEL become ingrained within the mindset of the educators and culture of the school. SEL should be a prioritized area of instruction and intervention, based on student-specific strengths and needs (Rosanbalm, 2021). The information gained in this study will add to a scarce research about students' perception of SEL (Tan et al. 2018).

GP34

Perceptions of Virtual Simulations

Mattie Sowers

Mentor: Lee, Tammy D

Labs are an essential part of any science curriculum. Most science teachers have completed a lab within their classrooms. With the incorporation of the internet and other programs that assist with curriculum and teaching, now teachers are finding labs easier to do in the classroom. Teachers are starting to use virtual simulations instead of hands-on labs. This study is about how students' perceptions of the curriculum using virtual simulations is affected. Within the study, some research has shown that students are more engaged within the science classroom through using virtual simulations. The research also shows that students have greater achievement as well. The researcher has investigated through other sources that students are more engaged in learning during a virtual simulation.

GP35

Evaluating the Impact of Modified Problem Based Learning on Low-Achieving Students

Theresa Van Noske

Mentor: Lee, Tammy D

Problem based learning (PBL) has shown to be an effective teaching method that can be altered to fit the diverse learning needs of students, as well as able to be implemented within any subject area. Research has shown to have positive impacts on a student's self-efficacy and reduce achievement gaps within some low-achieving students. The aim of this research is to add data to studies focusing on the impacts of problem based learning on low-achieving students with academic accommodations, and if scaffolding a traditionally autonomous teaching method provides enough support to improve understanding, retention, and critical thinking skills in science. This research will collect data regarding modified PBL effectiveness using qualitative and quantitative analysis in a classroom of 30 eighth grade accommodated students in a science classroom at a local public middle school. If modified PBL as an instructional strategy yields significant positive results, further collaboration and training with school and district level resource teachers may provide new opportunities to better engage and support accommodated students. Qualitatively, it is predicted more than half of the students will express an increase in confidence of knowledge and application of skills on the End of Unit survey. A positive or null outcome is expected as far as overall student motivation and self-confidence.

GP36

African American students in Honors level Science classes

Christina McCray

Mentor: Lee, Tammy D

The purpose of this research proposal is to examine the low enrollment numbers of African American students in honors level classes/AP classes at a high school in North Carolina. The questions be addressed include perceptions African American students have about enrolling into honors levels science courses and the reasons that current African American students are already enrolled in honors level science courses at the high school. The methodology will include both quantitative and qualitative data. Quantitative data includes the number of students already enrolled while the qualitative data includes surveys and interviews. This study also looks at initiatives that can be implemented to increase the enrollment of African American students in honors level/AP science courses in this school/district. Possible results will find that programs geared to support students will help to increase enrollment of African American students.

GP37

Impact of Lexia Core 5 on the Comprehension of Plant Life Cycle in Kindergarten

Myranda Parish

Mentor: Lee, Tammy D

My research is going to address if the Lexia Core5 program increases comprehension of science integrated text. The research will investigate comprehension of plant life cycles by sequencing. My question is as follows "Does usage of Lexia Core5 increase comprehension knowledge of plant life cycles in Kindergarten students?" This application gives explicit instruction, guided practice, teaches, and models how to answer questions on science-based text. This question is important to research because there is a large language gap not just in reading but all across content between advantaged and disadvantaged students. (Hirsch, 2003) This is where the explicit instruction of Lexia Core5 comes in to help students understand. The research will show if LexiaCore5 increases comprehension knowledge of plant life cycle. Students will be able to sequence the plant life cycles after explicit instruction from the teacher and also from the program itself. The goal is to gain more information on the program and how it effects comprehension in kindergarten students.

GP38

Utilizing Art as an Educational Tool to Discuss Healthy Relationships With Children and Adolescents

Nupur Jain

Mentor: Hall, Tana Louise

Supriya Sivadanam

Nupur Jain BSPH (MS2), Supriya Sivadanam BS (MS2)

Brody School of Medicine Class of 2024

Discussing healthy relationships with adolescents is important to ensure that they have long lasting and positive relationships, romantic and platonic, throughout the course of their lives. Having discussions about domestic and intimate partner violence early in life and explaining the differences between healthy and unhealthy relationships will hopefully help teens understand what it means to have positive relationships and could potentially save lives in the future. However, having discussions about such sensitive topics can be difficult, so using art as a vehicle for these conversations makes it more approachable for both the educator and the student. A 45-minute class curriculum was designed incorporating two art projects, a concept map drawing activity and an acrostic poem activity, that encouraged students to think about the aspects that make up healthy and unhealthy relationships. Teens are able to discuss and interact with each other during this process, as well as apply creative expression during the art projects. After the art activities, students participated in a classwide discussion, which really cemented the educational component. A total of four classes were held in person as well as virtually, with the Boys and Girls Club of Winterville and the Building Hope Community Life Center. While it has been difficult to measure the impact a one-time class has had on adolescent knowledge, staff directors at community centers where classes have been held have been in communication about project impact. Surveys were conducted with some of the students anonymously online post-class to get feedback on the class and gather information about the efficacy of material delivery. Additionally, feedback sessions will be hosted with community center staff to determine how valuable the sessions were, and what can be improved moving forward. The evaluation plan will consist of a survey and verbal interview to gather both quantitative and qualitative data about various aspects of the classes, including but not limited to, efficacy at message portrayal, participant engagement, clarity of presentation, and the enjoyability of the art projects. Lastly, future work includes hosting an educational session for medical students to talk about how art can be utilized in their future practices to have difficult discussions about other sensitive topics with children and adolescents.

GP39

Why di they stay?: Capturing Student Voice to Identify Best Retention Practices on an HBCU Campus

Jason Etheridge

Mentor: Siegel, David J

In the wake of the year 2020, society changed after being influenced by major political, civil, environmental, and health events. These events including the civil unrest of Breonna Taylor, the aftermath of the killing of George Floyd, the COVID-19 pandemic, the devastating impact of major hurricanes in the South and the violent January 6th insurrection have shaped much of how higher education has is viewed, operates and functions. Such events have caused higher education to shift from a traditional model of operation to more of a flexible adaptive model where online remote video technologies are leveraged to accomplish organizational goals. As colleges and universities grapple with the idea of having to reinvent themselves and shift, to meet the educative and teaching needs of students and faculty alike, many have raised questions regarding organizational, operational, and academic decisions made by university leaders. Central to this question has been the voices and narrative used to inform these decisions that impact faculty, staff, students, and the general academic community. As higher education continues to operate and meet the needs of the academic ecosystem, engaging various voices, reviewing evidence, and engaging stakeholders is needed to inform practice and create policies, practices, and an

environment where students and faculty can thrive, and staff are safe on campus. This notion is beyond the institutional type, but could have drastic implications for minority serving intuitions, HBCUs, and smaller universities who may not have the same resources and financial capital as their counter parts might have. Therefore, in the wake and aftermath of these major events, the shifting culture of higher education, and the changes in operations to meet the needs of students during this pandemic, listening to the narratives and voices of university constituents is paramount; and for the context of HBCUs, critical. Engaging HBCU student voices and incorporating their narratives into the decision making processes of higher education leadership, might provide an opportunity to develop holistic policies and practices that can improve student retention and systemic changes on campus.

GP40

Learning a Trade: Increasing Success Rates of African American Males in Gateway English and Math Courses in Trade Programs at Wilson Community College

Jennifer Gonyea

Mentor: Puckett, Heidi Leigh

This study examines the challenges and barriers experienced by African American male students enrolled in select trade pograms at Wilson Community College, how those challenges and barriers impact the success rates of these students in gateway English and math courses required for their program, and what type of intervention strategy would be most effective in alleviating the impact of identified challenges and barriers. Semi-structured interviews were held with faculty advisors for the selected trade programs, English and math faculty, and African-American male students currently enrolled in the selected trade programs at the time the study was conducted to obtain data on real and perceived challenges and barriers from both a faculty and student perspective.

The results of the study conclude that African American males enrolled in trade programs feel that English and math courses are uneccessary for them to be successful in their trade courses and/or in the field. In addition, student participants felt that if assignments in their English and math courses were related to the content taught in the trade programs they would be engaged and more likely to be successful in these courses. Using this data, a tutoring program was developed to address the challenges and barriers identified by the student participants that can be proposed for possible implementation at Wilson Community College.

GP41

Becoming A Better Ally: Improving the Social Experiences of Lesbian, Gay, Bisexual, Transgender, and Queer students at an Historically Black Institution in Northeastern North Carolina

Tiffany Hinton

Mentor: Chambers, Crystal Renee

Lesbian, gay, bisexual, transgender, and queer (LGBTQ) students attending historically Black colleges and universities (HBCUs) are often ignored and their voices are silenced, thus impacting their feelings of marginality and mattering. This presentation will discuss the social experiences of LGBTQ students enrolled at one HBCU and the impact of one campus-based strategy on the campus climate for LGBTQ students.

GP42

STRENGTHENING MENTORING: FACILITATING RELATIONSHIP BUILDING BETWEEN LOW-INCOME AND FIRST-GENERATION STUDENTS AND FACULTY AND STAFF MENTORS AT A LAND GRANT UNIVERSITY

Trisha Jackson

Mentor: Chambers, Crystal Renee

This study focuses on the mentor-mentee relationships of low-income, first-generation students and faculty and staff in the Pack Promise program at NC State University. This study will seek to answer the following research questions: (1) What are the mentoring experiences of low-income, first-generation students and faculty and staff in the Pack Promise program at NC State? (2) Given the experiences of participants in their mentoring relationships, what are some strategies the Pack Promise program can employ to enhance mentor-mentee relationships? (3) What are the effects of an

intervention developed to improve mentoring experiences of participants in the Pack Promise program? This study will use an action research approach with three phases of inquiry.

GP43

We Are Not Eighteen: Welcoming Non-traditional Students On Campus

Ashley Elizabeth Shivar

Mentor: Puckett, Heidi Leigh

Non-traditional students are quickly becoming the majority on college campuses, with three-fourths of campus populations fitting the definition of a non-traditional student. However, many institutions still lack a tailored orientation model for non-traditional students. This leads to the marginalization of adult learners, distance education students, transfer students, and veterans, creating an "outsider"mentality. This outsider mentality can affect non-traditional student success, causing these students to stop-off or drop-out completely. While much research and program evaluation has been conducted around first-generation students and their lack of collegiate knowledge, the same level of attention has not been paid to non-traditional students. Like other four-year institutions, East Carolina University focuses orientation efforts on the traditional student population; therefore, this mixed methods study evaluated the current online orientation program for transfer students at East Carolina University (ECU) using a modified version of Cuseo's (2015) Self-Assessment Model for Evaluating Orientation Programs in order to expand the discussion around non-traditional student success. The most effective methods for addressing the diversity of incoming non-traditional students were explored through quantitative surveys, semi-structured individual interviews, and focus groups with current non-traditional students attending East Carolina University. The study concluded with suggestions for a new online orientation model specifically catered to non-traditional students. Findings from this project can assist Student Transitions staff at ECU in creating a new online orientation model specifically catered to the growing non-traditional student population, as well as provide suggestions for other four-year institutions' orientation programs.

GP44

FACE THE FACTS: IDENTIFYING POTENTIAL SOCIOECONOMIC BARRIERS THAT IMPACT SUCCESS FOR STUDENTS ENROLLED AT LENOIR COMMUNITY COLLEGE.

Dusk Stroud

Mentor: Puckett, Heidi Leigh

This research study examines the relationship between socioeconomic barriers students encounter and the interventions to address those factors at Lenoir Community College. Specifically, the study seeks to determine the barriers and motivators that influence their education in regards to retention and persistence in academic programs. The study seeks to show that if socioeconomic barriers are indeed a major hindrance to their success, then there is a need for an intervention strategy. Therefore, our work could suggest that progress toward educational equity may be achieved through identifying barriers and implementing an intervention plan that could potentially increase student success.

GP45

A SENSE OF BELONGING: EXAMINING THE IMPACT OF A SOCIAL EMOTIONAL FRAMEWORK ON STUDENT CONNECTEDNESS WITH SIXTH-GRADEMALES

Krystal Tyndall

Mentor: Lewis, Travis Earl

Duckton is a township part of EasternCounty Schools, a community of schools comprising three elementary schools, one middle school, and one high school. Based on data collected from an at-risk referral database, Duckton Middle School experienced a sharp increase in student mental health referrals. The school community endured three student suicides over the last three years. Several parents of students also committed suicide, resulting in increased advocacy and support for their children in response. Separately, sixth-grade males consistently demonstrated a higher number of

discipline referrals than any other grade level in the school, as indicated by a three-year trend in the school's discipline report. Student connectedness and belonging play a pivotal role in discipline and at-risk behaviors. Given the concerning trends with disciplinary incidences with male students as well as the increase in mental health referrals and suicidality, the purpose of this study was to monitor the effects of implementation of the Responsive Classroom social emotional learning framework on student connectedness and a sense of belonging. A mixed method, action research design was employed. Quantitative and qualitative data were collected and triangulated from discipline incidents, student and teacher focus groups, and the administration of the Youth Risk Behavior Survey (YRBS). Through the use of action research, the collaborative inquiry partners and the scholarly practitioner appliedincremental changes as appropriate based on data collected throughout the study. The findings of this study were shared with the school's strategic leadership team to determine if continued use of this SEL framework would occur. The implementation of Responsive Classroomhad a positive relationship on the development of a sense of belonging and school connectedness.

GP46

PROVIDING TRANSFER STUDENT CAPITAL TO VERTICAL TRANSFER-TRACK STUDENTS IN A STUDENT SUCCESS COURSE: AN ACTION RESEARCH STUDY

Charles Gilmore, III

Mentor: Puckett, Heidi Leigh

Nearly 40% of all first-time college attendees in the United States begin their post-secondary education at a community college. The community college has increasingly become the entry point for many students, especially those from under-represented populations, whose goal is to transfer to a 4-year institution to pursue a baccalaureate education. However, for numerous reasons, many of these students never accomplish their goal of earning a bachelor's degree. The focus of this study was to understand how the current vertical transfer student success course (ACA 122) at Wayne Community College provides Transfer Student Capital (TSC) to vertical transfer-track students, to identify and implement changes to ACA 122 to improve the ability of the course to provide TSC to vertical transfer-track students, and to understand and assess how the changes made to ACA 122 may affect the ability of the course to provide TSC to vertical transfer-track students. The results of the study indicate that vertical transfer-track students believe the topics of student support services and academic planning as the most useful types of TSC. In addition, faculty participants believe the topic of financial aid is of equal importance. The findings of the study have several implications for higher education practitioners who work directly with vertical transfer-track students.

GP47

A Review of Literature in UAV Research on Construction Management: 2016-2021

Andrews Leonardo Acero Molina

Mentor: Huang, Yilei

Andres Leonardo Acero Molina

With the rapid advancement of Unmanned Aerial Vehicles (UAV) technologies in recent years, their uses have been increasingly adopted in many engineering disciplines, including architecture, civil, infrastructure, and construction industries. To satisfy the needs of various types of construction projects, a considerable amount of research work has been performed to test, verify, and refine the operations, implementation, accuracy, and safety during the last few years. This paper presents the findings of a comprehensive literature review that focuses on UAV research on construction management during the timeframe of 2016 to 2021. A total of 95 papers were identified and collected from a list of 21 relevant journals and conference proceedings and were then categorized by their research subjects, use cases, and aerial sensor types. The results of the identified paper were reported in two separate categories: UAV use and construction use. Research subjects in UAV use include its algorithm, applications, operations, framework, and training, while research subjects in construction use include inspection, surveying, safety, and monitoring. The application of other advanced technologies along with UAV, such as

deep learning, neural network, VR/AR, Unmanned Ground Vehicles, were also discussed. This paper summarizes the current results of UAV research on construction management, reviews the methodology, benefits, and limitations of each study identified, and thus provides invaluable insights on the future research development of UAV applications in the civil, infrastructure, and construction industries

GP48

Reconciling the Mechanical Properties of Lung Tissue using Computational Modeling

Elizabeth Dimbath

Mentor: Vahdati, Ali

Elizabeth Dimbath, Stephanie George, PhD, Ali Vahdati, PhD

Objectives: The emergent mesoscale mechanical properties of the lung are dependent on the microscale properties of the alveolar wall components and the surface tension. Currently, there are discrepancies in reported stiffness values of lung tissue. Therefore, our aim is to use computational modeling to reconcile the lung mechanical properties measured using different techniques at different length scales.

Methods: A mesoscale finite element (FE) model composed of a network of hexagonal geometries representing individual alveoli was constructed in COMSOL Multiphysics 5.6 (COMSOL Inc, MA, USA). Uniaxial tensile tests were simulated using FE analysis to compare the results of two microscale studies based on AFM to two studies of lung tissue strips at mesoscale. Mechanical properties from microscale studies were applied to the mesoscale models. Then, emergent properties from the computational models were compared to experimental data on lung tissue strips.

Results: In comparison to data from mesoscale studies, emergent behavior based on microscale studies showed some similarity to mesoscale behavior in specific strain ranges. At lower strains, the mechanical properties from AFM studies resulted in underestimation of stiffness compared to the mesoscale data with strain-stiffening occurring at larger strains.

Conclusion: Many studies on determining lung mechanical properties at the micro and mesoscales have reported a wide range of moduli for lung tissue. Our study shows that micro- and mesoscale mechanical testing data on lung tissue can be reasonably reconciled using computational modeling. In using stiffness values for FE modeling of lung tissue, it is essential to consider the experimental setup, pre-loading, and length and time scales of the mechanical tests performed to obtain relevant and accurate stiffness values.

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GP49

Increasing Creative Output by Visually Enhancing Engineering Design Tools

David Harr

Mentor: Sylcott, Brian

Engineering design focuses heavily on a designer's ability to create new, innovative, and unique solutions. The problem lies in that designers often struggle to generate a sufficient body of good ideas from which to work. To aid in the pursuit of novel ideas engineers have developed a multitude of techniques and tools for increasing creative output during brainstorming sessions. Analytical design tools provide engineers with a framework to guide their thoughts. A structured ideation tool can lead a designer to make connections and generate ideas which they otherwise would not have. This study focuses on the effects of enhancing such ideation tools by applying the principles set forth by modern learning theories. In this experiment the Elements of Design Ideation Tool was presented to students using both verbal (text only) and multimodal (text and visual) delivery. Statistical analysis was conducted to determine how the presence of visual icons affected creative output.

GP50

Efficient Semi-Automatic Workflows for Segmenting the Lung Lobes and Lesions in CT Images of COVID-19 Patients: Application to Full Inspiration and Full Expiration

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Introduction: COVID-19 is a severe acute respiratory syndrome that can affect the lungs. Computed tomography (CT) scans are useful for diagnosis, analysis, and research of COVID-19 infected lungs. Segmentation is used to isolate COVID lungs from surrounding tissues in CT images. Manual segmentation is cumbersome and automatic segmentation is computationally costly and reliant on image quality. COVID-19 makes segmentation challenging due to ground-glass opacities (GGOs) and nodules. Efficient semi-automatic segmentation using open source-software is a promising option for analysis of COVID-19 lungs. The objective of this study was to develop and compare two semi-automatic workflows for segmenting COVID lungs from low-resolution CT images at full inspiration and full expiration.

Materials and Methods: A CT dataset of the lung during breathing was obtained from a COVID-19-positive patient at Vidant Medical Center. Data were imported to 3D Slicer software and used in two separate workflows to create lung lobe and lesion segmentations at end-inhalation and exhalation. Workflows started by using the Interactive Lobe Segmentation module to outline the five lung lobes based on interlobar fissures. The additive workflow consisted of region growing using the Margin tool and manual addition of GGOs. The subtractive workflow created a segmentation of both lungs using the Lung CT Segmenter and adds GGOs on the edges of the lungs, then isolated each lobe from the lungs. Volumetric analysis was performed in the Lung CT Analyzer.

Results and Discussion: Total volume, functional volume, and COVID-affected volume (infiltrated and collapsed regions) were compared. Differences in these values ranged from 0% to 6% when comparing end-inhalation to end-exhalation segmentations, indicating similar capability for segmenting COVID lungs. A 30% reduction in functional volume and a 3-6% increase in COVID-affected volume was observed when comparing end-inhalation and exhalation. 48% of the lung volume is COVID-affected at end-inhalation compared to 59% at end-exhalation.

Conclusions: Additive and subtractive semi-automatic workflows are effective for COVID lung lobe segmentation. Inflated lung volume decreases from end-inhalation to end-exhalation while COVID-affected volume persists, resulting in the appearance of higher severity at end-exhalation than end-inhalation. This indicates that the current stage of the respiratory cycle should be considered when analyzing COVID lungs.

GP51

Convert Single-Use Mask to a Modifier to Improve Asphalt Pavement Rutting Resistance

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A large increase in plastic waste pollution is being caused by the rise of the COVID-19 pandemic. Between 2020 and 2025, compound annual growth is expected to be 20%. Before the coronavirus outbreak, we already had a significant problem with plastic pollution. Contamination of millions of PPEs will only make the problem worse. This paper explores an innovative way to reduce pandemic-generated wastes by recycling, processing, and using the shredded face mask (SFM) fibers as an additive to Hot Mix Asphalt (HMA) to enhance rutting resistance. Due to SFM becomes melted within the range of HMA mixing and paving temperature, the SFM provides stability and stiffness to HMA functioned like asphalt binder. The tested modified mixes exhibited excellent resistance to permanent deformation under the Asphalt Pavement Analyzer (APA), with values from 0.9 mm to 3.2 mm. For comparison, the maximum allowed rut for the control mix is 11.5 mm for local road; and 5.0 mm rut depth is considered fail-pass criterion in designing asphalt concrete mixes for use on interstate highways.

GP52

Mechanical Failure of Human Fetal Membrane Tissues in Premature Birth

Mackenzie Wheeler

Mentor: Ryan, Teresa Jean

Mackenzie Wheeler, Thomas Buckner, Dr. Ali Vahdati, Dr. Teresa Ryan, and Dr. Michelle Oyen

More than 1 in 10 babies in the U.S. were born premature in 2017, resulting in approximately 4,000 preterm deaths. One goal of this project is to determine the force it takes for a baby's amniotic sac to rupture, leading to the onset of labor. The amniotic sac is the protective layer that surrounds the fetus and amniotic fluid during gestation. The overall aim of the work is to discover a biomimetic material that can be used to patch up the baby's amniotic sac after a leak or rupture, allowing the baby more time inside their mother, as this is essential for the baby's life. A biomimetic material is electrospun to form a nanofiber mat. Current testing methods include the mechanical testing of electrospun nanofiber mats, which have comparable mechanical properties to that of human fetal membranes. The Zwick Roell machine used for testing provides the load and displacement, which can be used to calculate the elastic modulus and strength of the material. Next, fetal membranes are being obtained from full-term placentas as the IRB application has been approved for acquisition of tissue samples in collaboration with the obstetricians at Brody School of Medicine and Vidant Health. The mechanical properties of the amnion layers are being assessed with biaxial puncture testing in the same manner as the artificial membranes.

GP53

Is a 6-week in-person program effective for improving handwriting legibility, speed, and self-percpetion for 6-7 year-old students?

Christine Johnsen

Mentor: Turbeville, Lauren Shuler

Chelsea Alana Carré

Handwriting is a necessary skill for kids to acquire. Through teaching handwriting, kids gain independence and confidence in their abilities to communicate, and be able to engage in school-related activities. This study examined the effectiveness of a 6-week in-person handwriting program designed to improve handwriting legibility, speed, and self-perception of handwriting in 6 -7-year-old students.

Method:

Three students engaged in a 6-week in-person handwriting program, based on the handwriting curriculum, Learning Without Tears. Sessions occurred weekly for 75 minutes. Before the start of the program, participants were assessed using the Minnesota Handwriting Assessment (MHA) to evaluate legibility, form, alignment, size, and spacing. Here's How I Write (HHIW) was used to determine the child's perception of their own handwriting. Both the MHA and HHIW were used prior to the program for baseline evaluation and following the program as a post-test to determine changes for each participant.

Results:

The results of this study will look at the changes in legibility, form, alignment, size, and spacing using the MHA by comparing the scores from the pre-test and post-test. Results will also examine the pre-test and post-test results of the HHIW to determine if the child's self-perception of their handwriting changed.

GP54

Risk Assessment Need for Japanese Encephalitis Virus in Hog Farms in North Carolina

Michaud, Kenneth

Mentor: Richards, Stephanie Lynn

Kenneth Michaud (MSEH student) Stephanie Richards PhD (Environmental Health Sciences Program, Dept. of Health Education and Promotion, College of Health and Human Performance, ECU); Guy Iverson PhD (Environmental Health Sciences Program, Dept. of Health Education adn Promotion, College of Health and Human Performance, ECU); Michael Reiskind PhD (Department of Entomology and Plant Pathology, College of Agriculture and Life Sciences, NC State); Greg Kearney PhD (Department of Public Health, Brody School of Medicine, ECU)

Japanese encephalitis virus (JEV) is a mosquito-borne arbovirus primarily found in Asia and Australia and is one of the few with an associated human/animal vaccine. Hogs, cattle, and some species of wading birds are amplifying hosts for JEV, while horses and humans are incidental hosts. The primary JEV vector (blood feeds on swine, birds, and humans) is Culex tritaeniorhynchus and is not found in the United States (US); however, secondary vectors (e.g. Cx. pipiens/quinquefasciatus, Aedes albopictus, Ae. japonicus, Ae. vexans) are widespread in the US (including North Carolina). Eastern NC has an abundance of hog farms with concentrated animal feeding operations. Here, a literature review (N=50 articles) was conducted and suggestions for improving risk assessments are provided. In NC, more information is needed to inform risk assessments for JEV, including identification of potential JEV vectors and their blood feeding habits, JEV surveillance in swine and mosquitoes, and OneHealth-focused community engagement with farming, public health, and veterinary health communities about risk reduction.

GP55

Effects of Gender Stereotypes on Club Sports Participation

Belle Williams

Mentor: Das, Bhibha Mayee

Over 2.6 million people in the US identify as part of the LGBTQ+ population. Sports work within binary standards separating males and females by their physiological differences. Males are often encouraged to participate in sports that are traditionally masculine (e.g., baseball, rugby), and females are encouraged to participate in sports the avoid fulfillment of masculine characteristics (e.g., gymnastics, dance). Categorizing sports by gender appropriateness affects how individuals choose to participate in sports. The purpose of this study is to examine the impacts that gender stereotypes have on individuals' choice to participate in collegiate-level club sports. We hypothesize individuals that strongly identify with their gender identity stereotypes will choose sports the fulfill those stereotypes and individuals will participate on sports teams that they believe will fulfill stereotypes about self.

Participants (N=150;18-24 years old, Men's and Women's teams) will be active members of their university's club sports program and will be recruited via email and social media post. This pilot study will use an online survey to collect demographic data (e.g., age, sex assigned at birth, gender identity, sexual identity, university, club sports participation). To assess gender stereotypes about sports participants will be asked to rate on a 7-point Likert-scale (1= masculine, 4= neutral, 7= feminine), along with a list of common club sports will be provided (n=30+). To assess self0gender stereotypes the participants will be asked to rate themselves, and how people may perceive their gender on a 7-point Likert-scale. Based on their gender stereotypes about self and about sports the participants were asked if their sport helped fulfilled their own stereotypes. Descriptive statistics will be completed to

obtain demographic data. Also, a Pearson coefficient will be used to calculate the sports average gender-typing and the genders that participate in the sport most commonly.

GP56

The Relationship Between IADL and Naturalistic Driving Performance: Indications for Mild Cognitive Impairment Detection

Emily Mitchum

Mentor: Dickerson, Anne

The Assessment of Motor & Process Skills (AMPS), as a valid/reliable indicator of cognitive decline, has been shown to correlate with standard on-road driving evaluation (SODE) performance but has yet to be tested against naturalistic driving behaviors (NDBs). SODE has also shown some correlation with cognitive decline, suggesting NDBs may detect cognitive decline. This ongoing study is examining the nature and strength of the relationship between these assessments in older adults, and if there is a statistically significant difference in AMPS scores between participants with greater or fewer driving errors on the SODE and NDBs.

A cross-sectional design was used to compare the AMPS's process skills with NDBs and SODE outcomes in older drivers. Participants consisted of 41 older adult drivers recruited from the community over 65 years of age (M = 73 yrs). Participants agreed to drive with a computer chip in their vehicle for 20 weeks. The chip collects data similar to GPS as well as driving performance including sudden stops, hard cornering, and number of trips. Each participant completed the AMPS assessment and a comprehensive driving evaluation.

The P-Drive is an observational tool scored on quality of driving performance. While the mean score was 89.36/100, indicating normal performance, the scores were categorized by performance between those who did poorly (<80), passed (80-89), and did very well (>90). A one-way ANOVA found no significant differences in AMPS process scores based on the performance of the P-drive groups ($F(23)=1.19$, $p<0.324$). Using the same performance grouping, an ANOVA found a significant difference ($F(24)=3.864$, $p<0.036$) between MoCA scores and P-drive outcomes.

Non-significance in the AMPS scores and SODE is not surprising, as these were community-living and active drivers. However, the individual with the lowest AMPS process score (0.9) had the lowest P-Drive score (73). Interestingly, the MoCA mean score for the same group was 24.95, indicating sub-normal cognition amongst the sample. Also, a significant difference existed between P-Drive score groups. While one might argue that the MoCA is more sensitive to cognitive change, it is unclear if those changes interfere with functional performance. In fact, we argue that the non-significant difference in AMPS and P-Drive is based on functional performance or functional cognition, which may be a more relevant measure. NDB outcomes will be compared to these data in March 2022.

GP57

Food packaging decontamination with novel nano-antimicrobial

Caroline Knowles

Mentor: Pokhrel, Lok R

Foodborne illness is a critical public health concern, with a global burden estimated at 600 million cases and 420,000 deaths, annually. Common pathogens, including Escherichia coli and Salmonella enterica, that are responsible for more than half of the foodborne outbreaks were estimated to cost over 15.5 billion dollars for the US alone in 2013. Current gold standard in food/ packaging decontamination is washing the produce with disinfectants such as chlorine/dioxide, ozone, peroxyacetic acid, or alcohol; however, these agents have their inherent limitations and as such foodborne illnesses continue to rise, globally, highlighting an imminent need for effective, safer, and sustainable disinfectants. Herein, we report on the novel nano-based antimicrobial agent that effectively sanitizes food packaging materials, including wood, cardboard, and (hard and soft) plastics, at a low dose (10 μg/mL) and is safer to humans. We synthesized 5 nm size highly positive amino-functionalized silver nanoparticles (NH2 -AgNPs) and tested its bactericidal efficacy against the two most common model

foodborne pathogens, E. coli and S. enterica, applied on these packaging surfaces, as a function of exposure time (30 mins and 5 hrs.). Colony count enumeration followed by transmission electron microscopy confirmed that NH2 -AgNPs was bactericidal, via cell wall damage, disinfecting all types of packaging materials within 5 hrs. Studies are planned to test whether the same efficacy can be achieved at 30 mins post-treatment. The NH2 -AgNPs did not show oxidative stress response in human lung epithelial and dermal fibroblast cells, suggesting human exposure to these nanoparticles may not pose risk. These pilot results suggest that our novel NH2 -AgNPs may serve as a safer and effective disinfecting agent for food/packaging industry, potentially improving food practice safety standards and averting global foodborne illnesses and deaths.

GP58

Intravelar and Extravelar Length Following Palatal Re-repair: A Comparison of the Furlow Double-Opposing Z-plasty and Buccal Myomucosal Flaps

Mary Hannah Wilson

Mentor: Perry, Jamie L

Mary Hannah B. Wilson, BS; Taylor D. Snodgrass, MS; Megan N. Andrew, BS; Kevin O'Brien, PhD; Thomas J. Sitzman, MD; Jessica L. Williams, MS; Davinder Singh, MD; Jamie L. Perry, PhD

Background: Velopharyngeal closure (VP) is when the velum elevates to separate the nasopharynx and the oropharynx, and the levator veli palatini (LVP) is the most important muscle VP closure (Perry, et al., 2013, Ha et al., 2007, Moon & Kuehn, 2004). In individuals with cleft palate, there are differences in the LVP which can lead to velopharyngeal insufficiency (VPI) (Ha, 2007, Kotlarek et al., 2017; Kotlarek et al., 2020). 5-45% of individuals born with cleft palate require a secondary surgery to correct velopharyngeal insufficiency (VPI) (Bardach & Morris, 1990; Ysunza et al., 2002; Bicknell, McFadden, & Curran, 2002). Two common types of palatal re-repair techniques used for secondary surgery are buccal myomucosal flaps and the Furlow double-opposing Z-plasty. The purpose of this study is to 1. explore the impact of secondary surgery type on intravelar and extravelar segments of the LVP pre-operatively and post-operatively and 2. to evaluate differences in intravelar and extravelar segments pre-operatively and post-operatively compared to typical LVP anatomy.

Methods: Structural magnetic resonance images were obtained for 12 children pre- and post-secondary surgery to correct VPI (6 received buccal myomucosal flaps; 6 received a Furlow double-opposing Z-plasty). These MRIs were compared to data from 12 controls matched for age. Quantitative measures of intravelar length and average extravelar length were obtained. Pre- and post-operative measurements were compared using analysis of covariance. Subjects with history of VPI were compared to typical controls using analysis of variance.

Results: There were not statistically significant differences for intravelar length or extravelar length between the two palatal re-repair strategies compared; however, descriptive analysis of the data suggest there may be some preliminary differences. When compared to control data, there are significant differences in the intravelar length and average extravelar length for children with a history of VPI, both pre-operatively and post-operatively.

Conclusions: Palatal re-repair surgery to correct VPI did not appear to improve intravelar length and average extravelar length. Preliminary descriptive data suggests the two surgical re-repair types may impact intravelar length and average extravelar length. Future studies should explore differences between the two surgical techniques to see the impact on the LVP and management of VPI.

GP59

The Effect of Early Use of Hydrocortisone on the Prevention of Bronchopulmonary Dysplasia in Preterm Neonates

Supriya Sivadanam

Mentor: Akpan, Uduak Stella

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Background or Problem Statement: Bronchopulmonary dysplasia (BPD) is a common complication of extremely preterm birth (EPT, <28 weeks of gestation). Steroid medications are frequently used in the management of BPD, due to their anti-inflammatory properties. Dexamethasone, previously considered the steroid of choice, is associated with an increased risk of neurodevelopmental impairments. Hydrocortisone has been proposed as an alternative treatment to dexamethasone, with fewer side effects. However, optimal dosing and timing of administration have not been established.

Objective/Aim Statement: This study sought to determine whether early administration of stress dose of hydrocortisone to preterm babies at the time of illness in the first 2 weeks of life is associated with a decreased incidence of BPD at 36 weeks of gestation.

Methods: This was a retrospective cohort study. Extremely low birth weight (<1000g at birth) or EPT neonates born at or admitted to the NICU before 24 hours of age, between 2017 and 2019 were identified. The primary exposure variable was receiving a course of stress dose of hydrocortisone (3-4 mg/kg/day for 3 days or more) in the first 14 days of life. The primary outcome of this study was diagnosis of any BPD or severe BPD (sBPD). The secondary outcome was finding of moderate to severe neurodevelopmental abnormalities at 18 months of age, corrected for prematurity.

Results: Among the total 236 participants identified, 11 received stress dose steroids and 28 received some dosage of steroids in the first 14 days of life. No statistically significant difference was found in the incidence of BPD between the preterm babies who had received a stress dose of hydrocortisone in the first 14 days of life and those who had not (82% vs 60%, p = 0.210). However, the incidence of sBPD was higher among those who received the stress dose compared to those that had not (55% vs 20%, p = 0.014). Further analysis comparing the effects of any steroid use among the babies during the first 14 days of life found that the incidence of BPD was higher in the babies that had received steroids compared to those that had not (79% vs 59%, p = 0.045) and the incidence of sBPD was also higher (46% vs 18%, p = 0.002). Analysis of the secondary outcome is ongoing.

Preliminary Conclusions: The use of steroids in preterm neonates due to illness in the first 2 weeks of life did not appear to reduce the incidence of BPD in our study population, regardless of steroid dose.

GP60

Using 3D Dynamic Magnetic Resonance Imaging To Describe Velopharyngeal Function in Healthy Adults

Imani Gilbert

Mentor: Perry, Jamie L

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Introduction The production of speech is a dynamic process that involves many sudden and discrete movements. The velopharyngeal (VP) mechanism functions for closure between the oral and nasal cavities through lateral pharyngeal wall movement and superioposterior velar movement via contraction of the levator veli palatini muscle. Incomplete closure of VP structures may result in velopharyngeal insufficiency (VPI), characterized by hypernasality and poor speech intelligibility. Clinical imaging methods for assessing function of the VP mechanism include nasendoscopy and videofluoroscopy. However, these methods are invasive and often not well tolerated by young children1-2.

In this current work, we utilize a novel, child-friendly MR protocol, an innovative time-alignment method, and MR atlases to observe and compare changes in velar movements and configurations.

Methods Dynamic speech images were gathered using a high-speed and high-resolution 3D MR sequence3. 4 healthy adult subjects underwent a 3D structural scan and 5 dynamic speech scans. Scans were obtained in less than 20 minutes resulting in 40960 reconstructed

3D images. Stimuli included: “hamper”and “mom & bob are happy.”

All images were time-aligned according to novel procedures. Data were imported into Amira 3D Visualization Modeling Software to obtain linear measurements related to VP functioning. Data from all subjects were analyzed and compared to the corresponding statistical atlas across subjects. Of interest was possible variability in velar movements and configurations when the high-pressure consonant /p/ was produced (1) after a nasal consonant and (2) after a vowel.

Results Comparison of /p/ in the varying contexts revealed differences in velar configurations. The /p/ in “hamper”was produced with a longer and thinner velum than in “happy." Velar height, as measured by the ABC angle, also was greater when compared to the /p/ in “happy." Varying points of closure were also noted.

Conclusion By applying novel MR methods, we accurately described velar movements and compared individual subject data to the atlases, highlighting subject-specific deviations. This work helps pave the way for the implementation of dynamic MRI and MR atlases in the diagnostic process of velopharyngeal insufficiency as seen in children with cleft palate.

GP61

Mental Health and Feeding Styles in Parents of Formula-Fed Infants

Taylor Nelson

Mentor: Reis, Pamela Jones

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The responsive feeding style is recommended in infancy, and non-responsive feeding styles may contribute to impaired infant appetite self-regulation and the development of childhood obesity and other chronic health conditions. There is a need to investigate factors that potentially contribute to non-responsive feeding styles, including parental mental health disorders such as stress, depression, and anxiety. The purpose of this study was to investigate the influence of parental mental health following birth on feeding styles in healthy, term, formula-fed infants. A cross-sectional descriptive correlational design was employed using online surveys. Purposive and snowball sampling techniques were utilized to recruit participants online through Facebook groups. Recruitment also occurred through local pediatricians’ offices. Data were collected in REDCap®. Measurement tools included a demographic questionnaire, Perceived Stress Scale (PSS-10), Patient Health Questionnaire Depression Module (PHQ-9), 7-item Generalized Anxiety Disorder Assessment (GAD-7), and Infant Feeding Style Questionnaire (IFSQ). Participants were 306 parents of healthy, term, formula-fed infants in the United States. Prevalence of dominant feeding styles exhibited by participants were responsive (43.5%), pressuring (14.1%), restrictive (22.5%), laissez-faire (19%), and multi-style (1%). Most male parents exhibited either the pressuring or restrictive feeding style, while most female parents exhibited the responsive feeding style. WIC-enrolled parents were more likely to exhibit non-responsive feeding styles compared to those not enrolled in WIC. Responsive feeding parents were more likely to have moderate to severe anxiety scores and stress scores, and lower depressive symptom scores than non-responsive feeding parents. Our findings indicate a need for increased infant feeding support for parents, especially those experiencing depressive symptoms. Additionally, infant feeding support by healthcare professionals and in WIC programs is warranted for all parents, including those who formula-feed. Finally, there is a need to include fathers in infant feeding education and future research studies.

GP63

Examining Effective Velopharyngeal Ratio in Healthy Children using Magnetic Resonance Imaging

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Mentor: Perry, Jamie L

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Background: Velopharyngeal (VP) ratio has been described and reported among children with normal anatomy using a variety of imaging modalities including lateral cephalograms and magnetic resonance imaging (MRI). While VP ratio has been a useful tool in surgical planning for individuals with cleft palate, recent findings suggest that the effective VP (EVP) ratio at rest may be a more appropriate indicator of normal parameters for speech. Furthermore, EVP ratio is better correlated with VP function than VP ratio and provides a more consistent ratio of VP function across the age span. There is a need for normative data to be established for EVP ratio to be used in evaluation of VP function and surgical planning. The purpose of this study is to establish normative data for EVP ratio among children with normal anatomy. Additionally, secondary analysis will examine the presence of sex differences in VP and EVP ratios.

Methods: Participants in this study included We measured effective velar length and pharyngeal depth from the MRIs of 1,165 healthy nine- and ten-year-old girls and boys. We then used these measures to calculate the EVP ratio. We generated descriptive statistics and compared EVP between girls and boys.

Results: The mean EVP ratio in girls was 0.64 (SD = 0.25); the median value was 0.59 (range: 0.22-2.24). The mean EVP ratio in boys was 0.60 (SD = 0.22); the median value was 0.55 (range: 0.14-2.16). The distribution in girls and boys showed significant deviation from normality. The non-parametric Wilcoxon rank sum test showed that the EVP ratio was significantly greater in females compared to males ($p = 0.009$). Analysis with data collected thus far showed no meaningful relationship between age and EVP ratio. Data collection is ongoing, and the results will be expanded and updated as additional data becomes available.

Conclusion: Girls and boys show differences in the EVP ratio at ages nine to ten years. The results of this study can help improve our understanding of normal variation in clinically relevant VP measures. Furthermore, reported EVP ratio among children with normal anatomy may aid in the evaluation of VP function and surgical planning for children with repaired cleft palate.

GP64

Non-Governmental Organizations Involved in Global Cleft Care: Impact of COVID-19

Taylor Snodgrass

Mentor: Perry, Jamie L

Taylor Snodgrass, MS; Hugh Brewster, MEd; Usama Hamdan, MD; Erin Stieber, JD; Ruben Ayala, MD; Jamie Perry, PhD

Background: As a result of the pandemic and the associated shortages, many medical facilities reduced the number of elective surgeries offered (Diaz et al., 2020). This directly impacted comprehensive care for individuals with cleft lip/palate, especially in low and middle-income countries (LMICs) where there are additional pre-existing barriers that may prevent patients from receiving timely and comprehensive care (Kassam et al., 2020; Massenburg et al., 2016). Many non-governmental organizations (NGOs) work to reduce barriers in low and middle-income countries (Chanine et al., 2020; Kassam et al., 2020). The purpose of this study was to investigate the impact COVID-19 had across major NGOs involved in comprehensive cleft care and the impact COVID-19 may have on global cleft care moving forward.

Methods/Description: This study utilized a qualitative design. The primary author conducted interviews with four individuals from four different major NGOs involved in global comprehensive cleft care. Detailed notes were taken during each interview, and these notes were coded and later analyzed for themes.

Results: Participants reported changes in care as a result of COVID-19. These changes included the transition to

telehealth, cancellation of surgeries (both primary and secondary surgeries), and the cessation of international travel for extended periods of time (greater than six months). Participants reported that many pre-existing barriers in LMICs were exacerbated by the pandemic. Interviewees reported concerns regarding the number of surgeries that had to be cancelled and the quality of training provided for local healthcare providers and new healthcare providers as a result of the global pandemic. Participants stated telehealth has served as a helpful resource that will be utilized, even after the pandemic, to provide care for families and for training professionals.

Conclusions: The global pandemic impacted how NGOs aid in providing comprehensive cleft care in many ways. Sustainability of cleft care may be impacted as a result of the pandemic because many children have not been able to receive surgical care, and local professionals may not be receiving adequate ongoing training in cleft care. Telehealth has been vital to providing care and support to families and will continue to be a method of care moving forward.

GP65

Early Ambulation Among Persons Following a Surgical Procedure in Eastern North Carolina

Samantha Willard

Mentor: Larson, Kim L

Samantha Renee Willard
Michelle Bent
Carlos Melendez
Kim Larson

Early ambulation after surgery reduces postoperative complications and hospital length of stay. Patients who mobilized later in their postoperative period were at higher risk for readmission or death and lower health related QOL. The purpose of this study was to understand the relationship between early ambulation and key variables among a subset of adults following a surgical procedure.

Methodology

A retrospective record review was conducted using electronic health records (EHR) from the first quarter of 2019 (January through March) at a community hospital in eastern NC. We defined early ambulation as ambulation out of the room prior to postoperative day 2. Key variables were age, gender, race, and length of stay (LOS).

Results

We screened 251 records and 85 met the inclusion criteria. The sample was predominantly female (65.9%), with a high school diploma or less (62.4%), primarily Black (49.4%) with a mean age of 60 and range from 29-94 (SD 13.58). The primary surgeries were spinal and orthopedic. Sixty-nine percent reported pain on postoperative day 1. Over half (51%) of the sample did not engage in early ambulation. The mean LOS was 3.7 days. Length of stay was the only variable that was statistically significant (p=0.026).

Discussion

The sample represents a vulnerable population, i.e., female, Black, older adults, and low health literacy. Older patients are hesitant to ambulate early sometimes because of pain and fear of falling. Length of stay is significant because the longer a patient stays in the hospital, the less likely they are to ambulate. Other variables to be considered in further analysis are zip code, education, and pain scores.

GP66

Media Response to Outbreaks of Zika and Dengue in the United States: Can Health Education via Social Media be Improved to Protect Public Health?

Pablo Carvajal

Mentor: Richards, Stephanie Lynn

Other authors and mentor: Dr. Jo Anne Balanay, Dr. Sachiyo Shearman, Dr. Stephanie Richards

Objectives: This study aims to characterize the responses of users of Facebook to government health agencies' social media posts related to information about disease transmission, surveillance, and control during disease outbreaks. An important aspect of public health research focuses on examining public views

regarding major disease outbreaks. After analyzing Facebook data about Zika and dengue, a thematic analysis was applied to observe the nature of user responses.

Methods: Data were collected from several US government health agencies about vector-borne diseases dengue and Zika during the Zika outbreak in 2016. Official Facebook pages of these agencies were analyzed, and a qualitative analysis program, NVivo, was used to perform a thematic analysis of the data.

Results: Public sentiment information suggested that Facebook users had a negative sentiment towards health information data observed in this study. A number of themes were identified in the posts studied, giving insight into the nature of public discussions and responses to US government health agencies. Themes were also assessed based on the way the agencies' arboviral information was received by the public through a social media platform such as Facebook. The results invite researchers to further collect insight into the public's perception and understanding of arboviral outbreaks by analyzing Facebook users' interactions with health agencies active on Facebook. They also demonstrate the need to address gaps in health information sharing and monitoring by government agencies and highlight the importance of health education through social media platforms.

GP67

Quantifying the contributions of mesopelagic fishes to the biological pump in the North Pacific Subtropical Gyre using stable isotope techniques

Elise Easterling

Mentor: Asch, Rebecca G

Due to their vertical migratory nature of feeding, mesopelagic fishes are believed to be a major mechanism for transporting organic matter below the euphotic zone. After feeding at the surface, the fishes retreat to depths below 200 meters, where carbon is released through fish respiration and defecation. The objective of my research is to develop and test a method of tissue analysis that quantifies the amount of carbon that is potentially sequestered in the ocean column and seafloor by measuring the carbon that is ingested as food and expelled as waste by mesopelagic fishes. I will utilize data collected in the summer of 2019 from Station ALOHA, which is located in North Pacific Subtropical Gyre (NPSG). The NPSG plays a large role in nutrient cycling, carbon fixation, and contains a high diversity of fish species, which makes an ideal location to sample for mesopelagic fish.

The mesopelagic fishes captured during the cruise are very small, many less than 30 mm. As a result, size limitations may require removing only the whole stomach for the Hawaiian fish samples. In that case, we will estimate the amount of carbon in their stomach by determining the allometric relationship between fish size/weight and the carbon biomass in the stomach lining and stomach contents using a variety of fish species sampled in Beaufort, NC. If generalizable across species, allometric relationship from Beaufort samples will be used to derive a formula for estimating carbon content in the stomach lining of Hawaiian fishes, so that I can quantitatively estimate of the amount of remaining carbon in gut contents. A strong relationship was observed between stomach surface area and fish length ($df=23$, $p<.0001$, $r2=0.7430$) and weight ($df=23$, $p<.0001$, $r2=0.8033$) to support the development of the allometric relationship. Stable isotope analysis (SIA) will be performed on both the Hawaiian and Beaufort fishes to determine carbon content of both stomach tissue and contents. A preliminary analysis was conducted to observe the impact preservation method of samples has upon SIA results. This analysis was performed to determine if ethanol, as a preservative, would greatly influence SIA results of carbon isotopes in the ethanol stored fish samples. Findings from the preliminary study revealed ethanol has negligible impacts upon SIA results. Due to their large biomass, we anticipate mesopelagic fishes play a substantial role in providing a pathway to sequestering carbon deep into the ocean.

GP68

Parasite Diversity in the Invasive Asian shorecrab, Hemigrapsus sanguineus, on the Eastern Coast of the United States

Haley Hagemeier

Mentor: Blakeslee, April Monica Houghton

Haley Dawn Hagemeier, East Carolina University
April Monica Houghton Blakeslee, East Carolina University

Non-indigenous species can have strong interactions in invasive ranges and may be better competitors than co-occurring native species due to enhanced physiological performance associated with lower parasite loads. However, an invasive host's release from parasites may change with time if it becomes susceptible to parasites in the invaded range the longer it is present in the system. Moreover, geography and season may influence the parasite assemblages a non-indigenous species comes in contact with in its invasive range. We evaluated the diversity, richness, and intensity of metazoan macroparasites in the Asian shorecrab, Hemigrapsus sanguineus, throughout the entirety of its current established invasive range along the eastern seaboard of the US. Specimens were collected seasonally in 2020 from 5 sites, ranging from the southern edge (North Carolina) of its distribution to the northern edge (mid-coast Maine) and three core sites. On average, 20 crabs per site per season were dissected and evaluated for macroparasite infection. We found three parasite taxa (nematodes, acanthocephalans and cestodes) varying in intensity throughout the range, with most occurring in northeast USA populations and later in the season. Our work identified a new parasite taxon, a cestode from a single crab, but we did not observe any trematode parasites as had been found in prior surveys. Most infections were of acanthocephalans, which were in higher loads than in past work. Finally, our work confirms past surveys (2001-2016) demonstrating a reduction in the crab's escape from parasites with time, likely due to increased interactions with native parasites over time.

GP69

Striped Bass Egg Survey Shows Similar Modes of Variability with Different Sampling Schedules

Quentin Nichols

Mentor: Asch, Rebecca G

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

The seasonality of many marine species is changing due to climate change. However, it is difficult for ecologists to document these changes since it is more costly to conduct high-frequency surveys in marine and aquatic environments that require ship time compared to equivalent terrestrial sampling. To determine the optimal sampling frequency for documenting changes in fish seasonality, we used historical Striped Bass (Morone saxatilis) egg survey data to assess the effectiveness of reduced egg survey sampling schedules. Striped Bass eggs were collected by researchers from North Carolina State University and East Carolina University on the Roanoke River, NC from 1960-1993, to monitor the health of the Albemarle / Roanoke River Spawning Stock (A/R) of Striped Bass. Sampling of Striped Bass eggs occurred throughout the spawning season, with sampling every 3-4 hours. Prior to our initial work on this research project, these surveys had not been converted to spreadsheet format and some have never been digitized. Using daily data, we have removed specific days of data based on hypothetical egg survey sampling schedules to compare to the full daily sampling schedule. Even greatly reduced sampling schedules of two days a week showed very similar modes of variability of egg abundance compared to the full sampling effort. The egg data was digitized as part of a broader study on Striped Bass phenology (timing of biological events), so results are compared using phenological metrics that use cumulative percent of spawning activity and mark key points in the spawning season.

GP70

Thesis Origins: Investigating OSL and Potential Related Project Ideas

Marcus Snedeker

Mentor: DeWitt, Regina

The process of Optically Stimulated Luminescence (OSL) Dosimetry measures the amount of natural radiation absorbed by rocks and minerals. When certain crystals are irradiated, the electrons within their lattice can jump to higher energy levels. This configuration is

generally unstable, and most of the electrons fall back to their previous levels. Some of these electrons, however, find themselves trapped between energy levels in crystal defects within the lattice. Over time, natural radiation causes a buildup of these trapped electrons until the crystal is stimulated by a light source, which causes the electrons to be released. As the released electrons return to their original level, the energy is emitted as light and the crystal starts to glow. The intensity of the light, which is known as optically stimulated luminescence (OSL), correlates to the amount of natural radiation absorbed in the crystal.

The current goal of my work is to learn about practical aspects of OSL measurement and applications of the OSL method, and to decide on a project of my own. In this presentation, I will give an overview of my investigation into OSL theory and applications. I will present results from first measurements, describe various ongoing projects, as well as a potential project of my own.

GP71

Urban-rural homogeneity in morbidity and mortality throughout the life course in the southeastern U.S

Bridget Cone

Mentor: Perry, Megan A

The urban northeastern and mid-Atlantic U.S. in the 18th and 19th centuries often is characterized by poor childhood health due to high population density, poor sanitary conditions, and high levels of pollution, in addition to extractive childhood labor practices. While bioarcheological investigations have identified the poor nutrition and high activity levels of enslaved populations in the Southeast, the impact of urban environments in this predominantly agricultural, non-industrialized region remains relatively understudied. This investigation focuses on how early childhood environments impacted morbidity and mortality of one family from the urban southeastern U.S. from the 1850s through the 1970s. Evidence for early life stress in the form of growth disruption and skeletal and dental lesions associated with disease and malnutrition were documented in a minimum of 29 individuals from the Rhem family vault, located in New Bern, North Carolina. These variables were compared to two contemporary samples from land-owning families in rural eastern North Carolina to identify rural and urban differences in non-adult health its impact on health and disease later in the life course. No rural-urban differences in growth and development and their impacts on morbidity and mortality were identified through logistic regression and correlation analysis. One possible explanation for this homogeneity stems from the high economic status of the individuals included in this analysis, which could have buffered potential detrimental effects of urban living. This evidence highlights the complexity of urban and rural health and the necessity of parsing out impacts of economic status on health.

GP72

Utilizing Photovoice to Help Students Understand and Reflect on the Impact of COVID-19

Kaitlin Frey

Mentor: Lee, Mi Hwa

Kaitlin Frey, MPH and MSW Candidate
Mi Hwa Lee, PhD, MSW, MA
Jennie Ann Cole, PhD, MSW

Background: The COVID-19 pandemic has become one of the largest public health crises of our time, affecting everyone regardless of location or demographic. The purpose of this study was to help social work students better understand the impact of COVID-19 on their communities by utilizing photovoice techniques. The photovoice techniques (Wang & Burris, 1997) allows community members to collect data and document their observations through photos and subsequent narrative reflections. Photovoice is useful to better understand and cope with crisis and disaster situations by exploring their communities through art and creativity (Malka, 2021).

Methods: We collected 120 photos and narratives from junior social work students through social work research classes in Spring 2021. Students were asked 1) to take three photographs of the impacts of COVID-19 on their communities, 2) to describe how the photos reflect their views and experiences on COVID-19, and 3) to write one take away that they can use moving

forward in social work practice. We used thematic analysis (Braun & Clarke, 2006) to identify patterns and themes of our data.

Findings: Students found that many of their peers and those in their communities were feeling similar effects from the pandemic - both positive and negative. Photographs mainly represented mental health impacts, economic impacts, social distance requirements, and cleaning and sanitation. Five major themes emerged from the narrative data including shared living experience, expanded views on the pandemic, core social work skills to better serve clients, critical social work skills, and connection of research and theory to practice.

Conclusions: Photovoice allowed students to get involved and interested in their communities in a safe way and encouraged them to reflect upon the perspectives of others during this tumultuous global pandemic. Photovoice can also serve as a useful tool in social work practice, in particular learning social work competencies by Council on Social Work Education (CSWE). Students were encouraged to examine their own skills and apply them to the outcomes of the photovoice projects, increasing their empathy and rapport for the community, while recognizing the need to also grow and care for themselves. Photovoice provided an opportunity for students to increase their clinical skills, while learning more about their community, allowing them to understand and practice connecting theory to practice.

GP73

Motivational drivers of Heavy Work Investment: Intercultural comparison between USA and Middle East

Lydia Garas

Mentor: Aziz, Shahnaz

In the current study, we investigate the motivational correlation of two types of Heavy Work Investment (HWI)- workaholism and work engagement. While both entail spending considerable time and effort at work, workaholism involves an underlying internal compulsion and is the negative subtype of HWI, while work engagement includes passion and work enjoyment, and thus is the positive subtype of HWI. However, more focus has been given to outcomes of HWI types rather than their underlying motives, and the scarcity of random cross-cultural samples is a gap in the current literature, challenging the generalization of existing results. Therefore, the primary goal of our study is to investigate the relationships between HWI types and the motivation types presented by Deci and Ryan's (1985) self-determination theory. Moreover, we will examine the potential moderating influence of cultural dimensions presented by Hofstede (1988) and apply this to the HWI framework. Specifically, data will be driven from self-reported measures derived from two different cultures: the USA representing individualistic, low power distanced, and masculine culture, versus Middle Eastern culture (represented by Egypt and the United Arab Emirates) to represent contrasting culture. If significant results are found, antecedents of both constructs could be altered to include the influence of culture dimensions on the HWI framework. The sample consisted of working adults from various occupations and backgrounds.

GP74

The Tar-Pamlico River Basin Blue Economy Corridor

Shawn Jones

Mentor: Yeager, Emily Pauline

Anjalee J Hou,Taylor Kaylynn Cash,Kelly Nicole White-Singleton
Shawn Jones, Department of Psychology
Emily Yeager, Department of Recreation Sciences
Beth Bee, Department of Geography, Planning and Environment
Kelly White-Singleton
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Through a multi-stakeholder partnership, this research aims to catalyze the development of a Blue Economy Corridor (BEC) in the Eastern portion of the Tar-Pamlico River Basin in North Carolina. The BEC's assets would be documented through a digital interactive map that BEC visitors can use to curate their experiences in this portion of the Tar-Pamlico River Basin. The proposed BEC would extend through Tier 1 and Tier 2 counties

(Edgecombe County, Nash County, Pitt County, Beaufort County). The BEC unifies nature-based tourism, hospitality, socio-cultural heritage, health, conservation, STEM education, and accessibility assets in the Eastern Tar-Pamlico River Basin towards the goal of regional sustainable community development.

This presentation aims to present a template for blue economy development within a river basin that can be implemented in other river basins in Eastern North Carolina and beyond.

The template for building the BEC consists of four phases:

- Phase 1: establishing an advisory group comprised of stakeholders from all four BEC counties (Soulard et al., 2018).

- Phase 2: soliciting community members' input on the design and content of the corridor and the associated digital interactive map (Joyner et al., 2019;Yeager et al., 2020).

- Phase 3: geocoding identified assets and integrating them into a digital interactive mapping tool.

- Phase 4: ripple effects mapping to evaluate BEC successes and opportunities for improvement.

GP75

Mortuary Archaeology of the 19th to 20th century Rhem Family Vault in New Bern, North Carolina

Jalynn Stewart

Mentor: Perry, Megan A

The excavation and study of 19th and 20th century cemeteries in North America have not only illuminated shifts in mortuary behavior but also highlighted the lives of those invisible in the documentary sources, particularly women and children. However, unlike neighboring regions to the north and south, very few archaeological explorations of 19th and 20th century cemeteries in eastern North Carolina exist. A gradual picture of life in this relatively rural segment of the east coast is emerging through explorations of family vaults and cemeteries, largely initiated by their descendants. In 2019, the Anthropology Department at East Carolina University was asked by descendants of the Rhem family in New Bern to clear the ca. 1853 above-ground structure in preparation for restoration. This created the opportunity to study the material evidence for 19th and 20th century burial practices as well as the human remains within the vault during the 2021 field season. This presentation focuses on the material evidence for mortuary behavior during a rapidly-changing period of funerary history in the U.S. in order to document how these trends were practiced in a population center within a relatively rural context.

GP76

Ghosting: Reasons from the "Ghoster"and Reactions from the "Ghosted”

Brianna Waters

Mentor: Knox, David H

Brianna Waters, East Carolina University
I Joyce Chang, Central Missouri State University
Elizabeth Perkins, Morehead State University
Daniel Wohlfarth, Morehead State University
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Ghosting is the sudden unexplained disappearance (via social media or in person) of an individual with whom one had a relationship. One-hundred and forty-six undergraduates (80% women; 20% men) at a large southeastern university completed a 21- item questionnaire. Fifty-six percent reported that they had ghosted someone- the primary reason being that it was easier to disappear than to have further contact with the person. Fifty-one percent reported having been ghosted- the primary reactions being confusion and sadness. Women who had been ghosted were significantly more likely than men to report higher anxiety ($p < .01$), loss of appetite ($p < .05$), confusion ($p < .05$), lower self-esteem ($p < .05$), and feelings of distrust ($p < .05$). There were no differences by race or sexual orientation in emotional reactions to having been ghosted.

GP77

Hydrotherapy Use and Maternal-Infant Outcomes

Marianne Congema

Mentor: Larson, Kim L

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Kim Larson, RN, PhD, MPH, FNAP 1
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Significance: The benefits of hydrotherapy for women during antepartum includes pain management, shorter labor, and anxiety reduction. Less is known about the benefit of hydrotherapy on postpartum maternal-infant outcomes.

Research Aims: The aim of this study is to examine the relationship of hydrotherapy and exclusive breastfeeding, maternal-infant bonding, and hospital length of stay (LOS). The study is a component of a clinical nurse research fellowship to develop early career nurse scientists.

Methodology: This descriptive study was conducted using a retrospective record review of electronic medical records (EMR) from an urban community hospital that added hydrotherapy tubs to all labor and delivery rooms in 2018. The community hospital serves a child-bearing population of 63% White, 18% Asian, 12% Black, and 6% Latina. Records were included if the mother was >18 years and had a normal spontaneous vaginal delivery in September, October, or November 2019.

Results: Preliminary data indicates that 170 out of 229 records reviewed met inclusion criteria. Of the 170 mothers included, only 12 used hydrotherapy (7%). The mean age of these mothers was 32.8. Of these women, 11 were White and one was mixed-race. All women exclusively breastfed and most (83%) spent more than one hour of initial skin-to-skin time with their infant. The majority (92%) had a LOS of 3 days. Comparatively, of the 158 women who did not use hydrotherapy, the mean age was 31.1. The majority were White (62%), 61% exclusively breastfed; and less than half (43%) spent more than one hour of initial skin-to-skin time with their infant. More than half (53%) had a LOS of greater than or equal to 4 days.

Discussion: Hydrotherapy use is not documented in a specific area of the EMR; therefore, use may not be recorded consistently. In this study a small number of women used hydrotherapy in an urban hospital where it is widely available. The study suggests a positive relationship between hydrotherapy use, exclusive breastfeeding, and mother-infant bonding. The study also may indicate that disparities in hydrotherapy use exist.

Implications for Practice: Further study is needed on how diverse ethnic groups are informed of the benefits of hydrotherapy. Procedures should be created to accurately document the use of hydrotherapy.

GP78

A Safe Place Online: The Case Study of @Curvy.

Miranda Lee

Mentor: Bee, Beth Anne

The age of the internet has allowed human culture to take a digital form. The subsequent impact of the internet undoubtably created different avenues of interest for scholars. This research is situated within the interest of online safe spaces for marginalized travelers. As a feminist geographer, I am interested in understanding how gender and body size impact the lived experiences of solo female travelers. I believe it is possible to study this marginalized group of travelers by accessing one of their online spaces. To investigate my interest, I select a Facebook group for plus-size women travelers, @Curvy, to serve as a case study. Within @Curvy, global members post and interact with one another through sharing personal stories, tips and other content related to travel and body size. After narrowing down a timeframe, I gathered relevant posts using purposive sampling to perform a qualitative content analysis. From this, I discovered evidence of McMillan and Chavis' sense of community theory. Therefore, my study utilizes this theory to discuss how similar lived experiences can now result in a sense of community taking shape online.

GP79

B Sweet Social Media

Clayton Broadway

Mentor: Rowe, William Jason

For my Signature Honors Project I wanted to do something that would help me gain some experience in the field I want to work in, while also being able to help someone close to me. With that being said, I chose to help my mother expand the reach of her small business, B Sweet Bakery.The one thing she was lacking was a presence online.With social media growing at such an astonishing rate, it is an extremely important tool that must be utilized to help grow the business and boost sales. I chose to fix this by creating both an Instagram page and a Facebook page. The primary goal of this was to make community outreach easier, while giving her a centralized place to process orders. I also did some research into how other small businesses market themselves on social media and found that it came down to three main components. They use targeted hashtags to help them appear to people who browse similar topics. Their profiles have a certain aesthetic that they maintain by using similar colors and subjects in their posts. They also post people using their product on their story to help boost interaction with their customers. As you can see, the results of this project were promising, as we saw a small boost in both sales and notoriety at the local market and in local businesses. At the market, before it closed for the winter, we got some good exposure for Instagram. The problem with that is that the majority of our customer base is old enough that they do not have Instagram. This was before the Facebook page was created so it was our only platform at the time. Next year I am confident that we can grow our profile by advertising to our customers.

GP80

Enhancing Ethnic and Racial Diversity and Inclusion in Theses and Dissertations in Clinical Psychology Doctoral Programs

Angela Johnson

Mentor: Campbell, Lisa

Angela J. Johnson, B.S.
Emma Muscari, M.A.
Michelle Ruiz, M.A.
Juinell Williams, M.A.
Juliann Stalls, Ph.D.
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Lisa C. Campbell, Ph.D.

Racial and ethnic diversity and inclusion remain limited in many areas of clinical psychological research, which limits the applicability of psychological science to underrepresented research populations, including African Americans, Latinxs, Asian Americans, American Indians, and others. Increased attention upstream to diversity and inclusion in graduate psychology research training will be important for enhancing inclusivity and applicability of the psychology literature downstream as trainees transition into independent researchers. Toward that end, recommendations for racial and ethnic diversity and inclusion in thesis and dissertation research training are offered, focusing on opportunities at each phase of the research process, from conceptualization to dissemination. Consideration is also given to the challenges of conducting inclusive research when the campus demographic make-up and reliance on student participant pools pose constraints. In addition, the results of a preliminary assessment aimed at investigating the status of diversity in theses and dissertations within ECU's Clinical Health Psychology doctoral program are presented, along with key observations and ideas for future research mentoring.

GP81

Acculturation and Acculturative Discrepancies among Latinas

Michelle Ruiz

Mentor: Campbell, Lisa

Acculturation refers to the process of cultural and psychological change that occurs as individuals navigate two cultural worlds, and is often a salient experience for many Latinxs in the U.S. However, studies have regularly found that Latina women, as compared to Latino men, are particularly affected by the acculturative process, potentially due to discrepancies in self-perception that may arise as Latinas internalize two different cultural influences. In line with Self Discrepancy Theory (SDT), discrepancies in self-perceptions may involve various dimensions of acculturation, such as one's English and Spanish fluency, preferred social relations (e.g., ethnic make-up of friend groups), and cultural values. Thus, the current study sought to examine two categories of acculturative discrepancies: 1) acculturative self-discrepancies, which describe a discrepancy between perceptions of one's current acculturation level vs where one ideally wishes to be and 2) acculturative social discrepancies, which describe a discrepancy between perceptions of one's current acculturation level versus the obligations one perceives from friends and parents.

Participants were recruited through the Psychology department online research portal (SONA) and an email list generated by the Survey Review & Oversight Committee (SROC). The sample included 104 Latinas, ages 18-25, who were primarily 2nd generation, bilingual, Mexican American and Puerto Rican women. A majority of participants indicated that their current acculturation level was greater than both their ideal acculturation level, and the level they feel pressured to be at based on familial expectations. On the other hand, participants largely indicated they were less accultured than the level they felt pressured to be at based on peer expectancies, and this was unrelated to one's current acculturation level. These results suggest that college aged Latinas appear to be more concerned with perceived acculturative discrepancies between self and parents, reflecting familism values and developmentally appropriate concern with parental expectations. As this was the first study to examine perceived acculturative discrepancies through a SDT framework, additional research is warranted. Next steps may include identifying how acculturative discrepancies perform in various Latinx populations and utilizing statistical methods better equipped for capturing the development of acculturative discrepancies and potential indirect effects.

GP82

Expanding the Galaxy Universe of CartograPlant

Alicia Abrams

Mentor: Herndon, Nic

Alicia Briana Abrams, Sean Buehler, Irene Cobo, Jill Wegrzyn, and Nic Herndon

Climate change, pollution, and the destruction of the environment poses a risk to the genetic diversity of tree species. To mitigate the effects of climate change, it is necessary to decode the complex interplay between genetic, phenotypic, and environmental factors. However, there are challenges in identifying the correlations between these factors. One needs data sources that include genomic, phenotypic, and environmental data, as well as web services that exchange data between repositories, and tools that analyze the data. Although comprehensive data is widely available, there isn't a platform to integrate environmental, genetic, and phenotypic data. Many of the software available requires extensive knowledge of Linux and the command line, and enough understanding to be able to troubleshoot. Yet many natural scientists do not have the skills to use the software. CartograPlant is a web application designed to address this, with an intuitive user-friendly interface. It provides genotypic, phenotypic, and environmental data stored in databases. CartograPlant is a Drupal module, which allows it to work with other Tripal extensions and the repositories that use the Tripal Framework. Analysis is run on a high-performance computing cluster, using the Tripal Galaxy module. Galaxy is a web-based platform for easily reproducible and accessible computational research. It is a scientific

workflow, data integration and analysis, and publishing platform. Workflows allow the user to repeat the same analysis on different input data and/or parameters using a tool or a sequence of tools. Galaxy tools files serves the purpose of laying out the interface for the tool. It instructs Galaxy how to invoke the tool, what parameters to pass to it and what files would be output. In this project I have created tool config files for the following four software systems, to be used with CartograPlant. SamBada, a command line software written in C++, offers a simultaneous observation and analysis of more than one outcome variable to find genes with a unique pattern of expression that point to local adaptation in population genomics data sets. Metasoft, written in Java, estimates effect size, heterogeneity, and M-values. Bayenv, a Bayesian method, determines if local adaptation can be identified by correlation between allele frequencies and ecological variables or graphical location. BayeScan, written in C++, identifies loci that are responsible for certain forms of genetic variation.

GP83

Automated Dental Aesthetics with Machine Learning

Ashinee Mehta

Mentor: Herndon, Nic

Ashwinee Mehta1, Maged Abdelaal2, Moamen Sheba2, and Nic Herndon1

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While dentures contribute an important role in restoring the dental and facial structure, facial aesthetics are an equally important consideration during the restoration of an edentulous patient for elevating the treatment outcomes. Each denture is tailor-made for the patient, meaning the dental practitioner takes the impressions and measurements of the patient to make a perfect functional fitting denture. The current denture design workflow does not have a systematic approach to include the aesthetic factors, patient's pre-treatment facial shape and in-progress denture design visualizations, instead relying on discussing mock-ups with the patients during appointments. This results into waiting for the final denture fitting on the patient to evaluate the final denture aesthetics. In this research, we plan to develop and validate some facial aesthetic proportion techniques that are used in the current denture design workflow. Given a frontal image of a person with missing teeth or a collapsed face, the proposed method will automatically generate an image of the patient, with teeth, while restoring the patient's face shape. This will assist the dental clinicians to choose the best aesthetically fitting denture model, its size and position based on the current state of the face. Towards this goal, the method will automatically identify several facial landmarks, classify the patient's facial shape for easy selection of the denture model, and automatically create a three-dimensional denture design by using the patient's frontal and side-view images, as well as images captured from inside of the mouth. The goal of the research is to streamline the denture design process by considering the facial and teeth aesthetics, to enable denture-in-progress visualizations that avoid the end-moment denture refinements, with a simple graphical user interface that is easy to use by dentists and lab technicians.

GP84

Machine Learning in Software Development Life Cycle: A Comprehensive Review

Maryam Navaei

Mentor: Nassehzadeh-Tabrizi, Moha

This research concludes an overall summary of the publications so far on the applied Machine Learning (ML) techniques in different phases of Software Development Life Cycle (SDLC) that includes Requirement Analysis, Design, Implementation, Testing, and Maintenance. We have performed a systematic review of the research studies published from 2015-2021 and revealed that Software Requirements Analysis phase has the least number of papers published; in contrast, Software Testing is the phase with the greatest number of papers published.

GP85

Recommender systems using reinforcement learning algorithm

Mehrdad Reszei

Mentor: Nassehzadeh-Tabrizi, Moha

Nowadays, recommender systems are becoming an essential part of our lives. They play a crucial role in overcoming the overloading problem of information by suggesting and personalizing the recommended items. Collaborative filtering, content-based filtering, and hybrid methods are examples of traditional recommender systems which had been used for straightforward prediction problems. More complex problems can be solved with new methods which are applied to recommender systems, such as reinforcement learning algorithms. Markov decision process and reinforcement learning can take apart for solving these problems. Recent developments in applying reinforcement learning methods to recommender systems make it possible to use them in order to solve problems with the massive environment and states. Review of the reinforcement learning recommender system will follow the traditional and reinforcement learning-based methods formulation, their evaluation, challenges, and recommended future work.

GP86

Analysis of Patient Portal Utilization in an Academic Medical Center: A Retrospective Study

Fernando Chivela

Mentor: Burch, Ashley

Fernando Chivela, Dr. Ashley Burch, Dr. O. Elijah Asagbra

Patient portal utilization has been associated with positive patient engagement outcomes. Patient portals are secure online applications through which patients have convenient 24-hour access to their personal health information (PHI) from anywhere with an Internet connection. Despite their benefits and adoption efforts, the evidence of patient portal utilization and their association with patient engagement and clinical outcomes is inconclusive. We conducted this study to analyze demographic variables that predict patient portal utilization metrics and the differences in portal utilization based on diagnoses, including chronic diseases. Additionally, this study aimed to extend knowledge on patient portal utilization at an academic medical center in eastern North Carolina.

Method

This institutional review board-approved retrospective study analyzed Vidant's data on Epic MyChart utilization. We utilized PostgreSQL and SPSS to examine patient portal activation and utilization for Eastern

North Carolina patients who activated their MyChart account, received or sent messages, and had performed between January 1, 2015, and December 31, 2021. Descriptive analysis and logistic regressions were employed to model predictors and calculate odds ratios. Predictors and odds ratios of MyChart utilization included demographic variables and patient diagnosis.

Results

A total of 56981 patients were included in the final dataset. Time-trend analysis showed limed signs of attenuating utilization over time. Hypertensive disease, obesity, diabetes, kidney diseases, and sleep disorders were part of the included diagnosis. MyChart chart utilization was frequent among female, married, older, and white patients with hypertensive-related diagnoses.

Conclusion

In this dataset sample, male, younger, and minority individuals showed lower MyChart chart utilization. Although we found independent effects of race, we did not find a statistically significant interaction between race and time. The pandemic might have affected utilization rates, but additional analysis, including other diagnoses, is needed. Portals can provide a reliable system for distributing personal medical information to active patients and may impact hospital visits.

Postdoctoral Poster Presentation Abstracts

PD01

Elucidating the structure and function of a novel class of complement inhibitors of the Lyme disease agent, Borrelia burgdorferi

Sheila Thomas

Mentor: Garcia, Brandon L

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The complement system, an integral part of the host innate immune response, works in the recognition and clearance of pathogenic microorganisms. However, pathogenic bacteria utilize sophisticated complement evasion tactics as a means of survival and propagation within the human host. Two general functions of bacterial proteins involved in escaping or attenuating complement attack, include recruitment of functional host regulators of complement activation and proteins that bind and hinder complement activity. The causative agent of Lyme disease, Borrelia burgdorferi, is a spirochete that is transmitted by Ixodes ticks and disseminates via the blood of its vertebrate hosts. B. burgdorferi expresses a multitude of lipoproteins on its cell surface, including BBK32 and the complement regulator-acquiring surface proteins (CRASPs), which bind directly to complement components and interfere with their activities. Recently, we discovered two new paralogous proteins in the complement evasion repertoire of B. burgdorferi, termed ErpQ and ErpB, using a novel lipoproteome screening methodology. We have also shown that each protein is a potent inhibitor of classical pathway activation and their activity sufficiently protects B. burgdorferi from complement-mediated killing. Using surface plasmon resonance, our data shows that both Erps act at the level of the C1 complex by selectively binding with high affinity to the C1r and C1s protease subcomponents. In addition, we show that the Erps selectively recognize the active form of both proteases and we isolate their anti-complement activities to a C-terminal region of each Erp protein. Using X-ray crystallography along with hydrogen deuterium exchange mass spectrometry, we identify biophysical characteristics of both Erps which may contribute to inhibition. This study improves our understanding of immune system subversion by pathogens and may lead to new therapeutic approaches towards treatment of diseases associated with aberrant classical pathway activation.

PD02

New selective anti-Streptococci strategy for managing dental caries

Gabriel Abuna

Mentor: Geraldeli, Saulo

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Objective: The inclusion of the compound 2-amino-imidazole within a methacrylate polymer network will disperse selectively the biofilm formation without creating a dysbiosis.

Materials and Methods: one compound derivate from amino imidazole was included in a sealant to test its abilities against the adhesion of S. mutans biofilm. Antibiofilm properties of the compound were testes in Overnight cultures of S. mutans UA159 in concentrations of 1000µM (in DMSO and PEG400), 500µM, 250µM, 125µM, and 62.5µM, used to test inhibition of the compound. The polymer network was assessed using FTIR-ATR and a flexural test.

Results: The degree of conversion was not affected (H10: 94.6% and control: 93.5%). In addition, analysis of the IR spectra showed peaks at 1046, 1090, 1095 cm-1 for the imidazole ring that remain evident after polymerization of the compound. The flexural strength was improved dramatically in a 300%, and the graph showed a plastic material with higher toughness. The biofilm formed on the polymer were performed in 2 and

5 days. The reduction on the CFU and the biomass of the biofilm acquired demonstrates that the polymer has an antibiofouling properties.

Conclusion: Our outcomes revealed that this new approach of dispersing the biofilm at early stages of formation is a viable prevention strategy to diminish the occurrence of caries lesions.

PD04

Novel H-NS-like Protein MucR is Essential for Coordinating Virulence Gene Expression During Host-Association in Brucella spp. Through Silencer/Counter-Silencer Interactions

Ian Barton

Mentor: Roop, Roy M

Krishna K. Patel, Joshua E. Pitzer, Brandon L. Garcia, Daniel W. Martin, and R. Martin Roop II

Correct timing of virulence gene expression is critical for successful disease outcomes and the persistence of pathogens within the host environment. The global transcriptional silencer H-NS is a nucleoid-associated protein (NAP) that is important for coordination of virulence in many bacteria including Escherichia coli, Shigella, Salmonella, and Vibrio. In these bacteria, H-NS-mediated silencing is overcome through direct antagonization via transcriptional counter-silencers that bind to gene promoter regions, displace H-NS, and permit transcriptional activation. Brucella spp. and related members of α proteobacteria lack functional H-NS homologs, so it is unclear whether other proteins are involved in performing analogous functions during host-association and pathogenesis. We have identified the Zn finger protein MucR as a novel H-NS-like protein that is critical for virulence in Brucella spp. by binding to and directly repressing virulence gene promoters in an H-NS-like manner. Further, we show the stress-responsive regulator MdrA acts as a direct counter-silencer to MucR. Consistent with the role of MucR as an H-NS-like protein, hns from E. coli is able to functionally complement mucR mutants in Brucella spp. Together these data demonstrate the importance of silencer/counter-silencer interactions in the pathogenesis of Brucella spp. and related bacteria.

PD05

Metabolic Network Dynamics Underly Motility Pattern Changes During Sperm Capacitation in Mice

Schmidt, Cameron

Mentor: Neufer, Peter D

Cameron Alan Schmidt, Benjamin J. Hale, William Miller, P. Darrell Neufer, Christopher Geyer

Mammalian sperm are not fertilization competent following ejaculation but must undergo a series of biochemical changes, collectively termed “capacitation”, during residence in the female reproductive tract or under defined media conditions in vitro. Though the molecular signaling mechanisms associated with induction of capacitation are well-described, the role of the complex metabolite microenvironment in sperm function has remained largely underappreciated. One limitation that underscores this problem is the apparent representation of metabolism through unidirectional pathways rather than dynamic metabolic networks. In the latter case, metabolic flux patterns may take on a variety of distinct steady states in response to changes in microenvironmental conditions, such as those that occur during transit through the reproductive tract in vivo. These dynamic responses occur even while the underlying network topology remains constant and correlates with key functional alterations in sperm motility pattern that are associated with fertilization competence. Here, a dynamic network model of energy metabolism is defined using sperm isolated from the cauda epididymis of mice. Multiparametric metabolic phenotyping was combined with computer assisted sperm motility analysis (CASA) to define the relationships between metabolic network dynamics and motility pattern in vitro. Using a selective refeeding strategy, exogenous ketoacids were identified as potent inducers of a metabolic “switch” that dramatically shifted sperm motility. These findings highlight the importance of understanding metabolic networks as a phase space of possible dynamic states, rather than linear “pathways”, and provide insight into conditions that underly calcium induced capacitation in vitro.

PD06

Functional Significance of Angiotensin Receptors in the Neuroplasticity of (mRen2)27 transgenic model of Hypertension

Swami Vetha

Mentor: Aileru, Azeez

Swami Vetha, PhD, Rachel E Byrum and Azeez Aileru, PhD; FAHA

We study the sympathetic nerve activities (SNA) in the superior cervical ganglion (SCG) to delineate role of local renin-angiotensin system (RAS) in ganglionic transmission. Angiotensin II (AngII) peptide on SCG provoked postganglionic dose-dependent response in the amplitude of compound action potential (CAP) and ganglionic long-term potentiation (gLTP) and are remarkably higher in (mRen2)27 rats compared with Hannover Sprague-Dawley (HnSD) control animals. The objective was to study the influence of AngII in the synaptic transmission and the relative expression of angiotensin-related receptors in the SCG of hypertensive animals. Superior Cervical ganglia of a 12 – 16-week-old (mRen2)27 transgenic rats were isolated for extracellular recording. Tissue was processed for semi-quantitative reverse transcriptase (RT-PCR), western blot analysis for protein expression and confocal microscopy. AngII subtype-2 (AT2) receptor is one of the main components of the RAS and has a significant prospective for mediating the beneficial action of the RAS through its protective arm of autonomic homeostasis. Our results suggest that in (mRen2)27 SCG neurons, AT2 and MAS receptor protein expressions are considerably lower in (mRen2)27 compared to age matched HnSD group. The 2-ΔΔCT AT2 mRNA expression was 6-fold lower than the HnSD. The Immunocytochemistry (ICC) analysis of AT2 receptors showed a significantly lower receptor display in the SCG, which was concurrent with the receptor protein and mRNA expression in (mRen2)27. We speculate that the significant diminution in AT2 mRNA-receptor profile, the reduction in Ang-(1-7)-MAS mediated-receptor density and the protein expression may play an indirect role in the alteration and efficacy of gLTP in hypertension.

PD07

Influence of Quality High School Physical Education on Physical Activity

Xiaoxia Zhang

Mentor: Yun, Joonkoo

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Introduction: A population-based study revealed that taking physical education (PE) during school ages is more likely to increase physical activity levels in adulthood (Ekblom-Bak et al., 2018). However, there is limited understanding of the underlying mechanism in this relationship between PE and physical activity. One of the plausible explanations can be quality of PE experiences will increase students" physical literacy and physically literate individuals are more likely to engage in a lifelong physical activity. Therefore, this study was to examine how the quality of PE in high school is associated with future physical activity and whether physical literacy plays a mediator role in this relationship. Methods: A total of 280 college students (62.1% females; Mage = 20.09 +/-2.04) were recruited from 11 universities in the U.S. They filled out an online survey measuring the quality of PE in high school (i.e., policy and environment, curriculum, instruction, and student assessment), leisure-time physical activity (LTPA; Godin, 2011), and physical literacy (i.e., knowledge and understanding, self-expression and communication, sense of self and self-confidence; Sum et al., 2016). A path analysis was performed to test the associations between quality of PE and LTPA with physical literacy as a mediator. Results: The Goodness of Fit indices revealed the proposed mediation model was appropriate, X2/df = 34.90/18, p = 0.01; CFI = 0.99; IFI = 0.99; TLI = 0.98; RMSEA = 0.06, 90% CI [0.03, 0.09]. The model explained 9.3% of the variance in LTPA. The quality of PE had a direct and significant association with LTPA (β= 0.14, p <0.05) and with physical literacy (β=0.16, p <0.05). A significant positive association was also observed between physical literacy and LTPA (β= 0.25, p <0.01). There was a significant indirect effect

(mediation) of quality of PE through physical literacy on LTPA based on the bootstrapping test (95% CI: 0.005, 0.088; p = 0.01). Conclusion: The findings illustrate the direct association of quality high school PE with physical activity and supports that quality PE increases students' physical literacy and thus promotes future physical activity. It suggests high school physical educators and practitioners to improve the quality of PE by a) establishing quality policy and environment climate, b) using the grade-level curriculum, c) providing appropriate instructions, and d) applying aligned student assessment with learning objectives.

PD08

Fluid-Structure Interaction Simulation of Pulmonary Hypertension in Patients under Hemodialysis

Fatemeh Bahmani

Mentor: George, Stephanie

Early diagnosis of pulmonary hypertension development in end stage renal disease (ESRD) patients will improve the patients" quality of life, outcome of healthcare procedure, and potentially prevent the patients" removal from the kidney transplant list. The coupled analysis of blood flow and vasculature wall mechanics has been conducted in the pulmonary artery of a patient with pulmonary hypertension undergoing arteriovenous fistula hemodialysis. Images from magnetic resonance imaging (MRI) from patients have been used in Mimics 20.0 (Materialise, Inc.; Plymouth, MI) to produce the geometry and inlet velocity waveforms. The fluid flow and structural equations are solved in (ANSYS, Inc.; Canonsburg, PA) to compute parameters of interest over these geometries. The blood is taken to be a non-Newtonian fluid with a variable viscosity modeled using the Carreau model and a density of 1200 kg/m3. The vessel wall is modeled as a linear elastic material with E= 2 MPa and Poisson"s ratio ν=0.48. The contours of wall shear stress, flow velocity and wall total deformation at peak systole are presented. The outcome of this research may provide clinicians with data to monitor the function of pulmonary artery and intervene to prevent the incidence of pulmonary hypertension.

PD09

Sarcoidosis Mortality in North Carolina

David Wambui

Mentor: Kearney, Gregory Dale

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Background: Sarcoidosis is a rare inflammatory disease that affects the lungs and lymphatic system. Risk factors for disease mortality include Black race, advanced age, pulmonary hypertension and fibrotic lung disease. The objectives of this study were to 1) identify sarcoidosis mortality clusters or hot spots across North Carolina between 2000 – 2018; and 2) evaluate the association between sarcoidosis-related mortality and certain sociodemographic risk factors including race, obesity, occupational/environmental exposures, poverty, and ambient PM2.5 across NC.

Methods: To assess variability of sarcoidosis mortality across NC, counties were categorized into three distinct geographical regions (Western, Piedmont, and Eastern). Descriptive analysis was used to summarize the numbers of sarcoidosis deaths by race, sex, age category, and sarcoidosis type stratified by region. Mapping and cluster analysis were conducted in ArcGIS. A multivariate linear regression was conducted to assess the association between sarcoidosis mortality and identified risk factors.

Results: Eastern NC had the highest sarcoidosis mortality rate (1.16 per 100,000) compared to Piedmont (0.49 per 100,000) and Western (0.32 per 100,000) regions. Statistically significant sarcoidosis mortality clusters were detected in Eastern NC (p <0.001 for Global Moran”s I). Several sociodemographic and occupational factors (percent of African Americans, percent of obese adults and percent working in nature) were more prevalent in Eastern NC compared to Piedmont and Western regions (p-value <0.001 for all). Region and percent of African American population were statistically significant predictors of sarcoidosis mortality.

Conclusion: The Eastern region of NC disproportionately bears the largest burden of sarcoidosis mortality compared to the rest of the state. More in-depth research is needed to examine potential risk factors including health disparities, environmental, and occupational exposures.

PD10

Missed appointments in an orthodontic clinic, dental student clinics

Deborah Simmers

Mentor: McCarlie, Van Wallace

DL Simmers, ME Moss, VW McCarlie, J

Objectives: Our primary aim was to determine whether there are differences in missed appointments between Medicaid and non-Medicaid groups in the orthodontic clinic at East Carolina University’s (ECU) School of Dental Medicine. The secondary aim was to examine missed appointments in all ECU dental clinics.

Methods: ECU’s University and Medical Center Institutional Review Board approved this retrospective study (n=823). Deidentified data from the ECU School of Dental Medicine’s electronic health record, from 2018-2021, were used to summarize missed appointment rates between Medicaid and non-Medicaid groups. All active orthodontic patients were included. Missed appointments included any appointment where the patient did not show or cancelled the same day. Those in the Medicaid group included all who formally qualified for this benefit. It also included all those who are ineligible for Medicaid but participate in the North Carolina Health Choice (NCHC) program for low-income children. The non-Medicaid group included those with private insurance and so called self-pay patients who do not utilize insurance. We used Mantel-Haenszel chi-square tests to assess the difference in proportion of missed appointments by Medicaid status and clinic, choosing a p value of < 0.05 to indicate a statistically significant difference between groups.

Results: There was no statistical difference between missed appointment rates for non-Medicaid (28.6%) and Medicaid (27.4%) groups (p= 0.28). For all clinics, there was a significant statistical difference between the Medicaid missed appointment rate of 36.5% and non-Medicaid of 31.9% (p<.001). The Medicaid rate of 36.5% is also substantially higher than the expected 30% national mean. When considering all ECU clinical settings, the missed appointment rates for solely the Medicaid group was significantly lower in the orthodontic clinic (p<.001).

Conclusions: Our study found no significant differences between the groups in the orthodontic clinic alone, when comparing missed appointment rates. However, a significant difference was observed between these groups across all clinics at ECU. A lower rate of missed appointments was observed for the Medicaid group, when assessing the orthodontic clinic to other clinics within ECU. Future research is needed to ascertain reasons for missed appointments in both groups and identify strategies to reduce the frequency of missed appointments.

PD011

Estimating the performance of GEDI and ICESat-2 in mangrove forests of south Florida

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Mentor: Lagomasino, David

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Mangroves are very important ecosystems for both humans and wildlife. Quantifying the mangrove

structure is key for understanding its role in blue carbon management as well as studying resistance and resilience after disturbances. Spaceborne Lidar systems such as Global Ecosystem Dynamics Investigation (GEDI) and Ice, Cloud and land Elevation Satellite (ICESat-2), provide a unique opportunity for global mangrove structure monitoring. Yet the performance of spaceborne Lidar in global mangrove areas remains poorly understood. Here, we investigate the new NASA satellite technology, GEDI and ICESat-2, that can capture 3D forest structure including canopy height and elevation. The elevation and canopy height products of mangrove forests in south Florida were compared and validated by airborne Lidar from NSA G-LiHT. The results showed reasonable estimation of canopy height and ground surface from space-borne Lidar, with r value of 0.84 and 0.89 for GEDI and ICESat-2, respectively. The RMSE for GEDI was 2.34 m and that for ICESat-2 was 2.76 m. We also investigate the factors including canopy height, vegetation cover, daytime, slope, power of beam (weak or strong) that could influence the performance of spaceborne Lidar. We found canopy height significantly affects the accuracy of spaceborne Lidar measurements. Tall mangroves were both well measured by both GEDI and ICESat-2. More powerful beams improve the accuracy of measurements while accuracy of ground elevation was very sensitive to slope. Overall, the results show the promising application of GEDI and ICESat-2 as state of the art in spaceborne Lidar systems to study global mangrove structures and its resilience to disturbances.

PD012

Mangrove Forests have gained area, but lost carbon since 1985: the benefits of stability to put down roots from a postdoc perspective

Sean Charles

Mentor: Lagomasino, David

Mangrove forests are disturbance adapted ecosystems that provide high levels of ecosystem services, particularly carbon storage.However, due to their coastal location, mangrove ecosystems bear the brunt of sea level rise and enhanced storms driven by climate change. However, given space, climate change can drive mangrove migration inland and to higher latitudes. We compiled Landsat satellite data to identify changes in mangrove area and canopy greenness from 1985-2021 and combined field data, the normalized difference vegetation index and macine learning to model changes in carbon storage in mangroves across the state of Florida. We found that mangrove loss and degradation werer primarily associated with hurricane impacts, particularly near the coast. However, areas of mangrove gains (345 km2) exceeded losses (31 km2) by an order of magnitude. Mangrove gains were largely driven by sea-level rise and saltwater intrusion into wetland interiors and increasing temperatures at their northern limit. Net mangrove gain has increased after major storm events that push mangrove propagules inland and shows a positive relationship with sea level rise and marine influence. Mangroves have a very high capacity to store carbon in plant biomass and soils over time, yet we lack quantification of long-term change associated with vegetation shifts. In Florida, mangrove loss and degradation have disproportionately occurred along the coast in areas with mature forests and large carbon stocks, where forests that can be centuries old, particularly those that are already stressed are pushed past their limit during storms, rapidly losing carbon, potentially never to return. On the other hand, newly established forests develop and store carbon gradually. Here we use field data and 36 years of satellite imagery to quantify carbon change and determine that despite gains in area, mangrove forests lost substantial carbon stocks (118,992 Megagrams, the CO2 equivalent of burning 50 million gallons of gasoline). While coastal mangroves are increasingly lost during coastal storms, their capacity to migrate into undeveloped areas actually increased mangrove area and decreased the net-loss of carbon by 46%. Our findings suggest that mature coastal mangroves are increasingly at risk due to climate change and storms in their current locations, but by preserving hydrology and land for mangrove migration and establishment, we can drastically reduce losses in area and function.

PD013

Evaluating the impact of inter-tidal wetlands on storm surge flooding and damages in Galveston Bay: Case Study of Hurricane Ike

Zaid Al-Attabi

Mentor: Narayan, Siddharth

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Several coastal communities face losses to people and property during Hurricanes by storm surge and inundation. Previous studies have shown the benefits of wetland for reducing storm surge flood extents and hence, damages. In this study, we evaluate, using Delft-3D FLOW, a high-resolution process-based numerical model, the role that salt-marsh wetlands played in reducing flood extents from Hurricane Ike in Galveston Bay in 2008. Datasets obtained from NOAA are used to validate the storm surge model and to analyse the impact of wetlands on peak flood elevation in Galveston Bay. Hurricane Ike approached the Galveston Bay and made landfall on September 13 of 2008 with maximum storm surge of 5.3m and sustained winds of 176 km/h. Hurricane Ike caused significant flooding on the eastern side of Galveston Bay. The numerical model performs well in predicting the storm surge from H. Ike, with an RMSE error of 0.18-0.26 m with correlation coefficients ranges from 0.88-0.95. The impact of wetlands on flooding from this storm surge is studied by running the model for two scenarios: with and without wetlands. Flood maps from both scenarios are used to calculate the distribution of flooded people and property value under the two wetland scenarios. The study finds that wetlands reduce peak flood areas by 50.5 km^2 and have an equally significant impact on flood damages.

Undergraduate Oral Presentation Abstracts

UO1

Higher-Order Associative Learning Impairments in Mice with Rab10 Protein

Hailey Aldridge

Mentor: Tran, Tuan D

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Rab10 is a type of GTPase involved in neuronal vesicular trafficking. It is a known substrate of leucine-rich repeat kinase 2 (LRRK2), a serine/threonine protein kinase affiliated with Parkinson's disease. The phosphorylation of Rab10 is eminently expressed within hippocampal tissues of patients with Alzheimer's disease (AD) (Yan et al., 2018). Within the lab, we are examining the link between Rab10 expression and cognitive dysfunction, utilizing the trace eyeblink classical conditioning (TECC) procedure. TECC is a cognitive assay for associative learning mediated by cortical-hippocampal interactions, and is considered a form of higher-order learning.Rab10 could potentially play a differential role in cognition, leading to varying outcomes depending on the type of behavioral task utilized to assess the integrity of an underlying neural circuit that mediates a particular cognitive function. Adult Rab10 conditional knockout (KO) mice (Rab10+/-) and wild-type (WT) control mice were surgically implanted with recording electrodes and a stimulating electrode (after Tran et al., 2017) prior to TECC training. After a 5-day recovery period, they received six consecutive days of TECC. Each day consisted of 100 total trials, 90 trials of which involved presentation of an 80dB tone conditioned stimulus (CS) that lasted for 380ms.After a trace period of 500 ms, where there were no stimuli, a mild shock unconditioned stimulus (US, 1.6mA) was delivered to elicit an eyeblink unconditioned response (UR). During the remaining 10 trials, no US was delivered to probe for expression of CRs. The learning measure is the conditioned response (CR), an anticipatory eyeblink that is elicited by the tone CS and is emitted prior to the US. The trace period taxes the ability to time events properly and requires the integrity of cortical-hippocampal circuits. We compared whether the learning curves expressed by each group differed significantly. Rab10+/- mice were significantly impaired in acquiring CRs as measured by frequency and amplitude during the terminal portions of training (Sessions 4-6) compared to WTs. These learning impairments were not explained by sensorimotor changes, as their ability blink to the US (unconditioned responses) and initial reaction to the tone CS (startle responses) were not significantly different. Our findings indicate that Rab10 signaling differentially influences the neurocircuitry of conditioned behavior.

UO2

Effects of Geraniol, Linalool, and Citronellal on virulence factors of Candida"spp.

Nicole Cavaliere

Mentor: Murata, Ramiro Mendonca

Purpose: To assess cell viability and antifungal effects of Geraniol, Linalool, and Citronellal in Fibroblasts and Candida spp.

Methods: Three essential oils were assessed to find the Antifungal and cell viability properties. Human Gingival Fibroblast cells (1 x 105) were seeded in 24 well plates with DMEM medium + 10% FBS and incubated at 37°C in 5% CO2 for 24 hours. A Reductor of resazurin to resorufin was used to assess the cell viability. Candida spp. (C. albicans MYA-2876, C. glabrata CBS-138, C. tropicalis MYA-750, C. dubliniensis MYA-646) were evaluated when treated with 5 mg/mL diluting 10 folds

to find the MIC/MFC of Geraniol, Linalool, and Citronellal.

Results: The cell viability has been established and confirms that Geraniol's IC50 = 223.5 µM (log[IC50] = 2.349 µM), Linalool's IC50 = 46.41 µM (log[IC50] = 1.667 µM), and Citronellal's IC50 = 93.31 µM (log[IC50] = 1.970 µM). MIC/MFC for Geraniol: C. albicans (792 µM/>500µM) C. tropicalis (4484µM/>50mM) C. glabrata (767µM/>50µM) C. dubliniensis (77.83µm/50µM) for Linalool: C. albicans (5549µM/>500µM) C. tropicalis (1134µM/>50mM) C. glabrata (159µM/>50µM) C. dubliniensis (7516µM/>500µM) for Citronellal: C. albicans (>50mM/>50mM) C. tropicalis (>50mM/>50mM) C. glabrata (>50mM/>50mM) C. dubliniensis (>50mM/50mM)

Conclusion: Geraniol and Linalool both showed antifungal properties at sub cytotoxic doses whereas Citronellal did not. This was unexpected as Geraniol, Linalool, and Citronellal have similar molecular makeups.

UO3

BIOMECHANICAL DIFFERENCES IN LIFTERS WITH PRE-EXISTING INJURIES DURING THE SNATCH EXERCISE

Evan DeVitto

Mentor: Rider, Patrick Michael

Evan Conner DeVitto, Hannah E. Black, Dakota W. Godley

Introduction: High-intensity training (HIT) workouts such as CrossFit, are rapidly growing in the fitness industry. HIT workouts often include complex movements such as the snatch. The snatch requires the participant to lift a bar from the ground to an overhead position in one fluid movement. Participation in HIT workouts has been viewed as a higher injury-risk practice compared to other exercise programs. Research has suggested that high repetitions can result in a breakdown in the biomechanical technique used by the lifters thus leading to an increased musculoskeletal injury risk. Research also suggests that athletes with pre-existing injuries have a significantly higher chance of reinjury than healthy athletes. Therefore, the purpose of this study is to quantify the biomechanical differences between lifters with pre-existing injuries and those without.

Methods: 17 participants (18-45 years old) were recruited to participate in this study. Each participant completed a questionnaire assessing preexisting health conditions, injury history, and demographic information. Participants completed a snatch workout which consisted of 30 repetitions for time.Utilizing a twelve-camera 3D motion capture system, kinematic data was recorded. Reflective markers were placed onto the participant to track their body segments. A static trial was performed to create a model of each lifter. The weight used was based on 60% of the participants one rep max for the snatch. The kinematic variables of interest were 3D body segment positions and joint angles. The first repetition for each participant was used as a baseline, and differences from the baseline were calculated to determine the biomechanical alterations and used to determine injury risk. To determine the biomechanical differences between previously injured body segments, participants with pre-existing injuries were paired with healthy participants that had similar body types.

Significance of Results: These results will be significant to both practitioners and HIT participants. If our data supports that any observed mechanical changes during a workout might increase the risk of re-injury, releasing a patient to participate in HIT workouts too early could lead to a severe injury with a longer recovery time. Athletes can use these findings to understand how injury history necessitates changing their training routines to account for potentially increased injury risk in specific body segments.

UO4

Angiotensin-Converting Enzyme 2 Expression in Ovariectomized Rat Kidney: Effects of Ethanol and Estradiol

Sophia Farrow

Mentor: Abdel-Rahman, Abdel-Rahman

The COVID-19 pandemic has prompted discussion and research on angiotensin-converting enzyme 2 (ACE2) signaling. ACE2 promotes lowering blood pressure by

catalyzing angiotensin II (Ang II) metabolism into angiotensin 1-7 (Ang 1-7). ACE2 is utilized as a membrane receptor for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), also known as COVID-19. Therefore, the number of ACE2 molecules within the kidney will likely influence the severity of symptoms caused by COVID-19. Estradiol (E2), the form of estrogen produced by the ovaries, and ethanol (EtOH) have been proven to separately affect the expression of ACE2 within the kidneys of female rats. This research aimed to study the effect of EtOH, E2, and their combination on ACE2 expression in rat kidney in the abscence of E2 in ovariectomized (OVX) female and male, as well as OVX rats supplemented with E2 (OVXE2) using the Western blot technique. EtOH significantly increased renal ACE2 expression in OVX and male rats. By contrast, E2 reduced renal ACE2 expression and prevented the increase caused by EtOH in ACE2 expression in OVXE2."By researching E2 and EtOH effects on ACE2 expression, scientists can further discern how COVID-19 treatment can be tailored for alcohol-consuming females.

UO5

The Effect of Listener Group and Masker Condition on Auditory Working Memory

Kathryn Fennie

Mentor: Vermiglio, Andrew J

The goal of this study was to determine the effect of listener group and masker condition on auditory working memory. Forty-five participants between the ages of 19-31 years with normal pure-tone thresholds were evaluated. The Digit Span Forward Recall test was administered in four listening conditions using supra-aural headphones in a sound-treated booth to evaluate auditory working memory in the presence of semantically meaningful versus anomolous maskers. The conditions included including conversational masker forward, conversational masker backward, four-talker forward, and four-talker backward. A statistically significant main effect was found for listening condition on Digit Span scores. Evidence also suggests that working memory ability may be compromised by semantic interference as seen by consistently better working memory performance in backwards listening conditions versus forward talker listening conditions.

UO6

PFAS Behavior Effects

Megan Harmon

Mentor: DeWitt, Jamie C

Our laboratory studies the effects of per- and polyfluoroalkyl substances, PFAS, on responses in the immune system. Because PFAS are very chemically stable, they are often used in certain consumer products, like nonstick coatings, and as a result have been introduced into the environment. Once in the environment, their chemical stability leads to persistence and exposures to both animals and humans. The long half-lives of PFAS also allow them to bioaccumulate in some species. Although the number of individual PFAS is in the thousands, those that have been studied appear to have effects on multiple systems, including the immune system. Studies from our laboratory illustrate that exposure to PFAS can suppress adaptive immune functions. We also have anecdotal evidence from previous studies that mice exposed to higher doses of PFAS appear to display more anxious behaviors in comparison to those in the lower dose groups. Because there are linkages between the immune system and the nervous system, we hypothesize that alterations in behavior may come from alterations to immune cells in the brain known as microglia. Adult male and female C57BL/6 mice were given a PFAS known as perfluorohexanoic acid (PFHxA) for 30 days and their open field activity was evaluated throughout the dosing period as a measure of their anxiety. Open field activity was evaluated prior to dosing, mid-dosing, and two days before the end of dosing to describe changes in activity. Brains were necropsied after the end of the dosing period, fixed in neutral buffered formalin, and embedded in paraffin. Brains will be thinly sliced and sections of the frontal cortex will be stained for microglia to see if changes in microglial number and/or morphology are associated with changes in open field activity.

UO7

pH-Detection Bandages

Marzuq N. Islam

Mentor: Dickerson, Daniel Lee

Marzuq Naeem Islam, Ono Abhulimen, Daniel Lee Dickerson, Shawn Anthony Moore

This study represents an initial effort to develop a low-cost diagnostic bandage for underserved populations. Currently, the US is facing a crisis with the rise of diabetes. This disease often comes with a variety of effects, including foot ulcers. This effect can pose serious issues to people with diabetes because without proper treatment, it can lead to amputation and nerve damage; this can be even more dangerous because if there are other wounds gained, the person in question might not even feel any pain due to the nerve damage. To address this, we engaged in a research and design approach in partnership with the ECU STEM Center. This study builds upon work from Dasia Taylor(https://www.smithsonianmag.com/innovation/high-schooler-invented-color-changing-sutures-detect-infection-180977345/) who came up with pH-sensitive color-changing suture that used a natural ph indicator, such as cabbage juice, to detect infection. The same principle applies to our product. We use a natural indicator that, when applied to the bandages, monitors pH changes. A change in color would possibly detect if the person's wound is infected. What differentiates our product from the sutures is our enhanced precision and connection with physicians in real-time to remotely diagnose and asses wound treatment. This study leverages a low-cost sensor connected to a microcontroller, such as an Arduino, to detect changes in pH related to the bandage. We will explore the use of various telemetry options to relay data to physicians to monitor the status of their patients. Using data from the bandage, physicians could then recommend additional appointments or treatment. This study stands to directly benefit rural Black North Carolinians in an effort to positively address health disparity issues.

UO8

Adamts9 in Ocular Development in Humans and Zebrafish

Caroline Johnston

Mentor: Zhu, Yong

Caroline M. Johnston, Jonathan J. Carver, Susana Contreras-Blanco, Tierra N. White, Carisse T. Ginyu, Yong Zhu

Congenital disorders of eye formation affect millions of patients each year. Unfortunatley, these defects lead to blindness with no viable treatments in many cases. Mechanisms involved in morphogenesis of the eyes are still unclear. We used deep sequencing, genetic mapping, and candidate gene elimination to identify a missense mutation in ADAMTS9 (a disentegrin and metalloproteinase with a thrombospondin type 1 motif, member 9) as the likely cause of an ectopia lentis phenotype observed in a human patient. In zebrafish, we detected high adamts9 expression in the retina by mRNA in situ"hybridization and a transgenic reporter. In our zebrafish Adamts9 KO model, we observed eye and pupil defects that become progressively more severe as the fish age. These defects include significantly smaller pupil size at five days post fertilization (dpf), constricted pupil, a dialated pupil, or an irregularly shaped eye with a consistent defect in the anterior portion in juveniles or matured adult fish. For elucidation of underlying mechanisms of Adamts9 in ocular development, we are conducting histology analyses, immunostaining of extracellular matrix, and utilizing existing KOs or transgenic report lines suspected to be up- or down-stream of Adamts9. Using CRISPR, we are generating additional zebrafish KO models, including a missense mutation at the site of ADAMTS9 found in the human patient. We hope our study will facilitate the development of effective treatments for human patients in the future.

UO9

Simulated type II diabetes alters ephrinA1-epha (EFNA1/EPHA) expression in human inducible pluripotent stem cell-derived cardiomyocytes (hiPSC-CMs)

Amaia Lunsford

Mentor: Virag, Jitka Amira Ismail

Type II diabetes (T2D) affects more than 500 million adults in the US and is the ninth leading cause of death globally. Over time, the combined effects of hyperglycemia, hyperlipidemia, and hyperinsulinemia (HHH) result in the development of severe or life-threatening complications, including but not limited to heart disease/ failure, nerve damage, strokes, diabetes, and more. The heart is one of the most vital organs in the human body and is known to be adversely affected by HHH. Previous studies have shown that ephrinA1-Fc administration to the ischemic heart significantly reduces injury and that hearts from hyperglycemic mice have altered expression of the EFNA1/EPHA and cardioprotective pathway mediators. The potential for EFNA1/EPHA in the diabetic heart may be a critical component of tissue salvage. To understand the mechanisms involved, we are utilizing human inducible pluripotent stem cell- derived cardiomyocytes (hiPSC-CMs) to stimulate these conditions in vitro. We will determine the baseline levels of EFNA1/EPHA receptors and how they are affected by HHH both with and without anoxia. We hypothesize that EFNA1-Fc administration will positively influence cell function under simulated HHH conditions and improve survival during anoxia. To test this hypothesis, we will explore cell signaling pathway mediators involved in regulating metabolism, calcium handling, autophagic function, and cell survival by analyzing the changes in EFNA1/EPHA receptor expression and related cell signaling through Western blot analyses. Promoting optimal function and attenuating cell death with EFNA1 may be extrapolated to improve clinical outcomes in the hearts of T2DM patients with or without ischemia.

UO10

A New Model for Fibrinolysis - The End of a 50 Year Debate

Spencer Lynch

Mentor: Hudson, Nathan E

Spencer R. Lynch - East Carolina University

Brittany E. Bannish - Oklahoma State University

Sean M. Laverty - Oklahoma State University

Nathan E. Hudson - East Carolina University

Fibrin is an exceptionally elastic protein that acts as the primary structural component in blood clots. When fibrinogen and thrombin meet, they polymerize into chains of fibrin monomers called protofibrils. Protofibrils bundle together to form fibrin fibers which create web-like networks whose role is to catch blood cells, resulting in a blood clot. Once a clot has reached the end of its usefulness, plasmin, a lytic enzyme, begins to break fibrin down in a process called fibrinolysis which ultimately leads to the dissociation of blood clots. While clot dissolution has been observed, much is unknown about the details of fibrinolysis in a single fiber context. Previously, there were two theorized models for fiber dissolution: transection and uniform radial digestion. Transection claims that plasmin pools at a single location on fibers making a precise cut while uniform radial digestion says plasmin evenly distributes along fibers and digests every location an equal amount until the fiber becomes too thin and breaks.

Fluorescence microscopy was used to collect timeseries of fibers during fibrinolysis. We developed novel techniques we used to find correlations between fiber width and fiber properties including estimated cleavage location, initial maximum and minimum width locations, and overall change in width over time. In observing the change in width over time we show that there is longitudinal intensity sliding away from degradation sites. We offer two interpretations of this which are the recoil of protofibrils after they are cut and the unfolding of molecules comprising the protofibrils due to the redistribution of tension in fibers. Additional effort is being put into developing a new method of fiber

measurement by applying statistical distributions to fluorescence intensity data. Furthermore we investigate a potential positive feedback mechanism which accelerates digestion. 3-D stochastic modeling is also being used to help gain insight on how plasmin diffuses to fibrin fibers. Better understanding fibrin fiber digestion could help us understand why 20% of clots are resistant to digestion when plasmin is introduced. This would aid in developing treatments for blood clot related diseases like deep vein thrombosis and stroke.

UO11

The Effect of Semantic Interference on Speech Perception in Noise Ability

Abigail Ormond

Mentor: Vermiglio, Andrew J

The goal of this study was to determine the effect of semantically meaningful masker content on speech perception. The maskers included four-talker babble and conversational maskers presented forward and in reverse. Speech perception in noise ability was determined using the AzBio sentences. Poorer speech perception was found for the forward masker conditions than for the same masker conditions in reverse. Greater semantic interference was found for the four-talker babble conditions as opposed to the conversational masker conditions.

UO12

Differences in Neurological Connectivity Between Right and Left Limb Dominant Individuals in Implicit Motor Sequence Learning

Jennifer Painter

Mentor: Mizelle, John Christopher

Jennifer Painter, J.C. Mizelle

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Limb dominance has a substantial influence on implicit motor sequence learning, a critical aspect of our ability to interact with the environment in a goal-directed way. Current research has concluded that left hand dominant (LHD) individuals are often more bilateral than their right-handed (RHD) counterparts, as LHD individuals were found to utilize neural connections within both the right and left hemispheres of the brain. Thus far, 16 volunteers have been recruited for this study. Thirty healthy male and female volunteers (15 RHD, 15 LHD) ages 18 to 35 years will be recruited to participate. The participants perform all tasks with the dominant hand, and brain activity will be recorded for all tasks using EEG. A fixed 10-element movement sequence was created and inserted in a longer 13-element movement sequence at random locations. Participants will not be told of the repeating sequence. Four white rectangles will be displayed on a screen. When one rectangle turns black, the participant will press the corresponding button on a keypad. EEG activation patterns will be compared across RHD and LHD individuals, and behavior will be assessed by the rate of error reductions during the task. We expect that RHD and LHD will not show different rates of motor learning, but will demonstrate different neural mechanisms for how learning occurs. We also expect more complex, bilateral patterns of motor activity in LHD versus RHD individuals. Studying this fundamental difference in limb dominance and neural connectivity could greatly improve our understanding of human anatomy and physiology. This study challenges the theory of lateralization of brain function by analyzing the differences in neural connectivity between RHD and LHD individuals. This information can be used to determine if alternate treatment methods exist that may be more beneficial for LHD individuals and if the handedness of their healthcare provider is a crucial part of their learning and recovery process.

UO13

FACS Validation of Cell Specific Recombination in Novel Mouse Model

Anaya V. Pentakota

Mentor: McClung, Joseph Matthew

Ananya V. Pentakota, Reema Karnekar, Thomas D. Green, Zoe. S Terwilliger, Joseph M. McClung

Peripheral artery disease (PAD) is a vascular condition caused by atherosclerosis in the peripheral arteries, most commonly the ones supplying blood to the lower

extremities. Chronic limb threatening ischemia (CLTI) is the most severe clinical PAD presentation and carries a high risk of major amputation or death. Despite twenty years of trials and pre-clinical testing, no CLTI therapeutics have advanced or improved limb salvage. There is a dire need to understand the genetic mechanisms underlying CLTI to aid in effective therapeutic design. We identified Bcl-2–associated athanogene 3 (BAG3), a highly conserved protein that is expressed in the heart and vasculature, as a potential therapeutic target for CLTI. Currently there is little understanding of the cell-specific roles of BAG3 in ischemic limb pathology, therefore we generated a novel mouse model of endothelial cell specific BAG3 loss (CDH5-Cre;Bag3fl/fl).This project was designed to: 1) establish effective Fluorescence-Activated Cell Sorting (FACS) procedures for pre-clinical modeling of endothelial cell specific biology, and 2) validate endothelial cell specific recombination after tamoxifen induced Bag3 knockdown. Cell isolations and FACS were performed from isolated murine tissues and endothelial cell specific cell populations were verified, validating the efficiency of the procedure. Additional FACS using tissues from “tamoxifen treated CDH5-Cre;Bag3f/f mice was utilized to generate endothelial cells for specific validation of knockdown and recombination, which was performed by PCR and qRT-PCR. This data demonstrates the usefulness of FACS as a fundamental tool in validating models of cell specific targets from in vivo samples and is a crucial step in validating tools necessary for effective therapeutic design.

UO14

Altered Fibrinolysis by Fluorophore Labeling

Ethan Garrett Stoll

Mentor: Hudson, Nathan E

Fibrinogen is among the most abundant proteins found in blood plasma. After vascular injury fibrinogen is activated to fibrin, forming an insoluble mesh-like network that is the basis of a blood clot. After healing has occurred, plasmin, a lytic enzyme, begins the process of fibrinolysis to break down the fibrin network which allows for normal blood flow to resume. Improper dissolution of blood clots by plasmin is a precursor for many of the leading causes of death in the world, including thromboembolism and stroke. Studying fibrinolysis in human subjects is challenging due to multitudes of factors and uncontrollable variables. Thus, most fibrinolysis knowledge has resulted from laboratory study. Commonly, the laboratory technique used to study fibrinolysis is time-resolved microscopy utilizing fluorescent beads to label the otherwise invisible fibrin network. However, our data indicates that the labeling of fibrin with extraneous fluorescent material that would not be found in the body results in a change in the normal fibrin-plasmin interaction. The main driver of this altered interaction is fluorescent bead concentration, of which there is no universally agreed-upon standard. Our research has quantified the effects of fluorescent bead labeling of fibrin networks for the purposes of time-resolved microscopy. This has led to the conclusion that previous claims about fibrinolysis could be false due to the confounding variable of fluorescent beads threatening the internal validity of fibrinolytic study in this manner. In a field relying heavily on in vitro study to treat in vivo conditions, it is of upmost importance to attribute results properly and fluorescent beading does not allow this.

UO15

Applicationsof LiDAR to acoustic surface impedance measurements

Faith Cobb

Mentor: Ryan, Teresa Jean

Andrea Vecchiotti, The Catholic University of America
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Dr. Teresa Ryan, East Carolina University

This work presents the application of terrestrial LiDAR scanning to acoustic surface impedance measurements in order to predict outdoor acoustic propagation. This study is part of a larger effort working to develop a numerical model to predict long-range acoustic transmission loss through the lower boundaries of the atmosphere. Currently, this study is working to evaluate and catalog various outdoor surfaces following the

procedure set forth in the ANSI/ASA s1.18 standard for outdoor acoustic surface impedance measurements. As this standard limits measurements to surfaces with vegetation less than 5 cm in height, the use of a terrestrial LiDAR to obtain 3D scans of measurement sites would allow for a better understanding of acoustic propagation through bulk vegetation.

UO16

Characterization of Reproductive Materials

Maycie McDougal

Mentor: Ryan, Teresa Jean

Maycie Ann McDougal, Thomas Buckner, Dr. Ali Vahdati, Dr. Teresea Ryan, Dr. Michelle Oyen

The aim of this project is to better understand the factors that can cause preterm birth, which affects 1 in every 10 infants born. This work will determine the chemical and molecular changes that occur in reproductive tissues, specifically the cervix. Fourier-transform infrared spectroscopy (FTIR) can be used to understand how the cervix develops during a pregnancy to be able to identify potential problems. FTIR is a technique that is used to procure the electromagnetic radiation frequency of a material by detecting the sample's measured wavelengths. A spectrum of the absorbed wavelengths is obtained and can be analyzed to determine the biological makeup of the material. Thus, FTIR can determine molecular changes in biological tissues, offering a simple, non-invasive way to diagnose and predict abnormal tissue. Determining the wavenumbers and determining correlation with published wavenumber bands, helps to not only show the differences between healthy and unhealthy tissue, but also exemplify where different bonds and biological structures occur. 50 micrometer thick rat cervix sample cross sections that varied in gestational age were tested and showed trends in the peaks for Amide I and II, collagen, hyaluronic acid, and elastin. The data from gestational ages of 6 and 18 days were compared as they showed the greatest differences. Collagen and hyaluronic acid both showed increases from day 6 to day 18, while the peak elastin content occurred at day 6. The next step in this project is to compare the peak trends in cervical tissues that are from a healthy pregnancy to the peak trends in tissues that have resulted in preterm birth, specifically due to cervical insufficiency. Pinpointing when in gestation and which substance levels could be affecting preterm birth can aid in increasing a baby's time in the womb.

UO17

An Experimental Study on the Dynamics of Binder Drops Impacting on a Powder Surface in Binder Jetting Additive Manufacturing

Zachary Pakulniewicz

Mentor: Liu, Yang

Binder jetting additive manufacturing (AM) is an innovative form of 3D printing that generates complex and advanced structures of various material by jetting binder drops onto a powder bed. The drops on the bed cure the powder to form the structures in a quick and efficient manner. However, the method suffers several flaws including manufacturing inconsistencies and coarse resolution of structures. These flaws may be explained by complex interactions between the binder drop and the powder during the printing process. In this study, these complex interactions will be studied during the impact and subsequent curing processes. A high-speed imaging system will be used to capture the transient details of the drop-powder interactions while a micro digital image projection (m-DIP) system will be used to quantify the instantaneous 3D surface morphologies of binder drop impact onto the powder. This study will be instrumental in the development of binder jetting for fabricating multipurpose, higher-quality functional structures.

UO18

Characterization of Heartbeat Parameters in Drosophila Introduced to a Western Diet

Joshua Sutton

Mentor: Liu, Yang

James Theron Jones - Undergraduate Researcher and Author

Dr. Yang Liu - Mentor

Dr. Alexander Murashov - Mentor

Elena Pak - Research Specialist

Drosophila has been established as an effective surrogate genetic model for the early developmental stages of vertebrate hearts. This research uses this model to determine how a western style diet high in sugar, fat, and salt affects the heart rate, separation distance, and velocity of the heart tube inner walls in Drosophila and if exercise may play a role in mitigating any changes associated with that diet. The heartbeats of the fruit flies are recorded using a high-speed microscope imaging system whereby the recorded images are processed in a custom suite of MATLAB code to extract the heartbeat data. Preliminary data shows that a western diet decreases both the mean stroke distance and contraction and relaxation velocities compared to the control group. Exercise does show a trend of lessening the decrease of these parameters. Mean heart rate is negligibly affected by diet, though a western diet does tend to show a higher variance. Exercise has shown to decrease the mean heart rate with the most profound decrease being in the western diet group. Overall, these findings show that a western style diet tends to make the heart contract and relax slower and over a shorter distance. This could be correlated with less pumping force by the heart of a subject on the western style diet, though exercise does, in fact, seem to mitigate these adverse effects.

UO19

Exploring the effects of the variability of the vertical temperature gradient on acoustic propagation modeling

Nia Wilson

Mentor: Ryan, Teresa Jean

This work is part of a larger project that seeks to develop an improved numerical model for how sound travels over long ranges in terrestrial and littoral environments. The volume of sound is influenced by many things. Terrain characteristics including the shape, texture, vegetation, and soil characteristics of land can affect the way sound propagates. Several atmospheric variables also affect sound propagation,?such as wind, humidity, and temperature. The overall focus of this subordinate project is to understand how experimental temperature gradient data compares to existing temperature models. Recent findings indicate that existing temperature profile models are insufficient at capturing the near surface complexities below about 5 meters above ground level. The question to be explored in this work involves looking at temperature profile variability between individual flight cycles. A flight cycle is a pre-programmed vertical path that the UAV conducts. This path begins at 5 meters in elevation, then goes upward to approximately 100 meters and then back down to 5 meters. One flight cycle takes about 200 seconds.? The research question is how much can the temperature gradient change from one flight cycle to the next?”How much does the ever-changing relationship between temperature and elevation affect acoustic transmission loss? It is known that temperature does change over the course of the day or even a few minutes, but can this subtle change in the relationship affect acoustic propagation models? Understanding this question will help us answer the broader question of how accurate near-surface temperature information improves acoustic propagation modeling efforts when compared to the use of simplified temperature gradient assumptions.

UO20

GeoServer Integration of Analyses and Results' Visualization for CartograPlant

Lowe, Alex

Mentor: Herndon, Nic

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GeoServer Integration of Analyses and Results' Visualization for CartograPlant

CartograPlant is a web-based application that allows researchers to identify, filter, compare, visualize, and analyze geo-referenced biotic and abiotic data. Its goal is to support numerous multi-disciplinary research endeavors including: phylogenetics, population

structure, and association studies. This web application is a Drupal module which allows it to be used by other modules within the Drupal ecosystem and more importantly Tripal, which is a Drupal module that helps researchers reduce complexity of creating a website for searching and browsing genomic data. The TripalGeoserverAPI module was developed to allow the software developers to easily upload raster and vector layers to GeoServer. This module integrates with the GeoServer API to create, edit, upload, and delete different vector and raster layers with ease. The module will make CartograPlant aware of the new layers added without adding extra hassle to the upload process.

UO21

"Untitled" A One Act Play

Grace Gardner

Mentor: Clark, Patricia A

“Untitled” A One Act Play, is an original short production of a piece writtem based on the protests that took place in Summer of 2020. This script was written as a way to create an outlet for feelings that couldn’t yet be placed. Throughout this story line we are able to see how seemingly normal students, minorities, are fighting a separate battle. One where carelessness isn’t an option and there are outcomes not predicted. In producing this piece, I wish to start a conversation of the very real and very valid feelings of the minority students. Also in putting on this production, it will give some of the BIPOC students an opportunity to participate in and understand a work that they can relate to on a different level, as well as acting experience.

UO22

Singing: The Human Connection

Marguerite Hemedinger

Mentor: Gardner, Catherine M

Though music may not be a universal language, it is a facet of human existence that can help us understand each other across cultures, languages, and borders. This project explores the experiences in singing and teaching voice lessons of individuals in different parts of the world. It was designed as a case study not to analyze individual’s experiences as a representation of the whole, but rather as a point of comparison between individual experiences in different parts of the world. Through interviews with people who have sung or taught singing in Italy, Chile, Canada, and the United States, I compare cultural values and practices of singing. This study was conducted over the course of several months using virtual meeting technology. Each interview was recorded with the express permission of the subjects and the recordings were analyzed after all the interviews were collected. The interview answers reveal several connections and contrasts between the individual subjects. Some interviewees found different aspects of singing and learning to sing more important than others, such as lesson pacing (technique versus repertoire) and preparation (performing versus rehearsing). There were also many similarities that resonated in each singer’s observations of singing. For instance, all subjects discussed the mind body connection that is experienced in singing. Even though certain values varied between subjects, this study highlights the connection that different individuals have with their voice as part of their identity as a human in the world.

UO23

Teaching Children Kindness through puppetry

Kirby Lee

Mentor: Clark, Patricia A

The purpose of my presentation is to teach children kindness through Puppetry. My play is called ”The Grumpy Cat.” It is about an old cat who would not share his cat food, and he kept it all for himself. as the story continues, he realizes that the food isnt all for him, and learned that he needed to share and be kind with his friends. We have performed this play in person and virtually for schools, as well as the Smoke on The Water Festival in Washington NC, and The Youth Arts Festival at the Greenville NC. The reason I wanted to do this project, was to share my love of theatre for the kids in this community, as well as to teach them a lesson that is

important in everyday life, especially today, which is sharing and caring.

UO24

Hexatonic Collections and Thematic Development in Frederic Rzewski's Four Pieces for Piano

Evan Martschenko

Mentor: Richardson, Mark Douglas

This paper contains a comprehensive analysis of Four Pieces for Piano (1977) by composer/pianist Frederic Rzewski (1938-2021). This work falls chronologically between Rzewski's more celebrated works, The People United Will Never Be Defeated! (1975) and North American Ballads (1978). Together these three works are indicative of Rzewski's compositional output in the late 1970's. This document is one of the first to offer a complete theoretical analysis of a work of Rzewski, observed from the viewpoint of both theorist and pianist. The analysis contained within provides further clarity for the performer in the break-down of complex passages, conceptualization of the work as a whole, and the clarification of mistakes contained in the score. Throughout this thesis, Rzewski's music is considered alongside other composer/pianists in the canon, showing the culture of composers that Rzewski is a part of, and furthermore solidifying his place in the timeline of not only American piano music, but also in western art music across the centuries. Through the analysis, a great deal can be learned about the late composer in the hopes that his music may continue to be studied and performed.

UO25

Love and Loss: A Reading from "Dead Air"

Charles L. McKeown

Mentor: Thomas, Amber F

My reading will come from a manuscript of creative writing to be included in my Signature Honors Project. The manuscript is a collection of three works of creative writing; two fiction short stories and one nonfiction narrative. These three texts all revolve around a common theme: Love and loss. My goal for this project is to show that love and loss is a common struggle of the human species and that it should not be our goal to avoid heartbreak or disappointment. Rather, our goal should be to embrace those expreiences and accept them as a natural part of what it means to be human. Additionally, I hope for the audience to understand that cherishing every moment of our lives, both good and bad, is fundamental to our growth as individuals.

UO26

Comparing High Frequency Perception, Standard Pitch Range & Relative Pitch Perception of Pianists and Vocalists

Zachary Palma

Mentor: Driscoll, Virginia Darnell

The purpose of this study is to determine if the daily rigor and practice schedule of college age music students who are pianists and vocalists has an effect on the extended high frequency perception and standard range of hearing and the relative pitch perception of these groups. Prior literature indictaes musicians may be at risk of noise-induced hearing loss due to the frequent exposure of high-intensity sounds; noise exposure is considered the second highest cause of sensorineural hearing loss, second only to presbycusis (Pouryaghoub, 2017). In a study by Washnik (2016) where college age music students were followed for a day, it was determined 49% of the students exceeded their daily noise dosage in the school on a normal day not including extracurricular activities. Prior literature focuses on noise-induced hearing loss among professionals and noise exposure levels throughout the week, but rarely comparisons between two groups or extended high frequency perception. No current literature compares the hearing ranges and pitch perception of these musician groups. Being able to distinguish if there is a correlation between college student musicians and a reduced pitch perception range or lack of the ability to perceive pitch could help protect students by supporting the case for safer practice environments and safer practicing habits. This study gathered data to determine if pianists and vocalists are more inclined to having hearing loss in the standard

range and if their high frequency hearing range is impacted and both groups perception of relative pitch. These results will determine if a group is more inclined to noise-induced hearing loss and if a safer procedure or education is needed in these students' daily lives. Individuals that participated were healthy adults age 18 and up who were recruited through a flyer. Before testing particpants completed a questionnaire to determine any preestablished conditions. Particpants completed an audiogram, testing of extended high frequency and a test of relative pitch perception. Data Collection is ongoing but to date, 11 participants (9 women, 2 men) have completed the pilot study. All results will be prepared by the date by April 4th. Pilot study indicates a strong negative correlation between age and extended high frequency hearing.

UO27

Writing a Fiction Novel and it's Many Benefits"

Amrina Rangar

Mentor: Hallberg, Christy Alexander

Creative Writing is a passion of many, though some do not pursue their writing or other creative aspirations due to career responsibilities. I wanted to write a novel, not only because I've worked on it for years and am extremely passionate about it, but because I hope to inspire others to pursue their own creative endeavors despite what their career might be. Working on drafting a novel has not only strengthened my sense of empathy and communication, but it has also improved the basics of my writing skills such as grammar and organization, elements that are imperative in any career, but especially in Higher Education Administration. The book itself is largely fantasy but has heavy elements of historical fiction since the story takes place between the years 1934-1959 allowing me to apply my knowledge as a history major towards the crafting of the novel. The themes in the novel present a compelling story of the importance of family, good versus evil, and settling differences to work together. The book addresses cultural and moral differences and promotes compromise, both skills that everyone uses in their daily lives. Writing about these differences has allowed me to practice empathy through exploring the inner lives of the characters in my novel, meaning that I will have better relationships with my colleagues and ultimately the future students I wish to guide. The Anderson Sisters incorporates the themes mentioned above in a narrative about three sisters who hunt supernatural creatures and work with their fellow Hunters to keep the world at peace. In their universe, supernatural creatures have roamed the world for centuries and most have maintained a natural balance among each other. When the Pureblood creatures of the night want the world for their own, however, it is up to the three young huntresses to restore balance. They work to overcome their individual differences and the differences with allies to defeat Anslon, a powerful vampire who wishes to locate and use a powerful, mysterious entity called The Mist to dominate the world. During my presentation, I will read and offer explanations of short passages from the novel that demonstrate the listed themes. Additionally, I will briefly discuss my writing and editing process. My presentation will reflect the passion that I possess for creative writing. The presentation will also connect my passion for creative writing and how it will benefit me and my future career in Higher Education Administration.

UO28

Respect the Theater Space

Elijah Waldon

Mentor: Green, Erick Y

My name is Elijah Waldon, and I am a BFA Candidate in the Painting concentration at the School of Art and Design who is looking to transition into a career in Production Management for Film. As an Undergraduate Research and Creative Activity Award recipient, I was funded to produce a public service announcement about silencing cell phones in the movie theater for Professor Erick Yates Green's ART 2480 Visual Storytelling course in Fall 2021. From August to December, I learned how to go through the entire production process, from pre-production to post, of creating a short film and manage a small crew of filmmakers and actors. Using my award, I was able to reserve the Hendrix Theatre at the Mendenhall Student

Center as one of my set locations for filming, order props and transparent masks for the actors, and pay for a subscription for Envato Elements to include sounds/music in my film. In addition, I was able to submit my film to three student film festivals across North Carolina including the Reel Teal Film Festival in Wilmington, the RiverRun International Film Festival in Winston-Salem, and the Raleigh Film & Art Festival. At this year's RCAW, I would like to share my process in developing a plan to execute my creative concept as well as use the opportunity to showcase my film to an audience and thank the Research, Economic Development, and Engagement department for this opportunity.

UO29

One Good Road

Elizabeth Wynne

Mentor: Thomas, Amber F

There is a deep and rich culture rooted in the South. It is unique in its nature from other areas of the U.S., full of a specific type of charm and pride. This culture is significant to explore and remember, both for its good and bad characteristics. Through a poetic medium, I have been exploring my own experience of growing up in the South, specifically in a small town. In these roughly twenty pages of poetry, I discuss religion, family, language, and society. The poems paint a sense of place and personality. Beyond theme, the poems utilize various rhymes, rhythms, and forms. The purpose is not only to exercise these as tools, but also to seek out the natural structure inherent to the subject material. This collection is an exploration of southern culture through the intersection of language, rhythm, and experience.

UO30

Find A Friend PSA

Alexis Lloyd

Mentor: Green, Erick Y

Alexis Kayla Lloyd

A PSA focused on college-aged students who walk alone through their campus and consequently find themselves in potentially harmful situations.

UO31

Visualizing the Fruit of the Spirit

Abeanju M. Talieh

Mentor: Blake, Beth A

This visual art project is built on the foundation of the Bible verses Galatians 5:22-23. The fruit of the Spirit is a singular fruit that embodies the nine qualities stated in the verses, and after researching the meaning of each word in English and Greek, I have gained a new understanding of the Scripture. I have found that some qualities overlap among their meanings; therefore, this series of digital paintings has four pieces in which each piece embodies two to three qualities of the fruit of the Spirit.

In working on this project, I have learned that these traits are something that I myself have grown in; from the joy of starting this project to the patience in getting each piece done, I have slowly seen how the fruit of the Spirit manifests in life. The intentions of picking this topic were to create a visual aid of the Gospel through fine art.

UO32

EphrinA1/EphA expression changes during cardiomyocyte development and disease"

Onolunosen Abhulimen

Mentor: Virag, Jitka Amira Ismail

Amaia Lunsford

EphrinA1(EFNA1) and its cognate EphA receptors, the largest tyrosine kinase family, are involved in development and homeostasis in the heart. Our lab has shown that EFNA1 -Fc administration to the ischemic heart is protective in acute and chronic murine myocardial infarct models as well as anoxic human inducible pluripotent stem cell-derived cardiomyocytes (iPSC-CMs) in vitro. The expression profile of EFNA1/EphA receptors during cardiomyocyte development and disease are unknown.

In order to investigate the changes in the expression profile of EFNA1/EphA receptors during development we will observe ways diseases like diabetes and birth defects like HLHS effect cardiac development and whether outcomes can be improved through ephrin administration.Diabetes in pregnancy is an important risk factor for congenital heart disease. Maternal hyperglycemia may have a negative effect on fetal cardiac development which may influence growth and proliferation of fetal cardiomyocytes and subsequently affect myocardial structure and function. Hypoplastic left heart syndrome (HLHS) is a congenital malformation that results in underdevelopment of the left heart structures and is the most common cause for heart transplantation in infants. Most infants with HLHS die with an average age at death of 4.5 days. Data from failing hearts of pediatric patients with HLHS show compensatory increases of EFNA1 and EPHA7. To better understand the role of EFNA1/EphA during cardiomyocyte differentiation and disease, we will use iPSC-CMs to characterize the changes in EFNA1/EphA expression and the influence that EFNA1 -Fc may have on different stages of cardiomyocyte development.

Once we know the timing of the expression profile changes, we will treat the cells with EFNA1-Fc at varying intervals to determine its impact on cell survival, morphology, and EFNA1/EphA-R expression. If the data indicates that EFNA1 is critical to normal developmental processes, we will acquire iPSCs from HLHS and diabetic patients to further explore mechanism. Lastly, we will have access to human heart samples of all ages and both sexes with and without heart disease (HonorBridge organ donor services). As specimens become available, we will determine if there are correlates that permit us to extrapolate our in vitro findings to human health and disease.

UO33

Perceived Relationship Experiences Among Adolescents and Young Adult Women:

Reproductive Coercion Pilot Study

Rebecca Bonen-Clark

Mentor: Kovar, Cheryl L

Reproductive coercion (RC) involves behavior that interferes with the individual's unique ability to make decisions with regards to reproductive health. It is intended to maintain power and control in a relationship by someone past, present, or future wishing to be involved in an intimate or dating relationship. RC has been associated with intimate partner violence, unintended pregnancy, and sexually transmitted infections. In addition, it has been associated with depression and post-traumatic stress disorder. Prevalence estimates have ranged from 3% to over 38%. There are three specific forms: contraceptive sabotage, pregnancy pressure, and control of pregnancy outcomes.

The goal was to better understand the concept of RC among English speaking adolescents and young adult women (14-26 years) seeking healthcare care services in primary or public health settings in Indiana and North Carolina in 2020.

Methods:

A confidential Qualtrics survey was utilized to collect data on self-reports of contraceptive sabotage, pregnancy pressure, and control of pregnancy outcomes. Study participants were recruited through a generated QR code that was shared through posters, flyers, and social media posts of the study sites. Data were collected between 5/4/20 to 12/31/20. IRB approval was obtained from the two respective universities.

Results:

The survey had a total of 73 participants with 63 participants completing the survey. We found a RC

prevalence of 8% among this sample with almost 2% reporting more than one form of RC. Women who reported RC were less likely to report use of a more effective method of birth control (11.1% vs. 6.5%), more often white (60%), and live in a rural setting (60%). They were also more likely to have a partner who was older than compared to the sample (66.7% vs. 35.7%). We also found those who reported RC were more likely to report being “unhappy”(22.2%) compared to reporting “happy”(2.3%)(p=0.024).

Conclusions:

This small pilot study did find a prevalence of RC among this population in these two states. Reproductive coercion is a relatively new concept; but it plays such a vital role in the sexual and reproductive health of the clients we serve.

UO34

Filtration Efficiency of Top 10 Best-Selling Adult Masks Compared to the N95 Respirator

Omar Chaaban

Mentor: Balanay, Jo Anne Goot

Dr. Sinan Sousan

The purpose of this study is to assess the filtration efficiency of different face covering materials in comparison to the National Institute for Occupational Safety and Health (NIOSH)-approved N95 respirator. This investigation is significant because public health was jeopardized when COVID-19 spread through the United States. Healthcare professionals and the public depend on respirators to prevent disease transmission. Unfortunately, data regarding filter efficiency for unapproved masks were not available to assist decision-making. Therefore, healthcare professionals and the public used limited resources for virus protection.This project will use an aerosol generation method that produces particulates that simulate SARS-CoV-2 particles to identify which alternative fabrics can efficiently filter infectious aerosols. We hypothesize that the public is not using adequate respiratory protection from SARS-CoV-2 compared to the N95 respirator. To test this hypothesis, we determined what masks the public is wearing by searching the top 10 best-selling adult masks from the largest online retailer in the United States (Amazon.com) and determining their filtration efficiency.We will measure the filter efficiency of different masks by following the standard testing procedures developed by NIOSH. First, aerosol will be generated using a 2% NaCl solution to replicate infectious respiratory droplets. Next, the temperature and relative humidity of the generated particles will be set at 25 +/-5 °C and 30 +/-10%, respectively. The particle size distribution of the generated aerosol must have a count median diameter of 0.075 +/-0.020 micrometers. Finally, the single respirator filter will be tested in a customized chamber at a system flow rate of 85 +/-4 LPM. The filter efficiency will be calculated by measuring the aerosol size distribution of the upstream and downstream salt concentrations generated to challenge the filter. The efficiency will represent the filter's effectiveness to prevent particle penetration through the respirator. This work will build on our current research project, where we have tested a NIOSH-approved N95 filter in the Aerosol Research laboratory at ECU, resulting in an efficiency of 97%. The outcome for the top 10 best-selling adult masks will be presented as results.

UO35

Urinary Tract Infection (UTI) Epidemiology in United States Neonatal Intensive Care Units

Elizabeth Chan

Mentor: Fraley, Todd A

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Background:

UTI is a common cause of late-onset sepsis in very low birth weight infants (VLBW, birth weight <1500 g). Incidence, risk factors, timing of infection, and microbiology of UTI in VLBW infants are not well described in the medical literature.

Objective:

Characterize the incidence, risk factors, timing of infection, microbiology, and rate of concordant blood culture for UTI in VLBW infants.

Methods:

We performed a multicenter, retrospective cohort study of VLBW infants with gestational age (GA) <32 weeks, hospitalized on postnatal day seven, and discharged 2010-2018 from Pediatrix Medical Group neonatal intensive care units. Infants with major urinary tract abnormalities were excluded. We compared demographic and clinical characteristics of infants with and without UTI. We described the microbiology of urine cultures and rate of concordant blood culture. UTI was defined as isolation of a single pathogenic organism from urine culture collected. Concordant positive blood culture was defined as isolation of the same pathogenic organism in blood within 3 days before or after a UTI diagnosis.

Results:

Of 170,552 included infants, 10,240 (6%) infants had a UTI. Positive urine cultures were most common in infants postnatal age 8–30 days (4,289 [42%]). E. coli was the most common pathogen (18%), followed by Enterococcus (16%), and Klebsiella (16%). Candida (11%) was the most common non-bacterial pathogen. Concordant positive blood culture was present with 1,064 (10%) of these UTI diagnoses. Infants <24 weeks GA had the highest risk of UTI (Table 2). Compared to infants <24 weeks GA, infants 25-28 weeks GA had an odds ratio (OR) of 0.63 (95% CI 0.59-0.66) and infants 29-32 weeks GA had OR 0.22 (95% CI 0.20-0.23). Other factors associated with UTI included male sex (OR 2.17 (95% CI 2.08-2.28)), small for gestational age (SGA) status (OR 1.15 (95% CI 1.09-1.22)), prenatal steroid exposure (OR 1.15 (95% CI 1.09-1.22)). C-section delivery (OR 0.91 (95% CI 0.87-0.96)) was associated with decreased odds of UTI compared to vaginal delivery.

Conclusion:

In this large cohort of VLBW infants, UTI was associated with lower GA, male sex, SGA status, prenatal steroid exposure, and vaginal delivery.

UO36

Can Trauma be an Opportunity to Identify and Treat Non-Injury Medical Conditions in Young Adults?

Jackson Cheek

Mentor: Irons, Paige Latham

Dr. Michelle Brownstien - Primary Investigator

Background: Trauma is often the first point of contact for many people into the healthcare system and, following trauma, over 600k adults are hospitalized each year making the large influx of patients into the emergency department the optimal location for chronic disease screening.Studies have shown that discrepancies in chronic disease screening are preventing young adults from receiving preventative care for chronic illnesses. In many cases early detection and treatment is key to preventing the long-term side effects of chronic disease. Investigating traumas to determine the presence of undiagnosed health issues could allow for insight into early detection of chronic disease. Often, young adults are not diagnosed with a chronic condition until trauma occurs. Further research is needed to characterize the relationship between undiagnosed chronic disease and trauma outcomes, as well as the sociodemographic characteristics that may increase the risk of undiagnosed disease.

Purpose: The purpose of this study is to estimate the burden of undiagnosed hypertension, diabetes, obesity, and unmanaged substance use in young adult trauma patients, to assess the impact of disease on trauma patient outcomes and healthcare utilization, to identify potential patient demographic or trauma-associated characteristics associated with undiagnosed disease, and to identify potential areas for intervention, further treatment, or referrals.

Methodology: This study was designed as a retrospective cohort study with secondary data collection and will include young adult trauma patients (18-40 years old) who were admitted following a trauma activation at WakeMed, UNC, Duke, or ECU from 1/1/2018-12/31/2020. The exposure variables for this study will be hypertension, obesity, diabetes, and alcohol and substance use. Each of these variables will be recorded from the EMR and/or NC Trauma Registry as defined by their specific criteria for diagnosis in the scope of the project. In addition to the listed exposure variables, patient demographics and information pertinent to the trauma that was recorded in the Trauma Registry and/or in the EMR will be used as covariates.

For the purposes of this study, hypertension, obesity, diabetes, and tobacco and/or alcohol and/or drug use will be dichotomous categorical variables. The proportion of trauma patients with a primary care doctor or clinic will be calculated along with the frequency distribution of the exposure variables and the covariates.

UO37

Neuromotor Control Differences in the Upper Extremity Between Those With and Without Rheumatoid Arthritis

Juliana Ethridge

Mentor: Murray, Nicholas P

Julianna Ethridge, Georgia Parnell, Madison Holloman, Dr. Nicholas Murray

Introduction: The purpose of this study is to assess neuromotor control differences in the upper extremity between those with and without rheumatoid arthritis (RA). Rheumatoid arthritis is an autoimmune disorder in which the body's immune system attacks healthy cells, particularly the body's synovial membranes[2]. As a result, RA patients experience painful inflammation in their joints, most noticeably in their hands. Damaged and inflamed synovial joints may affect an individual's motor performance and neuromotor control. Consequently, they may experience difficulty when completing basic activities of daily living.

Methods: Participants will complete a total of eight trials manipulating fifteen marbles of varying sizes. The participants' neuromotor processes and cognitive workload will be analyzed immediately before and following the participants' manipulation of the marbles, using an electroencephalogram (EEG). Vicon Nexus' motion capture software will be used to track the participants' movement patterns. The start and end of each set of movements in the trials will be recorded using a BIOPAC sensor and corresponding software. Additionally, the participants' level of motivation and its subsequent effect on neuromotor processing will be assessed using a survey. The survey is based on the Self-Determination Theory of Motivation and assesses the participants' perceived autonomy, relatedness, and competence[1].

Anticipated Results: We anticipate that RA patients will adopt different movement patterns than the healthy controls to complete the same simple task. We believe that changes in movement patterns will result in greater processing within the frontal cortex both before and throughout trial completion. Further, we hypothesize that their movements will be slower and less accurate due in part to their loss of dexterity and increased processing demand. Lastly, we hypothesize from the pilot data for this study that any change in the cognitive load between tasks of different intensity is due, in part, to differences in motivation to complete each task.

UO38

Health and Wellness: Biofeedback Interventions in Mitigating Stress in Nursing Students

Sydney Farber

Mentor: Bolin, Linda Prior
Authors: Sydney Farber, Ellyson Burks
Biofeedback is a mind-body therapy that seeks to increase physiological awareness and gain control over certain physiological functions, such as heart rate and blood pressure. The impact of biofeedback on certain psychological conditions continues to be explored. Many studies in the past few years have focused on improving one's mental health and emotional well-being. Nursing students are under a significant amount of stress and are unstudied. Exploring the use of

biofeedback as a therapy could prove to be beneficial for this population. This quasi-experimental pilot study examines the use of heart rate variability (HRV) biofeedback and paced breathing on mitigating stress and anxiety in undergraduate baccalaureate nursing students. Study participants completed a stress/anxiety questionnaire, and their oxygen saturation, heart rate, and blood pressure were monitored intermittently for five minutes to provide a baseline reading. Participants then received face-to-face initial biofeedback training and were monitored for an additional five minutes while their breathing was paced. Participants were sent home with a paced breathing application and instructed to use the app twice a day for two weeks, at which point they came back to the lab for post-intervention data collections, with a repeat paced breathing session and a stress/anxiety questionnaire. This study received IRB approval and is still in progress. Our anticipated sample size is 10 undergraduate baccalaureate nursing students. Results will be analyzed to determine the use of biofeedback as an effective tool for the management of stress and anxiety in undergraduate nursing students.

UO39

Caregiver Oral Health Literacy, Pediatric Oral Health: A Systematic Review

Luke Fogarty

Mentor: McCarlie, Van Wallace

Dr. Van McCarlie - Mentor, Research Coordinator, Director of Orthodontics at East Carolina University School of Dental Medicine

Dr. Kelton Stewart - Director of Orthodontics at Indiana University School of Dentistry

Breanne Smith - Dental Student Research Assistant

Sarah Vossers - Dental Student Research Assistant

Luke Fogarty - Undergraduate Research Assistant

Jamie Bloss - Research Resource and Methodology Specialist

Objectives: The primary aim is to determine whether there is an association between caregiver oral health literacy and the oral health status of children.

Methods: All bibliographic databases with salient information on the proposed question were evaluated and included biomedical research literature (MEDLINE via PubMed and Embase), allied health, nursing and dental literature (CINAHL Complete), and social sciences/scientific literature (SCOPUS). We have also undertaken a grey literature search to be screened for additional articles or abstracts. The subject terms and keywords assessed for the main concept domains included: oral health literacy, oral health, parents or caregivers, and children. A comprehensive list of search terms was iteratively developed by the team, and peer reviewed by a second librarian. After removing duplicate works, 4,705 studies were screened at the title and abstract level by at least two independent reviewers. Five hundred twenty-six studies were identified for the full text screening. Preliminarily, at least two independent team members completed 40 full text reviews, with 15 articles meeting the specified inclusion criteria.

Preliminary Results: For articles that were excluded within the full text review, the most common reason articles were excluded is that they did not specifically address both caregiver oral health literacy and children oral health status together. Of the full text articles meeting the established inclusion criteria (37.5%), the majority indicate a connection between caregiver oral health literacy and the oral health status of children.

Preliminary Conclusions: Based on the articles reviewed thus far, there appears to be a positive association between caregiver oral health literacy and children oral health status across diverse countries and cultures.

UO40

Infusion Med Spas: Oversight, Ownership, and Consumer Safety

Kamie Mays

Mentor: Tillman, Janet D

Background

Infusion med spas providing intravenous (IV) vitamin and electrolyte mixtures to customers are a growing market. There is little regulation of these facilities in

North Carolina and could pose a problem to public safety.

Methodology

This integrative literature review analyzed scientific, popular, regulatory, and industry literature for evidence of safety concerns for consumers of spa infusion services. Academic databases and search engines were explored.

Results

Components of the infusion cocktails were reviewed for potential adverse drug interactions with commonly prescribed medications. A few drug interactions warrant additional monitoring, such as monitoring renal function, electrolyte levels, vitals signs, and blood levels. A notable interaction exists when Zofran, a common additive to any infusion, is paired with a selective serotonin reuptake inhibitor (SSRI). The combination is linked to serotonin syndrome and cardiac complications, such as arrythmias and QT prolongation (Epocrates, 2020).

A second risk exists for patients with a genetic predisposition for adverse effects related to IV administration of vitamin complexes. Case studies noted that patients with glucose-6-phosphate dehydrogenase deficiency can experience life-threatening hemolysis when IV vitamin complexes are infused.

Legislation or regulation of these services is not easily noted in North Carolina. State law determines who can initiate peripheral IVs, but there is limited regulation of IV infusion medical spas. Ownership and operation of infusion med spas varies from state to state, and may require that facilities be owned and supervised by a state licensed medical provider.

Discussion

Infusion spas are popular among healthcare providers interested in employment and consumers seeking health improvement. Public safety depends on consumer information of potential risks of infusion services.

UO41

Acceptability and Perceptions of Medically Tailored Food Bags by Rural, Pregnant, Food Insecure Pregnant Patients through the MOTHeRS Project.

Vedika Modi

Mentor: Sastre, Lauren Rogers

Sarah Woodlief BS
Sy Saeed MD, MS, FACPsych
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Food insecurity (FIS) is associated with poor diet quality and individuals residing in rural areas are disproportionately affected. A balanced diet is critical during pregnancy to optimize fetal development, particularly within the context of the fetal origins hypothesis, which demonstrates that the in-utero environment, particularly poor dietary intake during pregnancy can have adverse impact for generations. Moreover, FIS is associated with depression and stress, both of which can be alleviated by addressing food insecurity which further promotes health and wellness for women during pregnancy. A pilot health telehealth intervention program primarily focusing on mental health was expanded to include efforts to address FIS through the "MOTHeRS"Project (Maternal Outreach Through Telehealth for Rural Sites).Women were screened for food insecurity using the Hunger Vital Sign questionnaire, which has been specifically validated for screening in primary care. Those identified experiencing FIS received a voucher and a medically tailored food bag that day at the clinic they received care at. Bags were formulated with both optimal nutrition and shelf-stability in mind, along with nutrition education resources including recipes, general healthy dietary information for pregnancy to support and optimize utilization of the contents of the food bag. Preliminary results from interviews conducted with women receiving the bags have demonstrated high satisfaction and utilization of the food, with the majority not receiving any other food assistance despite FIS risk. Some foods (canned mushrooms, garbanzo beans, canned greens) were reported to be unfamiliar and unused, however, the majority reported utilizing all

food resources provided with most sharing contents with their household, especially their children. To the author's knowledge this study is one of the first to provide medically tailored food bags within the primary care setting to pregnant women, as well as evaluate the experience, perceptions, and utilization of the food and resources.Results from this study can be utilized by practitioners and researchers to design similar programming for pregnant women at high risk of FIS that compliments or fills gaps from traditional resources such as WIC or SNAP.

UO42

The role of utterance length and working memory capacity on second language (L2) Spanish listening comprehension

Soumya Kamath

Mentor: Medina, Almitra

In most Spanish classrooms today, listening comprehension is viewed as a product rather than a process, as illustrated by the fact that listening comprehension is often operationalized in terms of listening test scores (Vandergrift, 2007). Due to this product-based approach, many educators do not know what affects their students' listening abilities nor how they can be improved. Therefore, this study aims to understand the factors that influence listening success in acquiring Spanish as a second language so that educators in the future can implement new strategies that will allow their students to improve their listening comprehension skills.

Several variables have been posited to influence listening comprehension in a second language (L2), such as factors related to the listener (e.g., working memory capacity) and the aural text (e.g., length of utterance) (Bloomfield et al., 2010). However, there is a dearth of research that statistically explores how much of an effect these variables have on L2 listening comprehension (Vandergrift &; Goh, 2012). As such, the primary purpose of this study was to investigate how the variables of working memory capacity (WMC) and length of utterance predict the listening comprehension of L2 Spanish learners when processing native-Spanish speech."

Data was collected within the population of native English-speaking learners of L2 Spanish enrolled in upper-level Spanish courses at the university level. Data was pooled from two different tests that assess (1) listening comprehension (a recording of 32 short and 32 long sentences) and (2) working memory capacity (collected from a WMC test called Shapebuilder). The results from this study will help future Spanish educators understand the variables that play a role in listening ability and implement better teaching strategies to improve their students' listening comprehension skills.

UO43

Latino Higher Education Success in Sampson County Community College, NC

Genevieve T. Merlos-Pulley

Mentor: Daneri, Juan Jose

Rachel Richardson and Genevieve Merlos-Pulley

North Carolina has 53 colleges and universities. It also has 58 community colleges that serve North Carolina's 100 counties. Yet, out of all these higher education institutions, based on the 2020-2021 academic year, Sampson Community College (SCC) is the only established Hispanic Serving Institution (HSI). SCC has a 29.7% population of Latino students, while the state average is 10.7%. However, 39.6% of Latinos in North Carolina are dropping out of high school, and only 20.7% have some college or an associate degree. Fortunately, various colleges like SCC and other organizations are working to reduce these rates. As students, Latinos are confronted with a multitude of challenges. These include, but are not limited to, language barriers, lack of knowledge, lack of support, self-doubt, financial stress, and racial discrimination. For example, first-generation Latino students, and their families, can struggle with language barriers and a general lack of knowledge in the U.S. education system.

The present study articulates methods SCC uses to raise successful completion of higher education programs for Latino students in college. SCC has been working for years to decrease dropout rates and increase Latino student success. They accomplish this utilizing bilingual

staff, providing bilingual services, and resources.In 2021, SCC and Sampson Early College High School program chose to partner with Juntos, an NC non-profit, to provide additional bilingual resources for Latino students and their families. Juntos provides family engagement events such as 4-H club activities, success coaching, mentoring, and a summer academy on North Carolina State University campus (Juntos: Para Una Mejor Educación).As a testament to their success, the College has averaged a 96% retention rate of Latino students over the last five academic school years.

Since there is still room for improvement and gaps to fill, our presentation will discuss how high schools can facilitate conversations with Latino students and their parents, not only about being able to graduate high school and going to college, but about how this is an achievable reality. High schools and SCC can partner together and provide informational sessions throughout the year that explain to the Latino school community how to put all the resources and information that are available to them into action.

UO44

Teotography - A photo collection of North Carolina's wilderness, wildlife and culture surrounding coastal areas

Alexander D. Teodorescu

Mentor: Elmore, Cindy J

Teotography is a photography account I started in the fall of 2020, focusing on capturing Eastern North Carolina's wildlife, wild areas and the culture surrounding these areas. The goal with it is to present photographs to the general public and to bring awareness to the natural and cultural significance Eastern North Carolina holds to a demographic who isn't generally exposed to it. The current focus of teotography centers around clean water and the value it has on coastal communities and ecosystems. This is presented through a portfoilio which focuses on Eastern North Carolina's headwaters, river basins, peatlands, swamplands, estuaries, marshlands and coast. This portfolio can be accessed through the teotography wesbite. On top of this, in the Spring 2022, teotography is scheduled to host a photography showcase in hopes of selling the photographs and donating all proceeds to a local environmental nonprofit.

For more information on teotography, check out: www.teotography.com or teo.tography on instagram

UO45

Political and religious iconography in medieval European art and architecture.

Teresa Tomas

Mentor: Reid, Jonathan A

Medieval European works of art and architecture exhibit a number of notable iconographic similarities between artifacts and across the time period. Analysis of individual visual elements has revealed both political and religious symbolism, relevant to the time of creation of each separate artifact. This research seeks to address the relationship between the political and the spiritual in medieval era Europe through investigation and interpretation of its iconography in certain relevant works of art and architecture during the medieval time period. Additionally, by drawing attention to the similarities of medieval Christian iconography to the imagery used in the propaganda of modern, often atheistic, totalitarian regimes, this research hopes to reveal some potential motivations for the mingling of religious iconography into political works. This research is not limited merely to analysis of the symbolism of individual items, but includes contextual awareness of the purpose, audience, and effect that each piece would have had on the political/religious landscape.”The manner in which the political and the religious intersect through publicly available works of art and architecture are of particular interest; for those works of art not intended at their creation for a public audience, the question may be posed- for whom exactly are they intended? This research will address a number of case studies of specific works of art while focusing on interpretation of individual items from each work and comparison of the significance of those items to the broader religious and political circumstances, and the reemergence of visually similar elements in modern propaganda.

UO46

Assessing and Developing Protocols for Purifying Fibrinogen From Human Blood Plasma"

Caroline Daub

Mentor: Offenbacher, Adam Richard

Fibrinogen (Fgn) is a 340 kDa glycoprotein that is involved in forming blood clots and is present in blood plasma at concentrations ranging from 1.5-4 g/L. Blood clots are formed when Fgn is converted to its insoluble form, fibrin, by the enzyme thrombin (Thr). Fgn is essential to hemostasis, wound healing, and inflammation. It has been suggested that Fgn with altered N-linked glycosylation can lead to cardiovascular diseases such as stroke and atherosclerosis because of the link to altered blood clotting patterns. The purpose of the presented work is to quantify the differences between the blood clotting patterns of patients and healthy patients. Towards this goal, a novel peptide-based affinity chromatography is utilized for purifying human Fgn from complex media, including plasma. Preliminary experiments showed that the column was selective for Fgn and highly robust, permitting the reuse of the column after multiple purifications. Using this column, human Fgn was purified to homogeneity from plasma at 1-2 mg per mL of plasma. Fractions resulting from the purification was tested for quality based on SDS-PAGE and Western analysis, kinetics of polymerization, and clotting ability. Current efforts are focused on developing HPLC assays to test the kinetics of the efficiency of Thr reactions with Fgn that lead to formation of fibrin as well as developing sialic acid assays to provide a glimpse into the structure of the N-linked glycans. This will provide a springboard to assess the structure-dynamics-function relationships of patient-based Fgn.

UO47

3D Modeling of Fibrinogen's D region using Cryogenic Electron Microscopy

Jose De La Garza

Mentor: Hudson, Nathan E

Objective: The purpose of this experiment was to determine the three-dimensional structure of fibrinogen's D region. Fibrinogen is a protein that functions as a blood clotting agent by forming itself into a net and sticking to platelets. Goal of this research is to model the exact angles of fibrinogen's coiled coil region to measure its flexibility. This will enable a more accurate understanding of fibrinogen's dynamics in vivo.

Significance: This research is currently focused on modeling the D region of fibrinogen which contains a knob-hole interaction site as well as binding sites important for immune response and degradation resistance. Our recent 3-D model reconstructions of this region have given insight on particle processing methods that can improve the resolution of fibrinogen's D region. Currently available structural models do not take the flexibility of fibrinogen into account. For example, it is unknown how a cryptic site in the D region becomes exposed and interacts with leucocytes to initiate an immune response. Cryo- Electron microscopy (Cryo-EM) can be used to study dynamics by rapidly freezing a protein sample to trap them in their native-like states. An electron beam is used to take 2-D images, called micrographs, which are processed in to 3-D models showing fibrinogen's dynamics.

Methods: Micrographs of fibrinogen were collected. These micrographs were processed using croSPARC to estimate the CTF and extrapolate some of the lost information resulting from electromagnetic interference. 1,765,166 particles were automatically picked using a blob picker cryosparc. Those particles were further processed through a inspect particle picks job and 5 rounds of 2 D classifications. The total number of selected particles were reduced to 114,745 particle picks. This final 2 D classified particles were used to construct nine 3-D models of fibrinogen's D region.

Results: The model closely matched the PDB file, 3ghg, of the D region. The maximum resolution achieved has been 10 Å which is not detailed enough to show secondary structures.

UO48

The Production and Cell Viability Testing of 15d-PMJ2-arvanil as a Potential Cancer Therapuetic

David Halatek

Mentor: Burns, Colin Sanderson

David James Halatek, Dr. Colin Burns, Dr. Rukiyah Van Dross, Ariel Myers

Melanoma is the most lethal form of skin cancer in the United States, according to the Center for Disease Control, and on average results in the death of one person every hour. With cases increasing, there is a need for the creation of safer and more effective treatments. The purpose of this project is to determine if a recently detected metabolite (15d-PMJ2-arvanil) of the prodrug arvanil can serve as a selective and more potent anti-cancer therapeutic than a known structural analog, 15d-PMJ2, created in our lab. We hypothesize that 15d-PMJ2-arvanil is selectively toxic to melanoma skin cells and colon cancer cells compared to non-cancerous analogs. This is supported by previous cell viability studies using the colon cancer cell line, CT-26, that indicates the metabolized form, 15d-PMJ2-arvanil, will be an improvement. The synthesized 15d-PMJ2 will serve as a control when testing 15d-PMJ2-arvanil to determine if the new generation is an improvement in a series of cell viability studies focused on human melanoma, non-melanoma, breast, and colon cancer lines.

UO49

Physiological Relevance of Gene Expression Changes during Aging Associated with Declining Physical Function

Nathalie Hemingway

Mentor: Graber, Theodore G

Nathalie Hemingway, Megan Pajski, Ted Graber

Aging is physiologically detrimental to physical function and is highly influenced by the expression of preponderant genes. Next Generation Sequencing RNAseq previously performed in our lab has shown many skeletal muscle genes change expression with aging (log2fc> |2|) and have a strong association with physical function (R≥0.70). Between the ages of six (6m) and 28 (28m) months, 251 differentially expressed genes are strongly associated with physical function. Between the ages of six (6m) and 24 (24m) months, 21 are associated with physical function. We hypothesize that these top genes with expression changes associated with physical function will reveal a relationship to important molecular mechanisms. Specifically, genes that are physiologically relevant to the mechanisms relating to aging are examined. Using the RNAseq data, in this study we compared gene ontology of the affected genes to find a relationship between potentially correlated molecular pathways. In conclusion, we found evidence that changes to vascular endothelial processes, calcium regulation, and reactive oxygen equilibrium are good targets for future PCR, western blot, and other molecular studies.

UO50

Characterizing Brucella FtrB: A novel cupredoxin

Alexa Kerkan

Mentor: Banerjee, Sambuddha

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Brucella spp. is a Gram-negative pathogen that can cause reproductive infection in farm animals however, can be controlled by vaccination. Brucella can also infect humans zoonotically, although not life-threatening, in endemic regions it can add extra stress on the health care system. Being an intracellular pathogen, Brucella expresses dedicated transport systems to acquire essential nutrients, including iron, for survival from the host system. Brucella expresses multiple iron uptake systems to combat the low concentration of iron inside the cell, one such system being FtrABCD which is required for survival in the mouse model and takes part in Fe2+ utilization. Bordetella and Burkholderia spp. Have been observed to show”similar iron uptake from FtrABCD which is

characterized by a homolog of yeast permease Ftr1P permease, FtrC. For Ftr1P to take part in iron utilization, it requires a ferroxidase, Fet3p to be expressed. While no components of FtrABCD represent a ferroxidase, FtrB is predicted to be a novel cupredoxin in a bioinformatics study. Cupredoxins are very specific redox proteins with electron transport properties and are characterized by β-sheet structure and a Type-1 copper site described by His-His-Cys residues which both contribute to the ability”to carry out their electron-transport property. Although FtrB is classified as a novel cupredoxin, it lacks the Type-1 copper-binding residues and there is no biophysical data indicating it can oxidize Fe2+. The aim of this project is to characterize the Cu2+ affinity and the ferrous oxidizing activity of recombinant wild-type FtrB. Using circular dichroism, isothermal titration calorimetry, size exclusion chromatography, and a ferrous oxidation assay using ferrozine, we report that wild-type FtrB purifies as a monomer (10 kDa), can bind Cu2+ with low µM affinity in a 1:1 ratio, global structure of wild-type FtrB is β-sheet, natively folded FtrB shows Fe2+ oxidizing property when compared with denatured wild-type FtrB. With FtrB being an essential part of the virulence factor, FtrABCD, understanding the molecular mechanism of function of this protein (also found in two other pathogens) is essential. Our research showing FtrB can act as a ferrous oxidizing protein is also the first experimental evidence of such property in any novel cupredoxins that do not conserve the classical Type-1 copper site.

UO51

Gaining insights on the effects of sea level rise and coastal storms on septic systems in Nags Head North Carolina through historical permit records

Taylor Savitski

Mentor: O'Driscoll, Michael A

Co-mentor- Charles Humphrey

There is a growing concern that sea level rise and coastal storms are impacting septic systems in Nags Head, North Carolina and similar coastal communities. During the Fall of 2021, 253 septic system permits from Dare County were reviewed for sites located in Nags Head. It is estimated there are > 3,000 permits for Nags Head septic systems, so this initial review targeted systems in low-lying areas in south Nags Head. This information summarizing the permit information for a subset of Nags Head residences can help to guide larger efforts to digitize and map all permits. For this survey, we attempted to synthesize some basic information regarding septic systems in the neighborhoods in south Nags Head. Information reviewed included the number of bedrooms, date of initial installation, if the system required a repair, if there was fill needed, date of repair(s), the system type (conventional or advanced), permitted flow, number of bathrooms and bedrooms, the drainfield location, inspection/complaints or violations, the number of repairs and/or replacements, change of use or addition of new structures, and the groundwater depth. It was found that 47% of the total systems required repairs. The average age of the systems was 35 years old, and the average number of bedrooms was four. Neighborhoods with > 50% requiring repair included Nags Heads Dunes, Oceanside, Glean Lea Beach, and Dune Side. Examples of problems included: sites where groundwater was flooding the septic tank (Chawanook West); coastal erosion (Bodie Island, Chawanook Cay, Hollywood Beach, Oceanside, Glean Lea Beach, and Nags Head Beach); and sewage overflow onto the ground (Glen Lea Beach and Oceanside). For example, a lot at Glen Lea Beach experienced storm damage resulting in drain lines being washed out and the sediments covering the tank were eroded. In addition, at Hollywood Beach two houses were condemned due to coastal erosion. These data and groundwater elevation data from a corresponding study suggest that low-lying areas in Nags Head are facing challenges to their decentralized wastewater management associated with rising sea levels and the associated rising groundwater levels. Future work is needed to digitize and map all septic systems in Nags Head to evaluate threats to their functionality associated with changing coastal dynamics.

UO52

Refining artificial incubation of chicken eggs: laying season and not size affects incubation period of eggs laid by multi-generational crossbred chickens

Jessica Long

Mentor: McRae, Susan B

In birds, there is substantial intraspecific variation in chicken egg size among hens, and within these size differences, there are variations in incubation periods of the eggs. As chickens are the domestic animal model for husbandry of exotic avian species, research into their reproductive physiology has broader implications for human-managed breeding programs for species of conservation concern. This study investigates the effects of egg dimensions, in addition to temporal and environmental variables on incubation period duration (developmental period) in artificially incubated chicken eggs. Multi-generational crossbred chickens at Sylvan Heights Avian Breeding Center were housed together in an aviary and we incubated their eggs artificially. Egg dimensions (length, width, mass) were measured with calipers upon collection. Date of collection, max daily temperature, and daylight hours were recorded. Batches of eggs were collected over a period of days and the start of incubation was recorded when they were set in one of two different models of circulated air incubator, under consistent temperature, humidity, and rotation conditions. Eggs were evaluated for pips every six hours once the embryos entered the internal airspace, as determined by candling. Incubation duration was recorded (in hours) upon the initiation of hatching which we defined as the first appearance of an external pip on the eggshell. Initial results suggest a relationship between the date of egg collection and the total incubation period, in that the incubation period of eggs was shorter in the spring and longer in the winter. Egg dimensions were only weakly negatively related to incubation duration. Further analyses will factor in ambient temperature during egg collection, egg storage time prior to incubation, and model of incubator. Our findings will specifically contribute to the existing knowledge base of artificial incubation in aviculture at Sylvan Heights Avian Breeding Center.

UO53

The Economic Trajectory of Juvenile Deliquency

Francesa Defranco

Mentor: Kane, Melinda D

Economic status is one of the most important influences when it comes to an individual's power and privilege. A factor that impact's an individual's ability to achieve adequate economic status is the individual's interaction with the law. However, there are conflicting views and an overall lack of research on whether juvenile delinquency has an impact on a person's economic status as an adult. This research aims to evaluate the relationship between juvenile delinquency and its impact on the delinquent's economic status.

Research has demonstrated that incarceration and offenses against the law as an adult impacts a person's economic status. But what about juvenile delinquency's impact on participants' economic outcome. According to an article by Melanie Taylor contact with the criminal or juvenile justice systems result in subsequent challenges shape future employment outcomes (Taylor, 2016). Employment outcomes have a direct impact on economic status of juvenile deliquents.

The economic indicators that correlate to one's economic status can be explained by sociological theory. Drawing upon life course theory, existing research is used to understand the impact of delinquency and crime by looking at data collected over the trajectory of one's life and attributing certain characteristics to various categories such as economic or social status (Western, 2002). Many studies highlight the life course theory to explore the impact of juvenile delinquency over the course of time. These studies argue that juvenile delinquency's negatively impacts economic status due to interruptions of education or work (Stienberg, et al., 2004).They also suggest that juvenile delinquency impacts the individual by altering their relationship with the social strata and the individuals in that stratification (Uggen, 2000). This altered relationship with society is a direct impact of symbolic interactionism.

This study will build upon these studies by examining how the event of juvenile delinquency impacts people's economic trajectory by using factors that impact individuals' economic status.The study will look at the individuals who participated in the 1997 National Longitudinal Survey of Youth.We will also explore how female juvenile offender's economic trajectory is impacted.Little research has been done on female juvenile delinquents, though there has been many studies done on the gender disparity between female and male economic status, few have looked at delinquency.

UO54

The Efficacy of Teen Court on Juvenile Recidivism, Suspensions and School Climate

Phillip J. Lewis

Mentor: Bryson, Sara

Since the late 1990s, the use of Teen Court as a mechanism to keep non-violent youth out of the formal juvenile justice system has substantially increased. More recently, school districts have begun using Teen Court to decrease the number of youths experiencing the school-to-prison pipeline. Since these school-based initiatives have been implemented recently, there is a lack of research in this topic area. This study aims to expand on current research by examining the impact of Teen Court on recidivism, suspensions, and school climate in rural North Carolina. In addition, I will include the following independent variables: school behaviors, perceptions of school, peer delinquency, and negative school experiences.

This study will use a secondary dataset provided by the Inter-university Consortium for Political and Social Research (ICPSR). The original study was a longitudinal, randomized controlled trial conducted in North Carolina. Surveys were given to 2,749 students from 2014-2018 in 24 middle and high schools. Twelve schools were randomly assigned to give first time perpetrators Teen Court and 12 schools were randomly assigned to continue their usual tactics without Teen Court. In Fall 2021, I gathered research articles and created an annotated bibliography to enhance my knowledge about teen court initiatives and the factors that impact recidivism, suspension, and school climate. This semester, I plan to meet with Dr. Bryson several times to discuss the nature of longitudinal data and learn about SPSS. I will be responsible for learning how to recode variables, conduct univariate, bivariate, and multivariate statistics, and interpret the results from this project. With the assistance of my mentor, Dr. Sara Bryson, I will report the results from the descriptive, bivariate, and multivariate statistics.

UO55

Whose history matters? An examination of Black vs White cemetery loss

Spencer Story

Mentor: Schacht, Ryan Nicholas

Spencer Parks Story
Ryan Schacht, PhD
Charles Ewen, PhD

Historical cemeteries across the United States are at risk of being moved, destroyed, and/or abandoned. However, not all cemeteries appear to face this same risk. In North Carolina, African American cemeteries appear to face a higher likelihood of loss compared to White cemeteries due to both historical and continuing patterns of segregation and structural inequalities. Specifically, damage due to farming practices, infrastructure development, erosion and vegetative growth, and neglect appear to impact Black cemeteries at higher rates than White cemeteries. Moreover, historical Black cemeteries are often only discovered after they have been damaged or destroyed during construction or development projects. While there is a growing regional and national concern regarding Black cemetery loss, neither the scale of loss has been quantified nor the relative rate of loss has been compared to White cemeteries. Through a comparison of historical and modern maps of Pitt County, North Carolina, I have identified X missing cemeteries. A majority of these cemeteries were primarily white and small, family plots. However, larger municipal and church cemeteries that went missing were more often African American. Through this talk, I will discuss the results of my research, highlighting patterns of

cemetery loss as well as concerns for the preservation of Black heritage.

UO56

Perception and Evaluation of Antisocial Behaviors

Hannah Thornton

Mentor: Baker, Michael Drew

Perception and Evaluation of Antisocial Behaviors"aims to provide a better understanding of how personality traits impact the manner in which people perceive and evaluate antisocial behaviors performed by others. Participants were first asked to read vignettes of various antisocial behaviors, then respond to a series of questions about the individuals who performed these behaviors. The vignettes that were provided to the survey-takers include the topics of romantic cheating, academic cheating, theft, littering, lying, and illegal substance use. The following questions were measuring the Dark Tetrad (Palhus, 2020) and HEXACO (Ashton, 2009) personality inventories in order to measure personality traits that may be relevant to perception of antisocial behaviors. The objective of this study was to expand the current knowledge and understanding of how individual differences in personality traits impact the ways in which people interpret antisocial and illegal activities. For this research, we conducted a pilot test online survey of 365 participants, and plan to get approximately 300 more participants this semester.

UO57

Excessive Social Media Use and Your Executive Functioning

Megan Cavanaugh

Mentor: Walcott, Christy Mangione

The world's use of screens, namely smart phones, has significantly increased since the onset of the COVID-19 pandemic. This two week study examines a link between excessive social media use and the short-term self-reported executive functioning in traditional college students. Due to our brain's relationship with dopamine and social media, we predict an inverse correlation between social media use and executive functioning scores in college students. Thus, short-term self-reported executive functioning scores should improve following a social media intervention to reduce usage. All participants will be asked to reduce their social media use during the period of study and complete a pre and post questionnaire evaluating their short-term executive functioning skills. The control group will meet, learn about their responsibilities, and receive a brief overview of the study. The experimental group will receive two workshop interventions focusing on education, coping techniques, and encouraging communication between participants. Each participant in the experimental group will also recruit a partner for the study who will be measured. Social support is a crucial aspect of behavioral change, which we hope to foster through the requirement of partners and group communication during meetings."Executive functioning measures will assess impulse control, attentiveness, and task initiation/completion. Additionally, participants will be asked to report their daily screen time, social media time, and total number of lock screen activations. This information will be sourced from their phone's Settings menu. Group differences in usage and changes in short term executive functioning will be reported.

UO58

The Powers of North Carolina's Second Executive: Discovering if the Lieutenant Governor Should be Designated more Power under the Constitution

Brinkley, Ethan

Mentor: Eamon, Thomas Floyd

In the original 1776 North Carolina State Constitution, the executive branch of government was solely comprised of the Governor. It was not until 1868 that the Lieutenant Governor position, along with other executive offices, was added to the branch. The current NC State Constitution today was ratified in 1971 and outlines the powers of the Governor and Lieutenant Governor thoroughly. The designated constitutional powers of the NC Lieutenant Governor include serving as the President of the Senate with the ability to cast tie-breaking votes, serving on the State Board of Education, and most notably, succeeding the Governor

upon the death, resignation, or removal from office. These powers are weak in the spectrum of NC government because ties in the Senate and Governor's leaving office are rare. Additionally, it is important to note that in North Carolina, the Governor and Lieutenant Governor are elected separately and independent from each other, which can possibly result in the two offices representing different parties.

The NC State Constitution describes that the Lieutenant Governor "shall perform such additional duties as the General Assembly or the Governor may assign to him"(Art. III, Sec. 6). This means that the General Assembly can pass legislation to grant the Lieutenant Governor specific powers and the Governor can also give his Lieutenant additional duties. I am going to argue that the office of the Lieutenant Governor should be delegated more constitutional powers rather than relying so heavily on the assignment of duties from the General Assembly and Governor. I will argue that if the two executive offices are to be elected separately, then the Lieutenant Governor should have more distinct and important powers. I will conduct research as to whether the two executives should be elected jointly or separately, which additional powers (if any) should be designated to the Lieutenant Governor, and what are other States doing in terms of designating executive powers between the Governor and Lieutenant Governor.

UO59

The Conflicting Effects of Subsidies are They Always Beneficial

Harrison Rogers

Mentor: Howard, Gregory Edward

Monetary benefits such as subsidies designed to encourage a behavior often work as one would expect, which is to increase the occurrence of the behavior. However, changing incentives can also have unanticipated consequences and instead reduce that behavior.For my research project, I have worked with Dr. Gregory Howard on researching the effects of subsidies on pro-social behaviors, meaning behaviors that benefit others.The goal of our research is to present the effects of subsides on ECU undergraduate students' participation in activity that is beneficial.This will allow us to compare the cost-effectivity and efficiency of each combination of subsidies.Our research will use the data of which activities local students choose to participate or not participate in.In our research and previous cases, it is shown that often times subsidies lead to no additional benefits due to participants switching from one beneficial practice to a newly subsidized one.Intrinsic value also leads to subsides having lower effectiveness. Subsidies also face the risk of granting incentives to an activity that a participant would participate in regardless.To achieve our goal, we will measure the additionality of each combination of subsidized practices.

We will analyze previously gathered data on ECU undergraduate students in environmentally beneficial activities.We will use this data to analyze the effect of subsidies on their participation.Next, we will use the data analysis software Stata to analyze the average participation in a practice when it is subsidized against the average of when it is unsubsidized.In conclusion, this research will measure the additionality of each subsidy.

UO60

COVID-19's Impact on Head Start Teachers' Relationships, Health Behaviors, and Stress Levels

Holly Batt

Mentor: Stage, Virginia Carraway

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Background: Early care and education (ECE) workers experience physical and mental barriers to health. The novel Coronavirus Disease (COVID-19) worsened ECE workers' physical health, emotional stress, and financial burdens. These measures of well-being are important as they have also been linked to ECE workers' relationship with children in their classrooms.

Objective: Examine the impact of COVID-19 on the well-being of North Carolina (NC) Head Start (HS) teachers with an emphasis on their personal/professional relationships, personal health behaviors, and stressors.

Design: A cross sectional convenience sample of NC HS teachers were recruited to participate in the study. Data were collected from teachers across all three regions of North Carolina September 2020-March 2021 using an online 27-item survey.

Analysis: Researchers analyzed demographic information and quantitative survey data using basic descriptive statistics. Two researchers coded participants' open-ended responses using basic thematic analysis.

Results: Survey respondents (n=88) were predominantly female (97.6%), Black/African American (46.6%) or White (43.2%), with an average age of 43 years old. Teachers reported increased challenges to maintaining relationships with coworkers (57.9%), children in their classrooms (84.4%), and the children's families (81.1%). Half (50.6%) reported COVID-19 impacted their health. Over 70% indicated COVID-19 made physical activity challenging, 61.5% experienced weight gain, and 59% increased their snacking. Teachers expressed an increase in six psychological distress indicators; nervousness (88.9%), hopelessness (54.3%), restlessness (72.4%), sadness (50.6%), everything is an effort (58.4%) and worthlessness (31.2%).

Conclusion: Survey results furthered the understanding of COVID-19's effects on HS teacher health. In a workforce overburdened with stress, COVID-19 compounded and created barriers to wellness. Future research should explore avenues to reduce health barriers for all ECE workers during the ongoing pandemic.

UO61

Merit Scholarships; Are They Accessible for All Students?

Shaelyn R. Raleight

Mentor: Fraley, Todd A

Higher education should be accessible to all who reach for it. However, it is often out of reach for students from low socioeconomic backgrounds largely due to the cost barrier. Merit scholarship programs help make education more attainable for these students by eliminating this barrier. To understand the challenges underrepresented students face when applying to these scholarships, research was conducted on different merit scholarship and honors programs in the nation. Findings revealed that focus on social justice programming, service learning, holistic admissions, varied recruitment practices, and improved state merit aid programming can all be used to increase the number of underserved students receiving merit scholarships. The negative K-12 experience for low-income/ rural students including lack of extracurriculars, lack of transportation, limited access to standardized test preparation, and working long hours also contributes to decreasing the access of merit scholarships for underrepresented students. Interviews were conducted with merit scholarship directors across the state to discover practices they use to increase diversity and inclusion within their programs.

UO62

Mapping The Landscape of Educational Research Dissemination Through Social Media

Rylie Dickerson

Mentor: Dickerson, Daniel Lee

With today's modern technology, social media has become a useful tool in the field of communications. It as also become a key tool to use when disseminating educational research to students, faculty, and the

public. But the question is, what is the best way to disseminate information to the public in hopes that the information will reach the largest audience possible? There is a lack of research that identifies the scope of social media integration across educational settings and how it relates to research in other academic disciplines (Manca, S., Rehm, M., Brandon, D., & Greenhow, C.,

2019). By understanding and researching what elements contribute to successfully disseminating educational research to others, we can discover how to use and navigate one of today's greatest communication tools, social media most effectively.

Undergraduate Poster Presentation Abstracts

UP001

A "Swiss Army Knife" approach to targeted EFNA1 therapeutic proteins

Paree C. Amin

Mentor: Hughes, Robert Murray

Ephrin is a cell surface bound ligand for the Eph receptor, the largest tyrosine kinase family. They are crucial for controlling cell to cell communication, which in turn regulates cytoskeleton-mediated cell motility and morphology. More specifically, one type of Ephrin, Ephrin A1 (EFNA1), is a cell-surface bound ligand for Eph receptors, which has been demonstrated to have positive effects in model organisms, such as acute and chronic mice models of ischemia and Parkinson"s Disease. However, the extent to which these ligands can be optimized for therapeutic intervention is currently unknown. In this work, we describe the development of various targeted formulations of the EFNA1 ligand, designed to target the EphA receptors expressed in cardiomyocytes. We characterize the expression of these engineered ligands in E. Coli and investigate their ability to induce activation of Eph receptors in cultured cells.

UP002

Mitochondrial alterations accompany forced differentiation in acute promyelocytic leukemia cells.

Hannah Coalson

Mentor: Fisher-Wellman, Kelsey Howard

Hannah S. Coalson, James T. Hagen, and Kelsey H. Fisher-Wellman

Leukemia is characterized by blocked hematopoietic differentiation. Blocked differentiation results in the uncontrolled proliferation of immature, malignant myeloblasts. To counteract myeloblast proliferation, forced differentiation has been studied as a possible treatment for various types of leukemia -- most notably, acute promyelocytic leukemia (APL). In APL, standard of care encompasses treatment with all trans retinoic acid (ATRA), administered alongside chemotherapy or arsenic trioxide. Although the combination of ATRA with chemotherapy achieves complete remission in ~ 90% of APL patients, relapse remains a major clinical problem. For example, treatment with ATRA alone induces only temporary remission, with relapse usually occurring within six months. In vitro studies of differentiation in leukemia cells have shown that the cells seem to take on the phenotype of a terminally differentiated cell, but it is unclear whether the biochemical processes intrinsic to the cell return to normal. While changes in mitochondrial content and function are known to occur with hematopoietic differentiation, the impacts of ATRA-induced differentiation on mitochondrial bioenergetics has yet to be explored. To address this gap in knowledge, a human APL cell line, HL-60, was treated with ATRA, and resulting changes in proliferation, morphology, and mitochondrial function were investigated. In response to ATRA, cellular proliferation halted by day three of treatment and histology confirmed altered morphological appearance, consistent with myeloid differentiation. In differentiated cells, mitochondrial respiration was decreased; however, mitochondrial content was unchanged. Interestingly, the respiratory profile of ATRA-differentiated HL60 cells differed substantially from that of healthy primary human granulocytes. These findings were corroborated by differences in size and morphological appearance between the ATRA-treated HL-60 cells and primary human granulocytes. Although further investigation is necessary to fully elucidate the effects of ATRA-induced differentiation of HL-60 cells, these findings suggest that the clinical success of ATRA is likely not the result of APL terminal differentiation.

UP003

Investigating the Role of CG34367, CG8046, and CG4415 in Germline Stem Cell Renewal and Oocyte Production

Wesley Czika

Mentor: Ables, Elizabeth Tweedie

Wesley Cole Czika, Elizabeth T Ables

Therapeutic strategies for regrowing and repairing damaged tissue in regenerative medicine depend on a thorough understanding of stem cells (SCs) which have the capability to self-renew and give rise to cells that will differentiate. To better understand the mechanisms behind SC regulation, the model organism Drosophila melanogaster was used due to its wide range of available tools, fast life cycle, and easy-to-study stem cell niche found in the ovary. A recent study used single cell RNA sequencing to identify the uncharacterized mRNAs, CG34367, CG4415, and CG8046, that were enriched in germline stem cells (GSCs) (Rust et al., 2020). In order to explore their functions in GSC renewal and oocyte production, I used RNA interference (RNAi) to knockdown and deplete the germ cells of CG34367, CG4415, and CG8046 mRNA. It was hypothesized that if these mRNA were enriched in the GSCs, then their knockdown should result in the production of fewer GSCs and oocytes. Upon knockdown and visual analysis using immunohistochemistry, the data show that there is no significant difference between the control and experimental RNAi flies. Plans to perform RT-PCR are currently underway to assess the efficiency of the RNAi mechanism in order to validate and provide proper interpretation of results.

UP004

Characterizing the role of Mkp3, a negative regulator of the Ras/MAPK pathway, in germline stem cell self-renewal

Lauren Elberfeld

Mentor: Ables, Elizabeth Tweedie

A key property of cancer cells is their ability to improperly activate developmental pathways that promote unrestrained proliferation. Through studying the relationship between germline stem cells (GSCs) and developmental pathways, we can learn more about the ways in which cancer cells develop and proliferate using key developmental pathways. The Ras/MAPK pathway has been well categorized and is widely known to have an integral role in cellular proliferation and tumorigenesis. Within Drosophila melanogaster, mitogen-activated protein kinase phosphatase 3 (Mkp3) is an essential negative regulator of the Ras/MAPK pathway. Mkp3 has two main functions, the inactivation of p38 as well as the inactivation of the rl, the Drosophila counterpart to Erk. Mkp3 has been previously studied in the development of photoreceptor cells and wing veins, but its role in the germline is not yet understood. By furthering the understanding of Mkp3 in the Drosophila germline, we can better understand what may contribute to GSCs differentiation and self-renewal. An integral part of proper oocyte development and overall organismal fecundity is the self-renewal and differentiation of GSCs; by characterizing the role of Mkp3, we can further the understanding of GSC maintenance. My data showcases functional genetic tools that allow for visualization of Mkp3. In addition, I have tested tools for RNAi knockdown of Mkp3 and shown that functional knockdown of Mkp3 results in loss of GSCs and defects in oogenesis.

UP005

The Rational Design of an Actin Localization Peptide

Jordan Hardeman

Mentor: Hughes, Robert Murray

Actin-binding peptides and proteins have numerous applications in the control and monitoring of cellular dynamics. This is effectively demonstrated by the widespread usage of protein fusions containing the actin-binding peptide Lifeact as probes in live cell imaging. However, under certain conditions, these probes have also been shown to perturb cytoskeletal dynamics, unbalancing the G/F actin ratio, and producing anomalous cytoskeletal structures. As such, there remains a need for a new generation of actin-binding probes that are largely orthogonal to cellular processes. We propose that this need could be met by a rational deconstructive approach to well-characterized actin-binding proteins to identify alternate actin binding peptide sequences. In this work, we report on such an effort that uses structural information about the cofilin-actin binding interface as a guide for the selection and design of cofilin-derived peptide sequences (COFPEP). We describe the ability of these peptides to label cytoskeletal structures in live and fixed cells, and further

describe methods for their improvement via rational design methods. To fully investigate the COFPEP sequence, a phage display system will be used to identify optimized F-actin binding mutants. We have created a phage library that incorporates 12 randomized nucleic acids, covering four codons, into the COFPEP sequence. This phage library can be screened to identify COFPEP mutants with enhanced actin binding properties.

UP006

Efficacy of Targeted Formulations of EFNA1 in a Murine Model of Acute Cardiac Ischemia

Brittany Jefferson

Mentor: Virag, Jitka Amira Ismail

Ephrin A1 (EFNA1) exhibits ameliorative effects in disease model organisms, including acute and chronic mouse models of cardiac ischemia and Parkinson"s disease. However, direct intramyocardial injection of an Ephrin ligand (EphrinA1-Fc) does not represent a viable clinical strategy and the development of EFNA1 into a therapeutic modality has yet to reach full potential due to the lack of fully explored and optimized targeting and delivery strategies. Specifically, a targeted EFNA1 that can rapidly reach the therapeutic target after injection by IV, catheter, or delivery by surgical implant, presents viable strategies for harnessing the currently untapped therapeutic potential of Ephrin signaling. Moreover, a targeted entity would have numerous advantages, including increased longevity, decreased off-target effects, and would offer unlimited "tunability", as the sequence can be adapted to meet multiple therapeutic targets. Herein, we describe several targeted formulations of the EFNA1 ligand that will promote general (Eph receptor = EphR) and more specific (cardiomyocytes) targeting of EFNA1. These targeted modules also incorporate strategies to promote Eph activity through multimerization. Efficacy of these constructs compared to EFNA1-Fc will be assessed in vitro in human inducible pluripotent stem cells-derived cardiomyocytes (iPS cells) and validated in a mouse model of acute injury.

UP007

The pHAST and the Fluorescent: Measuring Extracellular pH with an Acid-Sensing Tag

Emily Monroe

Mentor: Allen, William E

In order to gain a better understanding of the extracellular pH response of GPR-68 in ischemic cardiovascular conditions, a pH sensor was synthesized. GPR-68 acts as a proton receptor, commonly found on the plasma membrane of many cardiovascular tissues. It works to interpret the proton gradient found in ischemic cardiovascular conditions, where pH decreases with increasing proximity to the plasma membrane. It was originally hypothesized that GPR-68 proliferates as a response to increased acidity, associated with ischemia, further contributing to the overall disease. To gain a localized pH reading to the plasma membrane and confirm these conditions of increased acidosis, we synthesized a pH sensor compound. This pH sensor is linked to the N-terminus of an alpha helical peptide, via a water-solubilizing linker. The pH sensor will stay exposed to the extracellular region, and will fluoresce as a response to acidity, while the peptide portion will remain wound in the plasma membrane. The water solubilizing capabilities of this structure allow for it to be used in biological settings, as it will be compatible with the extracellular environment it is exposed to. Successful synthesis and application of this extracellular pH sensor will help us gain a better understanding of the role of GPR-68 in terms of its pH response to ischemic cardiovascular conditions. Furthermore, this will lead to a greater understanding of the function of cardiovascular disease, as we work to combat it.

UP008

Centaurinα1-Bid signaling in Alzheimer”s disease progression

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OBJECTIVES:

The brain-specific Ras-anchoring protein, ADAP-1/Centaurinα1 (CentA1) is required for Aβ42-induced neuronal dysfunction. In the hAPP-J20 mouse model of Alzheimer”s disease (AD), lack of CentA1 reduces amyloid deposition, neuroinflammation and dendritic spine loss. To gain insights into the molecular mechanisms of this rescue, we performed transcriptome profiling. Using forebrain samples of wild type (WT), hAPP-J20, and hAPP-J20 x CentA1 KO mice, we identified the pro-apoptotic factor Bid (BH3-interacting domain death agonist) as a differentially expressed gene (DEG). As a member of the Bcl-2-family, Bid promotes death receptor-mediated apoptosis in neurons (Fig1). Therefore, the goal of this study was to determine the role of Bid, in the rescue of AD-like phenotypes in hAPP-J20 x CentA1 KO mice. Our working hypothesis is that CentA1 KO protects the brain from AD progression by inhibiting the upregulation and/or mitochondrial translocation of Bid.

METHODS:

Mice: Three different groups of mice were tested: WT, hAPP-J20, and hAPP-J20 x CentA1 KO. We used methods such as Transcriptome profiling gene expression analysis; qPCR to validate transcriptome profiling results; Mitochondrial isolation to obtain pure mitochondrial fractions from forebrain samples, and Western blotting to validate transcriptome profiling, and to evaluate Bid level in whole cell lysates vs. mitochondrial fractions.

RESULTS AND CONCLUSIONS:

We compared the expression of 880 genes across NanoString’s mouse Neuropathology and Neuroinflammation gene expression panels in matched forebrain samples from WT, hAPP-J20, and hAPP-J20 x CentA1 KO mice (n=5 mice/genotype; age 6-8 months). Plotting the pathway scores uncovered profound differences in multiple pathways associated with apoptosis and gliosis. At the level of individual genes, CentA1 KO reduced the level of the pro-apoptotic protein, Bid. (Fig2). Next, this significantly altered Bid gene expression was validated by qPCR analysis that was performed on RNA isolated from corresponding frozen tissue (Fig3) and western blotting from whole cell lysates and mitochondrial fractions (Fig4). While the data shows a trend towards increased Bid level in hAPP-J20 mice vs. WT and hAPP-J20 x CentA1 KO mice, there was no statistical significance at the gene or protein level, due to a low sample number. In conclusion, our data indicates involvement of Bid in AD-like phenotype in hAPP-J20 mice, which can be rescued by lack of CentA1.

UP009

Investigating the role of adamts9 in early oocyte development in zebrafish (Danio rerio)

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Mentor: Zhu, Yong

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Functional development of gonads is essential for fertility and sex determination in animals. ADAMTS9 (a disintegrin and metalloprotease with thrombospondin type 1 motifs, member9) is an extracellular matrix metalloprotease and membrane locating signaling molecule that is essential during early mammalian development. The conservation of Adamts9 sequence and structure from worms (C. elegans) to humans suggests that it has a critical role in organ formation, but the mechanism is still unclear. The underlining lack of research of Adamts9 is due in large part to embryonic

lethality within attempted murine ADAMTS9 knockouts.Adamts9 knockout (KO) within zebrafish (Danio rerio) is a good model organism to further study the Adamts9 mechanism, with most KO surviving to adulthood. In our preliminary studies of Adamts9 KO, we have found lower numbers and smaller size of Stage IB (primary) follicles in juvenile Adamts9 KO compared to their wildtype siblings. A potential explanation for the observed phenotype is the inability of mitotic oogonia to proliferate or for Stage IA oocytes to properly progress through early stages of meiosis and leave the Stage IA cysts. We hypothesize that germ cyst breakdown deficiency is the leading cause of the observed depletion of Stage IB follicles in juvenile Adamts9 KOs. Studying the chromosomes and telomeres arrangement within the nuclear envelope through Fluorescence In-Situ Hybridization will help determine cell progression through prophase in meiosis I, before primary oocyte arrest. Identifying the stage will further assist in determining pathways of gonad development that adamts9 plays a role in, further elucidating the mechanisms of Adamts9 in germ cell and gonad development.

UP010

Design and application of an immobilized protein kinase

Anna Schulz

Mentor: Hughes, Robert Murray

Anna Marie Schulz, Dalton T. Deane, Thomas A. Cope, Tate E. Bennett, Robert M. Hughes

Protein Kinase A (PKA) is a biologically important enzyme for cell regulation, often referred to as the “central kinase”. An immobilized PKA that retains native substrate specificity and activity would be a useful tool for laboratory scientists, as it would allow for targeted phosphorylation of various substrates while harnessing the benefits afforded by enzyme immobilization: namely ease of enzyme capture, repeated reuse, and increased enzyme stability in various temperature and pH conditions. In this research, we utilized a recombinant PKA fusion protein that incorporates the HaloTag covalent immobilization system to moderate enzyme immobilization. In addition, we investigated the importance of protein fusion order for optimal heterologous expression in E. coli. Furthermore, various applications of our immobilized PKA were demonstrated, including the phosphorylation of endogenous PKA substrates in a cell lysate. Overall, these results hold promise for a generalizable strategy for the production immobilized protein kinases and wide variety of applications that will be demonstrated through examinations of the reusability of the immobilized PKA under variable experimental conditions.

UP011

Nicotine Dependent Behaviors: Trans-Generational Effects of Nicotine in Caenorhabditis elegans

Ishani Shelat

Mentor: Pan, Xiaoping

Nicotine is a psychoactive and addictive substance that is found in commercial products such as tobacco. Nicotine targets nicotine acetylcholine receptors (nAChRs) at the ventral tegmental area of the brain which leads to the stimulation of the mesolimbic dopamine system. The model organism Caenorhabditis elegans (C. elegans) exhibits similar behavioral responses to nicotine exposure as mammals, which includes acute responses, tolerance, withdrawal, and the sensitization. These worms were used to investigate genetic mechanisms leading to behavioral and neurological changes. Our preliminary study has demonstrated nicotine withdrawal and dependent effects in C. elegans, consistent with others” reports. However, none have shown the transgenerational inheritance of nicotine-dependent behaviors. To understand and study the potential transgenerational effects, we tested the behaviors of C. elegans in the F1 and F2 generations following F0 generation exposure using two systems: Worm Tracker and WormLab. The F0 worms were exposed to 6.17µM and 61.7µM of nicotine on agar plates, and we found that the locomotion behavior was stimulated in F0 upon nicotine exposure, consistent with our previous observations. When deprived from nicotine exposure, the F2 generation of worms have higher locomotion speed on nicotine-free plates than in nicotine-containing environments, which suggests the nicotine withdrawal

effect, despite that F1 and F2 generations were not exposed to nicotine. The data showed significant results indicating inherited dependence of nicotine across generations. Ongoing research is conducted to find genetic factors that contribute to the transgenerational effects. These results provide insights regarding long term multi-generational risks involved with substance use.

UP012

Vitamin B12 Regulation of PUFA Synthesis

Molli Sholar

Mentor: Wheeler, Michael D

Low-grade, chronic inflammation is associated with a range of diet and age-related disorders, including diabetes, arthritis, and cognitive deficits. Inflammatory cells have the capacity to synthesize complex PUFA called specialized pro-resolution mediators (SPMs) that regulate the extent and duration of inflammatory responses. Humans have a limited capacity to synthesize SMPs, especially as we age, due to decreased expression of the elongase and desaturase enzymes required in their conversion from dietary PUFAs.

It was recently shown that vitamin B12, an essential micronutrient, enhances the cognitive benefits of dietary n-3 PUFAs. It is hypothesized that B12 will increase macrophage SPM synthesis and subdue pro-inflammatory cytokine production.

To test this hypothesis, RAW264 macrophage cell line was stimulated with LPS/ gIFN, which promotes robust pro-inflammatory gene expression. Cells were also stimulated in the presence of 50 uMl cobalamin (B12). Gene expression profiles were assessed using signal cell RNA-seq.

The addition of B12 had no significant impact on the expression of most prototypical pro-inflammatory genes. However, it was demonstrated that B12 significantly increased elov5 expression, suggesting that B12 does indeed regulate PUFA biosynthesis in macrophages. Moreover, B12 enhances the expression of Trem2, a novel anti-inflammatory transcript associated with neuro-protective effects.

While pro-inflammatory responses in general were not changed, B12 selectively regulated expression of key factors involved in neuro-protective pathways. It is concluded that B12 differentially regulates macrophage responses and may be beneficial in mitigating chronic inflammation associated with age-related pathologies.

UP013

Impact of insecticide exposure method on susceptibility/resistance in Aedes albopictus mosquitoes

Raven Slade

Mentor: Richards, Stephanie Lynn

Avian White

Insecticide resistance is a concern of mosquito control programs (MCPs) whose primary function is to protect public health. Mosquitoes can develop resistance over time when exposed to sublethal doses of insecticide active ingredients (AIs). Resistance to AIs renders them ineffective as a preventive measure for the risk of mosquito-borne diseases. Mosquito exposure to insecticides during ultra-low volume (ULV) application occurs via direct liquid contact (formulated product [FP]), while barrier applications expose mosquitoes to dried residual FP. The Centers for Disease Control and Prevention (CDC) bottle bioassay (based on contact with dried residual insecticide AI) may not directly relate to operational interventions for ULV applications. Hence, the current study assesses how topical/direct versus residual insecticide exposure impacts mosquito susceptibility/resistance to pyrethroid (permethrin) and organophosphate (malathion) AIs. Female Ae. albopictus (4-5-d old) were aspirated from a colony cage and anesthetized with cold. Mosquitoes were either treated topically with 1 µL of each AI (stocks made in acetone) or transferred to bottles containing residual AI as used in CDC bottle bioassays (400 µg/mL malathion; 8 µg/mL permethrin for topical and residual treatments). Control groups were treated with acetone instead of AIs (following topical and residual application methods). Immediately after topical exposure and 10-15 min after residual exposure, each group was

transferred to separate 0.5 L cardboard cages (7 mosquitoes/cage; 2-3 replicate cages/group). Mosquitoes were provided 20% sucrose and placed in a 28°C incubator with 14 h light:10 h dark. Mortality was monitored/recorded for all groups 1 h, 2 h, and 24 h post-exposure. Topical exposure to malathion (50, 83, 100% dead 1, 2, 24 h) showed higher mosquito mortality compared to residual exposure (0, 36, 36% dead 1, 2, 24 h). Both application methods showed high mosquito mortality for permethrin (topical: 69, 100, 100% dead 1, 2, 24 h; residual: 71, 100, 100% dead 1, 2, 24 h). No mortality was observed in control groups. Investigators will conduct a larger scale experiment using a field-collected Ae. albopictus population in February 2022.

UP014

EphrinA1-Fc Injection Effectiveness in Cardiomyocytes Post Myocardial Infarction with Relation to Timing of EphrinA1-Fc Injection in Reperfusion and Nonreperfused iPSC-CMs.

Steven Teague

Mentor: Virag, Jitka Amira Ismail

Cardiovascular Diseases (CVD) are the most common cause of death in the modern world, with myocardial infarction and myocardial infarction related issues constituting the major of CVD deaths. Reperfusion is the reestablishment of blood flow to cardiomyocytes that is done by reopening the affected blood vessel, reperfusion is the most common treatment option currently for ischemic attacks. However, reperfusion comes with the risk of oxidative stress that can cause further damage to myocardial cells. An effective treatment regimen to improve outcomes in patients suffering acute myocardial infarction (MI) on the scene for emergency response personnel or in the hospital during reperfusion is a critical unmet need. We have discovered that ephrinA1, a protein present in the plasma membrane of healthy mouse and human cardiomyocytes, expression is reduced or lost following an ischemic event. An injection of recombinant ephrinA1-Fc into heart tissue has been shown to reduce myocardial cell damage and dysfunction but the timing of administration relative to injury onset in the presence or absence of reperfusion is unknown. This research seeks to determine the optimal timing effects of ephrinA1-Fc administration relative to the onset of an ischemic event by simulation in human inducible pluripotent stem cell-derived cardiomyocytes. These cells have demonstrated high fidelity in terms of translatability of the effects observed in vitro to anticipated outcomes in vivo. This will help to determine the most effective time frame for ephrinA1 administration to minimize infarct size and dysfunction. We plan to investigate the timing of this protection by studying cell viability as it changes over varying lengths of ischemic duration as well as the oxidative stress burden in the cardiomyocytes at the time of initiation and conclusion of reperfusion. To do this, iPSC-cardiomyocytes will be made anoxic with oxyrase and ephrinA1will be administered at varying time intervals. After specified time intervals, the iPSC-cardiomyocytes will be examined for damage/death compared to controls. These time intervals will be determined based on current EMS response times of 1-6hrs that are known to be effective in reducing injury (such as arriving to the scene and time to the hospital) and additional times 8, 12, and 24 hours after onset of ischemic event to determine if ephrinA1 could be a useful adjunct to reperfusion therapy and even extend this narrow window of therapeutic value.

UP015

Neural Correlates of Balance Training in Children

McKenzie C. Whitley

Mentor: Surkar, Swati Manoharrao

The purpose of this research is to assess the effects of balance training on dynamic balance performance and associated cortical activation in children with cerebral palsy (CP). Various cortical areas such as sensorimotor, vestibular, and prefrontal cortices are associated with dynamic balance task. Our prior research suggests that children with CP have greater activation within prefrontal cortices compared to TD children while performing complex postural control task. However, it is currently unknown whether motor learning associated with practicing dynamic postural control task impacts activation within these cortical areas in children with

CP. Therefore, the next step is to assess the effect of 1-week of dynamic balance training on balance performance and sensorimotor, vestibular, and prefrontal cortices activation in children with CP. A total of approximately 20 children participated in this study. We hypothesized that with training children with CP will have enhanced performance on dynamic balance task and optimum activation within prefrontal, vestibular, and sensorimotor cortices. The knowledge generated from this study will help in developing effective assessment and intervention strategies for children with CP to improve postural control.

UP016

Neurophysiological evidence for task differences during the processing of emotional speech and vocalizations

Thomas Willis

Mentor: Rothermich, Kathrin

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In daily life, humans use different types of vocal communication to express emotions, such as non-linguistic vocalizations or speech prosody. We have shown previously that vocalizations seem to be processed preferably compared to speech, revealing differences about 100ms after stimulus onset. We used event-related potentials (ERPs) to replicate these findings while participants process neutral, happy, and disgust vocalizations and pseudo-speech. In each trial, the auditory stimulus was followed by a face 400ms later, which was presented for a companion study. In contrast to the earlier study, where participants were focusing on the emotional content, we asked participants to judge attractiveness and age of the accompanying faces. For each of the 22 participants, EEG was recorded using 64 active electrodes. N100 and P200 components were analyzed for different regions of interest (frontal, midline, parietal), tasks (age, attractiveness), speech type (vocalizations, speech prosody), and emotions (neutral, happy, disgust). We found significant amplitude differences for speech type, emotion, and task for the N100 in frontal, parietal, and midline regions of interest. For the P200, we found effects of speech type in the frontal region, and for emotion and task in all three regions. As the subjects" attention was not directed to the auditory stimulus, the current results may represent automatic affective processing. This could be behaviorally beneficial, for example in complex social settings. Significant differences found in the P200 by task indicate that the processing of auditory signals may be task-dependent, pointing to differences in the neuro-cognitive mechanisms of evaluating age or attractiveness.

UP017

Does High Intensity Interval Training in Older Mice Restore Age-Related Alterations to Activity Patterns?

Wallace Hollowell

Mentor: Graber, Theodore G

Wallace C. Hollowell, Kinesiology

Megan L. Pajski, Physical Therapy

Ted G. Graber, Physical Therapy, Kinesiology

As we age, inevitably, our physical function gradually deteriorates. This deterioration is at risk of being exacerbated by the development of sarcopenia (age-related reduction of muscle mass and strength) and frailty (age-related physiological capability decline). Prior investigations have shown that exercise is successful in mitigating the progression of these neuromuscular diseases and restoring overall functional capacity. These investigations have also shown that older adult mice run for similar durations as younger adult mice, but at a slower pace, thus reducing total volume of running. We hypothesize that HIIT (high intensity interval training) may restore the intensity of running pace and improve their propensity for volitional activity - even if the total distance run is not affected due to fewer total intervals. To test these hypotheses,

we will be comparing pre- and post-test data from 6-10-month-old adult C57BL/6 mice (n=10, 10m, the range correlating to mid-20"s to early 30"s in humans) and 22-26-month-old elderly adult C57BL/6 mice (n=10, 26m, the range correlating to approximately 70"s-to-80"s in humans). These mice underwent functional aptitude pre- and post-testing using our composite CFAB (comprehensive functional assessment battery) scoring system, which is comprised of VWR (voluntary wheel running to measure volitional exercise/activity rate), treadmill (endurance), rotarod (overall motor function), grip meter (fore-limb strength), and inverted cling (overall strength/endurance). After pre-testing, a group of these mice were assigned to a progressive and personalized 13-week HIIT program using a treadmill, which they ran on three days per week. From this program, we expect to see restoration in running intensity and volitional activity among the elderly mice.

UP018

Anoxic protective abilities of ephrinA1 and androgens

Benjamin Juhl

Mentor: Virag, Jitka Amira Ismail

Cardiovascular disease is the most prevalent and debilitating disease in the US and globally. Heart cells are terminally differentiated so damaged tissue cannot be repaired. There is no cure and it has a progressive and devastating socioeconomic impact. Studies have shown that the occurrence of myocardial infarction (MI) differs by age, sex, and physical well-being but little is known about the specific mechanism behind these discrepancies. Researchers hypothesize that these differences may be in part due to the varying expression of the predominant androgens estradiol(E2) in females and testosterone(T) in males which change with age. Both are linked to cardio protection and decreased expression in the elderly and obese likely contributes to their increased risk of MI. Our lab has shown that healthy mouse and human heart cells(cardiomyocytes) express ephrinA1. Administration of recombinant ephrinA1-Fc to the ischemic heart at the time of injury onset reduces tissue damage and preserves cardiac function in acute and chronicmouse models of MI. In vitro, treatment of human inducible pluripotent stem cell-derived cardiomyocytes (hiPSC-CMs) with ephrinA1-Fc preserve 84% of cells subjected to 24hrs of anoxia. One mechanism by which androgens may influence cardioprotective outcomes is by modulating the expression of the protein Ephrin A1 and/or its cognate EphA receptors in cardiomyocytes. To test this hypothesis, I investigated the effects of varying levels of testosterone or estrogen on ephrinA1/EphA expression and determine if there is a role for them in modulating ephrinA1-Fc-induced protection from anoxic injury. Specifically, human inducible pluripotent stem cell-derived cardiomyocytes (hiPSC-CMs) will undergo anoxia by treatment with oxyrase to remove all oxygen, simulating an ischemic event, and these cells will be treated with ephrinA1-Fc in the presence or absence of varying levels of E2 or Tto determine the effects on cell survival, ephrinA1/EphA expression,and molecular mediators of apoptosis, metabolism, and autophagy. This data sheds light on the importance of sex hormones in determining cardiomyocyte resilience during ischemic stress which can lead to improved treatment strategies for men and women of all ages and health statuses.

UP019

Understanding the Interaction of Ftz-f1 and Ecdysone Signaling in Escort Cells

Jung, Lauren

Mentor: Ables, Elizabeth Tweedie

The Drosophila melanogaster germarium is a niche within the ovary composed of somatic cells and germ cells responsible for promoting and controlling oogenesis through localized signaling. The germline stem cells (GSCs) rely on signals within the germarium for asymmetrical cell division to produce a cystoblast. The cystoblast produced undergoes four rounds of synchronous cell divisions inside the niche resulting in a 16-cell cyst where one of the cells will commit to becoming the oocyte. Escort cells are a type of somatic cell inside the germarium that adhere to the germline stem cells to help signal for proliferation and differentiation. Ecdysone, a steroid hormone, is one type of signal in the germarium important for germline stem cell maintenance. Ecdysone binds to the

heterodimeric complex of two proteins, Ecdysone Receptor and Ultraspiracle, to transcriptionally activate a variety of genes, including other transcription factors. Which ecdysone-responsive genes are essential for escort cell function, however, remains unknown. During larval development stages, a gene called Ftz-f1 is a downstream target of ecdysone signaling. Ftz-f1 encodes a transcription factor of the nuclear receptor superfamily. Intriguingly, Ftz-f1 is highly expressed in escort cells and is necessary for maintenance of the germline stem cells. Based on its relationship to ecdysone signaling during larval development, we hypothesize that Ftz-f1 is also regulated by ecdysone in ovarian escort cells. To first test whether Ftz-f1 is a transcriptional target of ecdysone in escort cells, we utilized a transgene in which a reporter, lacZ, is fused to a ftz-f1 transcriptional enhancer region previously characterized by our lab. We then blocked Ecdysone Receptor function specifically in escort cells. Using immunohistochemical staining and imaging, LacZ was used to visualize if Ftz-f1 is transcribed in the absence of functional Ecdysone Receptor in the escort cells. Then, we compared whether depletion of Ecdysone Receptor in escort cells results in loss of germline stem cells, similar to depletion of Ftz-f1. Taken together, our results will help reveal the mechanisms by which Ftz-f1 and ecdysone signaling in escort cells promote germline stem cell maintenance.

UP020

Pitt Perspective; Fostering community conversation in Pitt County.

Abigail Clavijo

Mentor: Christensen, Timothy W

Meaghan Amelia Skelly,Breanna Harleigh Sapp,Madeleine Rose Saucier,Abigail Nicole Clavijo

The Pitt Perspective is a research and conversation based podcast thats purpose is to augement the testemonies of Pitt County's marginalized communities and the county's reckoning with its untold local history. The podcast provides a platform for Pitt County locals to share their stories through conversational interviews and in-depth discussion. Current events that relate to these local histories and communities will be tied into episodes in hopes to not only amplify the voices of the marginalized communities in the area, but to assist in the healing of those that have faced generations of subjuagtion. The goal is that the podcast will create a conversation around both historical and current events to ultimately prevent these patterns from continuing in the future.

Our professors in the honors college challenged us to find an issue that seemed unsolvable because of it's complexity and develop an original solution for it. Throught the weeks we utilized human centered design by conducting interviews to workshop our ideas for a solution to combat the problem of racism. We developed different solutions such as a culture fair as well as a podcast about racism and scrapped old solutions as our research allowed us to develop new ones. Ultimately we found that a podcast was the best option for us to interact with the community and allow us to achive our goal of highlighting the untold stories of marginalized communities.

UP021

We asked, patients answered: Preferences for a produce Rx program

Khadijah R. Hendrix

Mentor: Sastre, Lauren Rogers

Introduction: Produce prescription programs (PPP) provide a voucher for fresh produce and most commonly target low-socioeconomic (SES) patients at risk for food insecurity with a chronic disease (CD). Research examining patient perceptions prior to implementing a PPP are limited, therefore, the objective of this study was to examine the perceptions, preferences and needs of patients to best tailor and target a future PPP.

Methods: Semi-structured interviews were conducted by phone between December 2020 and February 2021. Patient participants (n=26, 53.8% male) were recruited from a free and charitable clinic in rural, Eastern North Carolina. Interviews were audio-recorded and transcribed verbatim. Deductive content analysis was utilized to identify themes within three categories: PPP

promoters and preferences, resources, and barriers to PPPs. Transcripts were reviewed and coded independently by research members (n=4) until consensus was reached regarding all themes.

Results: Preliminary recurring themes suggested strong interest in weekly produce bundles, desire for nutrition education with a focus on the specific health and CD management benefits of produce. All participants reported being willing to try new produce, desired recipes and were interested in cooking classes, demonstrations and taste testing. Some patients faced transportation barriers to pick up produce and/or technology barriers to virtual resources.

Discussion: Preliminary analysis suggests PPP are valued by rural, low-SES, patients and results indicate specific resources needed (e.g. nutrition education, recipes, delivery). While PPPs are a promising public health strategy to address management of CDs, continued research is warranted to examine best methods and resources for implementation and impact.

UP022

Leadership and technology use among adolescents at a Boys & Girls Club in Eastern North Carolina

Hannah Haynes

Mentor: Larson, Kim L

Adolescents use social media to access information, including electronic health (eHealth) applications, and some of the sites are unreliable. The current project builds on a larger study of adolescent sexual health that began in 2018 in collaboration with the non-profit organization, the Boys & Girls Clubs (BGC) of eastern North Carolina (NC). The purpose of this study was to identify youth leaders who can participate in beta testing a reliable and engaging eHealth application.

Methodology

An observational study began in January 2022 in collaboration with staff of the BGC of eastern NC. One senior nursing honors student made site visits to one BGC to document leadership behaviors of youth and their use of mobile technology. The research questions were: What are the prevalent leadership behaviors of youth? What are key characteristics of youth leaders? and How do youth leaders use technology for health information? Following posting of the research flyers, observations were conducted in locations specifically serving Latinx and Black communities.

Results

Preliminary data analysis came from 16 hours of observations over six days at one site with between 15-47 predominantly Black youth between the ages of 12-18. The most prevalent leadership behaviors were distributing food, assisting staff with cleaning, helping others cooperate with staff, and initiating games. Boys assumed leadership roles more often than girls. Older youth were more likely to serve in leadership capacities compared to younger teens. Dominant forms of technology were mobile phones and gaming devices. A recent incident of inappropriate posting to social media led to a limited, temporary ban on technology use.

Discussion

While observations are on-going, we have identified 5 youth leaders with skills in leadership and technology.These youth leaders can work with university researchers to develop a sexual eHealth application that will promote safe, healthy relationships for their peers.

UP023

Community Health Information-Sharing by Latino Palliative Care Lay Advisors

Jenna Felts

Mentor: Larson, Kim L

Holly Mathews, PhD, Dept. of Anthropology

Lay health advisors are an evidence-based intervention that can address health equity. Lay advisors are trusted members of the community and serve as natural helpers. With training, lay advisors can help others navigate the health care system. The purpose of this study was to understand how trained Latino palliative care lay advisors (PCLAs) record information sharing

with community-dwelling Latino adults with a cancer diagnosis.

Methodology

A mixed-methods community-based action design, guided by the Ethno-Cultural Gerontological Model, was conducted between 2020 and 2021. This project trained 15 Latino lay advisors in palliative care principles. Following training, PCLAs were assigned Latino adults with a cancer diagnosis to contact via telephone and share information about home symptom management and advance care planning. Encounter forms were the source of documentation used by the PCLAs following their telephone discussions.

Results

A total of 41 Latino adults with cancer agreed to participate in the telephone intervention. Preliminary findings indicate that 85.3% (35/41) of the participants received some information from the lay advisors. Just over half of the sample (n=18; 51.4%) reported having one or more symptoms on the day of the call. Physical symptoms (i.e., pain and tiredness) were more prevalent than emotional symptoms (anxiety and depression). Lay advisors documented information shared on advance care planning with 65.7% (n=23) of participants.

Discussion

Trained lay advisors attempted several telephone calls before participants answered their call. When contacts were made, participants and PCLAs reported that the encounter was helpful. Over one third (35.2%) of participants did not receive information on advance care planning. Advance care planning remains a difficult topic to discuss. Interactive games, such as the “Hello Game” might assist Latino communities with these conversations. Future training might include best practice in recording information sharing.

UP024

Decimal Misconceptions in Elementary Math through the eyes of Preservice Teachers

Erin Baker

Mentor: Schwartz, Catherine Stein

The purpose of this project is to identify misconceptions elementary preservice teachers have about decimals in order to understand how best to prepare them for teaching decimal content to elementary students. Studies on general decimal misconceptions indicate that both preservice teachers and students often think the length of the number indicates the size of the decimal and rely on excessive rounding. Further, decimal placement on number lines is often incorrect. The goal of this study is to better understand the reasoning behind these misconceptions, and particularly, the role played by place value understanding. Two open-ended decimal tasks were given to undergraduate preservice teachers. The first asked participants to place given numbers on an open number line as accurately as possible. The second task was to identify the number of hundredths in the number 0.345. A subset of participants were chosen for follow-up, semi-structured interviews to better understand their reasoning behind the task responses and to subsequently identify points of misconceptions. Preliminary findings suggest that participants often put the given decimals below zero on a number line and equal space numbers rather than placing them proportional. In the second task, Preservice teachers often used rules they”ve learned associated with place value to consider each place individually rather than looking at the number holistically. Findings indicate a need to unpack and resolve these misconceptions with preservice teachers as they prepare to enter their future classroom.

UP025

Philosophy of Entrapments/Stings

Willaya Bannister

Mentor: Collins, John

Background: I have researched and read numerous articles involving entrapment and different opinions from different philosophers. Dworkin, Hunt, and Miller to name a few. I also read articles supporting my research regarding entrapments/stings that were not necessarily philosophical. For instance, an article revolving around the NBC show, "To Catch a Predator." Entrapment is an overrall defense to a criminal charge on the basis that the government cannot create criminal activity, implant it in an innocent person's mind and induce that person to commit a crime for the government to prosecute. Society is seemingly against government activities to induce law-abiding, innocent people into criminal activity. Through much of my reasearch, I have determined what probable cause is, and what is wrong with entrapments that lack probable cause. I have been able to create examples that illustrate what I would regard as acceptable and unacceptable use of entrapment through my readings and from my own understanding. I have learned about objective and subjective testing within philosophy and how it is applied to entrapments, and which test is better regarding the use of entrapment. Through all of this research, I have written a paper regarding entrapment and the philosophical views of it. My thesis being, "entrapments/stings that are conducted by law enforcement lacking probable cause are unethical, due to the lack of predisposition within the suspect, causing law enforcement to be creating crime rather than completing the goal of deterring crime.

UP026

Leadership Development in Undergraduate Nursing Students

John E. Byrd III

Mentor: Forbes, Thompson Hollingsworth

Background/Purpose: The purpose of this study is to describe the impact of an active learning approach to leadership development in senior nursing students. Nursing students need leadership development to become better prepared for their role as leaders of care at the bedside of patients. The healthcare industry is becoming increasingly complex and requires students to have leadership skills to aide in executing proper provision of care. This study will attempt to assess the results of one of these programs.

Methodology: This study uses a pre- post-survey design to understand the outcomes associated with one nursing programs implementation of an active learning course on leadership within their undergraduate curriculum. Data for this study was collected via Qualtrics survey at the beginning and end of the semester a cohort of students from the Spring 2021. The course consists of active learning strategies such as experiential activities, group projects, and projects that required students to apply leadership concepts to their concurrent clinical setting. Approximately 110 students have completed surveys.

Results: Preliminary results indicate that students improve in many aspects of leadership. The greatest growth appears to occur in students comfort participating in quality improvement principles and processes and understanding of effective leadership strategies.

Discussion: By measuring the outcomes of courses and programs designed to establish these skills we are able to contribute to the knowledge base of the most effective methods of educating nursing students on leadership.

UP027

Undergraduates' Argumentation Skills Differ with the Aspect of Argumentation and Lab Exercise Considered

Lindsey Clevenger

Mentor: Vance Chalcraft, Heather D

Lindsey Ann Clevenger, Dr. Heather Vance-Chalcraft, Dr. Joi P. Walker

Argumentation is a vital role in the development of scientific knowledge and understanding. Students who can argue from evidence and support their claim develop a deeper level of understanding in science. Argument-Driven Inquiry (ADI) is an instractional lab model constructed to help students gain knowledge of a specific discipline through scientific argumentation. In this study, scientific argumentation among students was video recorded in a two-semester sequence of introductory biology laboratories at East Carolina University. These videos were analyzed using the Assesment of Scientific Argumentation in the Classroom (ASAC) observation protocol. This protocol separates argumentation into three subcategories: cognitive-how the group develops understanding, epistemic-how consistent the group's process is with the culture of science, and social- how the group members interact with each other. We asked whether students are equally skilled at all subcategories of argumantation and how students' argumentation skills differ based on lab exercise and course. Students were more skilled at the social than the cognitive and epistemic aspects of argumentation. Total argumentation scores were significantly different between the two investigations in introductory biology 1 but not between the two investigations in introductory biology 2. The ADI labs give students the opportunity to apply biological concepts and practice justifying their claim from evidence. These results will ultimately aid in the development and expansion of ADI instructional models, with the goal of further enhancing students' scientific argumentation skills and understanding of science.

UP028

The Advantages of Executive Processing in Bilingual Students

Dixon, Hannah

Mentor: Christensen, Timothy W

Hannah Marie Dixon

Bilingualism in the U.S. has been historically misunderstood. Individuals who speak languages other than English have been considered intellectually inferior because of the belief that understanding multiple languages creates cognitive confusion. These negative ideas are impacted by traditionally racist beliefs which paint a negative picture of individuals who speak different languages due to cultural and ethnic differences. This is especially evident in U.S. schools as English Language Learners are viewed as social outcasts and their unique language needs are not accommodated in their classrooms. However, studies show that bilingualism actually creates social and cognitive advantages. The most notable of these advantages being related to executive processing, thought to have been created by bilingual individuals' continuous use of the executive control center of the brain to preform linguistic code-switching including the inhibition and activation of their multiple languages. Because of their greater experience with inhibition of their language not in use, bilingual individuals have a greater ability to inhibit inferring stimuli, resulting in better attention control. In order to create greater support for the research surrounding the advantages of bilingualism and to prove that bilingualism also creates advantages for young students in U.S. schools, a research study was performed in a N.C. elementary school with monolingual and bilingual second and third graders. These students were asked to participate in a series of dichotic listening tasks in which they were instructed to attend to and recall certain word stimuli and inhibit others. Upon analysis of the percentage of recall for the monolingual and bilingual students, the data failed to support the hypothesis that bilingual children will demonstrate a greater ability to attend to specific stimuli by inhibiting inferring stimuli. It is clear that further study will be required in order to support

the hypothesis that bilingual children are better able to inhibit interfering stimuli. This would need to include an increased population size in order to offer the researcher more data of which to analyze. With continued research regarding the advantages of bilingualism, negative stereotypes surrounding bilingual individuals in schools may be broken down and more programs supporting bilingual education may be established.

UP029

Machine Learning Classification of Hemodynamics to Predict Science Student Learning Outcomes in Real-Time During Virtual Reality and Online Learning Sessions

Kayleigh Anne Linder

Mentor: Lamb, Richard Lawrence

Knut Neumann

Students' learning results in science content and practices are expected to be improved through automated interactive learning management systems and linked online video-based learning environments. The goal of this study is to see how hemodynamic response data may be used to build student-level answer predictions using machine learning algorithms in a science classroom where students are using an online learning management system. A charter school in the northeastern United States was used to recruit 40 individuals (n=40), 21 females and 19 males. Students viewed a recorded film that included a 20-minute instruction and explanation of the DNA replication process. A female educator on a computer screen presented an overview of the DNA replication process during class. The findings imply that hemodynamic responses seen during topic presentations to students predict student accurate and erroneous replies to subject-related questions. The results imply that hemodynamic response can be used to gauge degrees of student involvement in video-based tasks, with error rates in the predictive models below 30%. This could lead to the development of unique visual media learning methodologies, allowing scientific educators to assess whether students can comprehend material from hemodynamic data.

UP030

Equity in Education: Impacts of the Project I4 Participation on School Leader and Teacher Practice

Ava McCoy

Mentor: Militello, Matthew

Inequities in elementary school classrooms impact the quality of education for many students. It is important for teachers to understand how to structure their classroom to provide equitable access for each student and focus on the assets each student brings to the classroom. The purpose of this study is to create statements for Project I4 participants to sort to understand which Project I4 experiences were more significant on their ability to lead for equity. It will provide an opportunity to learn how school leaders learn and how they can change teacher practices to improve learning outcomes for all students. Q-methodology is used to assess the trends displayed by school leaders and educators with respect to the impacts their actions have on equity within the classroom.

UP031

Mentoring in Nursing Education

Katelyn McKinney

Mentor: Hand, Mark Charles

Background: The nursing shortage is partly the result of the scarcity of nurse educators. To provide patients with competent, confident nurses that received quality education, having an adequate team of nurse educators is essential. To retain nurse educators and attract novice nurse educators, mentorship programs used in nursing education must be identified and utilized.

Aim: The purpose of this integrative literature review is to identify and analyze mentorship programs used in nursing academia.

Methods: A literature search was conducted by searching online databases including PubMed, Science Direct, CINHAL, and gray literature. Study quality was assessed prior to inclusion using the Joanna Briggs Institute Critical Appraisal Tools checklist for

quantitative and qualitative research. Findings from the studies were analyzed and categorized into themes, and a synthesis of conclusions from each of them was presented as an integrated summation of the topic.

Results: Seventeen studies were included in this review from 3,047 articles that were retrieved in the initial search. Themes identified include informal mentorship with colleagues, implementing a program, communication and support, mentorship structure and planning, and formation of the mentoring relationship.

Conclusion: After reviewing the literature, it is evident that few structured mentorship programs have been utilized and tested. Informal mentorship is commonly used in academia; however, novice nurse educators would most benefit from a structured and institutionally supported formal mentoring program.

UP032

Menstrual Maintenance Education in North Carolina's Healthful Living Standards

Elisabeth Reed

Mentor: Feder, Helena M

Morgan Nicole Canady,Mazie Wright Murphy

Menstruation is required to be taught in relation to conception in sixth grade according to North Carolina's Healthful Living Standards, thus students are not necessarily receiving information on how to maintain their periods. Information on disposable products, like tampons or pads, as well as reusable products, like reusable pads, reusable menstrual underwear, and menstrual cups, should be included in the health curriculum to ensure that all students are aware of these resources. Through conducting interviews with professionals in education and public health across North Carolina, Pink Clam Club (PCC) has created a plan on how to combat this lack of awareness. Through working with educators across North Carolina, PCC is working to distribute pamphlets on educational materials to parents, students, and educators, as well as creating lesson plans for instructors to incorporate this curriculum easily and efficiently. A website for the initiative is in the works to create accessibility and raise awareness across North Carolina. Additionally, PCC is working with individual schools to attempt to introduce this curriculum in classrooms across North Carolina. The group is working to make menstrual maintence education a mandatory part of North Carolina's Healthful Living Standards.

UP033

Energy Conversion Hardware in the Loop Software and Hardware Implementation using OPAL-RT FPGA Simulator and Power Electronics Building Blocks

Joseph Nguyen Ha

Mentor: Filho, Faete

With the transition into renewable energy sources such as solar and wave energy, it is critical to investigate energy conversion systems and the integration of Machine Learning (ML) within the power grid. To investigate and provide real time simulation, the unitization of the OPAL-RT 4510 Field Programable Gate Array (FPGA) – Based Real-time Simulator is used along with the PEB 8024 Imperix- Half-bridge Silicon Carbide (SiC) power module. The OPAL-RT has a multi-rate FPGA-based architecture and enables users to simulate power outputs quickly and accurately for Hardware-in-the-Loop (HIL) applications. With the addition of the PEB 8024, an advanced pulse width modulation (PWM) power converter, it allows for additional capabilities in controlling hardware for Rapid Control Prototyping (RCP) application with better timing resolutions around 20 nanoseconds. These two hardware systems are connected through software and hardware allowing for immediate changes in simulation, providing quick feedback when changes are made. With the future of machine learning the allocation of power will be done autonomously with minimum observation needed.

UP034

Lean Thinking and Practical Applications in small NC Manufacturers

Grace Jacobsen

Mentor: Abdel-Salam, Tarek M

Grace Hannah Jacobson, Haley Michelle Smith, Dr. Tarek Abdel-Salam, Dr. Kanchan Das, Dr. BJ Kim, Dr. Jinkun Lee

North Carolina currently accounts for 17.17% of the total manufacturing output in the United States, totaling $101.60 billion dollars in 2019. Lean thinking is a process improvement methodology that can be implemented in any manufacturing facility to reduce time, costs, and waste within the production process. Improvements are made by thoroughly evaluating the entire manufacturing process to eliminate or reduce non-value-added activities and errors in production. This study presents results for an applied research project at the ECU Center for Sustainable Energy and Environmental Engineering (CSE3). The project is funded by the USA Environmental Protection Agency and aims to reduce the amount of industrial pollution generated, water conserved, and energy saved by helping facilities adopt lean and green practices. Roughly 88% of manufacturing facilities in North Carolina are small businesses and many of them lack resources or expertise to implement lean practices into their production. Therefore, ECU"s pollution prevention team has an opportunity to make a positive impact on these businesses and the environment by providing small production facilities with the necessary resources and education to implement lean practices. This research outlines the impact of lean recommendations on the production processes in small manufacturing businesses in North Carolina. Key results and lean recommendations including current and future value stream maps will be included in the presentation

UP035

Implementation of an In Silico Modeling Pipeline for Bone Remodeling in Microgravity

Elliot Paul

Mentor: Vahdati, Ali

As space exploration become more prevalent, bone health in microgravity remains a major concern. Microgravity puts astronauts at risk of losing 1% - 1.5% of bone mass per month in space [1]. Researchers must better understand the pathways behind mechanically induced bone remodeling so that measures can be taken to protect astronauts" bones. This study aims to implement a mechanistic in silico approach to simulate mechanically-induced bone remodeling in microgravity.

A finite element model was developed in the open-source software FEBio [2], which was run using a MATLAB script and the open-source toolbox GIBBON. The output of this finite element analysis became the input to an existing NASA toolchain for bone remodeling in microgravity [3], which couples differential equations for temporal evolution of biological and chemical factors.

Preliminary results show that factors, such as TGF-β1, osteoblasts, and osteoclasts population dynamics play an important role in the computational remodeling simulations. For example, when the mechanical loading was increased, the population of active osteoblasts and bone density slightly increased, while the number of active osteoclasts slightly decreased.

This in silico model is currently being further developed, verified and validated against NASA's existing modeling toolchain [3]. The fully verified and vali dated model can eventually aid in designing exercise protocols that minimize astronaut bone loss and maximize the potential for safe space exploration.

UP036

Cryo-EM Sample Preparation Using Ultrasonic Vibrations

Wyatt Peele

Mentor: Hudson, Nathan E

Cryogenic electron microscopy, or Cryo-EM, is a technique used for imaging proteins at near-atomic resolution, allowing for better understanding to be made of protein structures and more importantly their functions. Applications for this Cryo-EM are vast and include not just understanding more about how proteins fold and function, but also how chemicals interact with molecules on an atomic level. This can help with highly targeted drug and therapy development which can help cut down on side-effects and drug-drug interactions.

This technique of imaging has had great advancements over the recent years due to improvements in detector technology and improved computer algorithms helping process data. However, one area where progress has lagged is in how samples are prepared. To image proteins with Cryo-EM, the sample needs to be applied to a grid, then excess liquid needs to be blotted off by hand, and lastly the grid is plunged into liquid ethane or a mix or ethane and propane. The method for freezing samples over the past couple of decades is not only tedious and time consuming but it wastes protein, produces thick ice patches which lowers resolution, and overall is limited in what it”s capable of. However, with the use of an ultrasonic humidifier, we can drastically reduce the amount of sample required, rapidly produce quality specimen, and has the added benefit of allowing for time-resolved experiments. Work on developing a simple homemade machine capable of producing these grids has already been done by Dr. John Rubinstein and his colleagues. Our goal now is to develop a fully automatic system for use by ECU for sample preparation and experimentation, and progress towards that goal will be presented.

UP037

COMPUTATIONAL MODELING OF ARTERIOVENOUS FISTULA HEMODYNAMICS IN PULMONARY HYPERTENSION PATIENTS

Kaitlin M. Southern

Mentor: George, Stephanie

Kaitlin M. Southern (1), Veeranna Maddipati (2) Stephanie M. George (1)

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In the United States, approximately 37 million people suffer from chronic kidney disease, which over time progresses to end-stage renal disease (ESRD). Care for these patients is typically managed by dialysis with the surgical creation of an arteriovenous fistula. Even though fistula formation is a common and an effective treatment it has been suggested as a risk factor for developing pulmonary hypertension (PH). The objective of this research is to develop a protocol for creating subject-specific computational fluid dynamics (CFD) models of fistulas in patients with PH. Using previously collected magnetic resonance images (MRI) from a single patient, a model of the fistula was created using Mimics software. Flow measurements from MRI were used as boundary conditions for the CFD model. The model was then meshed, and the 3D velocity field was solved using ANSYS Workbench. A double precision, second order, transient flow pressure-based solver was used during CFD analysis. A step size of 624 timesteps was used, with a single time step duration of 0.0038221 s, to simulate three full cardiac cycles. Fistula data, geometric and hemodynamic, was compared with formerly processed hemodynamic data from the pulmonary artery, amongst the same patient. This project presents a unique opportunity to study both the pulmonary artery and fistula within the same patient, simultaneously. Modeling of fistula hemodynamics may provide insight to the link between fistulas and pulmonary hypertension; thus, identifying key monitoring parameters. Improved monitoring will allow

physicians to intervene (such as fistula banding); thereby, preventing the development of pulmonary hypertension.

UP038

Comparing Fibrin Structure in Blood Clots Impacted by Flow Rate.

Hannah Sowers

Mentor: Vahdati, Ali, Hudson, Nathan

Fibrinogen is an important component of blood clots. It is activated by thrombin to form fibrin. Blood clots are primarly formed from a network of fibrin fibers. These fibers provide the structure and strength of blood clots. If the fibers break down incorrectly, a fragment of the blood clot can be released into the blood stream. This loose fragment can become an embolism that quickly becomes fatal. Blood clots are produced in both arteries and veins but are formed differently due to their environments. Blood clots formed in arteries contain more aligned fibrin fibers than blood clots formed in veins. While this difference is known, details about how fiber alignment impacts the blood clot's strength is not. This difference is important to understand because it could help with explaining why some blood clots become emboli while others do not. It could also aid in identifying blood clots that are about to break loose. This would allow the potential embolism to be prevented. To create blood clots, fibrinogen and thrombin were mixed under pressure and pushed through a microfluidic channel. The microfluidic channels were created by curing a gel like substance called PDMS over a template. This caused a small channel with inlet and outlet holes to be imprinted on the PDMS. Then the PDMS was bonded to a thin glass slide using a plasma cleaner that creates tight covalent bonds. Fibrinogen and thrombin mixtures were drawn up into syringes which were attached to the PDMS with tubes. A syringe pump was then used to apply constant pressure on the syringes and create a flow for the blood clot to form in. This was imaged with a microscope to help study the formation differences of clots formed in different flow rates. Multiple blood clots were created under flow and imaged but trials with varying flows were not completed due to time constraints. Preliminary data from these microfluidics experiments will be presented. The next step is to image multiple experiments with flow rates that mimic that of an artery and vein so the results can be compared.

UP039

Segmentation and processing of COVID-19 lung 4D-CT images

Leah Warren

Mentor: Vahdati, Ali

Contributing Researchers: Shea Middleton, Dr. Vahdati, Dr. Andrew Ju, Dr. M. Sean Peach

With the rapidly spreading nature of COVID-19, there is much anticipation and need to understand what lasting effects this virus has on the body. This research is centered around just that, by exploring and showing what effect this virus may have on lungs. Because the effects of this virus may differ from other lung damage, it is even more important that the public is educated about the extensive damage caused by this virus in the human lungs. Understanding lung damage from COVID-19 may allow for patients to receive optimal treatment and thus reduce this damage. In this study I worked to process and analyze a rich dataset of 4D-CT images of COVID-19-infected lungs in two patients. I studied regions of interest in the lungs, including identifying and segmenting COVID-19 regions, lobes, and major airways of the lungs. I then translate stacks of these 2D data images into 3D parts that are then made into computer models in the 3D Slicer Chest Imaging Platform program. The theory in this work is that segmentation of 4D-CT images of the COVID-19-infected lungs can provide patient-specific insights into lung damage.

The results of this study show extensive damage in lungs resulting from COVID-19. The air volume, which is the volume of air the lung is able to take in, ground glass opacities (GGO) which are the lighter areas of the lung that show where damage is located in the lung, and consolidated areas, which show where the lung has filled with liquid instead of air, thus indicative of damage, prove this. It is also shown that patient-specific information can be clearly observed, because while these results are similar in that both patients have

extensive damage, they are also very specific to the individual. For example, the air volume of the right lower lobe in patient 1 was severely impacted while the right lower lobe in patient 2 has slightly higher numerical results and this is slightly reversed in the left lower lobes of both patients. When comparing these results to those of two other patients, studied by Shea Middleton, similar findings are proven, with extensive damage shown, and very patient specific results.

UP040

Assesment of Recycled and Manufactured Adsorptive Materials to Reduce Phosphorous Wastewater Loads

Deja Drummond

Mentor: Bell, Natasha Lynn

Elevated concentrations of phosphorous (P) and other nutrients common in wastewater treatment plant (WWTP) effluent have been shown to contribute to the proliferation of harmful algal blooms (HABs) which may lead to fish kills related to aquatic hypoxia. Increased understanding of the negative effects associated with elevated P concentrations have prompted more strict regulation of WWTP effluents in recent years. The use of low-cost and potentially regenerative phosphate sorption filters has the potential to sequester P from water and decrease P concentrations in WWTP effluent released to natural waters. This ongoing research focuses on determining the phosphate sorption capacity of expanded slate, recycled concrete, and expanded clay at the lab-scale under batch conditions. These materials, in addition to gravel as a control, are exposed to treated wastewater effluent containing varying added phosphate concentrations (0 to 1000 mg PO4-P/L). Samples are shaken at 150 rpm on an orbital shaker for 24 hours at room temperature. Preliminary results indicate that recycled concrete has the highest sorption capacity of the materials tested. Desorption capacities of these same materials will be investigated to determine the potential for P release under varying pH conditions. Plant availability of P adsorbed to these materials will also be measured to determine the potential for beneficial reuse of adsorbed P as a plant fertilizer. By determining the P sorption and desorption characteristics of these materials, insight can be gained regarding the feasibility of using P adsorbing filters as an add-on treatment technology to reduce P release from WWTPs.

UP041

Next Generation Balance Test for Vestibular Hypofunction

Avery Vose

Mentor: Lin, Chia-Cheng

Problem: Current methods of obtaining reliable head movement data in primary care settings and physical therapy clinics are prohibitivly expensive.

Significance: To significantly reduce the cost of current methods (~$400,000) of obtaining reliable head movement data in the primary care settings and physical therapy clinics would allow more patients to have access to important clinical tests. The project also promotes utilizing VR technology in clinical settings.

Solution: Create six tests using the Unity game engine, utilizing the HTC Vive headset to obtain reliable head tracking data of subjects and compare the data with current methods to determine the accuracy of the tests.

UP042

A comparative analysis of hearing levels between collegiate musicians; instrumentalists vs vocalists

Katja Beebe

Mentor: Driscoll, Virginia Darnell

Katja Beebe, Zach Palma, Guy Divon, Alejandra Ferretiz, Raley Pope, Rachel Vaughn, Emma Golomb, Kamryn Cox, Reagan Knox

Abstract: The purpose of this study was to examine the hearing levels of collegiate level musicians and how both instrumentalists and vocalists compare to one another. Participants in this study will be pulled from the East Carolina University School of Music. Participants were healthy individuals at least 18 years or older, and enrolled as a student in the school of music (undergrad or graduate degrees). Subjects completed a survey that asks specific information about their instrument/voice type, hearing health, use of protective

hearing devices, and more information about their regular noise level exposure. Participants then took two different tests to evaluate their hearing perception: a traditional audiogram and a test of extended high-frequencies. Data collection is ongoing and results will be ready to present by March 24th, 2022.

UP043

Comparing the hearing of college age muscians vs non-musicians.

Alejandra Ferretiz

Mentor: Driscoll, Virginia Darnell

Alejandra Ferretiz, Kamryn Cox, Katja Beebe, Raley Pope, Rachel Vaughn, Guy Divon, Emma Golomb, Zach Palma, Raegan Knox

Problem under investigation: Musicians are likely to have noise-induced hearing loss due to constant noise exposure in ensembles (Jansen et al, 2009). It is more apparent in musicians who play higher frequency instruments such as the violin (Di Stadio et al, 2018). Additionally, college students often experience temporary tinnitus after exposure to loud noises and are unaware of the importance of hearing protection (DelGiacco, 2015). These noise exposures may be included in loud environments such as concerts, bars, and even restaurants. Loud environments can also be a barrier to communication causing a person to raise their voice even at an arm”s length distance which can lead to hearing loss (Eichwald et al, 2022). The purpose of this study is to examine the difference of the traditional and extended high-frequency hearing between college age musicians and non-musicians, comparing hearing levels between left and right ears and investigating the effect of exposure on hearing and perceptual ability.

Participants and pertinent characteristics: Data collection is ongoing; however, subjects were healthy adults over the age of 18 years who were students at East Carolina University and members of the community. Thus, musicians and non-musicians were recruited for comparison and to delineate between consistent and types of musical exposure.

Data gathering procedures for quantitative and/or qualitative research: Participants completed a questionnaire that included previous musical experience, experience of tinnitus, and the use of hearing protection when performing and practicing. Psychometric data collection consisted of a traditional audiogram (250-8000 Hz) and a measure of extended high frequency testing evaluating frequencies from 8,000 to 20,000 Hz and presented at a level where 1000 Hz was soft, but audible.

Results: Data collection is still ongoing but will be completed by conference time.

Conclusion: This study hopefully will indicate dissimilarities between college-age musicians and their non-musician counterparts, which may help determine areas in which hearing loss can be prevented with appropriate interventions.

UP044

A Look Inside Different Cultures Through Art

Skyler Hall

Mentor: Weckesser, Gerald

Growing up, I have always been heavily influenced and involved in art. As I have gotten older and come by the chance to learn more about different cultures, I have become increasingly interested in how each culture is so unique and different from the rest. A big inspiration for this project is a trip that I took to Australia, where I got to see firsthand how art plays such a big role in cultural expression.

I started my first piece exploring Australian art forms, as that was my main inspiration. From there, I branched out to other countries and cultures that interest me. These are all cultures that I feel have an extreme connection to art and nature. Portraying this connection through each piece insights a sense of curiousity in the viewer and encourages the observer to develop an intuitive understanding of the culture depicted.

This project highlights different cultures and forms of expressive art around the world. Art is such a huge part of most cultures and tends to be overlooked in most instances. There is beauty within every person, piece fo art, and culture. My work encourages others to respect and appreciate other cultures. More importantly,

challenge themselves to find the beauty within differing beliefs and values of other cultures. How do these cultures differ from my own? Furthermore, what can I stand to learn from these different areas of the world? These are just a few questions that I am seeking answers to in my current projects.

UP045

Sculpting with Carbon Fiber: Waterfall

Jordan M Hock

Mentor: Jubran, Hanna

Carbon Fiber has become a miracle substance in the world of material science. Its resistance to corrosion, incredible tensile strength, and extreme light weight have made it a premium choice for structural engineering applications. As the cost of producing this premium material has declined, its use has become more widespread across multiple industries. Carbon fiber is now regularly used in the aerospace, automotive, and marine industries, and many more besides. Its use isn”t just limited to structure either; its presence is quickly becoming synonymous with performance and luxury. Its detailed texture and brilliant shining finish are aesthetically pleasing and often used as interior trim pieces in our vehicles. Due to the incredible mechanical properties, falling prices, widespread adoption, and strong aesthetic value of the material, it was decided that carbon fiber would be a suitable sculptural medium.

Most industrial applications for the use of carbon fiber involve mold-making processes, which ultimately limit the complexity of the forms that can be produced. For this reason, a different method was adopted, using an armature to map out the shape of the sculpture. This different methodology removes the limitations imposed by the mold-making process, allowing for more creative freedom.

The sculpture itself is approximately 7 feet tall and full of complex, compound curvature. It is made of aerospace grade carbon fiber sheet infused with a clear epoxy resin. The sculpture is intended to mimic the juxtaposition of laminar and turbulent fluid flow present in a waterfall.

UP046

A comparison of high-frequency hearing levels between formal and informal musicians

Raley Pope

Mentor: Driscoll, Virginia Darnell

Raley Pope, Ginny Driscoll, Katja Beebe, Alejandra Ferretiz, Kamryn Cox, Zach Palma, Guy Divon, Rachel Vaughn, Emma Golomb, Raegan Knox

Abstract: The purpose of this study was to investigate the differences in high-frequency hearing levels between formal and informal musicians. The subjects completed an online questionnaire that determined their musical experience. This information was used to group subjects into formal and informal musicians, respectively. Hearing levels were measured using conventional audiometry and high-frequency audiometry. Data collection is ongoing and clinical implications will be discussed.

Rationale: Long-term exposure to loud sounds puts musicians at risk of hearing loss (Pouryaghoub, Mehrdad, & Pourhosein, 2017). Hearing damage has been associated with both occupational and environmental exposure to music (Schink, Kreutz, Busch, Pigeot, & Ahrens, 2014). Although previous studies have been conducted regarding hearing damage in professional musicians (Pouryaghoub, Mehrdad, & Pourhosein, 2017; Schink, Kreutz, Busch, Pigeot, & Ahrens, 2014; Halevi-Katz, Yaakobi, & Putter-Katz, 2015) and high-frequency hearing loss among musicians (Liang, Earl, Thompson, Whitaker, Cahn, Xiang, & Zhang, 2016; Lüders, Gonçalves, Lacerda, Ribas, & Conto, 2014), minimal research has been collected regarding hearing damage and high-frequency hearing loss in informal musicians (Schmuziger, Patscheke, & Probst, 2006). Additional research is needed to explore the severity of hearing damage among both formal and informal musicians. The purpose of this study is to examine the differences in high-frequency hearing levels between formal and informal musicians. We hypothesize that formal musicians are more inclined to high-frequency hearing loss than informal musicians.

UP047

Gender Difference Between Music Majors on High-Frequency Hearing

Rachel Vaughn

Mentor: Driscoll, Virginia Darnell

Rachel Brooks Vaughn, Zach Palma, Guy Divon, Katja Beebe, Emma Golomb, Alejandra Ferretiz, Kamryn Cox, Raley Pope, Raegan Knox, Virginia Driscoll MT-BC

The purpose of this study is to investigate the impact of being a musician on high-frequency hearing loss, specifically if gender is a factor that plays in effect. Subjects were students who are currently working on a music major at East Carolina University. The subjects completed a questionnaire in which they reported gener, musical experience, etc., along with a measure of their typical hearing and extended high frequencies ranges. Data collection is ongoing. Music students have a higher rate of noise induced hearing loss that is around 44-50% higher than the general population and is around the same level of noise-induced hearing loss in industrial workers (Phillips et al, 2009). Significant gender differences have been found in distortion-product otoacoustic emissions for lower and higher frequencies (Dunckley, Dreisbach, 2004). Little research had been done on the gender difference in hearing in musicians. The purpose of this study is to examine if there is a gender difference in traditional and extended high-frequency hearing in musicians.

UP048

Exploring Musical Heritage: Composition and Performance of an Original Jazz Ballad

Josiah Wattenbarger

Mentor: Roberson, Evan Michael

Jazz music and its development is a significant staple in the history of American culture. Despite its decline in prevalence in modern popular culture, jazz remains an influence on music in many ways that often go unappreciated. In an effort to further explore this musical heritage through my Signature Honors Project, I composed an original jazz ballad over the course of my final two semesters at East Carolina University.

The process began with building upon the foundational knowledge required to compose a jazz ballad. I entered the project with some basic music composition experience from my 10 years prior as a musician, but this was by far the largest composing endeavor I have taken up and required further expanding of my knowledge on certain concepts. In collaboration with the Jazz ensemble at ECU, my mentors guided me through reviewing music composition fundamentals, learning the processes of using the music notation software, completing practice composition exercises, and exploring the history and styles of classic Jazz ballads. With this refined knowledge at hand, I then composed a rough draft of my ballad and collaborated with several musician peers in order to find the balances of harmony and instrumentation for my final product. This final composition will be performed and recorded at the ECU Jazz Ensemble B concert in April 2022. I aspire for this piece to be something that myself and my peers can appreciate as a tangible expression of human emotion through music as well as a preservation of jazz culture.

UP049

The Impact "Influencers" Have On People

Isabella Deatherage

Mentor: Thompson, Brittany Myles Wright

Social media has given rise to a new type of celebrity, commonly known as an “influencer.” An influencer in theory influences the opinions of others, but how much of an influence do they actually have? This study analyzes the true power over people”s opinions these micro-celebrities possess. Through a survey of 278 individuals, comments on posts, and looking at purchase trends it was determined the impact. The study found that people want to trust who they are buying from, and they feel a higher level of trust from these individuals. The findings reflect that people will change their opinions, purchase products, and listen to influencers.

UP050

Adverse Childhood Experiences and Reproductive Traumas of Infertility and Pregnancy Loss

Madison Berry

Mentor: Swift, Alison D

Co-Investigator: Madeline Fernandez

Adverse childhood experiences, or ACEs, are potentially traumatic events that occur in childhood. Women are more likely to experience multiple ACE events, and ACEs are linked to chronic health problems and pregnancy complications. To date, no reviews have been conducted to examine the associations between ACEs and infertility or pregnancy loss. Therefore, the purpose of this integrative review was to explore the relationships between ACEs and the reproductive traumas of infertility and pregnancy loss.

Methodology:

An integrative review was conducted using the Whittemore and Knafl (2005) framework and Covidence software for data management. Using specific keywords to search PubMed, SocINDEX, PsycINFO, and CINAHL databases, 638 articles were identified. After 113 duplicates were removed, 525 articles were screened for inclusion criteria. Four additional articles were discovered using citation searching, resulting in a total of 20 articles included in the review. A quality appraisal was performed by two team members independently. Relevant data was extracted into a matrix and analyzed using categories for comparisons and emerging themes.

Results:

Four articles examined the association between infertility and ACEs, and 16 articles examined the relationships between pregnancy loss and ACEs. Preliminary results strongly support an increased risk of pregnancy loss in women with a history of ACE exposure, while three of the 4 studies support an association between infertility and ACEs, especially with the ACE events of emotional abuse, neglect, and sexual abuse. Other themes found among those with ACE and reproductive traumas include health disparities, risk factors, stress appraisals, and “weathering” or allostatic load from life-course chronic stress, all which may explain the interaction between ACEs and the reproductive traumas of infertility and pregnancy loss.

Discussion:

Findings of this integrative review support an association between ACEs and the reproductive traumas of infertility and pregnancy loss, though additional research is needed to further explore the relationships with infertility, the specific type of ACE most likely to be associated with reproductive trauma, and biological changes that may occur as a result of ACEs that may lead to reproductive traumas.

UP051

Quantitative content analysis of diversity and representation in preventive health-related images for health education materials

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Mentor: Lee, Joseph G

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Ineffective health communication can drive health disparities and limit the effectiveness of interventions to reduce health disparities. Stock photo libraries are a critical tool for developers of patient education and intervention materials. It is not clear how well stock photo libraries represent communities bearing disproportionate burdens of disease. We conducted a search using five popular stock image libraries (Adobe Stock Images, Canva, Getty Images, Microsoft Office Image Library, and Pixabay) in November 2021 to evaluate diversity and representation in health-related stock photos. We searched for five key preventive health topics: healthy eating, exercising, smoking, vaccination, and pregnancy. The images (N=495) were coded for representation of perceived minoritized

racial/ethnic identity, skin color using the Massey-Martin Skin Color scale, markers of high socioeconomic status (SES), and access costs. We established inter-rater coding reliability. The representation of perceived minoritized subjects, darker skin color, and inclusion of markers of high SES varied greatly by the search term and database. After excluding images without people or with ambiguous representation, 51.5% of images across all databases depicted a person of a perceived minoritized racial/ethnic identity. Images with costs to use were significantly more likely to depict a person of minoritized racial/ethnic identity, depict darker skin colors, and significantly less likely to contain markers of high SES identity than non-paywalled images. We found it costs more to develop quality health education materials for minoritized populations and that do not represent high SES populations. This may hinder the development of effective communication interventions.

UP052

The Relationship between Speech Recognition in Noise Ability & Listening Effort

Ava Cunningham

Mentor: Vermiglio, Andrew J

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The goals of this study were to determine the relationships between speech recognition in noise (SRN) ability vs. perceived listening effort, and between perceived listening efforts across listening conditions. SRN ability was evaluated using the AzBio test. A seven-point scale was used to measure listening effort. No statistically significant relationships were found between AzBio scores vs. perceived listening effort for each masker condition. However, statistically significant relationships were found between listening effort ratings for five of the listening condition comparisons.

UP053

Electronic Cigarette Users" Harm Perceptions of Secondhand Exposure and Electronic Cigarette Use in Vehicles With Adults and Children

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Significance: Limited research has examined electronic cigarette (ECIG) secondhand aerosol (SHA) exposure. Initial research shows ECIG SHA exposure may be associated with negative health effects, but many ECIG users associate little harm with SHA exposure and may be more likely to engage in ECIG use in indoor settings, such as inside of vehicles. This study"s purpose was to examine the association between harm perceptions of ECIG SHA and ECIG use inside of vehicles behaviors and perceptions.

Methods: Current (past 30-day) adult ECIG users in the US (n=1002; mean age=32.8; 50.4% women) completed an online survey examining harm perceptions of ECIG SHA ("no harm", "little harm", "some harm", "a lot of harm"), opinions about acceptability of ECIG use inside of vehicles in the presence of others("always allowed" or "be allowed under some conditions", "never be allowed"), and ECIG use behaviors inside of vehicles ("always", "sometimes", "rarely", "never"). Descriptive statistics and chi-square tests were conducted to examine associations between variables.

Results: Most participants (78.3%) who owned a vehicle reported ECIG use inside their vehicle "almost always" or "sometimes." Participants perceived ECIG SHA exposure was associated with "little harm" (34.6%) or "some harm" (36.5%), and few (8.6%) associated "a lot

of harm." Over three-quarters (79.2%) reported ECIG use inside vehicles when adults were present and 36.6% reported ECIG use when children were present. Most (89.5%) stated that ECIG use should be allowed in the presence of other adults and 39.9% reported ECIG use should be allowed with children present. ECIG users who associated no or little harm with ECIG SHA exposure were more likely to report ECIG use inside of vehicles, ECIG use inside of vehicles when adults or children were present, and to perceive ECIG use inside of vehicles when adults or children were present was acceptable ($p < .05$).

Conclusion: In this study, lower harm perception of ECIG SHA exposure was associated with increased ECIG use inside of vehicles. Future research should assess the impact of increasing harm perceptions of SHA on indoor ECIG use behaviors.

UP054

Detection of SARS-CoV-2 in Dorms Through HVAC System

Lauren Johansen

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Marina Nichole Boatman

Lauren Johansen, Marina Boatman, Dr. Sinan Sousan, Dr. Ming Fan, Dr. Rachel Roper

As universities became more acclimated to the hardships of COVID-19, East Carolina University began to search for other preventative detection methods as the campus reopened for students. We implemented air sampling of the HVAC systems in campus dorms to determine if SARS-CoV-2 could be detected. We present findings here from the fall 2021 semester. Two large dormitories were tested during the four-month sampling period. Each dorm contained one button air sampler that measured over a 24-hour period before collection. In one of the experimental dorms, the AerosolSense sampler was deployed for 5 weeks before being transferred to the isolation dorm suite, containing students with confirmed COVID-19. The known COVID positive dorm was sampled using four different methods: Button Sampler, Filter Cassette, BioSampler, and AerosolSense sampler, with sampling times ranging from 30 minutes to 24-hours. We developed protocols for stabilizing and extracting the RNA and performed qRT-PCR analysis to detect the presence of the SARS-CoV-2 virus. In the two large experimental dorms, we detected 12 positives, 10 using Button Samplers out of 58 samples and 2 using the AerosolSense Sampler out of 10 samples. In the COVID isolation dorm, we detected 22 positive samples out of 137 samples. Of the 22 samples, 11 were retrieved from Button Samplers out of 74 samples, 4 from Filter Cassettes out of 25 samples, 6 from the BioSampler out of 25 samples, and 1 from the AerosolSense Sampler out of 11 samples. Out of 203 samples collected over the semester, 34 (16.7%) were positive for SARS-CoV-2 by qRT-PCR testing, however there were no confirmed COVID cases on many of those days so we would expect no detection. We have demonstrated that it is possible to detect the SARS-CoV-2 virus using air samplers in HVAC systems of shared living spaces, such as dormitories. However, we do not know the lower limit of detection. Further work will be needed to determine how virus detection in the air relates to disease transmission.

UP055

Exploring the Use of Heart Rate Variability in Coronavirus Disease 2019

Sarah March

Mentor: Bolin, Linda Prior

Sarah March, Dr. Linda Bolin, Dr. Nick Murray

Background:Heart rate variability (HRV) is a measure of an individual"s adaptability to stress. HRV may be a valuable prognostic tool for identifying and understanding Coronavirus Disease 2019 (COVID-19). The primary objective of this scoping review is to examine the current state of HRV research in relation to COVID-19. The secondary objective is to identify gaps in current research surrounding HRV and COVID-19.

Methods: In November of 2021, a scoping review was performed by using PubMed and the key phrase "HRV

and COVID-19". Articles were excluded for not meeting these criteria: (1) discuss heart rate variability, (2) link HRV with COVID-19, (3) in English, or (4) have the full text available through PubMed, Elsevier, or Mendeley.

Results:42 articles were collected, of which 16 met the inclusion criteria for relevance. Relevant articles were grouped into one of four categories: (1) using HRV as a Predictive Tool of the Physical Impacts of Transient COVID-19, (2) explaining COVID-19 "Long Haulers" through HRV and Autonomic Dysfunction, (3) using HRV to Recognize the Psychological Impacts of COVID-19, or (4) using HRV to Examine Psychophysiology in COVID-19 patients. While all 16 of these articles were published throughout 2020 and 2021, most of the data collection was completed in 2020. There was a lack of studies linking HRV to newer variants of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). Additionally, no pediatric studies were identified in this review.

Conclusion:Current research demonstrates the potential of HRV to mitigate the impacts of COVID-19 beyond predicting COVID-19 diagnosis and patient outcomes. HRV can also be used to monitor Healthcare Worker (HCW) burnout and guide HCWs in triaging and treating patients. Outside of a clinical environment, HRV allows for the remote monitoring of a large population"s health. Future research on pediatric patients and newer variants are warranted. Limitations in this review include using only one database (PubMed) and not following PRISMA-type methodology.

Up Next: In the Fall of 2020, a pilot study began at East Carolina University using wearable devices to remotely monitor the HRV of those with COVID-19 that are homebound. Data are still being collected to address gaps in current research.

UP056

JUUL Misleading Emissions Report

Ronald Mooring

Mentor: Sousan, Sinan

Sarah Elizabeth Fresquez

Ronald Edward Mooring, Sarah Elizabeth Fresquez, Dr. Sinan Sousan, Dr. Eric K. Soule, Dillon Streuber, Rola Salman, Soha Talih, Dr. Jack Pender

In laboratory settings, standard puffing protocols are used to examine the emissions from tobacco products. These protocols were put in place with standard cigarettes in mind. This presents a problem because many laboratories are using the puffing protocols that were created for standard cigarettes to examine emissions from electronic cigarettes. There is little research as to how electronic emissions are impacted by these standard puffing procedures. With this experiment, we analyzed the particulate matter concentrations generated from the popular electronic cigarette device JUUL to determine how these emissions are impacted by laboratory puffing procedures. This was done using four different puffing procedures to better simulate real-world use. We generated electronic cigarette aerosol in a 0.5 m3 chamber using a JUUL device. For each experiment, 10 three-second puffs were generated. In Experiment 1, the JUUL pod was connected to the device for all 10 puffs. For Experiment 2, the JUUL pod was removed and reinserted after the first five puffs. For Experiment 3, the JUUL pod was removed and reinserted after every two puffs. For Experiment 4, the JUUL pod was removed and reinserted after each puff. For all experiments, PM 2.5 was measured using an aerosol sensor. This behavior of removing and reinserting the JUUL pod was chosen because survey research and internet forums suggest that this is a common behavior among JUUL users. For experiment 1, mean real-time PM2.5 concentration was 65.06 µg/m3 (SD=99.53, Median=16.01). For experiment 2, mean real-time PM2.5 concentration was 375.50 µg/m3 (SD=346.45, Median=265.47). For experiment 3, mean real-time PM2.5 concentration was 501.94 µg/m3 (SD=450.00, Median=374.71). Lastly, for experiment 4, the mean

real-time PM2.5 concentration was 834.69 µg/m3 (SD=578.34, Median=725.34). These results demonstrate how the first puffs from a JUUL after a pod is inserted result in peak mean PM2.5 concentrations that drop until steadying at around the 5th puff. In all experiments, mean PM2.5 concentrations increased after a JUUL pod was inserted into the device. JUUL users who engage in this behavior of removing and reinserting their pod after puffs are exposing themselves and bystanders to increased levels of nicotine and other toxicants. Laboratory puff protocols need to be developed to better examine electronic cigarettes.

UP057

Describing behaviors of participants during a Virtual Dementia Tour TM: A secondary descriptive analysis

Anna Morgan

Mentor: Roberson, Donna W

Background: Incidence of dementia is rising, requiring need for prepared caregivers. The Virtual Dementia Tour TM (VDT) simulates multi-faceted changes dementia can cause for caregiver participants. To determine how VDT participants behaved during the experience, aim #1 was to tabulate observation data collected on participants during a VDT and aim #2 was to identify frequency of common behaviors. The research question was: What are the common actions and verbal expressions of participants during the Virtual Dementia Tour TM.

Methodology: During the VDT, participants are given a list of 5 tasks to complete but often engage in other behaviors as they navigate the experience. Following IRB approval, a secondary analysis of observation data collected at previous VDT events was performed using 50 randomly selected observation forms. The student researcher tabulated number of tasks completed, summarized unexpected behaviors and, following review by the faculty mentor, formed themes and descriptors. Decisions about how to count a behavior or to award partial credit for a task was discussed as a team. To improve validity and reliability, decisions were recorded in a journal and reviewed at each analysis session. The team came to a consensus on counting rules and analysis.

Results: Mean, median and mode for completed tasks was calculated. Common themes and similarities between the participants were identified. Overall, participants did not complete all 5 tasks and demonstrated surprising common “extra” behaviors during their VDT. Talking to oneself, shadowing others, and performing tasks not on the list were most common.

Discussion: These results show that participants found simple daily tasks nearly impossible to complete. This analysis showed caregivers expressed frustration and an awareness that dementia creates more than memory issues. Given the results, we believe tools like the VDTTM can promote understanding and empathy for the person living with dementia among caregivers.

UP058

The Relationships Among Nursing Students’ Stress, Post-Traumatic Stress Disorder, and Caring Behaviors During the COVID-19 Pandemic

Morgan Shepherd

Mentor: Corbett, Robin

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Background: Among the challenges that higher education faces, students” mental health issues have become prominent. This study aimed to examine nursing students” current state of mental health, including stress and post-traumatic stress disorder (PTSD), and the relationships among students” caring behaviors, stress, and PTSD.

Methods: This is a cross-sectional descriptive survey study conducted in the United States during the COVID-19 pandemic. Instruments included the Perceived Stress Scale (PSS), Caring Behavior Inventory student version, the PTSD Checklist-5, and a demographic survey,

including five one-question items about students" perceptions of satisfaction of instructor teaching, impact of faculty caring on confidence level in learning, faculty support, students' self-rated stress, and impact of faculty caring on the ability to practice with empathy.

Results: Ninety-five students participated in the study. Over 90% of the students reported moderate to high levels of stress. Forty-three students (45.3%) scored over 31 points on the PTSD checklist, a cutoff value indicating PTSD symptoms. Students' stress scores were positively correlated with the PTSD checklist scores but were not significantly associated with students' caring behaviors. Students' perceptions of faculty support had significant and negative correlations with students" PSS and PTSD checklist.

Conclusions: Most students reported moderate-to-high-level stress, which was positively associated with PTSD symptoms. There were no significant correlations among students' stress, PTSD, and caring behaviors. Students" perceptions of faculty support may offset students' stress and PTSD symptoms.

UP059

The Effect of Demographic Variables and Risk Factors on HIV Outcomes: An Analysis

Aparna Tharmar

Mentor: Kipp, Aaron Marshall

HIV is still a global issue particularly among young adolescents. They carry approximately 26% of the burden of the disease. Ethiopia in particular has 1 million people who have HIV. The purpose of this analysis is to determine the effect of socio-demographic and behavioral risk factors on HIV outcomes in adolescents in Ethiopia among individuals aged 15-24. The research question of "what are contributing factors to HIV infection in 15-24 year olds in Ethiopia?" is answered by the use of the Population-Based HIV Impact Assessment (PHIA) Project public dataset. I will use the PHIA Ethiopia data use manual, the adolescent questionnaire consisting of the child interview data set, and Statistical Analysis System (SAS) coding. In order to identify risk factors that have the most robust point estimate effect on HIV outcomes among adolescents in Ethiopia, this study will analyze datasets compiled by PHIA that were gathered to guide the global HIV response. PHIA is a household based cross-sectional survey on HIV prevalence that was implemented in two waves, one in 2015 and the other in 2017, to detect trends in population-based data. This project consisted of two comprehensive questionnaires that were distributed to each household. Bivariate analysis will be conducted to assess if there is a statistically significant association with each predictor and the outcome of interest. Risk factors included as potential correlates of HIV infection in this population will include certain risk behaviors such as sexual debut, substance use, monogamy, unprotected sex, gender violence, and knowledge of HIV, with respect to region and gender. The correlation between each individual risk factor and the outcome of interest, HIV infection, will be determined through characterizing frequencies of demographic variables and risk behaviors. Using a 95% confidence interval, the statistical tests of chi-square and t-tests will be performed to identify the p-values respective to each factor. All correlations will then be combined and coded into one multivariable model to visualize if the associations persist with the outcome, adjusting for various confounding variables such as age, gender, and socioeconomic status. The potential confounders listed may distort the relationship between the correlates and the outcome, and thus will be adjusted to assess the causal relationship between the correlates and HIV outcome. All analyses are conducted using SAS. Results are still preliminary.

UP060

Association between electronic cigarette use behaviors inside of vehicles, age, and harm perceptions of secondhand electronic cigarette exposure

Alex Tiet

Mentor: Soule, Eric Kendall

Alex Minh Tiet, Anish Gogineni, Emily Gold, Sinan Sousan, Jack Pender, Eric Soule

Significance: With the increase of electronic cigarette (ECIG) use there has also been an increase of ECIG use in indoor spaces, including vehicles, where others can get secondhand exposures from ECIGs. Research has

not examined how harm perceptions and ECIG use behaviors inside of vehicles vary by age. This study examined ECIG use inside of vehicles behaviors and harm perceptions and the association with age.

Methods: A US sample of adult current (past 30-day) ECIG users (n=1002; mean age=32.8) recruited through Qualtrics Panels completed an online survey in 2020. Participants were asked about demographics, tobacco product use, and harm perceptions of secondhand ECIG use exposure. Age was coded into 4 bins (18-24, 25-44, 45-64, 65+). To assess ECIG use inside of vehicles, participants were asked "... how often do you vape inside of [your] vehicle". Harm perceptions of secondhand ECIG aerosol exposure were assessed by asking 'do you think breathing the vapor from others" vapes/e-cigarettes causes...". Descriptive statistics and chi-square tests were conducted to examine associations.

Results: Of those who owned a vehicle (n=919), 92.1% reported vaping inside their vehicle. Age was associated with frequency of ECIG use inside of vehicles (p=0.011) and harm perceptions of secondhand ECIG exposure (p <0.001). A greater percentage of 25-44 YOs (48.9%) reported "almost always" vaping inside of their vehicles compared to 41.2% of 18-24 YOs. Conversely, more 18-24 YOs (10.7%) reported never vaping inside their vehicles compared to 25-44 YOs (5.6%). Among 18-24 YOs, 10.4% reported "a lot of harm" from secondhand ECIG exposure, while only 5.3% of 65+ YOs did. Additionally, percentage of participants who reported "little to no harm" from secondhand ECIG exposure increased with age group, with 44.5%, 59.5%, 61.8%, and 78.9% reporting little to no harm among 18-24 YOs, 25-44 YOs, 45-64 YOs, and 65+ YOs, respectively.

Conclusion: While ECIG use is most prevalent among youth and young adults, this study suggests that middle-aged and older adults may have lower harm perceptions of secondhand ECIG exposure than younger adults and are more likely to vape inside of vehicles.

UP061

Adaptation of a modified Diet Quality Index to quantify healthfulness of food-related toy sets

Rachel Watkins

Mentor: Lazorick, Suzanne

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The objective of this cross-sectional study was to examine the construct validity of an adapted modified Diet Quality Index (aDQI) as a measure of the healthfulness of food-related toy sets for young children (3-8 years). A standardized online search was used to identify toy sets (n = 50) from ten retailers. An aDQI score (aDQI score, range 0 - 50) was determined for each toy set, mean (SD) = 28.7 (6.1). Regression analyses demonstrated a positive association between aDQI score and percentage of dairy, refined grains, protein, vegetables, and fruit and inverse association with percentage of desserts, sugar-sweetened beverages, and total number of servings. Sets contained more protein and fewer fruits than recommended. The aDQI score demonstrates construct validity to objectively assess the healthfulness of food-related toy sets. There is opportunity for toy manufacturers to make changes to improve the healthfulness in toy sets for young children, and future research can explore the impact of food-related toy sets on nutrition behaviors.

UP062

Impact of Covid-19 on Animal Assisted Therapy in Pediatric Oncology

Savanna Williams

Mentor: Sartore, Melanie L

Animal assisted therapy (AAT) has been shown to have a positive impact on the pediatric oncology population by lowering stress levels of patients and encouraging a positive treatment perspective (Uglow, 2019). Child life specialists champion animal assisted therapy and believe that it may contribute to decreased pain during treatments (Doobrow, 2016). (AAT) has also been thought to aid in the psychosocial health of pediatric oncology patients (Kvistad, 2016). Though there is not a significant risk of pathogen transmission from therapy animals to patients (Dalton et al, 2020) including transmission of the Covid-19 virus (Almendros, 2020) precautionary measures were taken to protect the immunocompromised community. It is currently unknown the impact that widespread procedural changes had on the practice of animal assisted therapy. It is important to understand the current conditions surrounding animal assisted therapy in order to better provide support services to patients undergoing treatment.

The study will highlight the opinions of child life specialists on whether AAT is still viable treatment option for immunocompromised patients, and if the added stress of the pandemic puts patients at a higher need for stress reducing therapies such as AAT.

UP063

Loneliness in the Adult Population

Avery Wilson

Mentor: Bowman, Josie Martin

Background: The older adult population is currently facing hardships with increasing rates of loneliness and social isolation. COVID-19 is a large factor in these increasing rates, due to the fact nursing homes, and other elder's facilities are following strict guidelines for health and safety. By experiencing loneliness, older adult's health is negatively affected both physically and mentally. Methodology: Through the use of an integrative review, online scholarly articles were found in relation to the topic of interest. Articles focused on the topics of older adult loneliness, technology's relation to loneliness, and nursing homes. Evaluation and analysis of relevant articles allowed for the relation of technology and reducing effects of loneliness to be evident. Results: Through numerous research and scholarly journals it is proven that technology can reduce the levels of loneliness in people. There are many factors to loneliness, as it effects ones emotional and physical wellbeing. Technology provide the opportunity to allow social interaction even during pandemic isolations. One factor that needs to be further considered is the cost, and complexity of technology for older adults. There ultimately are resources available to diminish this problem, however, it needs to be determined how to most effectively do so. Discussion: This review of literature allows for the gaps between loneliness and older adults to be visible. Further suggestions can be made in order to benefit the population of interest. Additionally, technology can be integrated to older adults to identify if it has the same effects on loneliness as previously found.

UP064

Transgender-Focused Clothing Drive

Payne Mansfield

Mentor: Rasdorf, Mark Edward

Created for a Senior Honors Presentation, this event was held on March 31st 2022 with the Dr. Jesse Peel LGBTQ Center at East Carolina's Main Campus, specifically after the Transgender Day of Visibility luncheon. This drive was held emphasizing the transgender and non-binary communities of ECU, and giving students the opportunity to obtain clothing that allows for the individual to align more easily with their preferred form of presentation. All clothes left over from the event afterwards are to be donated in hopes of being able to support the LGBTQ community in further areas (current donation place is planned to be the LGBTQ Center of Raleigh). More details are to come and a full presentation will be prepared for RCAW.

UP065

Patriarchy & Oppression: An Expression of Religion

Mikenna Morrison

Mentor: Maher, Derek F

Ecofeminism is a modern, yet arguably underapplied feminist viewpoint that challenges society to examine the underlying values that lead to similar results of disempowerment and humiliation for different groups of people. While one of the main goals of Ecofeminism is to fight for women"s and earth"s rights simultaneously, gender and the environment are not the only categories the movement considers. A primary perspective of Ecofeminism asserts that individuals may not be reduced to one characteristic at a time when considering the impacts of societal oppression on that individual. In other words, to deeply understand the unique experience of oppression an individual faces, one must consider the intersectionality among every label placed on them by society— such as race, gender, and socioeconomic class. Ecofeminism argues that these different labels each carry levels of either power or disadvantage, that amalgamate to form varying results of discrimination. Not only does Ecofeminism state that these categorizations overlap, but that the root of all "-isms" (racism, sexism, classism) is the value system created and upheld by patriarchal society and the male domination it allows. This link being established opens up the understanding of, and response to, oppression and discrimination. This paper demonstrates that patriarchal society, such as that with which the United States is familiar, is an expression of religious power structures. Therefore, religion can be labeled a generator of the values and conditions that have led, and continue to lead, to the mistreatment of all of society"s oppressed. This paper uses primary religious texts, historical and modern societal and political news, as well as the main perspectives of Ecofeminism, to argue that society cannot advance if it continues to remain hidden behind the wrongly perceived "moral perfection" of religion.

UP066

UterUS: Changing the Perception of Menstrual Health on College Campuses

Imani Riddick-Cherry

Mentor: Das, Bhibha Mayee, Carawein, Chad

Leah Beth Warren

UterUs is a group of women dedicated to bringing sustainable, and reusable menstrual hygiene products to both the Pitt County and ECU communities. We believe advocating for reusable menstrual products can empower menstruators to explore alternative options and change how future generations think about menstrual hygiene.

DotCup offers a "buy-one-give-one" promotion, meaning for every cup purchased, one cup is donated to a community in need. DotCup's CEO, Betsy Drach, has promised us that they would give us the cups to donate to local shelters and organizations who might need them. We believe that menstrual cups could be cost effective in the long-run, ensure that students have the coverage they need, and change the mentality of alternative menstrual products in the future.

In the Spring of 2021, UterUs with the help of the Honors College, raised almost $400 to purchase 80 Dotcups at a discounted rate for our first round of our giveaway cycle. In May we fulfilled our goal of reaching 40+ students on campus and providing them with a free DotCup and access to education on its use and benefits to themselves and our environment. In the Fall of 2021, because of our success in the spring, almost 40 Dot Cups were donated back to the Pitt community at Joy's Soup Kitchen in Greenville, NC. Not only were we able to reach out to the individuals who enjoy meals cooked by the staff at Joy's Kitchen, we observed the need within our community for safer menstrual products and access to proper education on women's reproductive health. The owner of Joy's Soup Kitchen is also working with UterUs to set up classes, taught by our members with information facilitated by DotCup and the Women and Gender Office, on safe menstrual and vaginal products for women in the community to use. We are going to continue to search for funding and people willing to try a menstrual cup in our community to allow us to keep donating cups, holding orientations, and creating a community of period positive individuals for years to come!

Given Pitt County's 24.5% poverty rate compared to North Carolina's 16.8%, we believe that the community could have a great need for these cups. We have received $2,500 in funding and are excited to use these funds, awarded to us as one of the 2021 RCAW winners, to take UterUs to the next level in women's health activism! We are considering reaching out to expand our audience and work with other companies such as sustainable period panites, reusable pads, and more.

UP067

Unveiling Meaning: The Pitt County Confederate Soldiers' Monument and Lost Cause Sentiment

Justin Mullis

Mentor: Prokopowicz, Gerald J

In recent years, the meanings of Confederate monuments have become a topic of public debate. Some argue that Confederate monuments are simply memorials for fallen Confederate soldiers and thus stand as reverent commemorations of Southern ancestors. Others argue that these monuments, produced by a post-war Southern propaganda effort, stand as relics of the Jim Crow era and are thus hateful pieces of cultural geography. This case study of the Pitt County Confederate Soldiers" Memorial Monument, which stood in Greenville, NC from 1914 until 2020, attempts to define the meaning of the monument through an analysis of its unveiling ceremony. Sentiments expressed and ritualistic acts performed at unveiling ceremonies can provide evidence of the motives and intentions of the monuments" creators. Through an analysis of the unveiling ceremony, this researcher argues that the Pitt County monument was intended to promote five central tenets of the "Lost Cause" ideology: glorification and romanticization of the Confederacy, white supremacy, male dominance of political and cultural life, preeminence of Southern Christianity, and generational transference of the four previous ideas.

UP068

Computational Study of the Performance of an Oscillating Surge Wave Energy Converter under Different Ocean Wave Conditions

Joseph Dickerson

Mentor: Abdel-Salam, Tarek M

Ocean waves offer gigantic energy potential and broad opportunities for clean electrical power generation. Compared to solar and wind energy, waves are a more predictable resource with a higher energy density. It is estimated that over one third of the electricity used in the United States could be drawn from the ocean. This research aims to investigate the effects of variable densities and wave conditions on the wave energy converters (WEC) used to harvest the ocean"s energy.

The finite volume computational fluid dynamics code ANSYS Fluent is used as the main computational platform in this study. Mass properties of each WEC geometry are obtained by modeling the WEC in Solidworks. A two-dimensional wave tank is simulated using the Navier-Stokes equation for incompressible fluids and the volume of fluid method. The volume of fluid method is used to model the free surface between the two phases simulated – water and air. A hinged-paddle type wave maker modeled after the one housed at ECU"s Coastal Studies Institute is simulated using dynamic mesh technology in this study. ANSYS is used to produce animations of the WEC reacting to incoming waves. The WEC"s hydrodynamic and kinematic force data will be post-processed and analyzed in AQWA. These data and animations will be used to optimize the WEC design and provide guidelines for the ideal operating conditions of the WEC system.

This research is part of a larger project that aims to develop a low-cost energy-efficient water desalination system that is integrated with renewable resources (wave and solar) and can be used in shallow waters and produce zero brine waste discharge (salt crystal as output) in a supercritical water system and recycle the energy in a supercritical Brayton cycle. The results of this study will be integrated with the work of other researchers on the project.

UP069

Greening of Industries in North Carolina using Pollution Prevention Techniques

Alexis Ferro

Mentor: Abdel-Salam, Tarek M

Kenneth Randall Weddle

As consequences of climate change and global warming become more evident, the United States has put an emphasis on practicing pollution prevention techniques in the manufacturing industry. Pollution prevention (P2) is any practice that reduces, eliminates, or prevents pollution at its source. Reducing the amount of pollution produced means less waste to control, treat, or dispose of. Less pollution means less hazards posed to public health and the environment. This study presents results from an applied research project funded by the environmental Protection Agency and managed by the ECU Center for Sustainable energy and Environmental Engineering (CSE3). Through this project CSE3 provided technical on-site assistance to manufacturing facilities in NC with a focus on 1) Food and beverage, 2) Metal fabrication, 3) Automotive and 4) Chemical industries. This assistance comes in the form of providing energy, water and lean manufacturing diagnostic assessments. In addition, the project targeted major energy consuming units that include industrial boilers and steam systems, compressed air systems, furnaces, and refrigeration systems. Key results and assessment recommendations will be included in the presentation.

UP070

Edible Landscape Initiative

Mauzy, Heather

*Mentor: Weckesser, Gerald*Heather Mauzy, Jonathan Hurst, Ethan Patel, Jacob Coman, Grace Harper

Climate change is a wicked problem that is faced by every person on earth. Whether this impact comes in the form of food scarcity, weather changes, disease, or a destruction of homes and habitats makes no difference. While the climate does go through a series of changes and rotations, the changes that we are experiencing now are exponentially higher and thus more dangerous. Climate change has been fueled by an excess use in fossil fuels, an excessive amount of deforestation, and an excessive attitude of uncaring within large companies and governments that have the ability and power to create real change. This problem has only grown in the past years and will continue to grow unless a change is made within each citizen of the world. The Edible Landscape Initiative began as a group of honors college freshmen. Our passion for the environment brought us together to make an impact. The goal: to create an orchard to bear fruit for the community, to promote an ecocentric worldview, and spread love of the environment across college campuses. By giving others the ability to invest in the environment through the establishment of orchards, we ensure future generations have effortless access, and the opportunity to cultivate a love for the natural world.

The Edible Landscape Initiative group has procured land, developed plans for the orchard (fruit trees, bushes, and pollinator/herb garden), gained necessary university approvals, and established ties with university communities to create a sustainability plan. Through crowdfunding the students raised approximately seven thousand dollars, developed service opportunities, and negotiated purchase of all plants, soil, and tools (planted on April 24, 2021.) The success of this project stands as evidence that not only can students make a difference on their physical campus, but also on the mindset of those around them.

In conclusion, the destruction that climate change causes will not be fixed with one change, but instead a change of mindset within a community is needed. One small orchard within a single community can help to inspire and grow an ecocentric mindset within areas around the country and around the world. The Edible Landscape Initiative actively works to create a change within the world by creating a change within the minds of students who will go on to positively change the world.

UP071

Numerical Analysis of Oscillating Wave Surge Converters Under Extreme Sea Conditions

Hunter Pigg

Mentor: Abdel-Salam, Tarek M

Sea water desalination is small but growing part of the global water industry. It is an important process to meet the increasing demand for fresh water. In the USA, the existing seawater reverse-osmosis (RO) market is at a capacity of 500,000 cubic meters per day translating to $65 million per year in electricity consumption. The use of renewable energy can help to mitigate the high cost of the process. Ocean energy is a promising source of renewable energy, with an estimated potential of approximately 337 GW worldwide. Reducing the cost of wave energy converters (WEC) is key for the advancement of the technology. One of the biggest cost reduction potentials has been associated with the device structure. WEC structures must be designed to survive extreme ocean conditions. In this research, two-dimensional computational fluid dynamic (CFD) analyses are conducted to study the performance of bottom-hinged oscillating wave surge converters (OWSC) under extreme wave conditions. This type of WEC is selected because it is suitable for the direct pressurization of water for desalination. The CFD analysis were performed with a finite volume code. The flow is simulated as unsteady with 0.01s time step using the volume of fluid method. Unstructured dynamic mesh is used in all cases. Different WEC geometries were simulated with multiple flaps. Results were obtained with a scaled down model of the WEC to allow for comparisons with future experimental results. Results were obtained for a range of different conditions and different flap openings.

UP072

Aging of Adult Southern Flounder (Paralicthys lethostigma) with Otoliths from North Carolina Estuaries

Derek Aceituno

Mentor: Asch, Rebecca G

Derek Aceituno, Justin Mitchell, and Rebecca Asch

The relationship between age and size in fishes can vary due to many factors. With many marine species, biotic and abiotic conditions can affect fish growth and size-at-age. These conditions could be based on temperature, salinity, pH, oxygen concentration, competition, and prey availability. To accurately determine fish age, hard parts of marine organisms reveal dynamics of somatic fish growth. The hard part examined in this study are otoliths. For this study, the question we are answering is: Does otolith diameter provide precise measurement of age compared to fish size? Located in the head of fish underneath the brain, otoliths are described as the inner ear of fish and are calcium carbonate structures. Since otoliths first develop when fish are larvae and often grow continuously throughout a fish”s life, they are used for aging. The Southern Flounder (Paralichthys lethostigma) found in the Western Atlantic Ocean, from North Carolina to the Gulf of Mexico, will be examined due to its abundance in North Carolina. For this study, samples were obtained from the Pamlico, Albemarle, and Core Sounds. Both sagittal otolith (left and right) are being extracted from Southern Flounder, so that accurate measurement of aging can be conducted. Size increments of fish and otoliths have been calculated for each sample. Aging of otoliths is conducted by analyzing each ring from the core to the edge of the otolith. Otoliths are cut to determine specific properties inside of otoliths. For this experiment, we believe fish age will be precisely estimated through sagittal otolith diameter than fish size due to aquatic conditions. This study will be beneficial for determining fish age for marine species, which is a piece of information included in stock assessments used to optimize the amount of catch that a fish stock can sustainably withstand.

UP073

Population Characteristics of Alewife Spawning in Lake Mattamuskeet, 2015-2016

Cooper Butts

Mentor: Rulifson, Roger

Lake Mattamuskeet is situated in the federally owned Mattamuskeet National Wildlife Refuge in Hyde County, North Carolina. To prevent oceanic saltwater from entering the lake, water control structures have been placed in all four of the man-made canals. These canals allow for the movement of many aquatic species including the anadromous Alewife Alosa pseudoharengus. Populations of once abundant river herring have declined to all-time lows, mainly due to habitat loss and overfishing. The sudden and continued population decline has caused most US coastal states to impose strict harvest limits in hopes of population recovery. The Lake Mattamuskeet Alewife population is limited by poor lake access through the water control structures to the spawning grounds during spring. There are currently two designs of flapgates being used to control water passage through the Waupoppin Canal. One design includes a top-hinged gate, while the other features a side-hinged gate. The objective of my study was to describe the length, weight, sex ratio and gonadosomatic index of Alewife passing through the two gate designs in 2015 and 2016, to determine whether one gate design was more efficient in Alewife passage. It was found that the side-hinged design allowed for a more efficient and varied passage of Alewife.

UP074

Investigating the causes of hatching failure of Eastern Bluebird eggs

Hannah Costa

Mentor: McRae, Susan B

Eastern Bluebirds studied for 12 years at ECU"s West Research Campus have shown declines in reproductive success via hatching failure in recent years. The purpose of our research is to determine the underlying cause. In 2021, hatching failure, defined as having 2 or more eggs in the same clutch fail to hatch, occurred in 11 of 45 nests. Examining 25 eggs from xx nests that failed to hatch revealed that 13 had partially developed embryos. We developed 2 hypotheses for hatching failure. First, since some birds hatched on site are recruited as breeders, there may be elevated levels of breeder relatedness, and inbreeding depression could explain embryo mortality. Among 26 breeding pairs in 2021, 5 males and 5 females hatched on site, but no incestuous matings were detected. However, hatching failure occurred significantly more often at nests tended by philopatric males (Fisher"s exact $p = 0.009$). Second, high seasonal temperatures in nest boxes during summer may have caused developmental failure. In support of this hypothesis, hatching failure affected mostly later clutches laid in June and July. To investigate the possibility that the eggs that did not survive were more sensitive to high temperatures, we will investigate sequence variation in heat shock proteins (HSPs). HSPs are molecular chaperones that become overexpressed in response to stress such as high temperatures. We will amplify and sequence segments of the Hsp60, Hsp70, and Hsp90 genes to look for sequence differences and differences in methylation status by comparing failed embryo samples to surviving chicks. We will extract DNA from partially developed embryos collected from unhatched eggs and from blood samples collected from siblings in the same nests that survived and successful nests. Finding alleles corresponding to survival differences would strengthen the link between heat stress and hatching failure. Sequencing these genes is a step toward looking at possible modifiers of gene expression such as DNA methylation (possibly mediated through the philopatric paternal lines). This would be

among the first studies to investigate the role of HSPs in a wild songbird.

UP075

Estimating Spawning Times of North Carolina Paralichthys lethostigma

Julie Davis

Mentor: Asch, Rebecca G

Southern flounder (Paralichthys lethostigma) range across the US South Atlantic coastline from Florida to North Carolina. Southern flounder are among some of the most valuable North Carolina fishes, both commercially and recreationally, generating billions of dollars in revenue. The population of southern flounder has been decreasing since the 1970”s and protection measures, such as harvest quotas and size limits, have not helped the population recover with any significance. Fisheries managers would benefit from a better understanding of southern flounder spawning biology, including where and when this species spawns. This project will evaluate the abundance and size of larval flounders obtained through the Bridgenet ichthyoplankton monitoring program in Beaufort, North Carolina to estimate the time that these flounder spawn. Flounder larvae will be sorted from weekly collected samples, identified as southern flounder using morphological characteristics, and will be measured for total length (mm). It is hypothesized that the greatest larval abundance will occur in January, corresponding to the estimated adult spawning time, and average larval size will increase as the season progresses as older larvae are washed into estuaries. Understanding southern flounder life histories could aid fisheries managers by improving stock assessments and protective measures, aiding recovery efforts.

UP076

The shear viscosity of quark-gluon plasma in full equilibrium

Jennifer Fulcher

Mentor: Lin, Ziwei

Jennifer Fulcher, Dr. Zi-Wei Lin, Noah MacKay

Quarks and gluons in the quark-gluon plasma (QGP) can be studied with high-energy heavy-ion collisions, such as Au+Au and Pb+Pb collisions. This plasma created in the collision zone has extremely high temperatures and densities, where the shear viscosity is an important property of the QGP. A study from 2012 examines two analytical methods for obtaining the shear viscosity of a QGP in full equilibrium under both isotropic and forward-angle scatterings [1]: a modified relaxation-time approximation method and the Chapman-Enskog (CE) method, the latter proving to be accurate for calculating the viscosity. We have found and corrected a typo in the 2012 study”s equations for viscosity. We then compare the CE method with the recent numerical results from a parton cascade [2].

[1] S. Plumari, A. Puglisi, F. Scardina, and V. Greco. Shear Viscosity of a strongly interacting system: Green-Kubo versus Chapman-Enskog and Relaxation Time Approximations. Phys.Rev.C 86 054902 (2012).

[2] X.L. Zhao, G. L. Ma, Y.G. Ma, and Z.W. Lin. Validation and improvement of the ZPC parton cascade inside a box. Phys.Rev.C 102 024904 (2020).

UP077

Environmental and Sediment Microbiome Effects on Salt Marsh Cordgrass Restoration Efforts

Surinder Gill

Mentor: Peralta, Ariane Legaspi

Surinder Kaur Gill, Rachel Gittman, Ariane L. Peralta, Department of Biology, East Carolina University

Coastal marshes provide important ecosystem functions such as contaminant processing, storm surge protection, and provide habitat to a number of key species. However, rises in sea-level and coastal development are responsible for increased coastal marsh losses worldwide. Therefore, successful restoration efforts require strategies that account for establishment and productivity of the marsh cordgrass, Spartina alterniflora. In addition, sediment environmental conditions, microbiome composition, and S. alterniflora growth all play a vital role in the restoration and maintenance of coastal marshes. However, the extent that the wetland sediment microbiome and salinity exposure of seedlings affects the productivity of transplanted S. alterniflora used for marsh restoration efforts is unknown. This project examines the role that the sediment microbiome plays in S. alterniflora establishment. We hypothesize that salinity stress can limit S. alterniflora establishment and productivity, but priming seedlings with microbiome additions and saline conditions can buffer against salinity stress effects. We test this hypothesis by examining how seed source (high or low wave energy sites), salinity (0 PSU, 35 PSU), and the addition of microbes (+microbes, no microbes) affect S. alterniflora growth. This work contributes to a larger marsh and oyster reef restoration investigation in Beaufort, North Carolina. This ongoing work proposes that the exposure of seedlings to realistic marsh conditions can influence the growth and establishment of S. alterniflora in the marsh restoration site.

UP078

Investigation of Putative Copper Chaperone and Its Role in Producing an Unusual Plant Lipid

Rebekah B. Gorman

Mentor: Horn, Patrick Jacob

Rebekah Brooke Gorman

Copper (Cu) is a metal cofactor of several enzymes including plastocyanin, a protein required for photosynthesis, making it essential for the proper functioning chloroplasts of plants. Therefore, if a plant is under environmental conditions where there is a deficiency in supply of Cu and delivery to the chloroplast, then these enzymes will not function properly. Conversely when there is too much Cu present, Cu could possibly replace other metals that require for other key enzymes resulting in Cu toxicity. My project uses the model plant organism Arabidopsis thaliana, which has an extensive mutant collection. We identified a gene (designated CCS-like) annotated as a Cu chaperone (i.e., delivers Cu to targeted proteins) but with no characterized function. Surprisingly, mutants in CCS-like show an altered leaf lipid composition, i.e., reduced 16:1trans fatty acid that is specific to the photosynthetic membrane. This led us to hypothesize that CCS-like might be involved in 16:1t production. The enzyme for 16:1t production (FAD4) uses an iron cofactor and there is no known direct connection between Cu and FAD4. We have multiple mutant alleles within this CCS-like gene of which some, but not all, alleles show the reduced 16:1 phenotype. In addition, we have acquired additional mutants in pathways for Cu transport to and within the chloroplast. I will present results characterizing the molecular genotype and lipid composition of these mutant strains. These results will start to clarify the biochemical relationship between of Cu and FAD4-mediated 16:1trans production.

UP079

Examining Parasite Escape in European Green Crabs (Carcinus maenas) in Invasive North American Populations

Madison Hill

Mentor: Blakeslee, April Monica Houghton

Many introduced species are successful in new regions, even without prior history. One possible reason is that introduced species may leave behind natural enemies such as parasites upon invasion, providing them with a potential edge over native species in these areas. However, time since introduction acts as a contributing factor, with historical invasions showing greater parasite diversity than newer invasions. This is likely attributed to an increase in parasites transferred to a region over time and/or the acquisition of new parasites in an introduced host. The effect of time since introduction was examined on macroparasite diversity in the European green crab (Carcinus maenas), a globally invasive crab species. On the eastern coast of North America, C. maenas invaded over 200 years ago, while it was only introduced ~30 years ago on the western coast. Parasite prevalence, richness, and intensity were examined in multiple populations of the crab from its native range in Europe, its historical invasive range in eastern North America, and its contemporary invasive range in western North America. A higher parasite richness and intensity in Europe was observed compared to eastern North America, but prevalence was similar between the two regions. In contrast, there were no observed parasites found in western North America, supporting the idea that C. maenas has escaped all of its native parasites in its introduced range after being established for only a few decades. This study demonstrates the strong correlation that time since introduction and geography can have on parasite diversity in introduced hosts.

UP080

Applying a new method for stickleback color pattern analysis with preliminary results from Apeltes quadracus

Kule Ifill

Mentor: McKinnon, Jeffrey

Rachel Watkins

Liliyana Weaver

Animal coloration fulfills a variety of functions, from attracting mates to reducing conspicuousness to predators or even thermoregulation. However, how animal coloration is perceived depends largely on the visual system with which the organism is being viewed. Although the threespine stickleback, Gasterosteus aculeutus, is a leading vertebrate model for evolution and behavior research, including studies of color pattern evolution, there have been almost no studies of color pattern evolution in other members of the Gasterosteidae family that incorporate perceptual models, and minimal comparative analysis across the family. The purpose of this “proof of concept” study is to apply a new, perceptual model-based method of color analyses to assess sexual dimorphism in body and spine color of fourspine stickleback (Apeltes quadracus), in which the spines have been suggested to play a key role in courtship. Successful development and application of these new methods will set the stage for quantitative analyses of how sexual and natural selection act on color in fourspine stickleback and across the stickleback family. Hypotheses to be tested include: (1) fourspine stickleback spine coloration is more sexually dimorphic than is lateral body coloration, in contrast to previous findings for threespine stickleback; (2) male fourspine stickleback body-spine contrast, for hue and chroma (or color intensity), is higher and thus more conspicuous than for females. We are working with images collected by other McKinnon lab members and collaborating on the analyses, with different team members analyzing the same image to confirm the methods are well standardized and replicable. Preliminary research using the “micaToolbox” software [doi:10.1111/2041-210x.13328] for processing images of fourspine stickleback spines has successfully generated cone

outputs for this region, providing a quantitative measure for the relative stimulation of each cone (UV, short-wavelength, medium-wavelength, and long-wavelength) in the UV and visible channels. These data allow for objective comparison between sexes and body regions. Initial analyses indicate differences in cone stimulation between males and females, particularly for the pelvic spines. Since these preliminary data show promising results, the novel methods and results we are developing and obtaining for stickleback color analysis will enable a substantial contribution to studies of sexual dichromatism evolution across sticklebacks.

UP081

Long-term nutrient enrichment effects on greenhouse gas production in a coastal plain wetland

Ivan Martinez-Santoyo

Mentor: Peralta, Ariane Legaspi

Scott Wyatt Siebor

Ivan Uriel Martinez-Santoyo, Scott Siebor, Virginia Y. Rosas Acosta, Brian Hinckley, Ariane L. Peralta, Department of Biology, East Carolina University

Slow decomposition rates and high carbon fixation rates are hallmarks of wetland ecosystems that make these systems efficient at storing carbon to mitigate climate change effects. But human activities such as fossil fuel combustion and intensive agricultural practices have increased atmospheric deposition of nitrogen and phosphorus onto wetland ecosystems that do not receive direct inputs of agricultural and industrial runoff. This nutrient enrichment to historically low nutrient wetland ecosystems can unintentionally increase rates of carbon loss and fixation leading to the modification of critical ecosystem functions such as carbon storage. Therefore, in this study, we examine the extent that long-term nutrient enrichment (through fertilization) affects carbon losses via greenhouse gas production in a coastal plain wetland. We hypothesize that nutrient addition increases microbial activity in ways that enhance greenhouse gas production, which could offset the wetland carbon storage function. We test this hypothesis using data collected from a long-term wetland fertilization experiment (Greenville, North Carolina, USA). This ecological experiment (est. 2003) examines how nutrient additions (N-P-K fertilizer) and disturbance (by mowing) affect wetland plant and microbial community structure and function. Rates of greenhouse gases (carbon dioxide, methane, nitrous oxide) are collected and measured monthly using static chamber methods. While we observe carbon dioxide flux rates differences according to month sampled, additional monthly data will provide insight into how fertilization effects interact with hydrology and temperature over time. This ongoing work provides insight into nutrient enrichment effects on the rates of carbon losses and sheds light on whether atmosphere nutrient deposition disrupts wetland carbon storage potential.

UP082

An Ongoing Study of Simulating Life on Mars through Microbes Isolated from an Ophiolite Deposit

Nona Moss

Mentor: Anderson, Eric Shawn

Nona K. Moss, Devin L. Smith, Anthony E. Herring
Eric S. Anderson, PhD

This work aims to determine the properties of unknown microbial isolates found in rock cores estimated to be six million years old that have similar geological conditions to those predicted for Mars. The rock core was extracted from an ophiolite deposit in California where the oceanic crust is exposed above sea level, and is a site known to have rocks and microbes that originate in the ancient oceanic crust. To culture the organisms, core rock samples were crushed and resuspended in saline solution and plated. A range of media and environmental conditions were evaluated to optimize the growth conditions for these organisms. Ultimately, five novel microbes were isolated using enriched media and reduced oxygen, utilizing high carbon dioxide conditions. The bacteria were found to be Gram-negative bacilli that were predicted to be facultative anaerobes. Notably, these organisms appear to be capnophiles, which are organisms that thrive in a high carbon dioxide and low oxygen environment, which is similar to the environment found in the near-

surface regolith of Mars. Characterization of these novel isolates is currently underway and includes partial genomic sequencing, metabolic analysis and evaluating optimal culturing conditions. The goal of further testing includes finding the growth curves and metabolic pathways for these isolates after determining ideal pH levels respective to each isolate. This investigation hopes to find novel enzymes with useful biotechnology applications and ideally, shed light on the growth conditions necessary for identifying possible life on Mars.

UP083

Impact of Temperature and Salinity on Southern Flounder Interannual Abundance in Estuaries

Catarina Roye

Mentor: Asch, Rebecca G

Catarina Jaleen Roye, Caitlin McGarigal, Rebecca Asch

Along the southeastern coast, the Atlantic population of southern flounder (Paralichthys lethostigma) ranges from North Carolina to Florida and are currently managed at the state level, despite being considered a single stock. This economically important species has been experiencing a decrease in abundance as a result of overfishing by commercial and recreational fishermen. Management of this species in North Carolina has been proven challenging due to limited knowledge of their life history, which includes migration from larvae development in estuaries to the open ocean adults, where it is believed the flounder spawn. An increased understanding of the seasonal distribution and environmental impacts on flounder larvae appearing in estuaries waters will aid fisheries managers in assessing stocks and setting effective regulations. We hypothesized that interannually southern flounder larvae will appear in estuaries later in the year due to the warming of sea surface temperatures and salinity concentrations. To evaluate the effect of temperature and salinity on larvae ingress weekly ichthyoplankton samples were collected from the long-term Bridgenet monitoring site in Beaufort North Carolina and preserved in 95% ethanol. Larval flounders were separated and identified to the species level using anal and dorsal fin ray counts and pigmentation. Environmental conditions were recorded at each sampling event using a KorEXO YSI. Understanding how changing temperature and salinity concentrations may be influencing southern flounder stock will help managers understand the life history of this economically valuable species and support improved management and regulation.

UP084

Variability of Zooplankton Diversity and Abundance in Beaufort Inlet, NC

Brianna Salazar

Mentor: Asch, Rebecca G

Brianna Angelica Salazar, Naomi Jainarine, Rebecca Asch

Zooplankton is a critical food source for the ichthyoplankton that will eventually recruit to fisheries and can be economically important. With the emerging uncertainties surrounding climate change, it is important to understand how critical food sources will shift. Comparing seasonal zooplankton assemblages over the course of two years, can provide foundation for investigating how the ingress of ichthyoplankton and the timing of zooplankton blooms overlap or become decoupled over time. In order to address these knowledge gaps, we have been collecting weekly samples of zooplankton from Beaufort Inlet, NC since 2017. This project aims to provide information on how zooplankton diversity and abundance changes on a seasonal and annual scale. In order to contribute to future research in biological cycles due to climate, the zooplankton samples from 2017 to 2019 will be processed using Hydropotic Zooscan technology and the EcoTaxa program to identify taxa. Common zooplankton taxa in the research area include Copepoda, other Crustacea, and Appendicularia. Less common taxa includes: larval fishes, Amphipoda, Annelida, bivalve larvae, Chaetognatha, Cumacea, Nauplii, and Polychaeta. Using environmental data recorded at the time of sample collections, we can also assess how patterns in abundance and diversity are influenced by variables, such as temperature, pH, dissolved oxygen (DO), salinity, and chlorophyll concentration. It is hypothesized that there will be significant variations in

zooplankton diversity over multiple seasons and years. These results will provide insight on short-term trends in this zooplankton assemblage and provide a baseline for comparing how future years compare to present data.

UP085

Genotype Determination of Lipid Redox Mutants in Plants

Param Shah

Mentor: Horn, Patrick Jacob

In order to engineer plants that are more resistant to climate change, it is important to understand how the chloroplast, the site of the photosynthesis reacts to stress. In my research, we are focused on the effects of adverse environmental changes on lipids which are key molecules within the chloroplast membranes required for photosynthesis. Previously, double mutants in the model system Arabidopsis were generated in our lab combining a single mutant from chloroplast redox regulation (NADPH thioredoxin reductase, c, ntrc) and chloroplast lipid metabolism (fatty acid desaturase 6, fad6). I will be following this research up by determining the genotype, via polymerase chain reaction, for molecular confirmation and by conducting lipid analysis, via gas chromatography, to determine the lipid composition. Currently, I am screening the F1 offspring of a cross between mutants (i.e., ntrc fad6). Based on Mendelian genetics, I expect to see 1:16 ratio for double homozygote plant (i.e., in every 16 plants, 1 of them will be a double homozygote). In the future, I will be repeating molecular confirmation and lipid extraction with an additional set of redox-chloroplast lipid double mutants to expand our toolbox in understanding environmental stresses and their impact on plant membrane biology.

UP086

Temperature and pH-Dependence of the Interconversion of Gamma-Hydroxyvaleric Acid and Gamma-Valerolactone

Shivam Shah

Mentor: Pajski, Jason John

Dishita Uppal

Sexual harassment is an increasing global problem around the world with cases increasing almost every year. Many of the sexual harassment activities involve the use of a drug, because of how effective and efficient it can be. An alleged case of drink tampering occurred on the ECU campus within the past year.

Gamma-hydroxybutyrate (GHB) was a common date rape drug that was used in college campuses across the United States. The FDA banned medical use of this drug in 1990. GHB is easily synthesized from gamma-butyrolactone (GBL) by hydrolysis of the lactone ring. Previous work has shown that an equilibrium exists between GHB and GBL at varying pH and the details and kinetics of this reaction are relevant for forensic analysis of samples in suspected cases of spiked beverages.

Two other similar molecules, gamma-hydroxyvaleric acid (GHV) and gamma-valerolactone(GVL) have a similar structure as GHB and GBL, respectively, differing by the addition of a single methyl group. GHV/GVL have a higher toxicity and lower potency than GHB/GBL, buthave also been used in criminal acts as they are legal to obtain. Our work characterizes the pH and temperature dependence of the GHV/GVL equilibrium and kinetics of interconversion to aid the forensic community.

UP087

Patching Purine Potholes in DNA with Fluorescent Analogs

Agne Shields

Mentor: Allen, William E

The goal is to develop a UV-Vis spectroscopic or fluorescence emission method to quantify abasic DNA sites. It will detect abasic areas based on the color change produced due to the bonding of the amino azulene ester to deoxyribose. A series of 2-aminoazulene molecules with ester arms of varying length was created to determine which most readily and sustainably binds to abasic sites. Ethyl 2-aminoazulene-1-carboxylate is being tested with valeraldehyde to determine whether an imine bond or a bond at the 1- and 3-position carbons of the five-membered ring will form. Current nuclear magnetic resonance (NMR) results are inconclusive as to which bond is formed due to the presence of water in the reaction solution. Further study will be conducted by protonating valeraldehyde before adding the 2-aminoazulene derivative molecule. UV-Vis analysis will be performed to confirm these results.

UP088

Assessing Rates of Consumption in Newly Restored Seagrass Beds Across a Depth Gradient

Dawsyn Smith

Mentor: Gittman, Rachel Kelley

Stacy N. Trackenberg

Rachel K. Gittman

Seagrass is a critical habitat for many marine species, however it is being lost at an alarmingly fast rate. To combat these losses, restoration of seagrass habitats is increasing. While efficacy of restoration practices have improved, it is still unclear if restored seagrass beds can support equivalent ecological function to natural beds. The two main research questions for this project are, “How do faunal consumption rates differ across seagrass depths: subtidal and intertidal?” and “How do consumption rates differ between habitats?” To answer these questions, I monitored consumption rates throughout 31 plots that are part of a seagrass restoration project. The plots of restored seagrass are located at two different depths: shallow subtidal and intertidal. Plots were also established in sandflat, adjacent to oyster reefs, and natural seagrass beds. We used squid pops, made with dried squid and garden stakes, for our consumption assays. The consumption assays were deployed in all plots one hour prior to low-tide and we checked their status after one, two, and 24 hours. Preliminary results show that after one hour there was a statistically significant difference between deep and shallow plots. After the second hour and 24 hours there was no significant difference in consumption between control (sandflat) and restored seagrass across depths. There was no statistically significant difference between shallow habitat types after one and 24 hours but there was a significant difference after two hours. Greater understanding of how depth of restoration can impact faunal consumption rates can ensure the future sustainability of restored seagrass beds as a habitat for fauna.

UP089

Toxic Metal Interactions with EF-Hand Peptides: A Lead-207 NMR Study

Taylor Falk

Mentor: Spuches, Anne M

The citizens of Flint Michigan have suffered the effects of Lead (Pb) ingestion from their water source since 2016. This exposure has led to numerous health problems including cognitive impairment in children and Legionnaire disease, a deadly form of pneumonia. Toxic metal research is crucial to understanding the mechanisms of Pb toxicity and can potentially result in therapies that may mitigate the harmful effects of this exposure. While it is known that divalent metals like Pb(II) can mimic essential metal ions such as calcium, Ca(II), and can interrupt Ca signaling pathways, we do not know how this occurs at the molecular level. Students in the Spuches lab are currently studying how toxic metals like Pb and Cd interact with EF-hand proteins and peptides using isothermal titration calorimetry (ITC), circular dichroism (CD), and

fluorescence spectroscopy to determine the thermodynamic and structural changes that occur upon metal binding. My study focuses on individual EF-hand peptides present in human cardiac troponin C; a Ca(II) binding protein that helps regulate muscle contraction within the heart muscle. My goal is to synthesize EF-hand III and IV according using solid state peptide synthesis and study the binding of Pb(II) to these peptides using Pb-207 NMR. This technique is useful in probing the geometry and Pb(II) binding environment in the peptide. The data collected will be compared to Cd-113 NMR data as well as to what we know regarding Ca(II) binding to this protein. We hypothesis that due to the hard-soft acid base characteristics of both Pb and Cd, that coordination environments will differ. Continuation of these studies will lead to a greater understanding of toxic metal binding to these proteins and may lead to the development of new chelation therapeutics.

UP090

Do Bikers and Pedestrians Feel Safe in Greenville, NC Streets Where NCDOT Considers Them Safe?

Leila Coe

Mentor: Hur, Misun

Leila Cora Coe, Laney Marie Rivera, James Golden

Greenville, NC, has a dense urban area of 87,521 people as of 2020, with East Carolina University at its core. In this urban core, 10th Street runs south of the campus, 5th Street runs on the north side of the campus, and 1st Street runs further north parallel to 5th and 10th streets. Three commonly used roads that can serve pedestrians, bicyclists, and drivers. However, commuter data (U.S. Census Bureau, 2019) shows that 87% of citizens drive alone, 2% walk, and .03% bike to work. This data indicates a significant lack of incentive for bicyclists and pedestrians to commute around Greenville. Transportation projects in Greenville metropolitan area are repeatedly deemed worthy of state and federal funding due to the safety measures implemented for these commuters. We ask why would bicycle and pedestrian commuter data continue to stagnate?

We seek to understand why this gap exists. Does perception of bicycle and pedestrian safety match the government"s consideration of biker and pedestrian safety? The intent of this project is to assess if people feel safe in places where the government considers them safe. In this study, we will use quantitative research methodology. We will employ a public survey of the population of Greenville, NC, accessing the perceived safety of central urban areas for pedestrians and bicyclists. The physical focus areas of our research are 10th St., 5th St., and 1st St. We aim to examine government interpretations of transportation safety related to pedestrians and bicyclists. We will be using a safety rating scale defined by Bicycle Level Safety (BLOS) and look at multiple sources to see if the definition of "safety" remains consistent among government documents or if this term frequently alternates.

We expect the results of our survey and data collection to reveal crash prone areas and safety concerns not identified on government bike and pedestrian crash data. We expect to find a large gap in the public perception and definition of safety and the government"s perception of safety, that the government definition will not be well defined and will not be consistent throughout multiple sources. We also expect the public survey to reveal gaps in the current government crash data. These results will indicate if the government should create an official definition of ped and bike safety that is consistent across the state and accurately reflect public perception of safety.

UP091

Efficacy in ROTC: Leader-follower congruence

Evin Flinchum

Mentor: Habeeb, Christine

Ajala Baker

Christine Habeeb

Efficacy, or confidence, is important to understand because it predicts one"s performance success (Bandura, 1995). Self-efficacy describes one"s confidence in oneself ("I believe I am good"), other-efficacy is one"s confidence in another individual in their group ("I believe my follower is good"), and

relation-inferred self-efficacy (RISE) is defined as one"s belief in someone else"s confidence in oneself ("I believe my leader thinks I am good"; Lent & Lopez, 2002). Research has shown that followers generally underestimate their leaders" confidence in them (RISE; Jackson & Beauchamp, 2010). Although this can have negative consequences such as lowering their own self-efficacy and affecting their performance, it has not been examined in military settings. Success is vital in the military because failure could cost people their lives. The purpose of this study is to (1) explore Air Force ROTC cadets" confidence in themselves and their team members, as well as their estimated confidence their respective leaders and followers have in them, and (2) examine congruency between their actual confidence (other-efficacy) and their estimated RISE through a survey. Students from the Air Force ROTC program (n=59) participated in this study by answering a one-time questionnaire specific to their status as a student leader or follower. Of these cadets, 12 were classified as "leaders" for this study and 47 were classified as "followers." The leaders were generally upperclassmen of higher rank whereas the followers were cadets of lower rank. Followers were split into two groups: upper and underclassmen. All surveys included questions about self-efficacy, other-efficacy, and RISE answered on 0-5 scale. Initial results indicate that the cadets" overall highest confidence was their other-efficacy (mean=4.56). Self-efficacy was lowest on average with a mean of 4.37, while RISE averages were 4.43. Comparing roles, SE was highest for the leaders, RISE for the upperclassman followers, and OE for the underclassmen followers. Correlations will be calculated to examine the congruence between the leaders" and followers" confidence in themselves, others, and perceived confidence others have in them. Analyses will be complete before the presentation so the results can be discussed. Assessing the types of efficacy can help the AFROTC program evaluate its strengths and weaknesses to further develop their practices and improve the military by utilizing new leadership training tactics.

UP092

Development of interprofessional competencies following a simulated home visit: A qualitative study of students" written reflections

Haleigh Jones

Mentor: Hart, Stephanie

Background/Purpose: Simulated learning can prepare interprofessional student teams for collaborative clinical practice through the demonstration of skills and competencies in a realistic, controlled clinical setting. The patient"s home as a clinical setting provides a context for interprofessional care that requires communication, mutual respect, and role clarity including the role of the patient/family. Yet interprofessional simulation in the home setting has not been well studied. Moreover, how interprofessional teams of students work together to reach a shared mental model during a team meeting about complex patient health problems and their management is unknown. The purpose of this pilot study was to explore physical therapy and nursing student groups" perceptions of the interprofessional process used to develop an integrated care plan following a simulated home visit.

Methodology: This study utilized a qualitative descriptive design. Written responses to five reflection questions were analyzed with responses provided by a convenience sample of pre-licensure nursing and physical therapy student teams (n=14) following a simulated home visit. Data analysis followed a directed approach to content analysis with data collection and analysis occurring simultaneously. Findings are presented by showing themes with exemplars with descriptive evidence.

Results: Preliminary analyses suggest three primary themes: student groups perceive a need to clarify and explain discipline-specific roles and responsibilities as part of the team process; priority interventions are determined using a cooperative approach that focuses on the most immediate needs of the patient; it takes an

"interprofessional" village to provide the best care to patients.

Discussion: Perceptions of interprofessional student teams regarding the process and methods used to develop an integrated care plan reflect competencies and sub-competencies for interprofessional collaborative practice (IPEC, 2016). More research is needed to explore how student teams" resolve disputes and use knowledge of other disciplines to assess and address patient health care needs.

UP093

Exploration of Interest and Development of Intergenerational Facilities in Pitt County

Emily Kustka

Mentor: Schwartz, Abby

Long-term care settings that provide eldercare and childcare can also be referred to as intergenerational facilities. Intergenerational facilities can combat the loneliness and isolation that older residents experience. Despite the documented benefits of intergenerational contact (Gualano, 2017; Feyh et al., 2021), there are no nursing homes in Pitt County that also house a childcare center. Due to the projected increase of older adults in Pitt County, there will be a need for more long term care options for older adults.

The aims of the present study included: 1) Exploring the interest in having an intergenerational facility in Pitt County, and key benefits and challenges during its development, and 2) Propose key elements and considerations in developing an intergenerational facility based on interviews with Pitt County stakeholders.

Using a qualitative interview approach, ten stakeholders were interviewed during the spring 2021 semester by phone or virtually due to the COVID-19 pandemic. The author was connected to stakeholders through her faculty mentor, and snowball sampling was used in asking stakeholders if there were other individuals they suggested to be interviewed. Participants included people engaged in the aging or childcare communities (e.g., nursing home activities director, director of a childcare facility). Thematic analysis was used to analyze the interview data (Braun & Clarke, 2006), which began with the use of open and descriptive coding (Saldana, 2013).

Three themes emerged from the qualitative data: concerns, considerations, and the benefits of having an intergenerational facility in Pitt County. Each theme included subthemes, with examples including the following: a need for education and environmental aspects (concerns), activities and architectural (considerations), and benefits to older adults and children.

The findings suggest that a Pitt County intergenerational facility is of interest to the community and may also be feasible pending implementation of the stakeholders" recommendations. Future research and limitations of the present study are also discussed.

UP094

The Mental Health Effects of Assisted Reproductive Technology

Shae Malham

Mentor: Black, Kristin Zenee

Background: Assisted reproductive technology (ART) has allowed women with fertility issues the ability to conceive and carry their own child. Researchers have been able to study the effectiveness of ART treatments, but rarely dive deeper to investigate the mental health aspects of the rigor and potential disappointment of ART treatments. Through a literature review and interviews with women who have previously been through ART treatments, the goal of this project is to acquire more information about the mental health effects of fertility treatments on women. The mental health conditions I focused on are anxiety, depression, postpartum depression, and post-traumatic stress disorder (PTSD).

Methods: My project has two components: a literature review and qualitative interviews. Through a literature review, I identified and extracted information from published research about the relationship between mental health and ART. To gain a better understanding of women"s lived experiences undergoing ART treatment, I will conduct semi-structured interviews

with up to 10 participants that are biologically female, age 18 or older, previously used ART, and experienced a successful OR unsuccessful ART treatment/birth. The interviews will be conducted virtually via Webex, and the interview data will be analyzed using an array of qualitative tools, including memos, code books, themes, and matrices.

Expected Results: It is expected that all participants (successful and unsuccessful conception/birth) will have experienced some sort of negative mental health outcomes during the ART treatment process, which may include self-reported symptoms of anxiety, depression, postpartum depression, and/or PTSD. Those who were unsuccessful with ART may have more frequent or severe experiences of negative mental health effects that occurred during or around the time of their ART treatment. The interviews will be conducted this spring 2022 to support (or refute) these hypotheses.

Conclusion: Most of the research focused on mental health and ART has been conducted in populations outside of the United States, and therefore there is a need to learn more about the mental health outcomes of women undergoing ART in this country. This research project will further our understanding of the mental health experiences of women undergoing ART, and hopefully aid public health and medical researchers in determining ways to reduce the potential negative mental health effects of undergoing ART treatments.

UP095

Racial Justice and Black Lives Matter Protests in North Carolina: Does Racial and Socioeconomic Inequality Lead to More Violent Demonstrations and Police Intervention in Protests?

Lily Philbrook

Mentor: Miller, James Kirk

For the past few years, researchers have been trying to identify the cause of the wave of Black Lives Matter protests that surged following George Floyd"s death. This study will provide an analysis on 86 protests in North Carolina during the 2020 wave of Black Lives Matters protests that were deemed by the Armed Conflict Location and Event Data (ACLED) Project as violent demonstrations. Violent demonstrations include: excessive use of force against protesters, protests with intervention, riots, mob violence, and looting/property destruction. As this study looks to pinpoint the differences between locations that did not have violent demonstrations compared to cities that did, interpretation of these violent demonstrations will include measures of racial and socioeconomic inequality in the locations that the violent demonstration(s) took place. To be able to conduct this analysis, data will be extracted from ACLED, news archives, Law Enforcement Management and Administrative Statistics (LEMAS), and the 2020 Census. The hypothesis is that cities with more protests - specifically, more contentious and/or violent protests and police aggressiveness and/or militarization - have higher racial and socioeconomic inequality. If this is true, then cities with less protest activity and police intervention have less inequality. It then follows to examine the cities with less protests/less inequality and determine what mechanisms they have in place, or if it is simply the racial/socioeconomic composition of that specific place. For example, Olzack (2021) hypothesized that cities with more protests are more likely to form Community Review Boards, which would lead to a decrease in police killings. Inferring from this, one reason a city may have had less protest activity may be because that location has a mechanism like a Community Review Board, which would review citizen complaints against law enforcement agencies in that community. Following this logic, a location in North Carolina with higher inequality will have more violent demonstrations and more police aggressiveness, and these protests should have led to the implementation of police accountability mechanisms like a Community Review Board to decrease police brutality and/or police killings.

UP096

Communication and Learning in Natural Environments: Generalization and Collaboration between Speech-Language Pathologists, Educators and Families

Sarah Porter

Mentor: Walker, Marianna M

Dr. Marianna Walker
Dr. Melissa Hudson

This study focuses on school-based speech language pathology and the impact of interprofessional collaboration on a child"s ability to generalize or apply newly acquired skills in their natural environment. Through each aspect of speech and language therapy, the communication between a child"s speech-language pathologist, educator, and family is analyzed through this mixed method study. The participants are speech-language pathologists who are currently employed by schools, were employed by schools within the last ten years, or working in schools, but are employed by private practices. The desired outcome is to determine what impact further collaboration would have on a child"s generalization ability.

UP097

Do the comments we receive on our performance change our motivation? A look at how our base motivation plays a role in how feedback affects our level of motivation to complete a task.

Alexis Schroeder

Mentor: Habeeb, Christine

Motivation is a key aspect of day-to-day life. We know that internally motivated individuals are not affected by rewards given from low-interest tasks (Eisenberg, 1999). The purpose of this study was to pilot our motivation survey and to understand how an individual"s type of motivation; internal, external, or amotivated, affects motivation level changes due to feedback. The online study involved 65 participants completing a reaction time task. Before the task, the participants completed a questionnaire asking them about their level of motivation from 0 (not motivated at all) to 100 (completely motivated), and their type of motivation (do they complete tasks like these because they are fun, because they would feel ashamed if they quit, etc.). The task required participants to respond as fast as possible by hitting a key on their keyboard corresponding to the placement of the ball on the screen. Upon completing the task, participants received bogus feedback and answered the same motivation survey. We hypothesized that individuals who are internally motivated will be highly motivated whether they"re told they are performing well or not, those who are externally motivated (more affected by the feedback they receive) will be less motivated if they are told they are doing bad and more motivated if they are told they are doing well, and those who are amotivated will remain amotivated. Results indicated that participants who were internally motivated (n=42) and were given feedback that they were in the 93rd percentile (n=21) had on average a starting motivation of 77 and an average motivation level of 85 after having received the bogus feedback. The participants that were internally motivated and were told they were preforming in the 37th percentile (n=21) had an average starting motivation of 79 and an average motivation level of 79 after having received the bogus feedback. Externally motivated participants (n=6) and amotivated participants (n=3) had trends consistent with those seen in the internally motivated participants; this is unexpected but can be explained by the low number of participants. These findings are consistent with the hypothesis concerning intrinsically motivated individuals; more participants would be needed in order to analyze the results of externally and amotivated individuals. This study is continuing with the goal being to create and pilot a pair version.

UP098

"Settling" for Romantic Partner or Relationship

Suhaima A. Sharif

Mentor: Knox, David H

Mariella Orianna Florimonte

Suhaima Afreen Sharif, Mariella Florimonte, Dr. Lacey J. Ritter, and Dr. David Knox

Settling is a phenomenon whereby a person feels that they are in a relationship with a partner whom they view as "less worthy" than themselves. The goal of this research was to investigate the degree to which high levels of psychological stress and anxiety related to singlehood are associated with settling in romantic relationships among emerging adults. The sample consisted of 290 emerging adults at a large southeastern university- 85% heterosexual, 78% women, and 61% White. Almost 75% (74.1%) reported that they were currently or had previously "settled" for a partner in a romantic relationship.

Results revealed that the 215 respondents who settled were significantly ($p<0.001$) more likely to have a higher average score (16.03) on the Fear of Being Single Scale than those who had not settled (13.84) ($p<0.001$). Relationship settlers also reported higher levels of Anxiety (18.52) than non-settlers (15.55) ($p<0.001$). There were no significant gender differences. However, respondents who reported having settled in a romantic relationship were significantly more likely to be other than Hispanic (e.g., White, African American) ($p<0.05$) and nonheterosexual ($p<0.05$) than non-settler respondents. Social exchange is the theoretical framework used to interpret the data. Limitations of the research will be identified.

UP099

Prospective and Retrospective Metamemory: A Comparison of College Students" Global, Category-level and Item-level Judgments of Learning

Peyton Shpard

Mentor: Reed, Jonathan Mark

Metamemory is one's self-awareness of long-term memory contents and the processes involved in memory self-monitoring. In classrooms, metamemory is usually assessed by calculating calibration bias scores (CBSs) – the difference between students' predictions about exam performance (i.e,, judgments-of-learning or JOLs) and their actual performance. Sometimes JOLs are made before exam administration (prospectively) and sometimes they are made after the exam (retrospectively). Sometimes students provide a single JOL for the entire exam (a global judgment) and sometimes they provide JOLs for each exam question (i.e., item-level JOLs). Occasionally, researchers have collected intermediate-level JOLs for topics covered by exams (i.e., category-level JOLs). Because no published studies have examined all six types of JOLs, it has previously been difficult to make comparisons among them.

For the current study, metamemory was assessed for the content of the first quarter of a cognitive psychology course using college students' JOLs for the first quarterly exam. Students from two online sections were tested with one section providing prospective JOLs and the other providing retrospective JOLs. All students provided global, category-level, and item-level JOLs and CBSs were calculated. At the start of the semester students had completed 1) a questionnaire about exam preparation habits, 2) the Metacognitive Awareness Inventory (MAI), 3) the Internal Control Index (ICI), 4) the Implicit Theories of Intelligence scale (ITI), and 4) the Need for Cognition scale (NFC), so that the measures could be examined for relatedness to CBSs.

The results of the study indicated that global and category-level prospective CBSs reflected overconfidence, whereas category-level retrospective CBSs reflected underconfidence. Retrospective global CBSs and both prospective and retrospective item-level

CBSs were not statistically different from ideal calibration. CBSs were positively correlated with scores on the MAI, regardless of judgment type or judgment level. CBSs were also positively correlated with ICI scores, except for prospective global judgments and item-level judgments. CBSs were negatively correlated with ITI scores except for retrospective category-level judgments. CBSs were positively correlated with both prospective and retrospective NFC scores. All findings are discussed in relation to previous research, theoretical and practical significance, and directions for future research.

UP100

Needs Assessment for a Physical Activity Intervention for Caregivers

Kristen Somma

Mentor: Das, Bhibha Mayee

Informal caregivers provide care to people who cannot take care of themselves. Informal caregivers are not paid for their work and it is often so time consuming that they cannot work another job to earn money. This, in addition to the stress of the job, leads to a poor quality of life for the caregiver. While informal caregiving can be very rewarding, it can also lead to burden and increased levels of stress, depression and anxiety. Caregiving is an emotionally and physically draining task and it can have negative effects on the physical and mental health of informal caregivers which can lead to caregiver burnout. Studies show that physical activity has positive impacts on the physical and mental health of the general population. Physical activity reduces levels of stress, depression, and anxiety as well as improves a person”s physical and mental health while improving overall quality of life. Purpose: The purpose of this study is to examine what aspects of a physical activity intervention for informal caregivers are feasible and whether it will positively impact their mental and physical health.

Methods: We will conduct a mixed-methods needs assessment to examine types of physical activity interventions that caregivers may be interested in. Our goal is to survey 50 people via Qualtrics that meet the inclusion criteria of being 18 years of age or older, speak English, and have been an informal caregiver either currently or in the past. Demographic questions will be asked to obtain participant representation mirroring the U.S. caregiving population. Survey questions include items on physical activity feasibility, acceptability, and effectiveness. This study will be beneficial to both caregivers and their care recipient since improving the wellbeing of the caregiver will improve the quality of care that the recipient is receiving, which will improve the quality of life for the caregiver and patient. Improving the mental and physical health of caregivers by decreasing caregiver burden, anxiety, depression and stress, as well as increasing their levels of physical activity will improve their quality of life.

UP101

Evaluating the Determinants of Player Transfer Values Within the Premier League

Cameron Starrett

Mentor: Liu, Haiyong

The world of soccer, often neglected by Americans in preference of football, basketball, or hockey, is home to some of the most lucrative markets in all of sport. With some players” transfer fees soaring to well above one hundred million euros in the past decade, it”s easy to see why the beautiful game has attracted so much interest over the years from economists and investors alike. Ultimately, one question lingers: what causes a player to be worth so much? Previously, a model with a larger consideration for concrete statistics—such as goals, assists, and saves—has been used to determine these player values. As data collection practices have improved, however, more niche statistics have become widely available. Examples of such ultra-fine data include passes per match, minutes played, fouls, tackles, interceptions, player value in millions of euros, etc. These pieces of data will be used as determinates of players” transfer values in a statistical model, with the impact of each specific statistic on such player values being the primary focus of the study. The data used for this analysis has been collected from the websites FBRef.com-whose data is collected by StatsBomb-and TransferMarkt.

UP102

Honors Educators: Faculty Perceptions of Teaching HNRS 2000 and 3000

Peyton Thomas

Mentor: Hodge, Elizabeth Baker

This qualitative case study aims to examine the faculty perception of their instructional role in an Honors College 5-credit hour, year-long required course for hundreds of incoming Honors freshmen, where design thinking is utilized to assess and tackle wicked problems identified within communities. Few studies, if any, have been done on the faculty experience of teaching an Honors College specific course at the 4-year University level. Nine current and former faculty that taught HNRS 2000 and 3000 were interviewed in Fall 2021 regarding what their personal experience with the course looked like. Faculty reflected on their role within the interdisciplinary team, as researchers, as educators, and as curriculum designers. In addition, faculty were asked to reflect on topics pertaining to the students, such as psychological safety of class meetings, student engagement, challenges students faced, and college and life preparation. Challenges were discussed at length, from physical barriers, such as location and time, to more emotional and psychological barriers, like disrespectful students and cultural differences. Participants also shared why they chose to teach such courses and what would (or has) kept them coming back to teach them. Finally, the role of the Honors 2000 and 3000 itself was analyzed, with faculty speaking on its uniqueness in delivery style and curriculum changes.

UP103

ACE's and Friendship Difficulties

Hannah True

Mentor: Smith, Aimee West

Hannah E. True, Kellie R. Long, MA and Aimee W. Smith, PhD

Adverse childhood experiences (ACEs) are traumatic events in an individual's life that occurred before age 18. The original ACE study included more than 17,000 participants, where two-thirds endorsed at least one ACE, while one in five endorsed three or more ACEs. Examples of ACEs include various types of abuse, neglect, and household dysfunction. Decades of research on the topic has linked ACEs to increased risk of developing chronic diseases and behavioral health challenges. Data also suggest the more ACEs an individual experiences, the greater the risk of negative outcomes and high-risk behaviors. ACEs can also impact an individual's ability to make and maintain friends, as many ACEs can have long-term effects on an individual's social interaction. In the present study, four ACEs related to household dysfunction were examined. It was hypothesized that experiencing household dysfunction was related to a child's difficulty making or keeping friends. To examine the research questions, four Chi Square Tests of Independence were completed. Survey responses for 51,895 participants from the National Survey of Children's Health were included in analyses. However, due to non-response to survey items, some variables have fewer respondents than others. Results indicated an association between a child having difficulty making or keeping friends and the four ACEs examined– witnessing domestic violence, $\chi 2$ (1, N = 49,527) = 598.90, $p < .01$, $\phi = .11$; parental mental illness, $\chi 2$ (1, N = 49,503) = 1349.12, $p < .01$, $\phi = .165$; parental incarceration, $\chi 2$ (1, N = 49,583) = 308.81, $p < .01$, $\phi = .079$; and parental substance abuse, $\chi 2$ (1, N = 49,505) = 736.48, $p < .01$, $\phi = .165$. However, the association between difficulty making and keeping friends and the four ACEs in question are weak, as indicated by the small effect sizes found in each analysis. The present analyses do not account for other factors that may influence a child's friendship difficulties, nor do they consider the potentially compounding effects of experiencing multiple ACEs. Although the present study is limited, the results reiterate the importance of screening for ACEs in children to provide targeted interventions, such as social skills interventions, that could be beneficial for children who have experienced household dysfunction.

UP104

Examining the extent to which cannabis provisions have been incorporated into new or existing city-level social host ordinances in California and Colorado

Sophia Villani

Mentor: Egan, Kathleen Louise

State-level legislation permitting recreational and medicinal cannabis use continues to be adopted across the United States. California (CA) and Colorado (CO) are two states that have legalized recreational use of cannabis for adults ages 21 years and older and medicinal use for individuals who have a physician"s recommendation. Similar to alcohol and nicotine products, efforts to prevent cannabis use and associated risks are needed for youth and young adults under 21 years of age. Social host ordinances (SHOs) are public policies that hold noncommercial property owners or tenants responsible for hosting or allowing underage drinking on property they own or lease. SHOs are a potential policy that can be implemented or expanded by municipalities to address cannabis use among persons under 21 years of age. The overall purpose of this study is to examine the extent to which cannabis provisions have been incorporated into new or existing city-level SHOs in CA and CO. A systematic protocol was utilized to identify adoption of SHOs in a census of cities and towns in CA and CO. To identify whether a location has a SHO, city and town codes were identified using MuniPro, a municipal law research tool, or a Google search. All identified SHOs were downloaded for data extraction. We documented: (1) presence of a SHO in each city/town; (2) whether alcohol, cannabis, or other substance use was included in the SHO; and (3) type of penalty associated with SHO violation. There were 753 cities/towns identified in CA (n=482) and CO (n=271). Of the 690 cities/towns with a published code, 24% (n=165) had a SHO. All SHOs addressed alcohol use and 31.5% (n=52) of SHOs included cannabis or other substances. Across all SHOs, 52.1% had a hybrid liability structure (civil followed by criminal for repeat offenses), 41.8% used civil-only, and 4.2% used criminal-only. The findings from this study indicate that some communities in states were cannabis is legal have incorporated cannabis and other substances into SHOs in efforts to prevent youth cannabis use. Future research should assess equitable policy adoption and effectiveness of these policies.

UP105

A scoping review of trends over time in LGB tobacco use disparities

Abdul Zahra

Mentor: Lee, Joseph G

Abdul G. Zahra, Joseph G. Lee, Tres Hinds, Raymond Ruiz, Kerry Sewell

BACKGROUND: Tobacco use is a major health disparity for lesbian, gay, bisexual, transgender, and queer (LGBTQ) individuals compared to their straight and cisgender counterparts. We asked (a) is this inequity getting better or worse over time and (b) are trends in disparities different between LGBTQ populations?

METHODS: We conducted a scoping review of papers focusing on youth and adult tobacco use and LGBTQ identity by searching five databases in August 2021. Two reviewers independently coded the title and abstract of 2,107 records for inclusion and then coded the full text of 35 records.

RESULTS: Ten studies were included and consistently demonstrated tobacco disparities for LGB samples. No studies examined trends in disparities for gender minority populations, and only one study examined tobacco use disparities by race, with mixed results. Regarding youth, the size of disparity in heavy or daily use for all LGB subgroups compared to heterosexual samples is shrinking longitudinally. Results for early-onset, current, and lifetime smoking were less consistent. Regarding adults, evidence was relatively sporadic; however, after 2010, studies consistently show decreases in disparity longitudinally.

DISCUSSION: Large inequities remain in tobacco use for LGB populations, although encouragingly, trends in the size of tobacco use disparities may be decreasing for some groups. However, the results are not consistent across all groups and measures of tobacco. More evidence is needed, particularly with larger samples, studies in trends in e-cigarette products, and studies in

trends by race/ethnicity/gender. Comprehensive interventions are needed to address LGB smoking as an understanding would help efforts in reducing disparities.

UP106

Why Accounting?: Factors influencing students' choice of major.

Sydney Braxton

Mentor: Quick, Linda Ann

It is essential to understand the thought process behind choosing a major in order to recruit and cater to individuals who possess certain skills or interests. As the number of accounting majors declines nationwide, (Gabbin, 2020), steps must be taken to analyze student"s viewpoints on accounting as a college major. Uncovering and recognizing the various perceptions related to accounting, both the college major and the professional industry, can greatly impact the actions taken to further educate students. Understanding the preconceptions and goals of undergraduates can improve recruiting and increase success within the major.

Purpose of the Study:

This research will investigate the demographic factors, interests, career goals, and talents of accounting majors compared to non-accounting majors. We will also focus on various perceptions of what accounting is and what accountants do from the perspective of accounting majors compared to non-accounting majors. Although accounting is widely known, the specific options within the industry are not limited to taxes, as often perceived. Gathering and examining information from undergraduate accounting and non-accounting majors will give more insight into the interests and thought process that goes into choosing a major.

Preliminary research questions include:

What demographic factors differ between accounting and non-accounting majors?

What perceptions of accounting make the major more (or less) attractice to students?

What career paths within accounting are most attractice to accounting and non-accounting students?

Revealing commonalities of undergraduate student's thought processes towards deciding their major has the potential to greatly impact recruiting and further achievement within accounting departments. Perceived accountant attributes and the overall lack of knowledge regarding the accounting industry can turn away potential students. Discovering these hinders will assist accounting departments in overcoming these hinders to gain students and improve the industry overall.

Simulation of Mixed Traffic Network with Human Driving and Autonomous Vehicles

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As autonomous driving capability such as self-driving has become a standard technology in major automobile manufacturers, the future of fully autonomous vehicles seems to change current traffic systems and traffic management strategies. In particular, the advanced sensor-based self-driving algorithm and the capability of data sharing between connected vehicles may enable each autonomous vehicle to drive with a minimum distance between cars at high speed which was not possible before. Since the transformation of the current road traffic network into a fully connected autonomous driving network will be a gradual progress depending on the penetration rate of autonomous vehicles, the road traffic network may show a transient system behavior. We are interested in understanding and predicting this transient system behavior to maintain or improve the performance of the road traffic network during this transitional period. We investigate the traffic network performance by simulating it with various vehicle models that capture the behavior of conventional and autonomous vehicles and identify key factors of the autonomous vehicle model that may impact the traffic flow during the transitional period toward a fully connected system.

A Collection Process and Cost Estimating Calculator for Applications of Disposable Face Masks in Asphalt Pavements,

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Before the Coronavirus pandemic, plastic pollution was already a major concern for the health of our planet. During the pandemic, the plastic pollution became exacerbated by the disposal of millions of face masks. Several studies have been conducted on the use of face masks in the construction field (e.g., asphalt pavements, pavement base and subbase, concrete). Although there is an added benefit of using face mask in construction, especially for improving the rutting of the asphalt pavements, the appropriate collection process and its cost have not been well addressed. The practical collection, processing and application of the facemask and the associated cost of the entire procedure could become a major challenge. This research aims to develop a collection process and a cost estimating calculator to estimate the cost of collection, processing, and application of disposable facemasks in asphalt pavements. The proposed collection process suggests each potential disposal site would have four waste bins for four weeks of each month. The masks would be collected twice in a month, as the presence of the COVID 19 virus in masks will not exceed 7 days. Disinfectants and sterilization procedures would need to be conducted for the cleaning of used face masks. Then, the masks would be transported to the shredding company for processing and preparation for application in asphalt mixtures. The calculator will include all approximate costs from collection to application. The proposed collection method would minimize the risk of being affected by COVID-19 virus and would add environmental benefits. Initial results have shown that the cost of construction with disposable facemask is greater than the cost of conventional methods. This may be related to the fact that the research was conducted on a small

scale (i.e., samples of hot mix asphalt). However, the cost may be reduced if the research was conducted on a larger scale (e.g., road sector). Finally, this novel collection method and estimating calculator could aid the construction industry to adopt a more environmentally friendly, sustainable, and cost-effective method of construction.

Is there a correlation between the drawing aptitude and manual skills of dental students?

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In 2020, a "Teeth Drawing Module" was implemented within the D1 dental anatomy curriculum. In this course, they learn to draw accurate outlines of teeth. The students are required to complete two types of drawing project. Students grades in the drawing module; waxing skills assessments and their didactic exams were used to evaluate and assess the correlation between the drawing aptitude and their manual skills. Class of 2021 (n=50) and 2022 (n=50) did not participate or had any drawing exercises, however, class of 2023 (n=52) and 2024 (n=52) they had the drawing exercises. Students who took the course were compared to students who did not take the course to determine if the drawings improved understanding of tooth morphology, their dexterity, and their clinical skills. A comprehensive survey was also developed and distributed to students who had the drawing module in their curriculum (class 2023 and 2024). The survey was consisting of 20 questions grouped in 6 main domains: knowledge/background, perception, didactic information, correlation, school perspective, students' skills, and preferences. Data were collected using Qualtrics Survey software and were managed and analyzed using SPSS 21.0 software (IBM Corp., Armonk, N.Y., USA). When compared with traditional modules, the drawing technique used as self-improvement was more effective. The response rate from both classes was 85% (n = 85). Students' feedback was assessed showing overall positive satisfaction. Classes which had drawing exercises score significantly higher in all other exercises compared to classes which did not have drawing exercises ($p < 0.0001$). There was a significant positive correlation between Drawing and, Waxing scores and Didactic scores. Thus, the study concludes that drawing exercises are useful instruments for effectively representing and integrating the spatial and symbolic domains of anatomical information. Teeth drawings as an adjunctive tool to traditional dental anatomy waxing courses improves students' visualization of tooth morphology and increases their dexterity and clinical waxing skills.

Wind and Flood Vulnerability Index for Residential Buildings

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Building vulnerability assessment is an important technique for managing disaster, performing hazard mitigation, and managing disaster reduction practices. In the engineering field, vulnerability is mainly assessed based on the quantitative approach, which is a simulation-based technique that provides information regarding the potential loss or damage rather than accounting for indicators influencing building vulnerability. Identifying indicators that significantly contribute to building vulnerability is a key element to develop vulnerability index, which is a tool for understanding performance of building subjected to hurricane hazards and helping decision-makers to prioritize evacuation. This study qualitatively assesses residential building vulnerability through the development of Wind and Flood Building Vulnerability Index (WFBVI). WFBVI is categorized as a three-level (low-moderate-high) index using Analytical Hierarchy Process (AHP). A dataset of single-family homes damaged by 2005 Hurricane Katrina is used to demonstrate implementation of

the WFBVI. The application leads to valuable results on how hurricane building vulnerability can be reflected by quantifiable wind and flood index across spatial scales. Overall, the results provide engineers with insights on the actual performance of residential structures in areas subject to severe wind and flood hurricane hazards and provide qualitative information for developing effective strategies to mitigate future risk and improve decision-making processes.

A case report of "Hereditary Angioedema", a rare genetic disorder emphasizing the burden of the disease

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In this case report we present a 24-year-old female with a rare genetic disorder "Hereditary Angioedema" (HAE**)**. HAE is a rare genetic disorder characterized by recurrent severe swelling of subcutaneous, mucosal, and submucosal tissue caused by increase in vascular permeability and unopposed release of bradykinins. We also address the burden of the disease commonly experienced in similar chronic rare conditions: Diagnosis delay, Disruption, Disability**,** Disappointment, Debt and Death. A 24-year-old, Caucasian female, started to have recurrent episodes of severe swelling of the face, lips, tongue, throat, abdominal pain and vomiting at age 12 with no clear triggers. The attacks occur several times a month and last for few days. Her condition has been misdiagnosed as an allergic disorder and did not respond to conventional therapy, leading to multiple hospital admissions with occasional "near suffocation" episodes. She also developed SLE "Systemic Lupus Erythematosus" at age 19, which further complicated her situation. Pregnancy & the process of labor constitutes a major danger in this case in addition to not having access to novel therapeutic agents. She developed more severe and frequent episodes during her last trimester with bleeding peptic ulcer, flare of her SLE, ICU admission with near death. Eventually, the patient was able to get access to the correct therapy, Icatibant a Bradykinin Receptor Blocker & Hegarda a Human C1- esterase inhibitor, which successfully aborted severe episodes during labor and immediate post-partum period. She had a normal vaginal delivery giving birth to healthy male baby. We reported a rare case of HAE with pregnancy. The use of Bradykinin Receptor Blockers was effective in aborting angioedema during labor and the postpartum period. The patient is currently doing well with no significant episodes while on Human C1-esterase inhibitor twice weekly. We also addressed the burden of the disease (diagnosis delay, disruption, disability, disappointment, debt, and death) and how to cope.

Exploring the Role and Experiences of Child Life Specialists on Short Term Medical Missions and developing capacity Building Efforts

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Certified child life specialists (CCLSs) are trained professionals with expertise in helping children and their families overcome healthcare challenges. CCLSs are serving on international short-term medical missions (STMMs) to provide psychosocial care for children and families. This study examined the experiences and roles of CCLSs on STMMs, as well as the impact of this service on the CCLSs' cultural competency and professional development. An online cross-sectional survey resulted in 124 respondents; 69 participants reported on their experiences with various types of international outreach activities and 55 CCLSs reported specifically on STMM experiences. Play and normalization, psychological preparation for medical procedures, and emotional support were most consistently provided during the

STMMs. Guidance in using non-pharmacological pain management techniques, providing alternate focus techniques during medical procedures, and developing coping plans were less consistently provided. Overall, all 55 respondents reported observing patients exhibit less anxiety and stress after receiving child life services. Majority of CCLSs serving on STMMs report increases in cultural competency levels including awareness of healthcare disparities, confidence in working with individuals from other cultures, and ability to communicate more effectively with patients and healthcare professionals from different socioeconomic and cultural backgrounds. Nearly all participants agreed that during the STMMs they practiced child life competencies. The STMM volunteer experience invigorated them as a CCLS and contributed toward their professional development including communicating and working with interdisciplinary team more effectively. Implications for improving the STMM volunteer experience for CCLSs, for increasing the impact of psychosocial care on host country beneficiaries, and for strengthening the sustainability of child life services in host countries are discussed. A subsequent grant was obtained (Desai) to develop a curriculum to increase capacity for psychosocial care services by standardizing provider recruitment, training, and credentialing for Operation Smile programs. A brief report of this an educational training curriculum that enhances psychosocial care providers' knowledge of child development, healthcare experiences, family centered care, and supportive psychosocial interventions in medical mission and comprehensive healthcare settings will be shared.

Thank you!

Thank you for your interest in East Carolina University's Research and Creative Achievement Week 2022

The RCAW Committee thanks all who participated and attended!

We look forward to seeing you again for RCAW 2023!